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THEME

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FORWARD

The purpose of the Readings Book is to provide a unique international forum to facilitate the exchange of cutting-edge information through multidisciplinary presentations of new challenges in global business and technology strategies, policies and issues. Academicians, practitioners, and public policy makers at all levels throughout the world submitted original papers for publication in this Readings Book. The result of the double-blind peer reviewing process efforts produced 329 empirical, conceptual and methodological papers involving all functional areas of business education with a special focus on international aspects. Of the 243 papers accepted, 97 papers are published in this Readings Book.

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ENHANCING ONLINE CONSUMER EXPERIENCE: THE ROLE OF AUGMENTED REALITY IN E-COMMERCE

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ABSTRACT

Augmented reality (AR) is a technique that helps people to see things in their real-world using tablets or phones, which makes online shopping look more fun and real. This paper sees that by asking 300 people, AR improves online shopping how they feel about it. The study examines whether AR's ability allows you to interact with products, adapt them, and feel that you really make people happy, rely more on products, and want to buy more. The results suggest that AR helps people enjoy shopping, feel more confident about what they are choosing, and more satisfied. The paper also talks about ideas for future studies and indicates certain limitations of current research.

Keywords: augmented reality, e-commerce, online consumer experience, interactive technology, purchase intension.

INTRODUCTION

Since e-commerce continues to accelerate globally, consumers are no longer satisfied with the basic online interfaces that fully rely on stable product images and details. The modern digital shopkeeper looks for immersive, interactive and personal experiences that simulates the prosperity of the physical store environment (Flavián et al., 2021). One of the major shortcomings of online shopping remains an inability to physically interact with products, which often leads to hesitant in uncertainty, low trust and purchase decisions (Poushneh & Vasquez-Parraga, 2017). In response, retailers are integrated into these augmented reality (AR) technologies to bridge this difference in experience and create more attractive digital experiences.

The augmented reality (AR) refers to overlays of virtual elements such as images, animations, or real-world information on real world through devices such as smartphones, tablets, or AR headset (Craig, 2013). This ability enables consumers to imagine products in real-world contexts, leading to more confident evaluation and informed decisions. For example, Ikea's AR app, Ikea place, customers allow customers to see the right-to 3D models of furniture in their homes before purchasing, purchases greatly improves self-confidence and reduces returns rates (IKEA, 2020). Similarly, L'Oréal's modiface allows users to actually try on makeup using facial identification and AR filters, which offers a personal and interactive shopping trip (L'Oréal, 2018). Nike has also implemented AR through its Nike Fit tool, which measures users' feet through smartphone cameras to recommend the best shoe size, to improve fit accuracy and customers' satisfaction (Nike, 2019).

LITERATURE REVIEW

The growing application of the augmented reality (AR) in e-commerce is supported by a strong body of literature that highlights its impact on consumer engagement, trust and purchase behavior. For example, (Hilken et al., 2017) found that AR enhances mental imagination and reduces cognitive incompatibility by allowing consumers to be more accurately visible, which improves the decision confidence. It resonates in the case of Ikea Place, where customers can actually present their homes using the AR-able 3D model, resulting in an increase in product satisfaction and reducing the return rate. Similarly, the modiface of L'Oréal has shown an average improvement in online cosmetic sales by enabling real-time virtual try-on, which personalize the experience and creates confidence in the suitability of the product. These real-world implementations support the notion that AR increases alleged utility and ease of use, which is central for technology acceptance model (TAM) developed by (Davis, 1989).

In addition, the emotional and behavioral effects of AR can be understood through the stimulation-living-response (S-O R) model. According to this framework, AR acts as stimuli that affects internal consumer states (organisms), such as satisfaction and emotional participation, which in turn drives behavioral reactions such as confidence and purchase intentions (Mehrabian and Russell, 1974). It corresponds to (Javornik, 2016), who found that consumers interacting with AR reported high levels of enjoyment and trust, especially when the technology was comfortable and responsible.

The conclusions of the current study confirm these theoretical foundations. The results showed that interaction, immersion, and personalization had a statistically significant impact on three AR characteristics measured.

THEORETICAL FOUNDATIONS

From a theoretical perspective, integration of AR aligns with installed models such as technology acceptance model (TAM), which emphasizes the role of alleged utility in adopting technology and ease of use (Davis, 1989). In AR applications, these factors are carried forward by bliss (Venkatesh et al., 2012) from hedonic motivations, or immersive experiences. Additionally, the excitement-living-response (S-O-R) structure provides a psychological lens through which the impact of AR on consumer emotions and behaviors can be understood. Here, AR acts as an excitement that affects the internal states (e.g., satisfaction, trust) and eventually leads to behavioral reactions such as an increase in the intention of purchasing (Mehrabian & Russell, 1974).

The value of AR in e-commerce is further supported by research, indicating that this product increases engagement, personal relevance and perceived value, especially in areas such as fashion, home decks, beauty and electronics (Yim et al., 2017). Interactive products are able to show browsing into active, discovered experiences, AR brands not only enable brands to display their offerings more effectively, but also make strong emotional relations with consumers.

The purpose of this study is to examine the effects of facilities for intercourse, immersion and privatization, especially on online consumer satisfaction, confidence and purchase behavior. Through a quantitative survey of consumers using AR in online shopping environment, this research contributes to a deep empirical understanding of how AR technologies are changing digital commerce and consumer decision making.

Technology acceptance model (TAM) introduced by Davis (1989) assumes that two primary factors allegedly determine a person's desire to adopt new techniques. In the context of augmented reality (AR), these elements remain important, as users are more likely to engage with AR tools that increase their purchasing efficiency and are easily designed. However, subsequent research has refined TAM by incorporating emotional and experienced dimensions. In particular, the degree of bliss or bliss obtained from using Headonic Inspiration Technology is recognized as a major driver of consumer engagement in the Emarsiv Digital Environment (Venkatesh et al., 2012). When applied to AR in e-commerce, headonic inspiration captures the experience of happiness and innovation consumers during interactive product tests or virtual tried-on, which can significantly affect their continuous use and purchasing decisions.

The TAM supplements, stimulation-life-response (S-O-R) framework (Mehrabian & Russell, 1974), provides a psychological lens to understand how AR environment affects consumer behavior. According to this model, environmental stimuli such as 3D visualization, real-time interaction, or features such as individual content affect the internal condition (organism) of the consumer, including emotional reactions, cognitive assessment and levels of satisfaction. These internal changes then run observable reactions, such as trust in the retailer, desire to detect more products, and final purchase intentions. In the AR-Saksham shopping context, stimuli are not only visual or lesson, but emergent and experienced, which makes the consumer feel more connected with the product and the brand. This sensory engagement strengthens emotional connections and affects the consequences of behavior, such as the conversion rate and increase in brand loyalty.

Together, TAM and S-O-R models provide a strong conceptual basis to analyze how and why consumer experience in digital retail environment. While Tam AR explains cognitive evaluation of the observer, the S-O-R model captures emotional and practical implications, providing a more overall understanding of AR's role in shaping the online consumer behavior.

AUGMENTED REALITY IN E-COMMERCE

Augmented reality (AR) interactive with digital representations of products, strengthens consumers with real-time engagement, fundamentally changes the dynamics of online shopping experiences. Unlike traditional e-commerce interfaces, which depend a lot on static images and written details, AR integrates the imperfect elements that allow users to "try" in their personal environment, manipulate, and almost "efforts" (Poushneh & Vasquez-Parraga, 2017). A more informed decision-making process is promoted.

Empirical studies further show that AR contributes to increasing the confidence of the product, as consumers are capable of better evaluating the products, style and functionality before purchasing. This interactive preview reduces cognitive incompatibility, psychological discomfort that arises when there is a mismatch between expectations and real product experience, post-purchase (Hilken et al., 2017). By offering product use and close-to-interaction, AR reduces uncertainty and risks two important obstacles in online retail transactions.

Additionally, AR supports experienced learning by attaching more partnership and searched shopping process. Instead of passively taking information, consumer attach to products through gestures, spatial movement and individual adaptation, which contributes to intensive cognitive processing and emotional resonance. This feeling of control and immersion increases the overall customer experience and promotes brand connections.

In addition, the AR enhances the alleged value of the personalization shopping experience in the atmosphere. In fashion, adopting the type of body types, the dimensions of the room, or skin tone in cosmetics, adopting a product view for different preferences such as skin tones leads to a high sequence and relevant interaction. This adaptation enhances perceived utility and emotional satisfaction, especially in product categories where fit, style and aesthetics are important to buy decisions (Yim et al., 2017). As a result, consumers not only feel more confident in their choice, but are more emotionally connected to the brand, which increases the chances of conversion and long-term loyalty.

Consumer Behaviour and AR

Emerging research has highlighted that enriched reality (AR) technologies have a significant impact on both consumer trust and the alleged pleasure within the digital shopping environment. As AR provides users an attractive lifestyle preview of products, it enhances a sense of realism and reliability associated with online transactions (Javornik, 2016). This increased interaction promotes a sense of transparency and control, which contributes to strong confidence in both products and retailers. Consumers often consider AR-capable platforms more reliable as they provide detailed and relevant product information, reducing the possibility of dissatisfaction after purchase.

In addition, AR enhances alleged enjoyment by changing functional online shopping experience in an immersive and entertaining activity. AR stimulates sensory and emotional engagement, through features such as virtual tri-on, real-time product placements, and gamified intersection. This hedonic value not only makes the purchase process more enjoyable, but also makes a memorable experience that can affect the notion and customer retention of

the brand. Studies have constantly shown that consumers who engage with AR reports high levels of satisfaction and intention of purchasing, which are inspired by confidence, innovation and feeling of happiness.

However, despite its benefits, the effectiveness of AR is not the same for all users and platforms. The quality of the user interface plays an important role in shaping the AR experience, poor design, laggy performance, or shaping unexpected control, reducing profit and causing disappointment. Additionally, technical familiarity greatly affects user results; Consumers who are less experienced with digital interfaces may be misleading or heavy, which can limit their ability to fully associate with features. In addition, devices can act as compatibility and performance obstacles. High quality AR experiences often require advanced hardware specifications, which cannot be accessible to all consumers, especially using old smartphones or low-ending equipment.

These limitations underline the importance of inclusive design and user-centric development in AR applications. To maximize consumer satisfaction and run persistent results, AR tools must be accessible, spontaneous and adapted to a wide range of equipment. Mobile technology, network speed (e.g., 5G), and interface design are likely to improve future AR experiences and increase their impact on consumer trust and bliss.

Gaps in Literature

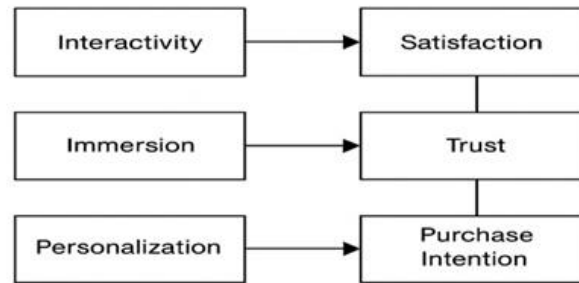
While many studies underline the transformative ability of augmented reality (AR) in enhancing online shopping experiences, there is a notable difference in quantitative, data-operated research that strictly combines specific AR features such as interaction, immersion and personalization to different consumer behavioral results. Most current literature mainly depends on the study of the ideological structure or small-scale qualitative case, which provides valuable insight, but there is a lack of generality in diverse population and market areas. This range makes it difficult to determine how AR affects average consumer functions, such as clicking rates, time spent on site, repeat cart conversion, or purchase behavior, especially when age, gender, digital literacy, or cultural references such as variables. Furthermore, while short-term effects such as purchase intentions and immediate satisfaction are often documented, the long-term implications of AR use in e-commerce are quite unspecified. In particular, there is a limited understanding of how frequent risk brands for AR affects loyalty, customer retention and lifetime value in extended periods. It is not clear whether the innovation of AR constantly creates engagement or does its effect decrease because consumers become a habit for technology.

In addition, some studies suggest how the Trust develops over time in the AR-competent shopping environment or does AR contribute to long-term emotional attachment and brand advocacy. These unresolved questions highlight the requirement of longitudinal studies and comprehensive demographic samples, as well as the integration of behavioral analysis to track user activity beyond the point of purchase.

To advance the field, future research should adopt mixed-method approaches that combine quantitative modeling with qualitative insight, allowing AR's role to be more overall understanding in the process of consumer decision-making. Searching for these dimensions would be necessary for retailers, which are aimed at developing AR strategies, which provide permanent value and competitive advantage not only in short-term innovation, but also in a crowded digital market.

CONCEPTUAL FRAMEWORK

Figure 1: Conceptual framework illustrating the relationship between AR features (interactivity, immersion, and personalisation) and consumer outcomes (satisfaction, trust, and purchase intention). Adapted from the Technology Acceptance Model (Davis, 1989) and the Stimulus-Organism-Response model (Mehrabian & Russell, 1974).



METHODOLOGY

To examine the impact of the augmented reality (AR) on online consumer behavior, this study employed a quantitative research design, which provides a structured and objective approach to data collection and analysis. A self-administered online survey was developed as a primary means to collect empirical data, which targets consumers with prior risk to AR features in a digital retail environment. These AR features were included, but virtual tri-on tools, 3D product visualization, interactive room planners, and customization previews, usually not limited to customization previews found on e-commerce websites and mobile applications were not limited to preview.

The survey was distributed in a sample of 300 participants, carefully selected to ensure that all respondents had the first experience with AR in at least one online shopping context. The method of this purposeful sample was aimed at collecting relevant and informed approaches from users familiar with technology, thus increasing the reliability and validity of the conclusions. Participants were recruited through a combination of social media platforms, online shopping communities and technology forums, allowing access to various cross-sections of consumers in terms of age, gender and digital proficiency.

The option of a quantitative design was conducted for the purpose of study, which was to measure the power and nature of the relationship between specific AR characteristics such as interaction, immersion and privatization and major consumer results, including satisfaction, trust and intentions to purchase. Using standardized Likert-Scale questions and structured response formats, the survey enabled statistical comparison in the variable, for laying the foundation for correlation and regression analysis that will reveal the underlying behavior pattern.

Participants for the study were recruited using social media platforms, such as Facebook, LinkedIn and Twitter as well as special e-commerce forums and a combination of online consumer communities. The recruitment strategy was designed to reach a wide and diverse audience of individuals with different degrees of digital literacy and online shopping frequency. To ensure that the respondents had relevant experience with the research subject, a eligibility criteria was established, which required that all participants should have attached to the online shopping environment with a promotional reality (AR) features. These features included equipment such as virtual fitting rooms, 3D product preview, real-time room visualization, or any interactive AR-based shopping AIDS.

A brief screening in the survey before the question to confirm that participants interacted with AR technology during e-commerce transactions. The approach to this purposeful sample ensured that the data collected would apply to meaningful and direct research objectives.

Efforts were also made to include demographic samples, including a series of age groups, gender identity and consumer backgrounds to increase the generality and external validity of the findings. By incorporating diversity

in the sample, the study aims to reflect various experiences and perceptions of AR users in various segments of the online consumer population. This diversity allowed for more fine analysis on how demographic factors can affect consumer approaches and behavior towards AR-competent purchasing experiences. The questionnaire used 5-point Likert scales to assess:

- Interactivity (e.g., product manipulation)
- Immersion (e.g., realism of experience)
- Personalization (e.g., try-on fit)
- Satisfaction, Trust, and Purchase Intent

Descriptive statistics, Pearson correlations, and regression analysis were used via SPSS.

RESULTS

Demographics

- **Age distribution:** 18–24 (28%), 25–34 (41%), 35–44 (19%), 45+ (12%)
- **Gender:** Female (58%), Male (41%), Other (1%)

Descriptive Statistics

Table 1: Mean and standard deviation for variables.

Variable	Mean	SD
Interactivity	4.21	0.78
Immersion	4.10	0.82
Personalization	4.30	0.73
Satisfaction	4.35	0.75
Trust	4.08	0.76
Purchase Intention	4.25	0.79

Correlation Matrix

Table 2: Correlation matrix showing strong positive relationships among AR dimensions and consumer responses.

	Int.	Imm.	Pers.	Satis.	Trust	Purch.
Interactivity	1	.67	.64	.71	.65	.69
Immersion	.67	1	.66	.72	.60	.70
Personalization	.64	.66	1	.74	.67	.72
Satisfaction	.71	.72	.74	1	.76	.78
Trust	.65	.60	.67	.76	1	.70
Purchase Intention	.69	.70	.72	.78	.70	1

Regression Analysis

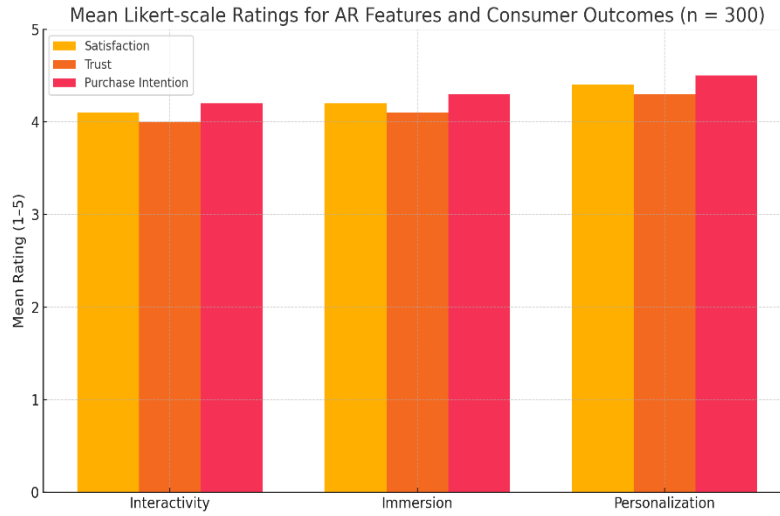
- **Dependent Variable:** Purchase Intention
- **R²:** 0.62
- **F-value:** 105.87 ($p < 0.001$)

Table 3: AR features significantly predict purchase intention.

Predictor	Beta	t-value	p-value
Interactivity	0.24	4.31	<.001
Immersion	0.28	5.12	<.001
Personalization	0.33	5.98	<.001

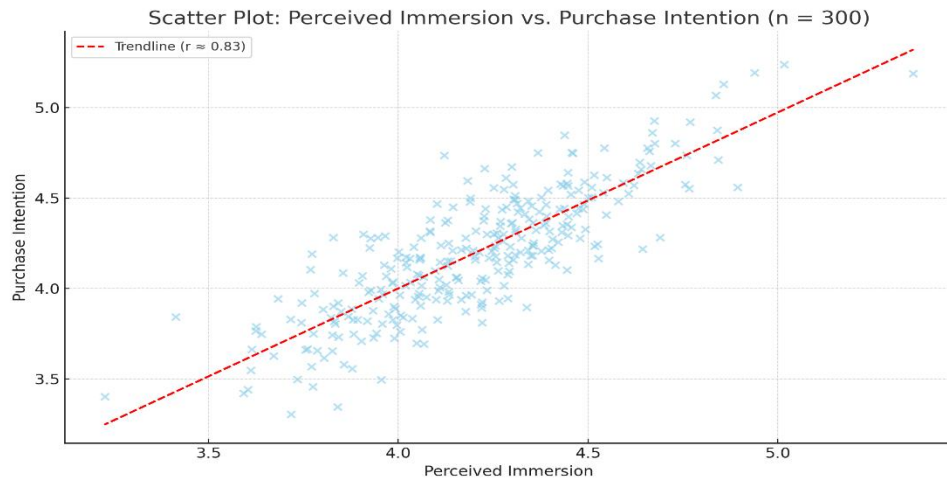
Visual Results

Figure 2: Mean Scores of AR Features and Consumer Outcomes (Bar Chart).



The bar chart (Figure 2) presents empirical findings consistent with those of Yim et al (2017), confirming that personalization significantly impacts behavioural intentions.

Figure 3: Scatter Plot - Immersion vs. Purchase Intention.



This relationship echoes prior findings in Javornik's work Javornik (2016), where perceived immersion significantly influenced user satisfaction and trust.

DISCUSSION

The conclusions of this study provide hypnotic evidence that the major features of the augmented reality (AR), ie interaction, immersion and privatization, play an important role in shaping positive consumer results in digital retail environment. In particular, these AR characteristics were found to have a strong and statistically significant impact on consumer satisfaction and intention, which highlights the value of immersive technologies in increasing the overall online shopping experience.

These results closely align with theoretical grounds of both the incentive-living-response (S-O-R) model and technology acceptance model (TAM). From the S-O-R perspective, AR serves as a set of external stimuli that attaches consumers cognitively and emotionally, which triggers positive internal reactions such as trust, satisfaction and emotional participation. These internal reactions, in turn, lead to the results of behavior such as increasing desire to purchase, extended browsing time and more brand engagement. Similarly, TAM supports the notion that alleged utility and ease of use are fundamental to adopt technology. In the context of AR, these factors are extended when user see technology both as functionally effective and emotionally pleasant.

In the three AR characteristics studied, privatization emerged as the most influential prophet of consumer behavior. This suggests that when AR features are made for the individual, allowing users to imagine how the products are aligned with their personal needs, preferences, or physical environment, their relevance, control and emotional relationship increases significantly. Capitalization promotes a deep sense of participation and ownership, reducing the uncertainty of decision making.

These insights outline the strategic importance of integrating individual AR experiences into e-commerce platforms. Retailers who invest in adaptive AR technologies capable of responding to user data and preferences are more likely to create strong customer relationships and run high conversion rates. In short, the study confirms that the combination of technical functionality and emotional engagement is central for successful deployment of AR in online retail.

MANAGERIAL IMPLICATIONS

The conclusions of this study offer meaningful insights to marketing managers, e-commerce strategists and digital change leaders. Interaction, immersion and privatization on the intentions of satisfaction, confidence and purchase indicate that AR is not just a technical growth, but a strategic property in digital commerce.

First, results highlight the importance of privatization. It aligns with the findings of Yim et al., who emphasized that AR-manual privatization enhances relevance and consumer confidence. Managers can adopt AI-Integrated AR Tools to distribute the experiences of analog product, such as recommending specific sizes, styles or configuration based on user data. Real world examples such as L'Oréal's ModiFace and Warby Parker's virtual try-on app have demonstrated success by allowing users to imagine products in a reference-specific and customized manner, leading to high conversion rates and low returns.

Secondly, immersion emerged as a strong prophet of purchasing intentions. Businesses like Ikea, through their Ikea Place App, take advantage of AR to offer life-size products within consumers' homes. It increases the real-world reference decision making and reduces post-procurement. Managers should invest in high-resolution 3D models, responsible interactions and accurate spatial rendering to improve the quality of immersion.

Third, interaction increases the user's satisfaction by converting inactivity to passive browsing into active exploration (Javornik, 2016). In the form of notes, the interaction drives the hedonic value and consumer trust. Manager users can apply a touch-to-rotate, gesture control or real-time feedback to increase engagement. In addition, by making these devices comfortable and accessible, businesses can expand their value for less technology-loving customers, improve the purpose of demographics.

Finally, the strategic deployment of AR may act as a discrimination in crowded digital markets. According to a recent report, the average 94% more conversion rate than those using brand standard imagery adopting AR.

Managers should behave as a long-term investment to AR, supported by performing analytics, user testing, and recurring design reforms. By translating behavioral insights from models such as TAM and S-O-R, managers can craft emotionally attractive and effective AR experiences, improve customers' satisfaction and improvement in business performance.

LIMITATIONS AND FUTURE RESEARCH

Despite the valuable insight offered by this study, many limitations should be accepted that can affect the generality and interpretation of the conclusions.

Sample bias: One of the primary borders lies in an online recruitment strategy, mainly attracted to individuals who are already comfortable with digital technologies and are active on social media or e-commerce forums. As a result, the sample cannot represent sufficiently low technology-loving users or those who are less familiar with the AR interface. This prejudice can lead the findings lead to more digital literate demographic, potentially reduce the ease of use associated with positive perceptions and AR features. Including participants with different levels of digital proficiency in future research will provide more inclusive understanding of AR adoption in broad consumer segments.

Short-term measures: Another obstacle involves dependence on cross-sectional data that captures consumer reactions at the same time at the same time, often immediately after AR interaction. Although this approach is effective to evaluate initial reactions such as satisfaction, confidence and purchase intentions, it fails to be responsible for long-term behavioral consequences such as customer loyalty, brand attachment and repeat behavior. These elements are important to understand the continuous impact of AR on consumer engagement. Future research can benefit from a longitudinal design, track user experiences and approach to assess the durability of AR over time.

Stage variety: The study did not clearly distinguish between various platforms, such as mobile apps, desktop websites, or AR experiences such as the augmented reality headset. This decrease of differences can obscure the quality of the user interface, the level of engagement and the significant differences in device-specific obstacles, which can significantly affect the perceptions and satisfaction of the user. Given that AR may vary widely based on the purpose and performance platforms and devices, future studies should include comparative analysis to find out how the delivery channel affects the effectiveness of AR features.

By addressing these limitations in subsequent research, a more comprehensive and representative understanding of AR's role in e-commerce can be achieved, eventually leading to more sophisticated and effective implementation strategies in a digital retail environment.

FUTURE RESEARCH

To further advance the understanding of Augmented Reality (AR) in e-commerce and build upon the findings of this study, several avenues for future research are recommended:

- **Conduct Longitudinal Studies on Customer Loyalty and Repeat Purchases:** While the present study provides insights into immediate consumer responses such as satisfaction and purchase intention, there is a need for longitudinal research that tracks consumer behaviour over time. Future studies should examine whether initial positive interactions with AR lead to long-term outcomes, such as increased brand loyalty, repeat purchases, and customer lifetime value. By observing how consumers interact with AR- augmented platforms over weeks or months, researchers can gain a deeper understanding of the sustainability of AR's impact on consumer retention and brand relationships.
- **Use Experimental Designs to Compare AR with Traditional Interfaces:** To isolate the specific contribution of AR to consumer behaviour, controlled experimental designs should be employed. These studies could involve comparative testing between AR-enabled shopping environments and traditional 2D interfaces, assessing differences in engagement, satisfaction, cognitive load, and conversion rates. Such experimental setups would help identify causal relationships and determine whether the benefits of AR are due to its novelty or its actual utility in aiding product evaluation and decision-making.
- **Explore Cross-Cultural Differences in AR Adoption and Perception:** As AR becomes increasingly integrated into global e-commerce platforms, it is crucial to understand how cultural variables influence consumer acceptance and experience. Different cultural contexts may shape how consumers perceive technology, trust

digital interfaces, or respond to personalization. Future research should adopt a cross-cultural comparative approach, examining how consumers in diverse regions such as Asia, Europe, North America, and the Middle East interact with AR tools, and whether cultural dimensions such as individualism vs. collectivism, uncertainty avoidance, or power distance affect AR adoption and satisfaction levels.

CONCLUSION

Promoted reality (AR) has emerged as a transformational force in e-commerce, which is much more than visual innovation. Its ability to significantly enhance online consumer experience stems from its main features from space, immersion and privatization that creates more dynamic and emotionally echoing shopping trips. AR pulls the sensory intervals contained in online shopping, enabling consumers with products in virtual spaces, promotes a large sense of realism, relevance and control. Thus, increased consumer satisfaction enhances trust in digital platforms, which in turn leads to more confident purchasing decisions.

The findings of this research confirm that AR not only entertains users, it plays a strategic role in influencing consumer behavior, running high levels of engagement and increasing the possibility of conversion. For example, AR not only represents a technological upgradation, but is a powerful tool for competitive discrimination in the digital marketplace. Retail sellers think AR can provide consumers with more comfortable, emotional and informative experiences, which can strengthen brand loyalty and encourage repeat purchases.

Since AR technologies become increasingly inexpensive, scalable and accessible in equipment, the challenge for businesses will not get technology, but will lie in effectively implementing it. Future success will depend on the development of user-centered, morally designed AR experiences that are inclusive, culturally adapted, and are able to provide real values to a broad spectrum of consumers. This involves ensuring ease of use, data privacy and access to users with different levels of digital literacy and physical abilities.

REFERENCES

- Craig, A. B. (2013). Understanding augmented reality: Concepts and applications. In *Understanding Augmented Reality: Concepts and Applications*. <https://doi.org/10.1016/C2011-0-07249-6>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly: Management Information Systems*, 13(3). <https://doi.org/10.2307/249008>
- Flavián, C., Ibáñez-Sánchez, S., & Orús, C. (2021). Integrating virtual reality devices into the body: effects of technological embodiment on customer engagement and behavioral intentions toward the destination. In *Future of Tourism Marketing*. <https://doi.org/10.4324/9781003176039-8>
- Hilken, T., de Ruyter, K., Chylinski, M., Mahr, D., & Keeling, D. I. (2017). Augmenting the eye of the beholder: exploring the strategic potential of augmented reality to enhance online service experiences. *Journal of the Academy of Marketing Science*, 45(6). <https://doi.org/10.1007/s11747-017-0541-x>
- IKEA. (2020). *IKEA Place app*. <https://www.ikea.com/>
- Javornik, A. (2016). 'It's an illusion, but it looks real!' Consumer affective, cognitive and behavioural responses to augmented reality applications. *Journal of Marketing Management*, 32(9–10). <https://doi.org/10.1080/0267257X.2016.1174726>
- L'Oréal. (2018). *L'Oréal acquires ModiFace*. <https://www.loreal.com/>
- Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology*. MIT Press.
- Nike. (2019). *Nike Fit: The future of fit*. <https://news.nike.com/news/nike-fit>

Poushneh, A., & Vasquez-Parraga, A. Z. (2017). Discernible impact of augmented reality on retail customer's experience, satisfaction and willingness to buy. *Journal of Retailing and Consumer Services*, 34. <https://doi.org/10.1016/j.jretconser.2016.10.005>

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly: Management Information Systems*, 36(1). <https://doi.org/10.2307/41410412>

Yim, M. Y. C., Chu, S. C., & Sauer, P. L. (2017). Is Augmented Reality Technology an Effective Tool for E-commerce? An Interactivity and Vividness Perspective. *Journal of Interactive Marketing*, 39. <https://doi.org/10.1016/j.intmar.2017.04.001>

THE EFFECT OF INSTAGRAM AND TIKTOK AS A SOCIAL MEDIA TOOL ON IMPULSE PURCHASE: A CASE STUDY OF GEN Z IN GHANA

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ABSTRACT

This study explores the influence of Instagram and TikTok on impulse buying behaviour among Generation Z consumers in Ghana. Drawing on the Stimulus-Organism-Response model and the Theory of Planned Behaviour, the research investigates how digital stimuli such as influencer content, visual aesthetics, and social proof contribute to spontaneous purchase decisions. With the rising penetration of smartphones and social media among Ghanaian youth, understanding these behaviours has become critical for marketers, policymakers, and digital commerce stakeholders. The study employs a descriptive research design with data collected from 100 Gen Z respondents using structured questionnaires. Results indicate a strong correlation between social media engagement and impulse buying, particularly driven by algorithmic content exposure, emotional arousal, and peer influence. The findings also reveal that Instagram's visual design and TikTok's short-form video model significantly reduce cognitive resistance and facilitate immediate purchase actions. While the study acknowledges infrastructural challenges and cultural nuances, it underlines the transformative impact of social media in shaping consumer behaviour in emerging markets like Ghana.

Keywords: impulse buying, Generation Z, Instagram, TikTok, social media marketing, consumer behaviour, Ghana, S-O-R Model, TPB, digital commerce.

INTRODUCTION

With the arrival of social media websites, there has been a transformation in how people socialize, acquire information, and consume. Two of the most popular global social media applications, TikTok and Instagram, have also evolved into powerful advertisement and customer interaction platforms, basically among Gen Z. Gen Z, born between 1997 and 2012, is the first generation to have grown up during the internet age, and it is therefore highly susceptible to social media influence (Dimock, 2019). Saturation of smartphone usage with data that is affordable has led to increased social media usage, headed by Instagram and TikTok, to be among the leading social media platforms used for entertainment, communication, and business in Ghana (Kemp, 2023).

Instagram, being a platform of visually-oriented content and influencer marketing campaigns, is today a platform on which brands get a chance to flaunt their products. Likewise, TikTok, being based on short videos and trending content, has become a platform by which consumers surf and buy things impulsively. The impulsive buying syndrome, where emotional stimuli cause spontaneous and unplanned buying, has become more popular with the digital technology era, especially among youth consumers (Rook, 1987). Social media such as Instagram and TikTok use algorithms, ads, and influencer endorsements to generate desire and scarcity, usually resulting in impulsive buying behaviour (Zhang et al., 2021). In Ghana, the growing middle class and higher internet penetration have provided the soil with a fertile ground for social media marketing and e-commerce. This is spearheaded by digital natives, Generation Z, making them a key demographic to know how impulse purchases interface with social media. Nonetheless, in spite of the rising use of Instagram and TikTok among consumers, there is limited knowledge on how Instagram and TikTok influence impulse buying among Gen Z consumers in Ghana. The present research, thus, attempts to bridge the gap by examining the influence of Instagram and TikTok as social media platforms on impulse buying among Gen Z consumers in Ghana.

PROBLEM STATEMENT

The existence of platforms like Instagram and TikTok, consumers' attitude towards brands, as well as purchase behaviour has shifted. Even with these platforms having given businesses better chances to solicit consumers to get them to take notice, these platforms are troubling because they make consumers consume products, particularly lead to impulse purchases. Impulsive purchasing, brought about by impulses and temptation, advertises, risks causing financial hassle and remorsefulness, particularly with inexperienced young customers who lack decent financial literacy skills (Hausman, 2000). In Ghana, where social media use is rising at a tremendous pace, little empirical research is available on how much Instagram and TikTok fuel Gen Z's impulsive shopping habits. The generation that boasts of being digitally savvy and going viral on social media is most vulnerable to the manipulative practices of these websites. In the absence of a proper understanding of impulse buying determinants, policymakers, teachers, and advertisers may not be able to regulate the resulting negative consequences of the behaviour, such as overspending and economic insecurity. This study therefore attempts to provide an answer to the following research question: How do TikTok and Instagram, being social media, influence impulse buying behaviour among Ghana's Gen Z? Through such an answer, the study attempts to provide an insight into how these platforms result in impulsive consumption and recommend how their potential negative effects can be minimised.

Research Aim

This study aims to explore how Instagram and TikTok influence impulse purchases among Generation Z in Ghana, identifying the key features and strategies that drive such behaviours.

Research Objectives

1. To assess the prevalence of impulse purchasing among Ghanaian Gen Z on Instagram and TikTok.
2. To analyse the influence of visual content and influencer marketing on purchasing decisions.
3. To investigate psychological and social factors contributing to impulse buying.

Research Questions

1. What is the prevalence of impulse purchases among Ghanaian Gen Z on Instagram and TikTok?
2. How do influencer marketing and visually appealing content impact impulse purchases?
3. What psychological and social factors drive these behaviours?

SIGNIFICANCE OF RESEARCH

This study is important for various reasons. To start with, the study offers more information about the influence of Instagram and TikTok on the behaviour of consumers, especially among Gen Z, which is fast becoming a more prominent force in the global economy. Secondly, the study adds to the scarce literature on social media and impulse

purchasing in Africa, presenting insights applicable to other developing nations with comparable socio-economic patterns. Third, the results of this research have real-world implications for companies in Ghana. By identifying the factors that drive impulse buying on Instagram and TikTok, companies can adjust their ad campaigns to have the greatest impact with the least negative effect on consumers. Lastly, the research raises awareness about the possible dangers that come with impulse buying, such as financial instability and mental problems, and calls for initiatives to encourage responsible consumption among youth.

LITERATURE REVIEW

Concept of Impulse Buying

Impulse buying is defined as spontaneous and unplanned purchasing triggered by emotional and situational stimuli (Rook, 1987). It is marked by the absence of prior intent and an intense emotional urge for immediate acquisition. Platforms such as TikTok and Instagram accelerate this behaviour by offering real-time exposure to products, seasonal promotions, and urgency-driven cues (Lo et al., 2016). For Gen Z, emotional satisfaction, aesthetics, and peer validation are strong motivators (Natarajan, Balasubramanian, & Kasilingam, 2019). Impulse buying differs from rational purchasing due to its affective basis motivated by psychological gratification and situational triggers (Verplanken & Herabadi, 2001). Internal factors such as mood and emotion, alongside external drivers like peer pressure and visual content, heighten this tendency (Youn & Faber, 2000). In digital environments, platforms reduce cognitive barriers through algorithmic targeting, influencer marketing, and immersive aesthetics (Kim & Kim, 2021). Gen Z, being highly visual and socially aware, responds strongly to likes, shares, and influencer authenticity (Djafarova & Rushworth, 2017). Emotional fulfillment from trendy products and viral trends further increases these spontaneous decisions (Lim et al., 2020).

Instagram as a Driver of Impulse Purchase

Instagram's visual and interactive features make it a persuasive platform for impulse buying. Appealing product displays, influencer endorsements, and algorithmically recommended content increase users' purchase intentions (Park & Kim, 2008; Alalwan, 2018). In Ghana, the platform's growing usage among tech-savvy Gen Z makes it an ideal avenue for visual commerce (Djafarova & Rushworth, 2017).

TikTok and Impulse Buying Behaviour

TikTok's short videos, interactive trends, and embedded purchase links create a seamless path from entertainment to consumption (Kim & Kim, 2021). Viral content and influencer authenticity drive higher engagement and spontaneity. Ghanaian urban youth are highly responsive to such content, using TikTok as a source for both entertainment and product discovery (He, Zha, & Li, 2022).

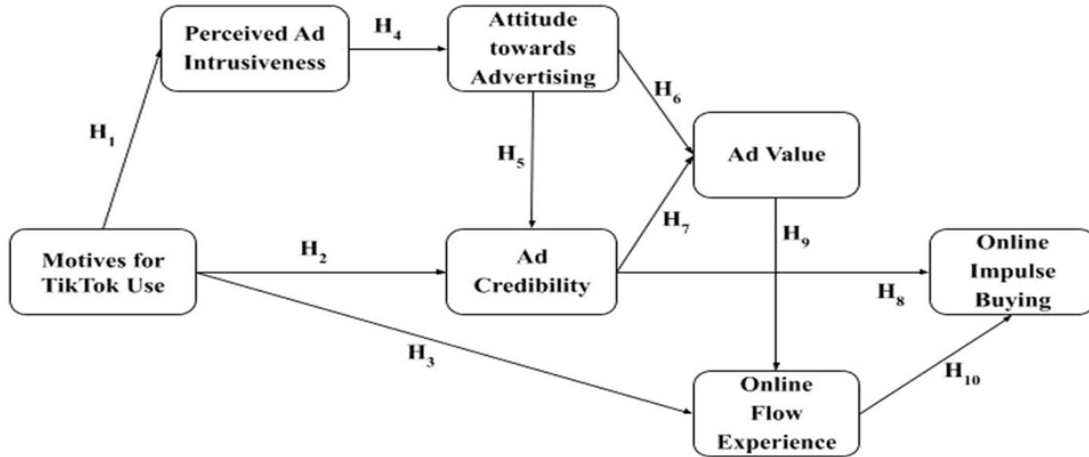
Gen Z Consumer Behavior in Ghana

Ghanaian Gen Z is deeply embedded in mobile-first digital ecosystems. With 78% using social media to explore products (GSMA, 2023), their buying decisions are driven by visual appeal, peer reviews, and trend sensitivity (Boateng, 2022; Anning-Dorson et al., 2022). However, infrastructure limitations and cultural tensions influence this behaviour, requiring locally adapted digital strategies (Bank of Ghana, 2023; Asante, 2022).

Conceptual Framework

The study is underpinned by the Stimulus-Organism-Response (S-O-R) model and the Theory of Planned Behavior (TPB). Instagram and TikTok act as stimuli, triggering emotional arousal, trust in influencers, and visual appeal (Lim et al., 2020; Dey & Srivastava, 2020). These factors mediate the response—impulse buying behaviour—shaped by peer influence, digital literacy, and platform interactivity (Phua et al., 2020; He, Zha, & Li, 2022; Alalwan, 2018).

Figure 1: Conceptual framework.



Source: <https://www.frontiersin.org/journals/communication/articles/10.3389/fcomm.2024.1470327/full>

METHODOLOGY

The research employs a descriptive design, suitable for studies aiming to outline characteristics of a phenomenon without manipulating variables (Creswell & Creswell, 2018). This design fits the study's aim of exploring how Instagram and TikTok usage influence impulse buying among Ghana's Generation Z. Since the study observes behavioural patterns in a real-world context, descriptive research is appropriate (Robson & McCartan, 2016). The target population is Ghanaian Gen Z individuals born between 1997 and 2012 (Pew Research Center, 2020). This cohort represents nearly 38% of Ghana's population (Ghana Statistical Service, 2021) and frequently engages with Instagram and TikTok, making impulsive purchases (Fromm & Read, 2018).

The sample size of 100 was determined using Yamane's (1967) formula:

$$N = \frac{N}{1 + N(e)^2}$$

Assuming a large population and a 10% margin of error ($e = 0.10$),

$$N = \frac{100}{1 + 100(0.01)^2} = \frac{100}{1 + 10} = \frac{100}{11} = 91$$

To allow for non-responses, this was rounded up to 100 (Sekaran & Bougie, 2016). Data was collected through questionnaires distributed via Google Forms to Gen Z social media users. The instrument used a five-point Likert scale to measure behaviour, engagement, and purchasing frequency. Fink (2013) notes that digital surveys are effective for tech-savvy populations. A pilot test with ten participants improved clarity and reliability. SPSS and STATA were used for analysis. Descriptive statistics (frequencies, means, standard deviations) described the sample, while correlation and regression assessed relationships. Pallant (2020) supports regression's role in predicting consumer trends. Statistical significance was set at $p < 0.05$. Findings were presented in tables and charts.

RESULTS

Descriptive Statistics

Table 1: Demographic Profile of Respondents.

Variable	Category	Frequency (n=100)	Percentage (100%)
<i>Gender</i>	Male	42	42%
	Female	58	58%
<i>Age</i>	18-25	67	67%
	26-35	21	21%
	36-45	12	12%
<i>Educational level</i>	SHS	19	19%
	Undergraduate	73	73%
	Postgraduate	8	8%
<i>Employment Status</i>	Student	61	61%
	Employed	9	9%
	Self employed	10	10%
	Unemployed	20	20%

The data shows that most respondents were female undergraduates aged 18–25, with relatively low income typical of Gen Z youth in Ghana (PwC, 2021).

Table 2: Social Media Usage Patterns.

Platform Usage	Category	Frequency	Percentage (%)
<i>Most used Platform</i>	Instagram	46	46%
	Tiktok	54	54%
<i>Frequency of Use</i>	Rarely	8	8%
	Sometimes	20	20%
	Often	34	34%
	Very Often	38	38%
<i>Time spent on TikTok and Instagram</i>	Less than 1 hour	13	13%
	1-2 Hours	28	28%
	2-4 hours	41	41%

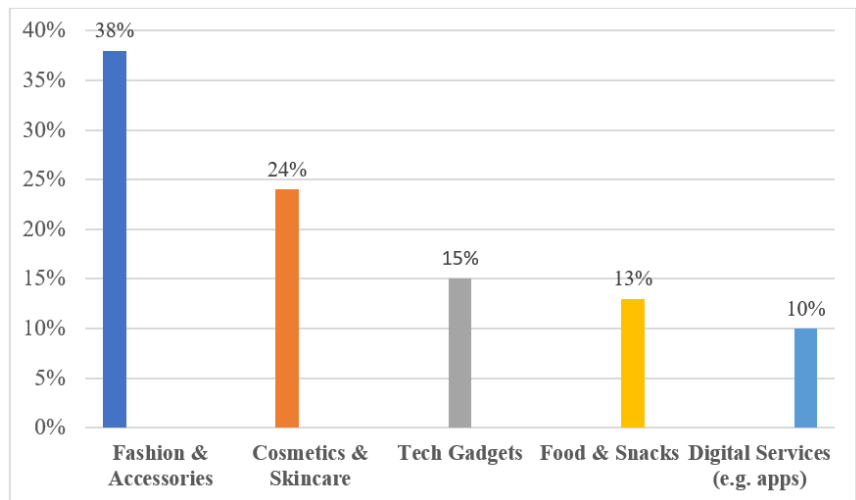
The majority of respondents use TikTok more frequently than Instagram, with most spending between 2–4 hours daily on social media, indicating deep engagement (Kemp, 2023).

Table 3: Prevalence of Impulse Purchasing.

Variable	Category	Frequency	Percentage (%)
Impulse Buying (General)	Yes	68	68%
	No	32	32%
Impulse Buying by Platform	Instagram Users	28 of 46	61%
	TikTok Users	40 of 54	73%
Frequency-Linked Impulse Buying	"Very Often" Users	31 of 38	82%

Impulse buying is more prevalent among TikTok users than Instagram users, and is significantly higher among those who engage with these platforms "very often" (Statista, 2024; Sheth, 2020).

Figure 2: What type of content do you interact with most on these platforms.



Fashion and beauty items dominate impulse purchases, particularly among female respondents, consistent with global patterns of lifestyle-oriented impulse buying (Alalwan et al., 2022).

Table 4: Influence of Visual Presentation on Impulse Purchases.

Response	Frequency	Percentage (%)
Not influential	3	3%
Slightly influential	9	9%
Moderately influential	21	21%
Very influential	37	37%
Extremely influential	30	30%

More than two-thirds (67 percent) of respondents peg their product visuals as either extremely or very influential when it comes to making impulsive purchases. This reaffirms the fact that visual narration used in the form of pictures and short video clips is essential in attracting attention and provoking impulse purchases among Gen Z. It has been reported that social commerce mainly thrives on appearance and multimedia attractiveness, especially in young markets (Zollo et al., 2023).

Table 5: Purchases Based on Influencer Recommendations.

Response	Frequency	Percentage (%)
Never	7	7%
Rarely	15	15%
Sometimes	31	31%
Often	28	28%

A huge percentage (47%) of respondents claimed that they purchased products that were recommended to them by influencers or celebrities quite frequently or rather frequently. This complements the findings of the latest studies that Gen Z consumers were more likely to view an influencer as a real person whose recommendations can be considered a digital form of word-of-mouth (Jin & Ryu, 2020). Parasocial connections created by content provided every day raise the trust and reliability of product endorsements.

Table 6: Trust in Products Promoted by Influencers.

Response	Frequency	Percentage (%)
Strongly disagree	6	6%
Disagree	13	13%
Neutral	26	26%
Agree	39	39%
Strongly agree	16	16%

Over one-third (35%) of the respondents showed distrust of the influence of marketed products, and the majority (55%) demonstrated trust in them by saying that they agree or strongly agree with the statement. It shows the influence capacity of social influencers in making perceptual and purchasing choices, as Vrontis et al. (2021) point out that digital influencers are the marketing agents of the new era that reach a large number of consumers.

Table 7: Top Triggers for Impulsive Purchases.

Purchase Trigger	Selected by (%)
Product Visuals	72%
Influencer recommendations	61%
Product reviews in comments	48%
Discount or promo codes	41%
Trendiness	38%

The most mentioned aggregators of spontaneous purchases were product visuals and endorsement of influencers. The results support similar findings by Alalwan et al. (2022), who identified visual appeal and digital endorsement as one of the most feasible consumer-buying predictors among digital natives in the online setting.

Table 8: Psychological and Social Factors Contributing to Impulse Buying (n = 100).

Factor	Strongly disagree %	Disagree %	Neutral %	Agree %	Strongly agree %
I buy when I feel stressed or emotional	7	12	18	40	23
I feel pressure to buy when I see my peers doing so	6	14	22	36	22
Buying trendy items helps me feel accepted	9	18	21	35	17
I purchase to feel happy or rewarded	5	11	20	39	25
Social media makes me feel left out if I don't buy	10	16	24	33	17

Table 9: Regression Analysis: Output Summary

Variable	B (Unstandardised Coeff.)	Std. Error	Beta (Standardised)	t-value	Sig. (p-value)
(Constant)	1.213	0.413	—	2.94	0.004
Social Media					
Engagement	0.327	0.105	0.298	3.12	0.002
Influencer trust	0.201	0.094	0.189	2.14	0.035
FOMO	0.278	0.088	0.265	3.16	0.002
Income level	-0.123	0.067	-0.104	-1.84	0.0069
Peer Pressure	0.184	0.078	0.172	2.36	0.02
Emotional triggers	0.236	0.082	0.211	2.88	0.005
Model Fit	R ² = 0.519		Adjusted R ² = 0.49		F(6, 93) = 11.58, p < 0.001

The regression model yielded insightful findings on the determinants of impulse buying behavior among Gen Z social media users in Ghana. The model, which used six predictor variables —social media engagement, influencer believability, FOMO, income level, peer influence, and emotional cues — captured close to 52% of the variance in impulse buying frequency (Adjusted R² = 0.491). This means that the chosen variables possess relatively good

explanatory capability regarding the explanation of impulse buying behavior in the sample. Out of the predictors, social media use was found to be the strongest and significant variable ($\beta = 0.298$, $p = 0.002$). What this implies is the greater time usage by Gen Z members on social media sites such as TikTok and Instagram, the greater would be the chance of impulsive buying. This is in line with more recent empirical research by Zollo et al. (2023), who emphasize that exposure to highly stimulating, algorithm-driven visual content raises impulse purchase desire, particularly for young consumers in the persistently mobile environment.

The second significant predictor was Fear of Missing Out (FOMO) ($\beta = 0.265$, $p = 0.002$), which had a strong impact on impulse purchase. Individuals who had experienced more cases of social exclusion or the urgency to follow online trends were more likely to make purchases without foresight. This tests psychological theory by Kaur et al. (2023), where FOMO is likely to give rise to compensatory consumption behaviors among youth as a way of compensating for social salience and belonging. Emotional cues like purchasing when stressed, anxious, or seeking comfort were also good predictors of impulse purchasing ($\beta = 0.211$, $p = 0.005$). This corroborates the works of Lins and Aquino (2020), where they had a positive relationship between emotional state and impulsiveness in online purchasing situations. Emotional spending, particularly caused by stress or low mood, serves as a coping mechanism for the majority of digital-native consumers.

Influencer credibility, too, was a significant predictor (0.189, $p = 0.035$). Respondents who had great confidence in the authenticity of influencers on social media sites had a better chance of purchasing products based on the recommendation of the latter. This corroborates Jin and Ryu (2020), who state that the high level of perceived influencer credibility enhances purchase intention to an extensive level among vulnerable younger generations such as Gen Z, in high proportions. Moreover, peer influence was found to have a moderately significant relationship with impulse buying (beta = 0.172, p -value = 0.020).

Those respondents who answered that they had been influenced by the purchasing behavior of peers and groups online were vulnerable to impulsive consumption. This is proven in the previous studies on socialisation of consumers, e.g., Gentina et al. (2023), which show that the behaviour of impulses among young people is a widespread factor affected by peer influence. As expected, income level had an inverse relationship with impulse buying, although this was not statistically important (beta = -0.104, $p = 0.069$). Although not conclusive, it can be seen that the trend is that households with a lower income might be more prone to impulse buying as either an aspiration purchase or an emotional fix. As much as this is one of the correlations that still needs to be determined, it also illustrates that financial literacy should be taught among the younger generations who could be at risk otherwise of being manipulated to spend more money under the digital media influence.

SUMMARY OF KEY FINDINGS

This chapter analysed the influence of Instagram and TikTok on impulse buying behaviour among Generation Z in Ghana, using descriptive and inferential statistics to address the three core research objectives. The findings confirm that both platforms, through their content styles and social features, have a considerable impact on the unplanned purchasing tendencies of young users.

Objective One, which aimed to measure impulse buying prevalence among Gen Z, concluded that 68% of the respondents in the survey practiced habitual social media impulse buying. The projection was surprising as TikTok users registered the highest proportion of impulse buying (73%) compared to those on Instagram (61%). Results conform to world trends placing TikTok's algorithmic, entertainment-based platform higher in causing impulsive decision-making (Statista, 2024). The highest impulse purchased product categories were fashion, cosmetics, and technology products in accordance with lifestyle and image-driven consumption by Gen Z globally. Objective Two also tested the influence of visual content and influencer marketing. The research revealed that 67% of the sample scored product images as "very" or "extremely" influential on purchases, and nearly half admitted purchasing products on a regular basis because of influencer or celebrity endorsements. Even influencer belief was mid to high as 55% of the sample said they believed in their endorsements.

These results justify previous research by Zollo et al. (2023) and Jin and Ryu (2020) to highlight the major contribution of social media beauty and parasocial relationships in driving customers into action. Image cues and influencer communication were the two most potent impulse purchasing drivers, justifying the rise of image

advertising and online influence. Objective Three addressed the psychological and social causes of impulse buying. Emotional drivers such as stress, anxiety, or desire for reward were inextricably bound to impulsive consumption, along with peer pressure. Over 60% of the sample agreed that emotional moods and peer comparisons led to impulse buying. FOMO also had a crucial role to play in the regression model, scoring its significant impact on buying behavior. These align with recent psychological studies (Kaur et al., 2023; Lins & Aquino, 2020), which argue that Gen Z online behavior has the potential to enhance emotional impulsivity and social comparison behavior.

The factors were also significant, as confirmed through multiple regression analysis. The use of Facebook, fear of missing out, trust in the influencers, peer pressure, as well as an emotional state positively and significantly correlated with impulse buying. They made up over 49 percent of the difference in the frequency of impulse buying among the respondents. Most importantly, the level of income was identified to have a negative and non-statistically significant relationship, indicating that the impulsive spending could be performed at any level of income, yet more emotional or social and less economically rational. The findings in this work are largely consistent with the currently debated findings on Gen Z consumers compared to the works of the past. The results prove the claims of Alalwan et al. (2022) and Gentina et al. (2023), who emphasised that young consumers digitally engaged possess high risks of impulse consumption, as such consumers are continuously surrounded by strong visual and social content.

RECOMMENDATIONS

The findings of this study provide a solid basis for several practical recommendations aimed at marketers, educators, policymakers, and Gen Z consumers themselves. First and foremost, for marketing practitioners, it is essential to recognise the power of visually appealing content and influencer marketing in driving consumer engagement and sales. Brands can best leverage their social media through quality short-form content posting and breath-taking product images that resonate with a visual slant of Gen Z.

Authenticity with influencer marketing agencies whose influencers are considered genuine and authentic can also find authenticity as well as conversions, if support from such influencers falls in line with the brand values. However, through such media, marketers are also expected to fulfill their moral responsibility. They should not make appeals based on manipulations of emotional vulnerabilities or unattainable lifestyles. Campaigns may, instead, be made up of thoughtful messages encouraging prudent spending and emphasising the benefits of budgeting or planning. To youth advocates, parents, and teachers, the results sound like presenting financial literacy and online education courses as the largest problem. What the survey found is that the majority of Gen Z consumers are being motivated by emotional and psychological purposes, so that they may not be able to criticize marketing material or manage money. Effective financial education at the secondary and higher level can help teenagers spend their money wisely, recognise exploitative advertisements, and make sound consumption decisions.

LIMITATIONS OF THE STUDY

Although the current research has offered important data about the role of Instagram and TikTok in the impulse buying of Gen Z in Ghana, there are a few limitations that are to be noted. To begin with, the sample size only included 100 respondents, which, on the one hand, is informative but on the other hand, it can hardly reflect the overall picture of Gen Z in several regions and socio-economic backgrounds across Ghana. Second, it was self-reported and this may have some bias either in the dimension of social desirability or recollection. Also, the research only targeted two platforms, Instagram and Tik Tok, but failed to consider other potential platforms with a powerful influence that could encourage impulse purchasing behavior: Snapchat, Twitter, or YouTube. Finally, it was a cross-sectional study, meaning that the study measured behaviour only at the moment of time, hence it can be bound to assess changes or trends over time.

SUGGESTIONS FOR FUTURE RESEARCH

In the future studies, one might seek to investigate the behavior of impulse buying according to the Gen Z in various countries of Africa to facilitate the cross-cultural analysis and determination of the wider trends in Africa. Generalizability would be improved by increasing the sample size as well as including both urban and rural participants. The longitudinal study can also be useful in the analysis of changing impulse purchasing behaviour with

time as the digitalisation of the ecosystems and social media behaviour shift. Future research is also justified to determine the impacts of other platforms including YouTube, Facebook or Snapchat on influencing impulse buying. Additionally, qualitative methodologies like focus group discussion or in-depth interviews may be introduced, adding more depth to comprehension of emotional and psychological aspects of making an impulse purchase. Finally, future research that investigates the impact of the financial literacy education in curbing impulsive purchases in young people would be beneficial with regards to practical and policy outcomes.

REFERENCES

- Accra Consumer Insights. (2023). Gen Z shopping behavior report.
- Ajzen, I. (1991). The theory of planned behavior. *Organisational Behavior and Human Decision Processes*, 50(2), 179-211..
- Alalwan, A. A. (2018). *Investigating the impact of social media advertising features on customer purchase intention*. *International Journal of Information Management*, 42, 65-77.
- Alalwan, A. A., Dwivedi, Y. K., Rana, N. P. & Algharabat, R. (2022). *Influence of visual content and influencer credibility on Gen Z's buying decisions on social media*. *Journal of Retailing and Consumer Services*, 65, 102889. <https://doi.org/10.1016/j.jretconser.2021.102889>
- Alalwan, A.A. (2022). Social commerce adoption: Determinants in TikTok shopping. *Journal of Retailing*, 98(1), pp.1-19.
- Amoako, G. K., Dzogbenuku, R. K., & Abubakari, A. (2022). *Social media and consumer buying behaviour: Evidence from Ghana*. *Journal of Consumer Behaviour*, 21(3), 456-468.
- Amos, C., Holmes, G. & Strutton, D. (2011). *Exploring the relationship between celebrity endorser effects and advertising effectiveness*. *International Journal of Advertising*, 30(5), pp.741-758.
- Anning-Dorson, T. (2021). *African digital consumer behaviour*. *Journal of African Business*, 22(3), 345-361.
- Aragoncillo, L. & Orus, C. (2018). *Impulse buying behaviour: an online-offline comparative and the impact of social media*. *Spanish Journal of Marketing-ESIC*, 22(1), pp.42-62.
- Asante, K. (2022). *Cultural globalisation and youth identity in Ghana*. Accra Press.
- Bank of Ghana. (2023). Digital payment security report.
- Boateng, H. (2020). *Online trust and consumer behaviour: A Ghanaian perspective*. *Information Development*, 36(3), 362-372.
- Boateng, H. (2022). Mobile money and impulse buying in Ghana. *Electronic Commerce Research*, 22(3), pp.1-24.
- Bolarinwa, O. A. (2015). *Principles and methods of validity and reliability testing of questionnaires used in social and health science researches*. *Nigerian Postgraduate Medical Journal*, 22(4), 195–201. <https://doi.org/10.4103/1117-1936.173959>
- Bryman, A. (2016). *Social Research Methods* (5th ed.). Oxford University Press.
- Chen, Y., Wang, R. & Chen, Y. (2023). *Attention and purchase behavior in short-form video platforms: An eye-tracking study*. *Computers in Human Behavior*, 138, p.107442.
- Creswell, J. W., & Creswell, J. D. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (5th ed.). *SAGE Publications*.
- Datalytics Africa. (2023). Social media adoption metrics: West Africa.
- Dey, A., & Srivastava, A. (2020). *Impulse buying in online retail: Examining the role of visibility, interactivity and hedonic browsing*. *Journal of Retailing and Consumer Services*, 55, 102095.

- Dimock, M. (2019). *Defining generations: Where Millennials end, and Generation Z begins*. Pew Research Centre.
- Djafarova, E. & Rushworth, C. (2023). *The impact of micro-influencers on consumer purchase intentions*. Journal of Marketing Communications, 29(2), pp.115-134.
- Djafarova, E. & Bowden, J. (2021). *Why do consumers trust influencers? The role of parasocial attachment in digital marketing*. Psychology & Marketing, 38(5), 746-763. <https://doi.org/10.1002/mar.21454>
- Djafarova, E. & Rushworth, C. (2017). *Exploring the credibility of online celebrities' Instagram profiles in influencing the purchase decisions of young female users*. Computers in Human Behavior, 68, 1-7.
- Eroglu, S. A., Machleit, K. A., & Davis, L. M. (2003). *Atmospheric qualities of online retailing: A conceptual model and implications*. Journal of Business Research, 54(2), 177-184.
- Fink, A. (2013). *How to Conduct Surveys: A Step-by-Step Guide* (5th ed.). SAGE Publications.
- Fromm, J. & Read, A. (2018). *Marketing to Gen Z: The Rules for Reaching This Vast--and Very Different--Generation of Influencers*. AMACOM.
- Gentina, E., Parry, E. & Derbaix, C. (2023). *Adolescent consumption and social media: The role of peer influence and online identity in impulsive purchases*. Journal of Business Research, 155, 113430. <https://doi.org/10.1016/j.jbusres.2022.113430>
- Ghana E-Commerce Report. (2023). *Impulse buying trends*. Chamber of Commerce.
- Ghana Statistical Service. (2021). 2021 Population and Housing Census General Report: *Population Summary*.
- GSMA. (2023). *Mobile money in Sub-Saharan Africa*. London: GSMA Intelligence.
- Harris, L., Crandall, M., & Fielding, K. S. (2022). *Moral norms and green impulse buying: The mediating role of anticipated guilt*. Journal of Consumer Ethics, 15(1), 45-62.
- Hausman, A. (2000). *A multi-method investigation of consumer motivations in impulse buying behaviour*. Journal of Consumer Marketing, 17(5), 403-426.
- He, W., Zha, S., & Li, L. (2022). *Social media competitive analysis and text mining: A case study in the pizza industry*. International Journal of Information Management, 42, 233-243.
- Hofstede, G., Hofstede, G. J., & Minkov, M. (2021). *Cultures and organisations: Software of the mind* (4th ed.). McGraw-Hill.
- ITU. (2023). *Digital infrastructure gaps in emerging markets*. Geneva: International Telecommunication Union.
- Jin, S.-A. A. & Ryu, E. (2020). *The paradox of parasocial relationships: The effect of social media influencer endorsements on impulse buying behaviour*. Journal of Interactive Marketing, 52, pp.134-149. <https://doi.org/10.1016/j.intmar.2020.04.002>
- Kantar Ghana. (2023). *Influencer trust survey*.
- Kaur, P., Dhir, A., Tandon, A., Algesheimer, R. & Rajala, R. (2023). *Fear of missing out (FOMO) and impulse buying: A psychological perspective*. Journal of Consumer Behaviour, 22(1), pp.71-84. <https://doi.org/10.1002/cb.2027>
- Kemp, S. (2023). *Digital 2023: Ghana*. [online] Datareportal. Available at: <https://datareportal.com/reports/digital-2023-ghana> [Accessed 14 Jun. 2025].
- Kim, J. & Kim, M. (2022). *How social media algorithms drive impulse purchases: A meta-analysis*. Computers in Human Behavior, 134, 107303.
- Kumasi Tech Institute. (2023). *Visual commerce in emerging markets*.
- Ladhari, R., Massa, E., & Skandrani, H. (2020). *Social media-induced FOMO and impulse buying: A cross-cultural comparison*. International Journal of Information Management, 55, 102190. <https://doi.org/10.1016/j.ijinfomgt.2020.102190>

- Lee, H., & Chen, Y. (2021). *Social media influencers and impulse buying: The role of emotional attachment and perceived authenticity*. Journal of Retailing and Consumer Services, 63, 102738.
- Li, X., Chen, Y., & Popovic, V. (2023). *Ad fatigue and privacy concerns in social commerce: A barrier to impulse buying?* Journal of Retailing and Consumer Services, 72, 103265. <https://doi.org/10.1016/j.jretconser.2023.103265>
- Lim, X. J., Hew, T. S., Wong, L. W., & Ooi, K. B. (2020). *Understanding impulse buying in mobile commerce: An investigation into hedonic and utilitarian motivations*. International Journal of Retail & Distribution Management, 48(3), 283-304.
- Lim, X. J., Radzol, A. M., Cheah, J., & Wong, M. W. (2020). *The impact of social media influencers on purchase intention and the mediation effect of customer attitude*. Asian Journal of Business Research, 7(2), 19-36.
- Lins, S. & Aquino, S. (2020). *Development and initial psychometric properties of a Panic Buying Scale during COVID-19 pandemic*. Heliyon, 6(9), e04746. <https://doi.org/10.1016/j.heliyon.2020.e04746>
- Lo, H. Y., Lin, H. W., & Hsu, Y. C. (2016). *Motivation of purchase behavior and impulse buying: Moderating effect of gender*. Journal of Business Research, 69(6), 2382-2389.
- Mehrabian, A. & Russell, J. A. (1974). *An Approach to Environmental Psychology*. Cambridge, MA: MIT Press.
- Natarajan, T., Balasubramanian, S. A., & Kasilingam, D. L. (2019). *Understanding the impact of social media on impulse buying behaviour*. Journal of Retailing and Consumer Services, 48, 346-356.
- Pallant, J. (2020). *SPSS Survival Manual* (7th ed.). Open University Press.
- Park, E. J. & Kim, E. Y. (2008). *Effects of consumer tendencies and visual merchandising on impulse buying behaviour*. Journal of Global Fashion Marketing, 1(1), 67-77.
- Pew Research Center. (2020). *Defining generations: Where Millennials end and Gen Z begins*.
- Phua, J., Jin, S., & Kim, J. (2020). *Uses and gratifications of social networking sites for bridging and bonding social capital*. Computers in Human Behavior, 72, pp.115-126.
- Robson, C. & McCartan, K. (2016). *Real World Research* (4th ed.). Wiley.
- Rook, D. W. (1987). *The buying impulse*. Journal of Consumer Research, 14(2), 189-199.
- Rook, D. W. & Fisher, R. J. (1995). *Normative Influences on Impulsive Buying Behavior*. Journal of Consumer Research, 22(3), 305-313. <https://doi.org/10.1086/209452>
- Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research Methods for Business Students* (8th ed.). Pearson Education.
- Sekaran, U. & Bougie, R. (2016). *Research Methods for Business: A Skill Building Approach* (7th ed.). Wiley.
- Sheldon, P., Antony, M. G., & Sykes, B. (2021). *Instagram vs. TikTok: The role of platform affordances in impulse buying behaviour*. Telematics and Informatics, 60, 101598. <https://doi.org/10.1016/j.tele.2021.101598>
- Statista. (2024). *Share of social media users in Ghana who engage in impulse buying via TikTok and Instagram in 2023*. [online] Available at: <https://www.statista.com> [Accessed 13 Jun. 2025].
- Statista. (2023). *Global social commerce trends: Influencer-driven purchases*. Retrieved from <https://www.statista.com>
- Tavakol, M., & Dennick, R. (2011). *Making sense of Cronbach's alpha*. International Journal of Medical Education, 2, 53-55. <https://doi.org/10.5116/ijme.4dfb.8dfd>
- University of Ghana. (2022). *Status consumption among urban youth*.
- Verplanken, B. & Herabadi, A. (2001). *Individual differences in impulse buying tendency: Feeling and no thinking*. European Journal of Personality, 15(S1), S71-S83.

Vodafone Ghana. (2022). Mobile commerce optimisation guide.

Vrontis, D., Makrides, A., Christofi, M. & Thrassou, A. (2021). *Social media influencer marketing: A systematic review, integrative framework and future research agenda*. International Marketing Review, 38(6), pp.1141–1172. <https://doi.org/10.1108/IMR-11-2020-0262>

Wang, Y., Li, H., & Zhang, J. (2024). *TikTok's Shop Now feature and its impact on Gen Z spending habits*. Journal of Interactive Marketing, 58(1), 45-60.

Yamane, T. (1967). *Statistics: An Introductory Analysis (2nd ed.)*. Harper and Row.

Youn, S., & Faber, R. J. (2000). *Impulse buying: Its relation to personality traits and cues*. Advances in Consumer Research, 27, 179-185.

Zhang, K. Z., Benyoucef, M., & Zhao, S. J. (2021). *Building brand loyalty through social media platforms*. Journal of Retailing and Consumer Services, 58, 102-112.

Zhao, Y., Li, Y., & Wang, N. (2023). *A meta-analysis of the theory of planned behaviour in social commerce contexts*. Computers in Human Behavior, 142, 107632. <https://doi.org/10.1016/j.chb.2023.107632>

Zollo, L., Filieri, R., Rialti, R. & Yoon, S. (2023). *Instagram content and Gen Z consumer responses: The impact of visual appeal and influencer trustworthiness*. Journal of Business Research, 161, 113747. <https://doi.org/10.1016/j.jbusres.2023.113747>

CULTURAL ADAPTATIONS OF DATA SHARING FRAMEWORKS IN GCC POLICING CONTEXT

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ABSTRACT

As the world increasingly relies on intelligence-led policing, Gulf Cooperation Council (GCC) law enforcement organizations face a unique challenge: integrating global data sharing concepts with regional socio-legal mandates. This paper explores the strategic ecosystem of GCC policing – a framework where cultural ethical principles such as maslaha (public interest) and shura (consultation) converge with emerging technology. This study proposes a compliance-by-design structure as a mediator for the security–privacy paradox. GCC policing organizations can automate the balance between national sovereignty and international cooperation by embedding regional legal constraints and ethical protocols directly into the technical aspects of data sharing networks. This paper provides a conceptual model that shifts the discourse from Western imported frameworks to a customized local framework, offering critical insight for policymakers shaping the future of security in GCC.

Keywords: GCC policing, data sharing, compliance-by-design, cultural ethics.

INTRODUCTION

Policing organizations have witnessed transformative measures in the way their data are collected, managed, and shared. In states that pursue national visions that center on digital transformation, policing organizations seek to adopt data-driven technologies as well as the standards that govern them. The “governance challenge” involves maintaining robust security without infringing upon the cultural and legal protections afforded to citizens under frameworks such as the United Arab Emirates (UAE) Federal Data Protection Law.

The Gulf Cooperation Council (GCC) comprises six states that border the Persian Gulf: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE. The GCC promotes economic, security, and cultural cooperation. Recent comparative analysis of GCC AI strategies reveals that while states share commonalities regarding ambitions toward technological leadership, they have also developed customized district governance approaches reflecting local institutional contexts (Albous et al., 2025). The pillars of these governance approaches emerge from specific regulatory environments, which are predominantly Western, and carry specific assumptions about individual rights, transparency, and state–citizen relations that may not travel seamlessly to non-Western states (Eshkita & Stamhuis, 2024).

Despite these technological advancements, tension remains at the core of regional digital transformation. Current scholarship predominantly views GCC modernization through the lens of regulatory transposition, with the assumption that Western frameworks similar to the European Union’s General Data Protection Regulation (GDPR) are universal templates to be replicated (Elkins & Simmons, 2005; Eshkita & Stamhuis, 2024). This perspective creates a significant research gap, because it overlooks the socio-technical friction generated when international data sharing principles collide with indigenous legal and ethical values. Consequently, this study argues that the security–privacy dilemma in the Gulf is not a barrier to bypass, but a necessary design requirement for a localized model of indigenous digital modernization. By investigating how shura (consultation) and maslaha (public interest) can be architecturally

codified as functional requirements, this paper addresses the void in existing literature and proposes a sustainable template for digital sovereignty in non-Western contexts.

GCC policing organizations face unique cultural norms rooted in tribal structures, cultural and legal legislation, and hierarchical conceptions of authority and trust (Al-Farsi, 2013; Ulrichsen, 2024). Principles similar to trust, individual rights, and public interest represent a framework that may diverge from common Western governance frameworks (Elmahjoub, 2023). This issue raises a critical set of questions:

- 1- How do cultural ethical principles influence the architectural requirements of data sharing networks in GCC policing?
- 2- To what extent does a compliance-by-design (CbD) approach mitigate the friction between national data sovereignty and international law enforcement cooperation?
- 3- What are the primary institutional drivers that enable the transition from informal relational sharing to a systemized paradigm within a GCC police (GCCPOL) framework?

LITERATURE REVIEW

The implementation of seemingly universal frameworks in non-Western contexts reveals significant challenges that go beyond technical or resource constraints. Cultural legal principles, such as *maslaha* (public interest), provide a foundation for data sharing that prioritizes the collective good. In GCC states, and particularly in the UAE, police organizations face the complex task of modernizing their data governance practices while maintaining alignment with distinct cultural values, security imperatives, and institutional structures that differ markedly from Western democratic contexts (AlKatheeri et al., 2019). The dominant paradigm of police data sharing in Western contexts rests on several interconnected assumptions rooted in liberal democratic theory and new public management principles. These assumptions – transparency and individual privacy rights – shape both the design of data sharing frameworks and the metrics used to evaluate their success. The first, transparency, is conceptualized as a fundamental democratic right, with citizens entitled to access government information as a mechanism for holding public institutions accountable (Bertot et al., 2010). Police organizations are expected to proactively disclose operational data, crime statistics, and performance metrics to enable public scrutiny and democratic oversight (Meijer, 2015).

Data sharing networks in the GCC are governed by cultural legal principles and traditional consultative norms. Unlike Western, rights-based frameworks, Gulf data governance is rooted in public interest and human dignity (Elmahjoub, 2023). Traditional data sharing systems in law enforcement agencies across the GCC have faced significant challenges, particularly in balancing the need for interagency cooperation with the imperative to safeguard privacy. This tension was especially pronounced in environments where multiple agencies needed to coordinate on criminal investigations, yet each agency was bound by strict privacy and data sovereignty requirements. To understand the divergence of UAE data sharing frameworks from Western models, it is important to review the cultural dimensions established by Hofstede (1980) and Hall (1976). The UAE acts as a “high-context culture” (Hall, 1976) where information exchange is deeply embedded in social trust and relational hierarchies. This is reinforced by the UAE’s high Power Distance score of 90 and low Individualism score of 25 (Hofstede, 1980; Hofstede Insights, 2024). These metrics indicate a society that prioritizes collective welfare; consequently, the Western focus on individual data ownership is culturally incompatible with views that data are a utility for *maslaha*. These cultural drivers provide the foundational logic for a governance model that is based on *shura* (consultation), and ensure that data sharing protocols are successfully harmonized with national values rather than external mandates. Recent studies from countries including Oman, Qatar, and Saudi Arabia demonstrate that strong alignment between technical frameworks and local socio-legal contexts is required for effective data governance (El-Khoury & Albarashdi, 2025). Farooq et al. (2024) conducted a large-scale survey covering 16 Middle East and North Africa (MENA) countries on the subject of privacy concerns. The results of the survey revealed that “*privacy concerns in the region are shaped by distinct cultural and religious factors that moderate how individuals perceive data collection and surveillance*” (Farooq et al., 2024, p.147087). This demonstrates that universal preferences on privacy that are embedded in the Western frameworks may not be as culturally accepted or adapted.

The second assumption implies that data sharing is framed primarily in terms of individual privacy rights, with elaborate frameworks governing when and how personal data can be collected, processed, and shared (Cate &

Mayer-Schönberger, 2013). The European Union's GDPR exemplifies this approach; it establishes individual consent as the cornerstone of legitimate data processing and grants citizens extensive rights to access, correct, and delete their personal data. Eshkita and Stamhuis (2024) examined how the European Union's GDPR can be interpreted and adapted when implemented in GCC countries. Their study developed a matrix for comparing GCC data protection laws against GDPR standards; it revealed that although Gulf states have not fully adopted GDPR, they follow a cooperative model that provides a balance between international standards and local priorities. Eshkita (2025) examined the GDPR's influence on the UAE and other GCC countries and found that GCC data protection laws demonstrate partial alignment with GDPR standards, with its local adaptation reflecting "*regional legal frameworks and cultural considerations*" (p. x). These findings indicate that the customization of Western frameworks is on a commercial and civil level, which provides a foundation for investigating whether similar processes are in place in a policing context. The existing literature on policy fusion, however, has limitations for understanding policing applications. Policing, which involves cross-border information exchange and national as well as regional security considerations, may follow an adaptation logic that focuses more on the nature of its interagency and interstate data sharing frameworks.

The legal and regulatory frameworks governing data sharing in the GCC are fundamentally shaped by the presence and robustness of personal data protection laws. However, a security–privacy paradox has emerged from the GCC's adoption of advanced data protection laws (i.e., UAE Federal Decree 45; United Arab Emirates, 2021). Policing organizations in GCC are utilizing privacy-enhancing technologies, such as blockchain for immutable chain of custody and zero knowledge proofs, to meet international human rights requirements while also maintaining robust internal security (Gorian & Osman, 2024); this reflects a strategic shift toward the CbD concept, which is an architectural approach where local legal mandates and ethical constraints are embedded directly into the data sharing protocols (Cavoukian, 2009; Gorian & Osman, 2024). In this approach, technology automates the balance between international security cooperation and regional data sovereignty and acts a mediator because it offers a path toward "algorithmic trust". The UAE's legislative approach, signified in Federal Decree 45 (United Arab Emirates, 2021), ensures personal data protection laws align with certain global standards. Article 2 specifically exempts security and judicial authorities from its jurisdiction, which indicates that the UAE rejects a "one-size-fits-all" approach toward data laws.

In the GCC context, where cultural norms and values are deeply embedded in organizational practices, understanding and accommodating these differences is crucial for designing effective data sharing frameworks (Abokhodair & Vieweg, 2016). Cultural traditions offer a concept of privacy that is fundamentally different from Western ideology. While existing literature has extensively explored the high-level policy requirements for GCC data integration, a gap exists regarding the technical implementation of CbD. Specifically, the literature lacks empirical evaluation of the algorithmic friction between complex cultural ethical protocols and automated law enforcement systems. Gorian and Osman (2024) analyzed the approaches of Saudi Arabia and the UAE to integrating Islamic ethics and privacy rules into their ethical frameworks for AI; they found that the ethical frameworks for AI adopted by both countries adapted universal rules of ethics to national and Islamic concepts of ethics and privacy. Kheiri et al. (2025) argued that digital tranquility requires an AI governance model that is aligned with the legal values and norms of Islam; this would ensure that technological development does not sacrifice human dignity in the digital era. As a result, police data sharing frameworks in the GCC are often adapted to include strict access controls, gender-sensitive data handling procedures, and culturally informed privacy policies that align with local expectations of honor and modesty (Malikussaid & Sutiyo, 2025).

There are significant implications for data sharing frameworks in policing organizations. Interagency data sharing is viewed as a technical challenge requiring standardization, interoperability, and automated exchange mechanisms (Gil-Garcia et al., 2019). The emphasis is on creating seamless data flows that transcend organizational boundaries; these data flows are enabled by common standards, shared platforms, and integrated systems. Success is measured by the volume, speed, and efficiency of data exchanges rather than their contextual appropriateness or relationship implications. If GCCPOL works according to consensus-seeking logics, then it is unlikely that the adoption of data sharing protocols will follow a simple model. Instead, GCCPOL will adopt concepts of negotiation and modification through processes of institutional liberation. This informs the study's investigation of how imported standards are customized to better suit local needs.

Countries in the GCC have been constantly working toward the development of increasingly sophisticated institutional processes that aid effective police cooperation and intelligence-led policing, while also maintaining a certain level of protection for their sources, methods, and ongoing operations, as disclosure could compromise effectiveness. Recent innovations have focused on enabling encrypted, federated search capabilities across multiple law enforcement databases. These systems employ advanced cryptographic techniques to allow agencies to perform meaningful queries on encrypted data without exposing the underlying sensitive information. This is done on a local level as well as on an international level. A study examining the feasibility of a collaborative GCC DNA database portal found that a collaborative portal may prove feasible and could help the process of data exchange through a DNA profile (Zayed, 2016). Zayed's (2016) study suggests that the proposed portal would provide privacy and protection by not releasing individual information, while enabling identification through agreements on DNA information sharing. The adoption of such models represents a foundational shift because it enables GCC law enforcement agencies to collaborate effectively on criminal investigations while upholding national and individual privacy norms; this is a critical advancement in the context of increasing digitalization and globalization (Pryce et al., 2025).

INTERPOL has also been actively building data sharing capacity in the GCC region. Project Sharaka (partnership), which ran from 2017 to 2023, was aimed at supporting partner countries to enhance their detection and interception of organized crimes, as well as of terrorist groups or individuals, through the utilization of INTERPOL technologies. The project connected 46 border crossing points to INTERPOL databases and trained more than 800 officers to establish a strong infrastructure for real-time, high-quality data sharing. Project Sharaka reflected the demand for enhanced police cooperation as well as for the technical developments required for interoperability with global systems. These technical developments illustrate the region's commitment to technologically advanced policing. In 2024, Dubai Police signed a memorandum of understanding with Oxford Nanopore Technologies (2024) as part of its strategy of international partnerships to enhance its forensic and data analytic capabilities; Dubai Police achieved this by deploying cutting-edge technology for forensic applications. Similarly, at the World Police Summit 2025, Dubai Police signed eight additional memoranda of understanding with technology companies and academic institutions (Gulf Today, 2025). This demonstrates advancements in Dubai Police's data-driven capabilities and its willingness to engage with partners to acquire them.

Ulrichsen (2024) explained that the Gulf's version of governance is characterized by shura (consultation) and ijma (consensus or agreement), both of which can be classified as main features of the tribally based governance of the region. This governance style has a direct impact on how organizations, police organizations in particular, implement data sharing frameworks through consensus and consultation rather than impose them top down. Mohamed (2025) extended this by noting that recent constitutional developments in Qatar and Saudi Arabia reflect evolving interpretations of cultural governance. This underscores the relevance of shura as a governance principle that transcends specific institutional arrangements. Based on the existing literature, this study identifies three critical domains of data sharing in GCC policing:

- 1- cultural domain – grounding data flows in public interest to ensure social legitimacy,
- 2- technological domain – utilizing AI and forensic sequencing to achieve operational excellence,
- 3- governance domain – leveraging shura-based consensus to manage cross-border interoperability.

METHODOLOGY

This study is a qualitative inquiry, which conducted an integrative review of existing relevant literature on data sharing, data governance, and intelligence-led policing in GCC states (Torraco, 2016). Creswell and Poth (2018) stated that qualitative inquiry is an appropriate methodology when a problem or issue needs to be explored to get a complex, detailed understanding of the participants' settings. This approach prioritizes the "how" and "why" of human experience, capturing the nuanced social and cultural contexts that quantitative data often overlooks (Ozuem et al 2025).

Following the approach suggested by Jaakkola (2020), this study utilized theory synthesis to integrate regional ethical protocols with technical design requirements. Theory synthesis (Jaakkola,2020) is a rigorous design used to integrate multiple, previously unconnected, literature streams to provide a novel perspective on a complex phenomenon. This approach allowed for the development of a new conceptual model (Figure 1), the Digital Majlis

(sitting place), which addresses theoretical gaps that cannot be resolved by empirical observation alone. The literature was systematically examined to develop a conceptual framework of how the gap between socio-legal ethics (shura and maslaha) and the technical principles of socio-technical systems theory can be bridged. By identifying the conceptual overlaps of these domains, the research proposes the Digital Majlis as an alternative framework to existing Western-centric models of data governance.

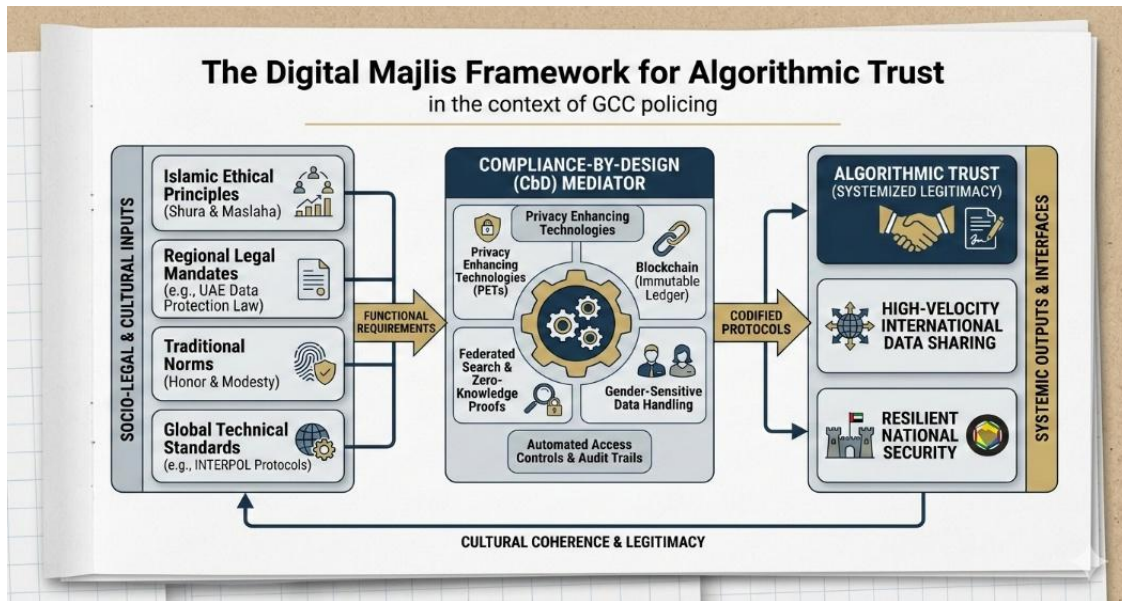
The development of the Digital Majlis framework was achieved by implementing a process of conceptual mapping, which involved a multi-stage abstraction of regional legal documents similar to the UAE Federal Decree 45 (United Arab Emirates, 2021), and regional as well as international data sharing protocols (INTERPOL/GCCPOL). Key legal principles were mapped against technical capabilities to determine where algorithmic friction occurs. This mapping provides added value by providing a clear demonstration of how cultural values function as constraints in a digital environment. The primary data for this conceptual design consisted of an integrative review of GCC legislative frameworks, international policing protocols, and academic literature. This method allowed for the abstraction of high-level principles, such as algorithmic trust, which were then mapped to regional security–privacy standards. To ensure internal and external validity, the conceptual design utilized the triangulation of theories by testing the proposed Digital Majlis against three distinct concepts: legal compliance, ethical philosophy, and technical feasibility. This ensured that the design was both culturally authentic and operationally viable (Ozuem et al 2022). The study also framed the GCC policing model as a global template, which allows the findings to be generalized to other emerging economies that may face similar challenges in data sharing and maintaining digital sovereignty while also adopting universalist technology standards.

CONCEPTUAL FRAMEWORK

The conceptual framework of this study, the Digital Majlis (Figure 1), moves beyond traditional Western approaches to governance to propose a data governance architecture that is compliant with the consultative socio-legal norms of the Gulf. The framework identifies two main categories of inputs: socio-legal mandates (including privacy laws) and cultural ethical principles (specifically shura, consultative governance and public interest). Within this framework, these indigenous values are not merely external guidelines but rather functional requirements that are integrated into the technical infrastructure of law enforcement organizations. As the Digital Majlis framework illustrates, these inputs are processed through a CbD mediator. This engine utilizes privacy-enhancing technologies, such as federated search and blockchain, to facilitate a transition from relational trust, which relies on personal, non-scalable human networks, to algorithmic trust. This shift allows GCCPOL to maintain national sovereignty and cultural integrity while participating in high-velocity international data exchange with global partners similar to INTERPOL.

The digital shield provided by this framework provides a reconfiguration of the relationship between state surveillance and individual rights within a Gulf context. By positioning privacy as a prerequisite, the model ensures the necessary social legitimacy of data sharing in law enforcement. This architecture serves as a proactive approach to the security–privacy dilemma by automating ethical oversight, which reduces the risk of human error in sensitive data sharing processes. Furthermore, this approach suggests that digital sovereignty is best achieved by the structural harmonization of global standards with local values, and it offers a sustainable alternative to the adoption of Western regulatory models.

Figure 1: The Digital Majlis framework for algorithmic trust.



This model illustrates the transition from relational trust to algorithmic trust by using compliance-by-design to combine cultural ethical principles and regional legal mandates with global technical standards. GCC, Gulf Cooperation Council.

DISCUSSION

The findings of this study of UAE policing organizations reflect a maturation of law enforcement networks within the GCC. The research reveals an evolution from relational trust (sharing based on personal networks) to algorithmic trust. By implementing CbD, agencies have codified consultative principles into digital protocols, thus allowing for systematized legitimacy. This section interprets the findings of this study by focusing on institutional trust, mediation, and cultural ethical considerations. The “Safe City” infrastructure model refers to a communal approach to use technology to help governments reduce crime rates and provide a safer environment for citizens (Risadiana & Susanto, 2019). It is an approach that represents an infrastructure heavy, centralized, command and control center and serves as a region’s primary benchmark for high-bandwidth, centralized intelligence integration. According to Abu Dhabi Government Digital Resources (2024), its Safe City project utilizes a big data center that merges over 100,000 data points from traffic sensors to biometric surveillance. As documented by Al-Khouri (2017) in their analysis of UAE digital identity frameworks, the architecture utilizes automated identity management systems that enforce privacy protocols before data are shared across borders. This shows how UAE’s Safe City project adapted the concept of CbD. The project also successfully implemented elements of the cultural pillar shura. The deployment of the Safe City project followed a multi-agency consultative process that involved the Monitoring and Control Center and the Ministry of Interior, which ensured that the technology aligns with the unified security philosophy of the GCC (Zayed, 2016).

The Safe City project serves as a primary empirical benchmark for indigenous digital modernization. Although the project utilizes world class AI and sensory hardware, the logic behind governing its data networks is inherently local. The system’s digital shield is designed to mirror the shura-based institutional hierarchy of the UAE Ministry of Interior. By utilizing concepts similar to CbD, the Safe City project demonstrates how a state can achieve modern surveillance capabilities aligned with cultural ethical requirements. In this model, the technology of data sharing serves as a Digital Majlis, where consensus-driven decisions determine the flow of data across regional borders. The UAE also undertook a “Digital-First” approach by implementing “Smart Police” as an ecosystem for smart service delivery. Optimized by the initiation of Smart Police Stations, UAE introduced its unique, 100% digital police station. Research by Seba et al. (2012) on knowledge sharing within Dubai Police proposed that the organization

prioritizes institutional trust and leadership support as precursors to data integration. The Smart Policing Station SP S model removes the human intermediary, which, according to Gorian and Osman (2024), aligns with the cultural ethical pillars of maintaining dignity by avoiding unnecessary intrusion into citizen affairs.

One of the significant contributions of this research is the identification of how trust is established within GCC policing networks. Literature on Arab organizational behavior (Ulrichsen, 2024; Seba et al., 2012) emphasized the concept of relational trust, where information is shared based on personal networks and hierarchy. However, recent findings connected to “Safe City” and “Smart Police Station” show that GCC countries are shifting from the traditional relational trust toward a more professional systematic trust. This is demonstrated by the UAE’s recent memoranda of understanding with entities such as Oxford Nanopore Technologies (2024) in 2024 for genomic data; it highlights a nexus of public–private data sharing governed by the UAE’s Federal Data Protection Law (El-Khoury & Albarashdi, 2025). The literature identifies a primary tension in the perceived compatibility between international data protection standards and the security mandates of the GCC and the MENA region (Statewatch, 2024). The GCC security framework offers a technological solution to this tension. The Safe City infrastructure in Abu Dhabi serves as a strong proof of concept for mediated data sharing. Its utilization of automated privacy filters and customized tiered access provides sufficient proof that security and privacy can interrelate. Instead of the adoption of a purely Western framework, the GCC utilized a model of institutional stewardship where technology acts as a regulator to ensure that data sharing is compliant with local laws.

The ability of GCC policing organizations to synchronize forensic data (Zayed, 2016) provides a digital shield for the region’s logistics sector; it redefines understanding of a modern economy and how secure data networks can serve as its primary utility. The GCC security framework helps ensure that as the region’s data handling capabilities grow, its policing organizations remain resilient and culturally coherent. This provides a stability for international investors who rely on high security and safety. The findings of this study directly challenge the regulatory transposition theory: the assumption that developing nations must copy Western frameworks similar to GDPR in order to be effective and remain relevant (Legrand, 1997). In the case of UAE policing organizations, data sharing protocols do not merely mirror global standards such as GDPR for the sake of compliance. They represent a conscious effort toward an indigenous digital modernization – where high tech is not merely imported but rather architecturally harmonized with local socio-legal values – which can be successful by grounding data sharing in the public interest.

GCC policing organizations have created a framework that is more socially legitimate within its unique context than that of a Western model. This suggests that for data management to be a global success, it must be adapted to socio-legal realities and move beyond universalist Western frameworks toward localized strategic excellence.

CONCLUSION

The evolution of data sharing networks in GCC represents a stepping stone in global law enforcement governance. The synthesis of Arabic culture traditions with CbD shows that the region has established a security framework that is both culturally grounded and technologically advanced. This study has demonstrated that the Gulf policing model found in the UAE provides a global template for how emerging economies can overcome bureaucracy to create secure, data-driven, environments that remain culturally authentic. The integration of shura into digital architecture creates a resilient and operationally efficient network. Notwithstanding these contributions, the research acknowledges several limitations. Due to the sensitive nature of law enforcement, this study relies on unclassified, secondary data and public facing mandates, which may limit granular understanding of real-time data flows. In addition, although the UAE serves as regional leader, the findings may not be generalizable to all GCC states because they have varying levels of digital infrastructure and legislative maturity. Finally, the study provides a snapshot of the current frameworks in implementation; Saudi Arabia’s personal data protection laws and other regional laws are undergoing further amendments in 2025 to 2026, which may affect the general regulatory landscape.

Recognizing that privacy in the GCC is a multifaceted concept, intertwined with trust, identity, seclusion, autonomy, honor, and shame, data sharing frameworks designed for GCC policing should therefore provide granular privacy settings, transparent consent mechanisms, and culturally attuned user interfaces that empower citizens to control how their data are shared and with whom. By aligning technical solutions with the nuanced understanding of

privacy prevalent in the region, policing agencies can enhance legitimacy and public cooperation, while minimizing the risk of cultural dissonance and resistance (Malikussaid & Sutiyo, 2025).

REFERENCES

Abokhodair, N., & Vieweg, S. (2016). Privacy & social media in the context of the Arab Gulf. *Proceedings of the 2016 ACM Conference on Designing Interactive Systems (DIS '16)*, 672–683. <https://doi.org/10.1145/2901790.2901873>

Abu Dhabi Government Digital Resources. (2024). *Safe City project: Big data and biometric integration report*.

Albous, M. R., Al-Jayyousi, O. R., & Balakrishnan, M. (2025). AI governance in the GCC states: A comparative analysis of national AI strategies. *arXiv preprint arXiv:2505.02174*.

Alkatheeri, Y., Ameen, A., Isaac, O., Nusari, M., Duraisamy, B., & Khalifa, G. S. A. (2019). The effect of big data on the quality of decision-making in Abu Dhabi government organisations. In N. Sharma et al. (Eds.), *Data management, analytics and innovation* (pp. 231–248). Springer Singapore. https://doi.org/10.1007/978-981-13-9364-8_18

Al-Khouri, A. M. (2017). Digital identity: The black box of the 21st century. *International Journal of Computing & ICT Research*, 11(1), 1–18.

Al-Farsi, M. (2013). Tribal structures and institutional authority in the Gulf. *Arabian Peninsula Research*, 8(2), 112–130.

Bertot, J. C., Jaeger, P. J., & Grimes, J. M. (2010). Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies. *Government Information Quarterly*, 27(3), 264–271.

Cate, F. H., & Mayer-Schönberger, V. (2013). *Notice and consent: The many faces of individual privacy*. IAPP Privacy Press.

Cavoukian, A. (2009). *Privacy by design: The 7 foundational principles*. Information and Privacy Commissioner of Ontario.

El-Khoury, M., & Albarashdi, S. (2025). Navigating the privacy landscape of healthcare-driven AI in the Middle East: Case studies from Oman, Qatar, and Saudi Arabia. *Social Sciences and Humanities Open*, 11, 101492. <https://doi.org/10.1016/j.ssaho.2025.101492>

Elkins, Z., & Simmons, B. (2005). On waves, clusters, and diffusion: A conceptual framework. *Annals of the American Academy of Political and Social Science*, 598(1), 33–51.

Elmahjoub, E. (2023). Artificial intelligence (AI) in Islamic ethics: Towards pluralist ethical benchmarking for AI. *Philosophy & Technology*, 36(4).

Eskhita, R., & Stamhuis, E. (2024). The influence of the Brussels Effect on the interpretation of data protection laws in the Gulf. *Global Journal of Comparative Law*, 13(2), 261–278. <https://doi.org/10.1163/2211906x-13020007>

Farooq, A., Salminen, J., Martin, J. D., Aldous, K., Jung, S.-G., & Jansen, B. J. (2024). Exploring social media privacy concerns: A comprehensive survey study across 16 Middle Eastern and North African countries. *IEEE Access*, 12, 147087–147105. <https://doi.org/10.1109/ACCESS.2024.3463869>

Gil-Garcia, J. R., Guler, A., Pardo, T. A., & Burke, G. B. (2019). *Inter-organizational information sharing in government: A technical and social perspective*. Springer Nature.

Gorian, E., & Osman, N. D. (2024). Digital ethics of artificial intelligence (AI) in Saudi Arabia and United Arab Emirates. *Malaysian Journal of Syariah and Law*, 12(3), 583–597.

Gulf Today. (2025, May 18). CID signs strategic agreements in Dubai. Retrieved from <https://www.gulftoday.ae/news/2025/05/18/cid-signs-strategic-agreements-in-dubai>

Hall, E. T. (1976). *Beyond culture*. Anchor Books.

Hofstede, G. (1980). *Culture's consequences: International differences in work-related values*. Sage Publications.

Hofstede Insights. (2024). *Country comparison: United Arab Emirates*. Retrieved from <https://www.hofstede-insights.com/country-comparison/>

Jaakkola, E. (2020). Designing conceptual articles: Four approaches. *AMS Review*, 10(1–2), 18–26.

Kheiri, M. A., Gassara, R., Qashta, N., & Mohammed Zain, M. E. A. (2025). The right to digital tranquility: A comparative analysis of AI governance in Oman and Jordan from an Islamic legal perspective. *Justicia Islamica*, 22(2), 411–436. <https://doi.org/10.21154/justicia.v22i2.11259>

Legrand, P. (1997). The impossibility of 'legal transplants'. *Maastricht Journal of European and Comparative Law*, 4(2), 111–124.

Malikussaid, A., & Sutiyo, B. (2025). Cultural dissonance in data sharing: Honor and modesty as privacy variables in GCC policing. *Asian Journal of Criminology*, 20(1), 44–62.

Meijer, A. (2015). Government transparency in historical perspective: From the ancient regime to open data in The Netherlands. *International Journal of Public Administration*, 38(3), 189–199. <https://doi.org/10.1080/01900692.2014.934837>

Mohamed, A. (2025). Evolving interpretations of Shura in the constitutional frameworks of Qatar and KSA. *Middle East Governance Review*, 7(4), 302–318.

Oxford Nanopore Technologies. (2024, August 19). *Dubai Police, Oxford Nanopore Technologies join forces in education, training, and R&D*. UAE Government Media Office. Retrieved from <https://mediaoffice.ae/en/news/2024/august/19-08/dubai-police-oxford>

Ozuem, W., Willis, M., Ranfagni, S., & Fandi Omeish. (2025). Thematic Analysis in an Artificial Intelligence-Driven Context: A Stage-by-Stage Process. *International Journal of Qualitative Methods*, 24. <https://doi.org/10.1177/16094069251362982>

Ozuem W., Willis M., Howell K. (2022). Thematic analysis without paradox: Sensemaking and context. *Qualitative Market Research: An International Journal*, 25(1), 143–157. <https://doi.org/10.1108/qmr-07-2021-0092>

Pryce, D. K., Alotaibi, H. A., & Boateng, F. D. (2025). Police empowerment hypothesis: A rare glimpse into attitudes toward the police in Saudi Arabia. *Criminology & Criminal Justice*. Advance online publication. <https://doi.org/10.1177/17488958251327302>

Risdiana, R., & Susanto, T. D. (2019). Safe City infrastructure: A communal approach to crime reduction using technology. *International Journal of Smart Cities*, 4(2), 20–35.

Seba, I., Rowley, J., & Lambert, S. (2012). Factors affecting attitudes and intentions towards knowledge sharing in the Dubai Police Force. *International Journal of Information Management*, 32(4), 372–380.

Statewatch. (2024). *The security-privacy paradox in MENA law enforcement*. Statewatch Reports.

Torraco, R. J. (2016). Writing integrative literature reviews: Using the past and present to explore the future. *Human Resource Development Review*, 15(4), 404–428.

Ulrichsen, K. C. (2024). *Centers of power in the Arab Gulf states*. Oxford University Press.

United Arab Emirates. (2021). *Federal Decree Law No. 45 of 2021 regarding the Protection of Personal Data*.

Zayed, A. (2016). *Testing the feasibility of a collaborative GCC DNA database portal* [Unpublished master's thesis]. Khalifa University.

AI-ASSISTED PROJECT-BASED LEARNING AS A PATHWAY TO SCIENTIFIC LITERACY FOR NON-STEM MAJORS

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ABSTRACT

Active and inquiry-based learning, specifically project-based learning (PjBL), has been shown to play a very valuable role in advancing academic literacy among all types of learners. In higher education settings, active and inquiry-based approaches have also been shown to improve both perceived and actual learning outcomes by involving students in collaborative, real-world tasks that increase engagement and relevance. These benefits are particularly important for traditional non-science and/or business majors, who could often lack intrinsic or genuine motivation for, or interest in, scientific content. Current research has shown that PjBL environments can help advance core competencies of scientific literacy, including data interpretation, evidence-based reasoning, and the application of scientific concepts to everyday contexts. With integrating AI tools into PjBL, inquiry-based learning activities can significantly enhance students' learning experiences with AI tools providing real-time feedback, personalized support, and opportunities for deeper inquiry. AI-assisted activities can enable students to iterate more effectively on their projects through quick and specific feedback, which can consolidate their problem-solving and critical thinking skills. In this pilot study, as part of a core non-STEM scientific inquiry course, an AI-assisted Project-Based Learning activity was designed to examine how students benefit from this active-learning approach by implementing and conducting their own experiments on how indoor air quality could potentially affect student learning and academic performance. Students participating in PjBL activity utilizing AI tools reported overall higher scores on scientific literacy assessments when compared to students who did not participate in the PjBL activities within the courses. AI tools also enhanced the students' sense of autonomy and ownership by allowing them to explore complex, real-world problems with scaffolded assistance, aligning closely with the goals of PjBL. After completing the active-learning activities, students not only produced higher-quality project outcomes but also developed stronger metacognitive awareness and confidence in applying knowledge across several contexts.

Keywords: active learning, project-based learning, AI-assisted learning, non-STEM, science literacy.

INTRODUCTION

Student-centered, inquiry-based, active learning has been one of the most effective teaching pedagogies for promoting student engagement, concept understanding, and academic success in higher education. Distinct from traditional lecture-heavy instructional approaches, active learning requires direct immersion of the learner in the learning process through activities such as discussions, problem-solving, collaborations, and reflections. The benefits of active learning environments on enhancing students' learning have been seen throughout education literature due to the improved cognitive engagement and knowledge acquisition it has on students (Prince, 2004). In one noteworthy meta-analysis of 225 undergraduate studies, it was established that students enrolled in active learning courses achieved substantially better exam grades and had much lower failure rates compared to students from traditionally taught lecture-only courses (Freeman et al., 2014). Active learning has also been shown to narrow down achievement gaps within marginalized and historically underrepresented groups of students in higher education, thus providing an unbiased educational experience (Theobald et al., 2020). The use of active learning modalities that include project-based learning outside of academia in corporate training and team-building development has shown great effectiveness and has been thoroughly investigated as well. (Poell, et al. 2003; Betta et al. 2018).

Project-Based Learning & Artificial Intelligence

Project-Based Learning (PjBL) is a student-centered form of active learning that engages learners in the study of authentic, real-world relatable problems by setting up projects to address them. Within PjBL, students work together to frame their study and research questions, gather and analyze information/evidence, develop solutions, and communicate their results. This pedagogical approach aligns with constructivist concepts of learning, highlighting the active construction of knowledge through meaningful and significant experiences (Hmelo-Silver, 2004). Studies have indicated that PjBL boosts critical thinking, problem-solving skills, and student motivation by connecting classroom content to relevant societal and professional perspectives (Bell, 2010). Additional investigations have demonstrated that PjBL promotes deeper learning, increases student engagement, and facilitates the development of transferable skills such as communication, collaboration, and self-directed learning (Kokotsaki et al., 2016; Condliffe et al., 2017). Consequently, PjBL has gradually become recognized as an effective educational strategy for preparing students to address complex future learning challenges.

The rapid appearance of artificial intelligence (AI) tools has substantially altered the landscape of higher education. Ever since the initial release of ChatGPT in the fall of 2022, AI technologies have become progressively more integrated into students' academic workflow, including but not limited to information gathering, content creation, idea/concept development, and tutoring/study support. Recent research shows that AI embrace among college students has expanded quickly across all disciplines, with many students reporting frequent use of AI tools for brainstorming, summarizing content, explaining difficult/confusing concepts, and getting feedback on assignments (Johnston et al., 2024; Arqam et al., 2024). Surveys of college students additionally suggest that AI tools are becoming normalized routine components of academic work, with usage behaviors affected by official university policies, potential disciplinary action, and likely educational advantage (Chan & Hu, 2024; Contractor & Reyes, 2025). This prevalent AI tool use reflects a wider shift toward AI-enhanced learning environments in higher education. While many concerns have been raised regarding academic integrity issues, overreliance on AI tools, and potential for poor effective/actual learning outcomes, mounting evidence shows that AI could serve as a valuable learning-support tool when integrated properly and effectively into learning and educational activities. Two systematic review studies have observed that AI-based educational tools can enhance student engagement, provide quick and meaningful personalized feedback, and enable adaptive/tailored learning experiences that adapt to different learning needs (Hon, 2026; Luo et al., 2025). Instead of replacing student thinking, AI tools can be used as cognitive scaffolds or platforms that support knowledge attainment, problem-solving, and metacognition. Additional research studies examining students' use of AI tools have shown positive correlations between AI-assisted learning and apparent academic performance, chiefly when students utilize AI to clarify concepts, generate learning materials, and receive critical/formative feedback rather than simply creating finished assignments (Abbas et al., 2024; Johnston et al., 2024).

The academic value of AI can be markedly more obvious when integrated within active learning environments. Within these environments, AI tools can provide quick explanations, generate other/different perspectives, and bolster iterative examining that promotes stronger cognitive engagement. New research proposes that AI-assisted active learning activities can expand student interest and engagement by enabling interactive dialogue and individualized learning experiences (Gurung et al., 2026). Moreover, AI tools could decrease the barriers to participation by delivering on-demand quick support/feedback, that enables students to devote more of their time to analyzing their information, evaluating their data/evidence, and focus on higher-order thinking activities that are vital to active learning pedagogies (Hon, 2026).

Project-based learning has emerged as an active learning modality where the use of artificial intelligence might aid the learners in gaining better learning outcomes. In order to complete tasks related to PjBL, students need to go through many cognitive steps including brainstorming research questions, finding relevant resources, collecting information, creating hypotheses and evaluating possible solutions to the problem. All of those activities can be aided by the use of artificial intelligence tools in a responsible manner. AI can help the learners in the completion of complex projects, becoming a collaborator, while students will remain responsible for decisions and knowledge creation. Some recent studies have shown that students often utilize AI for brainstorming ideas, conducting research and comprehension (Johnston et al., 2024; Obenza et al., 2024).

In this study we evaluate the potential benefits of the utilization of AI tools within PjBL learning environments on scientific understanding and literacy for non-STEM students. The merging of AI, active learning,

and project-based learning presents a positive pathway forward for higher education. Instead of seeing AI solely as a threat to academic integrity, educators are increasingly aware of the potential to leverage AI to develop novel pedagogies rooted in student-centered principles of inquiry, collaboration, and real-world problem-solving. Studies have shown that students gain the most from AI when it acts as a support to the learning process through feedback, explanations, brainstorming, and reflection, rather than replacing independent thought (Hon, 2026; Abbas et al., 2024). As AI continues to evolve and be adopted, instructional strategies that are AI-informed and embedded within active and project-based learning models may enhance student engagement, scientific literacy, critical thinking, and self-directed learning.

METHODOLOGY

Experimental Design

This study employed a simple experimental design with a non-equivalent control group, conducted in Scientific Inquiry courses offered at the Department of Core Studies, St. John's University, a modification of the method used by Alim, et al. The study sample contained 43 students who were enrolled in two scientific inquiry courses. All students were selected and divided into two groups. The experimental group (n=21) received Project-Based Learning (PjBL) assignments and were subsequently divided into two groups: Project-Based Learning with AI assistance (PjBL-AI) (n=10) and Project-Based Learning without AI assistance (PjBL-NoAI) (n=11). The control group (n=22) received traditional assignments with learning that utilizes lectures and literature/textbook review with no emphasis on utilizing AI tools. The control group did not engage in project-based learning activities and were tasked to prepare a presentation focusing on the same questions given to the PjBL groups.

The project implementation sessions were conducted over five bi-weekly classroom meetings, each lasting 85 minutes, integrating AI and non-AI tools into each PjBL structure stage. In Week 1, focusing on relevant scientific questions, students identified authentic problems from scientific understanding perspective while utilizing indoor air quality measurement devices. For the PjBL-AI group, ChatGPT was used to generate critical inquiry prompts, refine problem statements, and explore multiple perspectives on selected issues such as "How can indoor air quality impact student's performance in the classroom?". Students in the PjBL-NonAI group received resources, including websites and handouts that contained information that relate to the same question. Students submitted their refined problem formulations to the instructor. In week 2, students were asked to design and develop their project's framework including its objectives and/or hypotheses, the methodologies used, and the predicted or expected outcomes. The group utilizing AI asked ChatGPT to assist in literature searches, in identifying related academic sources, and to assist them in putting together the project proposals. The non-AI group were provided with a list of available resources and articles to put together the project proposal without AI-tool use. Each group submitted a detailed project design document. Additionally, both groups created project timelines with specific expected aims.

In Weeks 3 and 4, students began to perform their projects and collected and recorded DATA to support their objectives/Hypotheses. Their progress was observed through frequent check-ins with the course instructor. The students in the PjBL-AI group used ChatGPT as an introspection tool. The students were describing their progress in the project and receiving AI-generated feedback and ideas for improvement. Similarly, students in the PjBL-NonAI group were asked to personally reflect on their project's progress and think of ways that can improve their outcomes. The last week of the project centered on evaluating project outcomes. Students in both groups analyzed their projects' results and compared them with their original goals/objectives. The group of students utilizing AI used it to perform an analysis of their results, in recognizing points of significance, and to articulate meaningful conclusions. The PjBL-non-AI group were asked to complete the same tasks using text and statistical tools given to them as part of the resources provided at the beginning of the project. Both groups of students prepared and delivered project presentations and handed in a written reflection on their scientific learning and experience by considering their learning process throughout the project. The control group delivered their presentations utilizing the typical/traditional learning approaches with no AI integration. They were relying mostly on textbook related lectures, discussions, and article search to put together their presentations on the topic.

Data Collection and Analysis

Data collection and analysis of outcomes in this study utilized direct testing approaches. There were pre/post-assessments that were analyzed to reflect the active-learning modality's impact on scientific understanding and knowledge comprehension (Gormally et al, 2012). The assessments contained 41 question items measuring interpretation, analysis, evaluation, inference, and explanation skills that are typically known to have a Cronbach's Alpha reliability coefficient between 0.7 and 0.8. The assessments were administered at the beginning (pre-assessments) and end (post-assessments) of the course. The data analysis for this study was generated using Microsoft Excel with the Real Statistics Resource Pack software (Release 9.7.6)*. Descriptive statistics, including mean and standard deviation, summarized pretest and posttest scores. Normality was tested using the Shapiro-Wilk test. A 3 (Group: Literature Review, PjBL without AI, PjBL with AI) $\times$ 2 (Time: Pre-assessment, Post-assessment) mixed-design ANOVA was conducted, with Group entered as a between-subjects factor and Time entered as a within-subjects factor. Paired-sample *t*-tests examined within-group improvements from pretest to posttest for both experimental and control groups. Independent- and paired-samples *t*-tests with Bonferroni correction (Dunn, 1961) were conducted to decompose the Group $\times$ Time effect to determine the effectiveness of the PjBL-AI intervention along with a *Post Hoc* pairwise comparison. Lastly, to directly compare the magnitude of improvement across groups, a one-way ANOVA was conducted on gain scores (Post vs. Pre). Statistical significance was set at $\alpha=0.05$, and effect size was calculated using Cohen's *d* to quantify the magnitude of differences between groups.

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RESULTS

Preliminary Analysis

Descriptive statistics for pre- and post-assessment scores across the three instructional groups: (Literature Review, PjBL without AI, and PjBL with AI) are presented in Table 1. As group sizes were unequal (Literature Review $n = 22$, PjBL without AI $n = 11$, PjBL with AI $n = 10$), It was necessary to have distributional and variance assumptions evaluated prior to conducting parametric analyses. Shapiro-Wilk tests indicated that gain scores (Post vs. Pre) were approximately normally distributed within each group (all $p > .05$; Shapiro & Wilk, 1965). Levene's test indicated that the homogeneity-of-variance assumption was met for gain scores across groups, $W = 1.23$, $p = .304$ (Levene, 1960). These results supported the use of parametric mixed-design ANOVA, paired-samples *t*-tests, and one-way ANOVA (Tabachnick & Fidell, 2013).

Table 1: Mean Pre- and Post-Assessment Scores by Instructional Group.

Group	Time	M	SD	n
Literature Review (No PjBL)	Pre	29.55	3.74	22
Literature Review (No PjBL)	Post	32.32	3.73	22
PjBL without AI	Pre	30.64	4.46	11
PjBL without AI	Post	35.18	2.86	11
PjBL with AI	Pre	29.40	3.69	10
PjBL with AI	Post	36.60	1.84	10

Statistical Analysis of Assessment Results

A 3 (Group: Literature Review, PjBL without AI, PjBL with AI) $\times$ 2 (Time: Pre-assessment, Post-assessment) mixed-design ANOVA was conducted, with Group entered as a between-subjects factor and Time entered as a within-subjects factor (Table 2). There was a statistically significant main effect of Time, $F(1, 40) = 76.69$, $p < .001$, partial $\eta^2 = .657$,

such that scores were higher at post-assessment ($M = 34.05$, $SD = 3.62$) than at pre-assessment ($M = 29.79$, $SD = 3.86$) across all participants. The main effect of Group was not statistically significant, $F(2, 40) = 2.15$, $p = .130$, partial $\eta^2 = .097$. Critically, the Group $\times$ Time interaction was statistically significant, $F(2, 40) = 6.70$, $p = .003$, partial $\eta^2 = .251$, which is a large effect by conventional benchmarks (Cohen, 1988). This indicates that the magnitude of pre-to-post improvement differed across instructional conditions.

Table 2: Mixed-Design ANOVA Results.

Source	SS	df1	df2	MS	F	p	partial η^2
Group (between)	87.82	2	40	43.91	2.15	.130	.097
Time (within)	389.41	1	40	389.41	76.69	< .001	.657
Group $\times$ Time	68.00	2	40	34.00	6.70	.003	.251

Following the significant interaction, independent- and paired-samples t -tests with Bonferroni correction (Dunn, 1961) were conducted to decompose the Group $\times$ Time effect. Effect sizes for these pairwise contrasts are reported as Hedges' g , which corrects Cohen's d for bias arising from unequal and small sample sizes (Hedges & Olkin, 1985) (Table 3). No groups differed significantly at pre-test (all $p_{\text{corr}} = 1.00$), confirming baseline equivalence. At post-test, the Literature Review group scored significantly lower than the PjBL with AI group, $t(29.7) = -4.34$, $p_{\text{corr}} = .001$, $g = -1.27$; the Literature vs. PjBL without AI and PjBL with AI vs. PjBL without AI post-test comparisons were not statistically significant after correction.

Table 3: Post Hoc Pairwise Comparisons.

Contrast	Comparison	t	df	p (Bonf.)	Hedges' g
Time (collapsed across Group)	Post vs. Pre	7.77	42	< .001	1.13
Group (collapsed across Time)	Literature vs. PjBL+AI	-1.88	22.6	.221	-0.63
Group (collapsed across Time)	Literature vs. PjBL no AI	-1.64	21.6	.344	-0.58
Group (collapsed across Time)	PjBL+AI vs. PjBL no AI	0.07	18.8	1.000	0.03
Simple effect at Post-test	Literature vs. PjBL+AI	-4.34	29.7	.001	-1.27
Simple effect at Post-test	Literature vs. PjBL no AI	-2.44	25.5	.131	-0.80
Simple effect at Post-test	PjBL+AI vs. PjBL no AI	1.36	17.2	1.000	0.56
Simple effect at Pre-test	Literature vs. PjBL+AI	0.10	17.7	1.000	0.04
Simple effect at Pre-test	Literature vs. PjBL no AI	-0.70	17.3	1.000	-0.27
Simple effect at Pre-test	PjBL+AI vs. PjBL no AI	-0.69	18.9	1.000	-0.29

Paired-samples t -tests were conducted within each group to evaluate pre-to-post change, with effect sizes expressed as Cohen's d (Cohen, 1988) (Table 4). Paired-samples t -tests confirmed statistically significant pre-to-post gains within every group: Literature Review, $t(21) = 4.35$, $p < .001$, $d = 0.74$; PjBL without AI, $t(10) = 3.78$, $p = .004$, $d = 1.21$; and PjBL with AI, $t(9) = 8.85$, $p < .001$, $d = 2.47$. The largest effect was observed for the PjBL with AI group, followed by PjBL without AI and the Literature Review group.

Table 4: Paired t-Test Results: Post vs. Pre Scores.

Group	t	df	p	95% CI	Cohen's d
Overall (all groups combined)	7.77	42	< .001	[3.15, 5.36]	1.14
Literature Review (No PjBL)	4.35	21	< .001	[1.45, 4.10]	0.74
PjBL without AI	3.78	10	.004	[1.87, 7.22]	1.21
PjBL with AI	8.85	9	< .001	[5.36, 9.04]	2.47

To directly compare the magnitude of improvement across groups, a one-way ANOVA was conducted on gain scores (Post vs. Pre; Table 5), followed by Bonferroni-corrected pairwise comparisons (Table 6). Consistent with the mixed-design interaction, the one-way ANOVA on gain scores was statistically significant, $F(2, 40) = 6.70$, $p = .003$, $\eta^2 = .251$. This test is mathematically equivalent to the Group $\times$ Time interaction reported above, as a two-level within-subjects interaction reduces to a one-way ANOVA on difference scores (Field, 2013). Post hoc comparisons showed that the PjBL with AI group's gain ($M = 7.20$, $SD = 2.57$) was significantly larger than the Literature Review group's gain ($M = 2.77$, $SD = 2.99$), $p_{\text{corr}} = .001$, $g = 1.50$. The PjBL with AI group's gain did not differ significantly from the PjBL without AI group's gain ($M = 4.55$, $SD = 3.98$), $p_{\text{corr}} = .254$, nor did the Literature Review and PjBL without AI groups differ significantly from one another, $p_{\text{corr}} = .633$.

Table 5: One-Way ANOVA on Gain Scores (Post vs. Pre).

Source	SS	df	MS	F	p	η^2
Group	135.99	2	68.00	6.70	.003	.251
Within (error)	406.19	40	10.15			

Table 6: Post Hoc Pairwise Comparisons of Gain Scores (Bonferroni-corrected).

Comparison	M diff (gain)	t	df	p (Bonf.)	Hedges' g
Literature vs. PjBL with AI	-4.43	-4.28	20.2	.001	-1.50
Literature vs. PjBL without AI	-1.77	-1.30	15.8	.633	-0.52
PjBL with AI vs. PjBL without AI	2.65	1.83	17.2	.254	0.75

Examined together, these results indicate that all three instructional approaches were associated with statistically significant improvement from pre- to post-assessment. However, project-based learning supplemented with AI produced significantly larger gains than the literature-review-only approach, with the one-way ANOVA and post hoc comparisons converging on the same pattern of results as the mixed-design ANOVA interaction. Although the PjBL with AI group showed the numerically largest gain, its advantage over the PjBL without AI group did not reach statistical significance after correction for multiple comparisons. All analyses were conducted at $\alpha = .05$.

DISCUSSION

The results of this study demonstrate the significant benefit of utilizing PjBL, coupled with AI tools use, in advancing student learning when compared to traditional lecture-based or lecture heavy approach, consistent with initial study goals. And while the study did not exhibit effective improvements among the groups that utilized PjBL with AI use verses the groups that didn't, the outcome could simply be an artifact of the small sample presently studied. Future work will look to increase the sample size and examine student sentiments during and after the completion of the learning activities. The application of AI tools in PjBL has become a promising pedagogical approach in higher

education settings. Project-Based Learning involves students in authentic inquiries where they have to solve a problem, collect and process information, generate solutions, and present their findings. Thanks to the developments in generative AI, the process of PjBL can now be enhanced via the provision of help for students in brainstorming, information synthesis, conceptual understanding, and feedback generation. The literature reports that the use of AI tools allows these tools to act as cognitive scaffolds, relieving students from routine cognitive operations while allowing them to engage in more challenging activities of analysis, evaluation, and problem solving (Chen & Cheung, 2025; Xia et al., 2025).

Several studies have empirically proved that project-based learning assisted by artificial intelligence can considerably help improve students' critical thinking and communication skills. In particular, Habibah et al. (2025) have conducted research on AI-assisted problem-solving project-based learning and found out that those students who had been using PjBL assisted by artificial intelligence showed considerable progress in critical thinking and scientific communication compared to those students who were taught using conventional instruction techniques. This is possible due to the fact that AI software allows generating ideas, evaluating evidence, and refining solutions to projects. These results confirm constructivist theory of learning according to which learning becomes effective if there is an active interaction with information. Promoting the inquiry and reflective processes, AI tools might promote cognitive processes that contribute to successful project completion and knowledge construction. Moreover, results of the meta-analytical research support the efficacy of the learning environment enhanced by AI technologies. According to Chen & Cheung (2025), the meta-analysis of 57 articles and 97 effect sizes showed large positive effect of the use of generative AI in university student learning outcomes ($g = 0.804$). The positive effects were noted for academic achievement ($g = 0.633$), affective-motivational outcomes ($g = 0.617$), and higher-order thinking skills ($g = 0.580$). At the same time, Liu et al. (2025), analyzing 49 studies, noted that generative AI had significant positive effects on the learning achievements (effect size = 0.857) and learning motivation (effect size = 0.803). The findings are especially important for project-based learning because its success is highly dependent on students' motivation and problem-solving skills. Thus, meta-analyses show that AI technologies can be effective for multiple aspects of student learning in active learning environments.

Furthermore, recent research indicates that the use of AI in PBL might foster creativity and innovation. PBL implies generation of new ideas, evaluation of different alternatives, and coming up with innovative answers to real-life problems. Specifically, scientific studies analyzing human-AI cooperation indicate that students working together with AI create more creative answers and are better at ideation exercises than those working alone (Holzner et al., 2025). Likewise, scientific research dedicated to the analysis of PBL assisted by generative AI reveals that using AI for brainstorming may result in greater generation of new ideas and overcoming of mental barriers, including writer's block (Xia et al., 2025). These studies show that AI may become a good partner to assist in fostering creative thinking without losing control over decision-making process and results.

However, despite these positive results, existing research highlights the importance of maximizing educational effectiveness by using AI as a learning aid rather than a replacement for student work. Positive results have been consistently found when students work with AI-generated material through its evaluation, re-evaluation, and reflection rather than simple acceptance of generated answers (Chen & Cheung, 2025; Fan et al., 2026). Accordingly, researchers have argued that the effectiveness of instructional design will determine whether the use of AI technology in learning will facilitate or impede the learning process (Ruiz et al, 2025). In a project-based learning setting, the proper use of AI can help learners develop the necessary inquiry, collaborative, critical thinking, and creative skills without undermining their engagement, which is a core element of a student-centered approach. Hence, based on the available data, it can be argued that AI-assisted PjBL holds significant promise in terms of enhancing the quality of learning.

REFERENCES

- Abbas, M., Jam, F. A., & Khan, T. I. (2024). *Is it harmful or helpful? Examining the causes and consequences of generative AI usage among university students*. International Journal of Educational Technology in Higher Education, 21, 10.
- Alim, B., & Butsiarah, B. (2025). The Application of AI-Assisted Project-Based Learning to Improve Students' Critical Thinking Skills. *DIAJAR: Jurnal Pendidikan dan Pembelajaran*, 4(4), 818–827.

- Arqam, A., & Asrifan, A. (2024). Integrating AI in Project-Based Learning for Differentiated English Language Instruction: A Scoping Review. *Journal of English Education and Teaching*, 8(3), 586–608.
- Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 83(2), 39–43.
- Betta, J., Boronina, L., Senuk, Z., & Baliarov, A. (2018). Project-Based Learning in Training of a New Generation of Specialists: A Corporative Analysis. *NORDSCI*.
- Chan, C. K. Y., & Hu, W. (2024). “ChatGPT seems too good to be true”: College students' use and perceptions of generative AI. *Computers and Education: Artificial Intelligence*, 7, 100294.
- Chen, S., & Cheung, A. C. K. (2025). *Effect of Generative Artificial Intelligence on University Students Learning Outcomes: A Systematic Review and Meta-Analysis*. *Educational Research Review*, 49, 100737.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.
- Condliffe, B., Quint, J., Visser, M. G., Bangser, M. R., Drohojowska, S., Saco, L., & Nelson, E. (2017). *Project-based learning: A literature review*. MDRC.
- Contractor, Z., & Reyes, G. (2025). *Generative AI in Higher Education: Evidence from an Elite College*. arXiv.
- Dunn, O. J. (1961). Multiple comparisons among means. *Journal of the American Statistical Association*, 56(293), 52–64. <https://doi.org/10.1080/01621459.1961.10482090>
- Fan, C., Ke, L., Chen, Z., & Lv, P. (2026). *Exploring the Effect of GenAI on Learning Outcomes in Higher Education: A Three-Level Meta-Analysis*. *Frontiers in Psychology*, 17.
- Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences*, 111(23), 8410–8415.
- Gormally, C., Brickman, P., & Lutz, M. (2012). Developing a Test of Scientific Literacy Skills (TOSLS): Measuring Undergraduates' Evaluation of Scientific Information and Arguments. *CBE—Life Sciences Education*, 11(4), 364–377. <https://doi.org/10.1187/cbe.12-03-0026>
- Gurung, R. A., Oxlade, M., & Slade, J. J. (2026). Does an AI-Assisted Active Learning Exercise Foster Student Interest? *Teaching of Psychology*. Advance online publication. <https://doi.org/10.1177/00986283261425238>
- Habibah, L. B., Ibrahim, I., & Susilo, H. (2025). The effect of AI-assisted problem-oriented project-based learning on students' critical thinking and communication skills. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, 11(2), 656–668. <https://doi.org/10.22219/jpbi.v11i2.40667>
- Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis*. Academic Press.
- Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review*, 16(3), 235–266. <https://doi.org/10.1023/B:EDPR.0000034022.16470.f3>
- Holzner, N., Maier, S., & Feuerriegel, S. (2025). Generative AI and creativity: A systematic literature review and meta-analysis. *arXiv preprint arXiv:2505.17241*.
- Hon, K. (2026). Generative AI in higher education: A systematic review of its effects on learning outcomes and academic performance. *Journal of Educational Technology Systems*, 54(3), 537–560.

Johnston, H., Wells, R. F., Shanks, E. M., Boey, T., & Parsons, B. N. (2024). *Student perspectives on the use of generative artificial intelligence technologies in higher education*. *International Journal for Educational Integrity*, 20(2).

Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving Schools*, 19(3), 267–277. <https://doi.org/10.1177/1365480216659733>

Levene, H. (1960). Robust tests for equality of variances. In I. Olkin (Ed.), *Contributions to probability and statistics: Essays in honor of Harold Hotelling* (pp. 278–292). Stanford University Press.

Liu, X., Guo, B., He, W., & Hu, X. (2025). *Effects of Generative Artificial Intelligence on K–12 and Higher Education Students' Learning Outcomes: A Meta-Analysis*. *Journal of Educational Computing Research*, 63(5).

Luo, J., Zheng, C., Yin, J., & Teo, H. H. (2025). *Design and assessment of AI-based learning tools in higher education: A systematic review*. *International Journal of Educational Technology in Higher Education*, 22, 42.

Obenza, B. N., Salvahan, A., Rios, A. N., Solo, A., Alburo, R. A., & Gabila, R. J. (2024). *University Students' Perception and Use of ChatGPT: Generative Artificial Intelligence in Higher Education*. *International Journal of Human Computing Studies*, 5(12), 5–18.

Poell, R. F., & Van der Krogt, F. J. (2003). Project-based learning in organizations: towards a methodology for learning in groups. *Journal of Workplace Learning*, 15(5), 217–228.

Prince, M. (2004). Does active learning work? A review of the research. *Journal of Engineering Education*, 93(3), 223–231. <https://doi.org/10.1002/j.2168-9830.2004.tb00809.x>

Ruiz Viruel, S., Sánchez Rivas, E., & Ruiz Palmero, J. (2025). The Role of Artificial Intelligence in Project-Based Learning: Teacher Perceptions and Pedagogical Implications. *Education Sciences*, 15(2), 150.

Shapiro, S. S., & Wilk, M. B. (1965). An analysis of variance test for normality (complete samples). *Biometrika*, 52(3/4), 591–611. <https://doi.org/10.2307/2333709>

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Pearson.

Theobald, E. J., Hill, M. J., Tran, E., Agrawal, S., Arroyo, E. N., Behling, S., Chambwe, N., Cintrón, D. L., Cooper, J. D., Dunster, G., Grummer, J. A., Hennessey, K., Hsiao, J., Iranon, N., Jones, L., Jordt, H., Keller, M., Lacey, M. E., Littlefield, C. E., ... Freeman, S. (2020). Active learning narrows achievement gaps for underrepresented students in undergraduate STEM. *Proceedings of the National Academy of Sciences*, 117(12), 6476–6483. <https://doi.org/10.1073/pnas.1916903117>

Xia, Q., Zhang, P., Huang, W., & Chiu, T. K. (2025). The impact of generative AI on university students' learning outcomes via Bloom's taxonomy: a meta-analysis and pattern mining approach. *Asia Pacific Journal of Education*, 1–31.

BLOCKCHAIN FOR TRANSPARENCY IN SOUTH AFRICA'S ENERGY SECTOR: A REVIEW OF PROCUREMENT AND QUALITY CONTROL CHALLENGES

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ABSTRACT

This paper reviews procurement and quality control challenges in South Africa's energy sector, highlighting how inefficiencies, corruption, and governance failures contribute to load-shedding, inflated costs, and project delays. While blockchain has been explored in various sectors, its application to the unique complexities of South Africa's energy procurement, marked by bid manipulation, political interference, and weak quality oversight, remains underexplored. This study addresses that gap by situating blockchain within this context and assessing its potential to enhance transparency, accountability, and operational efficiency. A total of 160 academic and industry sources published between 2018 and 2024 were identified, with 28 selected based on relevance, credibility, and impact for detailed thematic analysis. Findings indicate that blockchain's decentralised, tamper-proof structure can streamline procurement processes, automate verification through smart contracts, and strengthen quality control. The study also identifies adoption barriers, including resistance from entrenched systems, high implementation costs, and the absence of clear regulatory frameworks. Recommendations include establishing public-private collaboration structures, implementing targeted pilot projects, and introducing legislative measures to enable adoption. By addressing both the opportunities and barriers, the study advances the discourse on digital transformation in public procurement and offers practical pathways to promote transparency, efficiency, and sustainable energy delivery.

Keywords: blockchain, energy sector, South Africa, Quality Control.

INTRODUCTION

South Africa's energy sector faces persistent challenges in its procurement and quality control systems, including inefficiency, inflated costs, and a lack of transparency, conditions often exacerbated by corruption and fraud. These issues result in resource delays, higher operational costs, and compromised energy quality, all of which hinder effective service delivery and contribute to ongoing load-shedding. Blockchain technology offers a promising alternative by enhancing transparency, improving data integrity, and promoting accountability across procurement and quality control operations.

South Africa's energy supply relies heavily on coal, which accounts for approximately 77% of electricity generation (Mirzania et al., 2023). Although renewable energy sources, particularly solar photovoltaic (PV), are gaining traction, with a 15% increase in capacity from 2022 to 2023 (Adebiyi & Moloi, 2024), coal-fired power stations continue to dominate the landscape. The energy sector contributes approximately 95% of the country's total

energy supply and plays a critical role in economic development. However, outdated infrastructure, poor maintenance, and limited investment in innovation have led to widespread power outages and eroded public confidence in energy providers (Mahlangu & Mbohwa, 2023), (Adewuyi et al., 2020). Blockchain technology presents an opportunity to modernise procurement and quality control systems by offering a decentralised, tamper-proof platform that enables transparent tracking of transactions. This can significantly reduce fraud and enhance managerial accountability (Prins et al., 2022). When integrated with Fourth Industrial Revolution (4IR) technologies, blockchain can help digitise procurement platforms and improve decision-making efficiency (Plantinga & Adams, 2021). However, for successful implementation, the sector requires favourable regulatory support, infrastructural investment, and capacity-building initiatives.

This paper reviews the development and application of blockchain in energy procurement, with a specific focus on its potential to address the systemic challenges in South Africa's energy sector and enhance transparency, cost-effectiveness, and operational accountability.

Aim of the Study

This study aims to investigate how blockchain technology can enhance the sustainability, efficiency, and transparency of South Africa's energy supply by reducing corruption in the procurement of vital resources and improving the accountability of procurement managers and specialists.

Objectives of the Study

The study seeks to achieve the following objectives: (1) To examine the current procurement and quality control systems used in South Africa's energy sector. (2) To identify the key challenges within these systems that contribute to corruption and operational inefficiencies. (3) To explore the potential integration of blockchain technology with existing procurement and quality control frameworks. (4) To assess the anticipated benefits and challenges of implementing blockchain technology in energy procurement processes within South Africa's energy sector.

Scope of the Study

This study focuses on the procurement of vital resources and the quality control systems within South Africa's energy sector. It specifically reviews literature published between 2018 and 2024 to explore how blockchain technology influences accountability in procurement and quality management processes.

Value and Significance of the Study

This study addresses a key gap in literature by examining how blockchain's decentralised, tamper-proof features can tackle corruption, inefficiency, and weak quality control in South Africa's energy sector procurement. It offers context-specific insights for policymakers and industry stakeholders to enhance transparency, accountability, and operational efficiency. By situating blockchain within the country's unique governance and infrastructural challenges, the research advances understanding of its potential to restore public trust and support sustainable energy delivery while recognising the barriers to its adoption.

RESEARCH METHODS

This study uses a literature review approach to examine blockchain applications in South Africa's energy sector, focusing on procurement, quality control, and operational efficiency. Sources were identified using keywords such as "Blockchain in Energy," "Blockchain Procurement," and "South African Energy Sector" across SCOPUS, Google Scholar, ResearchGate, the University of Johannesburg's database, and other repositories. From an initial pool of 160 publications (2018–2024), sources were screened using inclusion criteria: direct relevance to blockchain in procurement or quality control, applicability to South Africa or comparable contexts, methodological or industry credibility, and actionable insights for policy or practice. Exclusion criteria removed outdated, non-credible, or methodologically weak works. Citation impact and industry recognition were also considered. This process yielded 28 high-quality sources for in-depth thematic analysis, summarised in Table 1. While the literature review approach

enabled a broad assessment of blockchain applications within procurement and quality control systems, the methodology may be subject to selection and publication bias due to reliance on secondary sources. The inclusion of predominantly published academic and industry literature may have excluded unpublished institutional data or opposing perspectives regarding blockchain implementation challenges. The contextual focus on South Africa may limit the broader generalisability of the findings to other regions with different regulatory and infrastructural conditions.

Table 1: List of Reviewed Sources.

	Source Title	Authors(s)	Year	Document Type
1	Blockchain for energy management and trading	S. Andoni, V. Robu, D. Flynn	2019	Journal Article
2	Blockchain-enabled peer-to-peer energy trading in South Africa	D. Molefe, L. Sibanda	2020	Journal Article
3	The use of blockchain in enhancing energy data security	V. Hlongwane, P. Ndlovu	2020	Conference Paper
4	Blockchain and the future of energy	Vlada Brilliantova, Thomas Wolfgang Thurne	2020	Journal Article
5	Smart contracts for decentralized energy trading	P. Wang, X. Liang, R. Lu	2021	Conference Paper
6	Enhancing supply chain transparency in the energy sector using blockchain	C. Ncube, A. Khumalo	2021	Industry Paper
7	Renewable energy integration using blockchain	J. Daniels, A. Van Rooyen	2021	Journal Article
8	Blockchain's impact on South Africa's carbon credit trading	K. Mbatha, R. Sithole	2021	Journal Article
9	The role of blockchain in South Africa's energy policy framework	P. Dlamini, C. Mngomezulu	2021	Journal Article
10	The role of blockchain in South Africa's energy transition	K. Mokwena, T. Mofokeng	2022	Journal Article
11	Challenges of implementing blockchain in South African energy procurement	T. Maseko, K. Ndhlovu	2022	Conference Paper
12	Integrating blockchain in South Africa's electricity distribution networks	O. Nkosi, P. Moyo	2022	Conference Paper
13	Blockchain-based renewable energy certificates	T. Mthethwa, L. Govender	2022	Journal Article
14	Improving transparency in Eskom's procurement with blockchain	K. Mthombeni, J. Sithole	2022	Industry Paper
15	Distributed ledger technology for South Africa's smart grids	T. Phiri, L. Radebe	2022	Conference Paper
16	Supply chain resilience in South Africa's energy sector through blockchain	T. Khumalo, B. Ngubane	2022	Journal Article
17	Adoption of blockchain for procurement in the South African energy sector	M. Dlamini, S. Sithole	2023	Conference Paper
18	Blockchain-based microgrids for rural electrification in South Africa	B. Maluleke, R. Naidoo	2023	Journal Article
19	Impact of blockchain on Eskom's procurement system	N. Zulu, R. Mthembu	2023	Industry Paper
20	The potential of blockchain in mitigating fraud in energy procurement	B. Shongwe, M. Zwane	2023	Journal Article
21	Evaluating blockchain for cost reduction in South Africa's energy sector	S. Gwala, T. Molepo	2023	Industry Paper
22	Digital transformation of South Africa's energy procurement with blockchain	L. Nkala, D. Mashaba	2023	Journal Article
23	Investigating blockchain-based tariffs for energy in South Africa	M. Makhanya, S. Sithole	2023	Journal Article

24	Blockchain applications in renewable energy projects	L. Pretorius, J. Van Wyk	2024	Journal Article
25	Blockchain for improving supplier verification in South Africa's energy industry	T. Khosa, S. Sithole	2024	Journal Article
26	Optimizing South Africa's energy contracts with blockchain	A. Ncube, D. Tshabalala	2024	Journal Article
27	Using blockchain to improve billing accuracy in South Africa's power sector	J. Motsepe, K. Molefe	2024	Industry Paper
28	Blockchain for decentralized energy management in South Africa	N. Maseko, L. Dube	2024	Journal Article

LITERATURE REVIEW

Traditional Procurement and Quality Control Systems in South Africa

Procurement in South Africa's energy sector is largely centralised, with key players including Eskom, the Department of Mineral Resources and Energy (DMRE), Independent Power Producers (IPPs), and the Government overseeing the acquisition of essential infrastructure and resources (National Treasury, 2021). Regulatory frameworks such as the Public Finance Management Act (PFMA) and the Preferential Procurement Policy Framework Act (PPPPFA) are designed to promote efficiency, fairness, and competition. However, despite these frameworks, the sector continues to experience significant inefficiencies, bid manipulation, overpricing, and political interference (Ambe & Badenhorst-Weiss, 2012). Non-compliance with procurement laws, lack of transparency, and biased contract awards have led to inflated contracts, fund misappropriation, and delays in energy infrastructure development, as highlighted by the Zondo commission (Zondo Commission, 2022). Quality control systems also face challenges, with poor oversight leading to substandard equipment and an unstable energy supply. Moyo (2023) noted that weak enforcement of procurement laws has undermined quality control and the sustainability of energy services in the country. These procurement shortcomings have contributed to frequent load-shedding and increased operational costs (Williams-Elegbe, 2020).

Eskom, the primary electricity provider, employs a Procurement and Supply Chain Management (P&SCM) Policy to align with legal standards and improve procurement efficiency (Eskom, 2023). Measures such as the Supplier Integrity Pact promote ethical procurement, while the DMRE's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) has attracted over R209 billion in private investment since 2011. The programme also contributed to local economic development and added 3,876 MW of renewable energy to the national grid. Quality improvements were noted between 2018 and 2022, including a 15% reduction in equipment failures and better adherence to ISO 9001 standards. While 77% of REIPPPP projects complied with ISO 9001, challenges such as high certification costs and lack of technical expertise still hinder broader adoption, especially among SMEs.

The Challenges in the Procurement Systems in South Africa

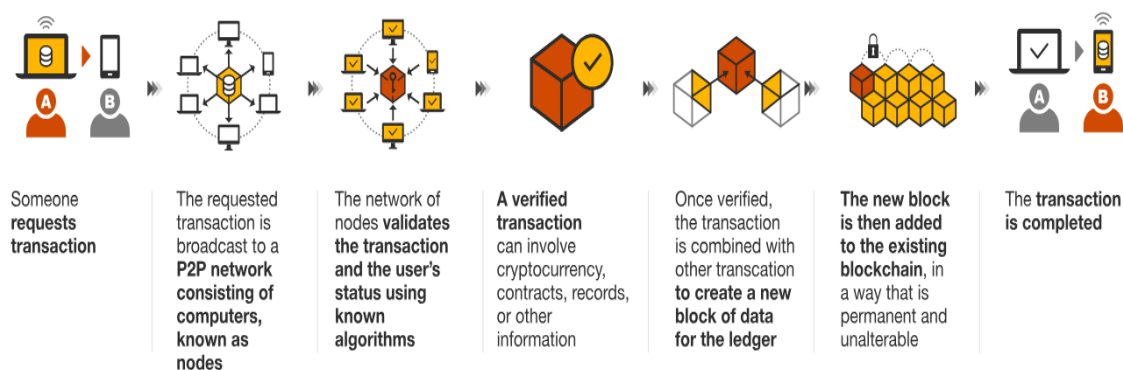
Corruption remains a pervasive issue in South Africa's procurement landscape, particularly within the energy sector. Political favouritism, bribery, and other forms of procurement fraud have frequently led to contracts being awarded to unqualified contractors and service providers (Corruption Watch, 2020). These fraudulent activities have significantly inflated project costs, caused implementation delays, and resulted in substandard infrastructure delivery.

According to (Corruption Watch, 2020), corruption in government tender processes is estimated to cost the country between R25 billion and R30 billion annually, representing a substantial loss to the national procurement budget. These figures reflect systemic weaknesses in procurement oversight and enforcement mechanisms. The Institute for Security Studies Africa further highlighted that in 2017 alone, nearly half of the R800 billion procurement expenditure was mismanaged due to ineffective procurement systems. Such findings underscore the urgency of reforming procurement practices in South Africa's energy sector. Without effective accountability mechanisms and transparent systems, public trust continues to erode, and critical infrastructure projects remain at risk of inefficiency and failure.

Blockchain and Evolution in the Industry

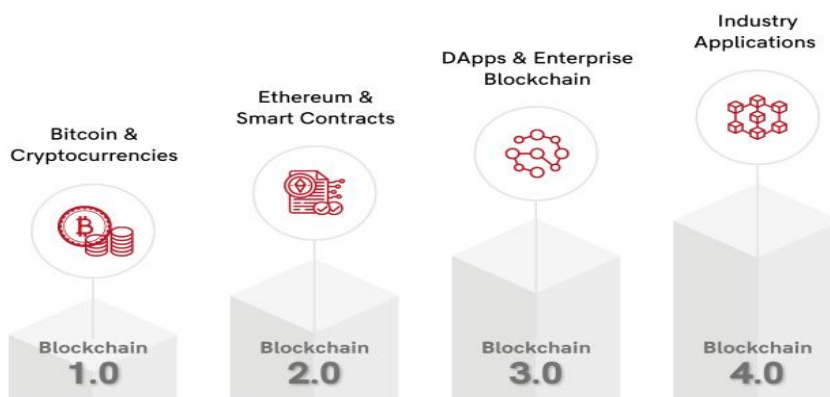
Blockchain technology has evolved significantly from its original association with cryptocurrencies to become a flexible and transformative solution across multiple sectors, including banking, supply chain management, energy, and information technology. Sithole et al. (2022), The report “Benefits of Technology: Utilisation of Blockchain in the South African Banking Sector amid Industry 4.0” describes blockchain as an artificial intelligence-driven database system that records permanent, immutable transactions and data. This decentralised technology eliminates the need for third-party intermediaries, enabling secure and transparent business transactions. As illustrated in Fig. 1, blockchain operates as a distributed ledger system, facilitating trust and data integrity. Fig. 2 highlights the progression of blockchain technology from its origins in digital currency to the development of smart contracts, decentralised applications (DApps), and broader industrial use cases. These advancements underscore blockchain’s potential to address transparency, efficiency, and accountability challenges across industries (Zhang et al., 2019). One of the significant developments in blockchain architecture involves improvements in energy efficiency. The traditional Proof of Work (PoW) consensus mechanism, while effective, consumed substantial amounts of energy. In contrast, the introduction of the Proof of Stake (PoS) protocol has reduced energy consumption by approximately 99% (Ethereum Foundation, 2022), (Buterin, 2019). PoS relies on validators selected based on their token holdings and participation in the network, making it a more sustainable and environmentally friendly alternative. These technological enhancements strengthen blockchain’s suitability for application in the energy sector, particularly in enhancing procurement transparency and efficiency while aligning with sustainable development goals.

Figure 1: Blockchain Process.



Source: Authors

Figure 2: Evolution in the Industry.



Source: Authors

Blockchain Adoption Benefits in Energy Procurement and Quality Control Systems

Blockchain technology offers promising applications for enhancing transparency and accountability in supplier transactions and contract management within the energy sector. Its decentralised architecture, immutable records, and distributed ledger framework present a viable solution for reducing corruption and fraud in procurement processes (Dlamini, 2023). The Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) has initiated efforts to pilot blockchain solutions for monitoring supplier transactions, with early results showing a 20% reduction in procurement irregularities related to bidding and payment processes (World Bank, 2023). Similarly, Eskom, in partnership with IBM, has implemented blockchain programs to track coal supply networks in real-time, aiming to prevent fraudulent activities and unauthorised billing (Eskom, 2023).

Further innovations include blockchain-enabled peer-to-peer (P2P) energy trading platforms. According to Shan et al. (2023), these models allow consumers, particularly those with solar energy systems, to sell surplus energy directly to other end-users, bypassing traditional utility intermediaries. Such platforms enhance distribution efficiency, lower transaction fees, and foster competitive and transparent energy pricing. Collectively, these developments highlight the growing potential of blockchain to modernize procurement and distribution processes in South Africa's energy sector, supporting greater operational transparency, reduced corruption, and improved service delivery. The study primarily draws on concepts of transparency, accountability, and digital transformation to assess the relevance of blockchain technology within energy procurement systems. These perspectives align with the research objectives by emphasising governance improvement and operational efficiency. However, alternative theoretical perspectives such as Institutional Theory and the Technology Acceptance Model (TAM) could provide additional insights into organisational resistance, stakeholder adoption behaviour, and regulatory adaptation challenges associated with blockchain implementation in the public sector.

FINDINGS

Inefficiencies in South Africa's Centralised Procurement Systems

The review reveals that South Africa's energy sector suffers from significant procurement inefficiencies, largely due to its highly centralised systems. These systems are particularly vulnerable to political interference, often resulting in inflated tenders and bid manipulation. Such irregularities compromise the effectiveness of procurement processes, leading to resource misallocation, project delays, and increased operational costs. Ultimately, these inefficiencies disrupt the consistent supply of electricity and contribute directly to the country's ongoing load-shedding challenges.

Corruption Undermines Quality Control and Service Delivery

While South Africa's energy sector is guided by quality control regulations intended to ensure effective operations, inconsistencies in procurement continue to undermine its impact. Corrupt practices within procurement systems, such as the diversion of vital resources, have led to inadequate infrastructure, poor maintenance, and inefficiencies in electricity generation and distribution. These challenges result in elevated operational costs and frequent service interruptions, disproportionately affecting marginalised communities that rely on stable energy access.

Corruption Erodes Public Trust and Hampers Sustainable Operations

Corruption remains a critical challenge within South Africa's energy procurement systems, significantly eroding public trust and hindering equitable resource distribution. Practices such as inflated contracts, preferential treatment of suppliers, and lack of transparency in tender processes have led to substantial financial losses and operational inefficiencies. These corrupt activities not only delay the execution of major projects but also escalate costs, making it increasingly difficult for the energy sector to maintain sustainable and reliable operations.

Barriers to Blockchain Adoption in the Energy Sector

Despite its potential, the adoption of blockchain technology in South Africa's energy sector faces several challenges. These include resistance from entrenched procurement systems, high implementation costs, and the absence of clear regulatory and legal frameworks. Overcoming these barriers requires a fundamental shift in procurement practices, supported by ethical leadership, the establishment of clear and enforceable regulations, and a commitment to technological innovation. Such reforms are essential to promote sustainability, transparency, and efficiency within procurement and quality control systems.

Implementation Recommendations

Blockchain adoption in South Africa's energy sector requires coordinated institutional reform, targeted pilot implementation, and a supportive regulatory environment. A national Blockchain Energy Procurement Consortium should be established through collaboration between the Department of Mineral Resources and Energy, Eskom, Independent Power Producers (IPPs), technology providers, academic institutions, and civil society organisations. The consortium could oversee blockchain governance standards, supplier verification protocols, and data-sharing frameworks across the energy procurement value chain. Pilot projects should initially focus on high-risk procurement activities such as coal supply contracts, renewable energy tenders, and infrastructure maintenance projects. Smart contracts could be implemented to automate supplier verification, milestone approvals, payment releases, and quality compliance monitoring. Blockchain-enabled audit trails may further improve traceability and reduce opportunities for procurement fraud and unauthorised contract modifications.

Unique policy interventions are also necessary to support implementation. The South African government should consider amendments to the Public Finance Management Act (PFMA) and Preferential Procurement Policy Framework Act (PPPPFA) to formally recognise blockchain records and smart contracts as legally enforceable procurement instruments. In addition, the development of a national blockchain regulatory framework for public sector procurement could establish standards for interoperability, cybersecurity, digital identity verification, and ethical data governance. To support long-term sustainability, government and industry stakeholders should invest in blockchain skills development programmes for procurement practitioners, quality managers, and energy sector regulators. Incentive mechanisms such as innovation grants, tax incentives, and public-sector digital transformation funding may also encourage private sector participation and accelerate blockchain adoption across the energy sector. The findings of this study have important implications for policymakers and energy sector decision-makers. Government institutions and regulatory bodies can utilise blockchain technology to strengthen procurement oversight, improve supplier verification, and reduce opportunities for corruption in public tenders. Policymakers should prioritise the development of blockchain governance frameworks, digital procurement regulations, and capacity-building programmes to support implementation. Energy sector organisations may further apply blockchain-based smart contracts and real-time auditing systems to improve transparency, operational efficiency, and public trust in procurement processes.

CONCLUSION

This study highlights that corruption, and inefficiencies remain major challenges within South Africa's energy sector procurement and quality control systems. Practices such as bid manipulation, inflated tenders, and political interference continue to undermine service delivery, increase operational costs, and contribute to ongoing load-shedding. The findings indicate that blockchain technology has significant potential to improve transparency, accountability, and operational efficiency through decentralised record-keeping and smart contract functionality. However, successful implementation will require regulatory support, institutional readiness, stakeholder collaboration, and investment in digital infrastructure and skills development.

The study contributes to the growing discourse on digital transformation in developing economies by providing practical recommendations for improving transparency and sustainability within South Africa's energy procurement systems. This study is limited by its reliance on a literature review approach and secondary data sources published between 2018 and 2024. Although the review provided valuable insights into blockchain applications in procurement and quality control, it did not include primary empirical data from stakeholders within South Africa's

energy sector. The study focused mainly on transparency and operational efficiency perspectives, without extensive engagement with broader theoretical frameworks related to technology adoption and institutional change.

Future research should employ empirical and mixed methods approaches involving procurement officials, regulators, and energy providers to assess blockchain implementation readiness and practical adoption challenges. Further studies may also explore the integration of blockchain with other Fourth Industrial Revolution technologies, such as artificial intelligence and the Internet of Things (IoT), within the energy sector.

AI Declaration: *This paper utilised artificial intelligence tools, including ChatGPT, to assist with language editing and structural refinement. All core ideas, analysis, and conclusions are the original work of the author(s). The author(s) accept full responsibility for the accuracy, integrity, and originality of the content.*

REFERENCES

- Adebiyi, A. A., & Moloi, K. (2024). Renewable energy source utilization progress in South Africa: A review. *Energies*, 17(14), 3487.
- Adewuyi, O. B., Kiptoo, M. K., Afolayan, A. F., Amara, T., Alawode, O. I., & Senjyu, T. (2020). *Title of paper if known. Energy Reports*.
- Ambe, I. M., & Badenhorst-Weiss, J. A. (2012). Procurement challenges in the South African public sector. *Journal of Transport and Supply Chain Management*, 6(1), 242–261.
- Buterin, V. (2019). *Proof of stake: How I learned to love saving energy*. Medium. <https://vitalik.ca>
- Corruption Watch. (2020). *South Africa needs clean hands: A report on corruption within local government*. <https://www.corruptionwatch.org.za/wp-content/uploads/2020/08/CW-2020-Local-Government-Report.pdf>
- Dlamini, S. (2023). Blockchain applications in energy procurement: A South African perspective. *South African Energy Journal*, 12(3), 123–135.
- Eskom. (2023). *Annual performance report 2023*. Eskom.
- Ethereum Foundation. (2022). *Ethereum 2.0: The future of blockchain and Web 3.0*. <https://ethereum.org>
- Mahlangu, V., & Mbohwa, C. (2023). Exploring the impact of institutional quality on South Africa's transition to renewables. *Environmental Economics and Policy Studies*, 25(4), 717–740.
- Mirzania, P., Gordon, J. A., Balta-Ozkan, N., Sayan, R. C., & Marais, L. (2023). Barriers to powering past coal: Implications for a just energy transition in South Africa. *Energy Research & Social Science*, 101, 103122.
- Moyo, C. G. (2023). *The legal autonomy of municipalities in energy governance in South Africa* [Institutional repository thesis/dissertation, North-West University]. <https://repository.nwu.ac.za/handle/10394/42279>
- National Treasury. (2021). *Public procurement in South Africa*. Government Printer.
- Plantinga, J., & Adams, C. (2021). Revolution of South African public procurement in the Industry 4.0 era. *Journal of Transport and Supply Chain Management*, 15, a1079.
- Prins, J., Van Belle, J. P., & Turpin, M. (2022). Using information and distributed ledger technologies to combat public procurement corruption: A South African perspective. In *Proceedings of the Federated Conference on Computer Science and Information Systems* (pp. 223–230).
- Sithole, S., Bakama, E. M., & Mushavhanamadi, K. (2022). Cryptocurrency as a component of blockchain in the South African banking industry amid 4IR. In *Proceedings of the 1st Australasian International Conference on*

Industrial Engineering and Operations Management (Sydney, Australia, December 21–22).
<https://index.ieomsociety.org/index.cfm/article/view/ID/12046>

Williams-Elegbe, S. (2020). Public procurement in the South African economy: Addressing systemic issues. *Sustainability*, 12(20), 8692.

World Bank. (2023). *Energy compliance and regulation in South Africa*. World Bank.

Zhang, R., Xue, R., & Liu, L. (2019). Security and privacy on blockchain. *ACM Computing Surveys*, 52(3), 1–34.

Zondo Commission. (2022). *Final report: Commission of inquiry into allegations of state capture*.
<https://www.statecapture.org.za/site/information/reports>

ENHANCING VEHICLE SECURITY THROUGH LEAN MANUFACTURING: EVIDENCE FROM SOUTH AFRICA'S AUTOMOTIVE SECTOR

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ABSTRACT

Vehicle theft remains a persistent challenge in South Africa, particularly in high-risk urban areas, despite advances in automotive security technologies. This study explores how lean principles and core philosophies focused on maximising value and eliminating waste can be applied beyond their traditional manufacturing context to enhance vehicle security systems. A quantitative, survey-based design was employed, targeting 100 participants from 26 automotive dealerships in Johannesburg's East Rand, including technicians, engineers, and vehicle inspectors. Data was collected through a 28-item validated survey and analysed using descriptive statistics and Pearson's correlation in SPSS Version 29. Findings reveal a strong positive relationship between awareness and application of lean practices and the perceived effectiveness of vehicle security systems. While existing security technologies provide moderate protection, their fragmented and reactive implementation limits their impact. Participants indicated that early integration of technologies such as RFID, biometric access, and AI-powered detection within lean-oriented workflows could improve reliability, responsiveness, and operational efficiency. These insights can guide manufacturers and policymakers in developing integrated, proactive, and cost-effective strategies to reduce vehicle theft in South Africa.

Keywords: automotive industry, lean manufacturing, South Africa, vehicle security.

INTRODUCTION

In South Africa, vehicle ownership is more than a convenience; it is often a necessity. Yet, car theft remains a critical challenge, with Johannesburg among the hardest-hit cities (Maluleke & Dlamini, 2019). Despite advancements in vehicle security technologies, existing systems frequently operate in isolation and lack real-time responsiveness (South African Police Service, 2023). This paper explores how lean manufacturing, traditionally used to eliminate waste and boost efficiency, can be repurposed as a framework for enhancing automotive security. As a major automotive hub, Johannesburg presents both significant opportunities and heightened risks (Kempen, 2019). The growing sophistication of criminal syndicates demands an equally innovative and integrated security response (Thangarajan et al., 2019). This study proposes a novel approach: leveraging lean manufacturing principles to support proactive, system-wide theft prevention strategies in South Africa's automotive sector. This study contributes to existing literature by extending lean manufacturing beyond its traditional focus on productivity and waste reduction to the underexplored area of vehicle security and theft prevention. While previous studies have largely examined lean principles within operational efficiency and production optimisation contexts, limited research has investigated how lean thinking can support the integration, responsiveness, and reliability of automotive security systems, particularly within developing economies such as South Africa. The study therefore introduces a novel perspective by positioning

lean manufacturing as a strategic framework for proactive vehicle security management. In doing so, it contributes both theoretically and practically to the fields of automotive operations management and security innovation.

Problem Statement

Although modern vehicle security technologies, such as alarms, immobilisers, GPS tracking, and biometric systems, have advanced significantly, their standalone implementation often results in fragmented and reactive responses to car theft (Thangarajan et al., 2019). This lack of integration reduces the overall effectiveness of security frameworks, leaving critical vulnerabilities within vehicle production and distribution systems. In South Africa, where vehicle theft is both frequent and highly organised, these gaps are particularly concerning. Johannesburg continues to record some of the highest rates of car theft, despite ongoing investments in security innovation (Palange & Dhatrak, 2021). The complexity of this problem is further compounded by outdated security protocols, siloed technology systems, and minimal real-time adaptability. These issues highlight the need for a strategic shift from reactive measures to proactive, system-wide prevention. Lean manufacturing, originally developed to eliminate waste and enhance operational efficiency, offers a potential solution by promoting streamlined, integrated processes. This study seeks to bridge the current security gap by exploring how lean manufacturing principles can be adapted as a strategic framework to strengthen vehicle security, improve response times, and reduce theft across South Africa's automotive value chain.

Aim of the Study

The aim of this study is to investigate how lean manufacturing practices can be applied within the automotive industry to reduce car theft in South Africa.

Objectives of the Study

This study aims to achieve the following objectives: (1) To identify how lean manufacturing practices can be adapted to enhance vehicle security. (2) To investigate the relationship between lean manufacturing and car theft prevention in the automotive industry.

Scope of the Study

This study focuses on operational processes within a car dealership based in East Johannesburg, South Africa. The research investigates how lean manufacturing principles can be applied in this localised context to enhance vehicle security and prevent theft.

Limitations of the Study

This study was limited to the East Rand area of Johannesburg and focused solely on dealer perspectives, excluding insights from designers, engineers, and vehicle owners. The reliance on self-reported perceptions restricts the ability to establish causality between lean practices and security improvements, which may have caused ambiguity. Without direct design interventions or a broader geographic scope, the findings may not fully represent the South African automotive sector. Future research should include multiple stakeholder groups, wider coverage, and design-focused methods to better assess the impact of lean principles on vehicle security.

Value of the Study

This study addresses a gap in existing research by exploring the underexamined link between lean manufacturing principles and vehicle security in South Africa's automotive sector, an area where prior studies have largely focused on efficiency and waste reduction rather than theft prevention. While the findings are based on dealer perspectives and do not claim to establish causality, they offer an initial evidence base for considering lean practices as a strategic tool for enhancing security system integration and responsiveness. By reframing lean thinking as more than an operational efficiency approach, the study contributes a novel viewpoint to both security innovation and manufacturing

management literature, laying the groundwork for future multi-stakeholder, design-focused research that could validate and expand these insights.

BRIEF LITERATURE REVIEW

Lean manufacturing (LM), rooted in the Toyota Production System, is widely recognised for its structured approach to enhancing productivity and minimising waste (Deshmukh et al., 2022), (Chiarini et al., 2018). It has become a global standard for achieving operational excellence. In South Africa's automotive sector, lean principles have been increasingly adopted to improve efficiency and respond to market and economic pressures (Kaneku-Orbegozo et al., 2019). While traditionally focused on production processes, the application of lean thinking to vehicle security remains largely unexplored, highlighting an untapped opportunity for innovation in theft prevention strategies.

Principles and Practices of Lean

At the core of lean manufacturing are five key principles: defining customer value, mapping the value stream, enabling continuous flow, implementing pull systems, and pursuing perfection (Jacobs, 2023). These are operationalised through tools such as Just-In-Time (JIT), Kaizen (continuous improvement), Kanban (visual workflow management), and Poka-yoke (error-proofing) (Panwar et al., 2015). These practices aim to streamline operations, eliminate waste, and enhance responsiveness. When consistently applied, they improve product quality, reduce operational costs, and foster agility characteristics that are increasingly vital for integrating effective vehicle security systems.

Integration of Lean in Automotive Security

Applying lean principles and core philosophies aimed at maximising value by eliminating waste in vehicle security offers a promising yet underexplored approach. While lean manufacturing refers to the structured application of these principles within production systems, lean principles themselves extend beyond manufacturing processes and can guide the design, integration, and continuous improvement of security systems. Traditionally, vehicle security has been treated as an isolated add-on, introduced late in production with minimal alignment to operational workflows (Dibaei et al., 2020). By contrast, lean thinking encourages embedding security objectives into the entire value stream, from design through to final assembly (Bernardini et al., 2017). This proactive integration allows technologies such as RFID, biometric access, and AI-powered threat detection to be incorporated early, improving system reliability and resilience while maintaining production efficiency and workflow continuity (Sharma et al., 2023). Integrating lean principles into the design of vehicle security systems presents a forward-thinking approach to theft prevention (Tseng et al., 2023). Lean's focus on efficiency, continuous improvement, and real-time responsiveness aligns closely with the functional needs of modern security technologies. For instance, AI-powered motion detection, GPS geo-fencing, and RFID-based inventory control can be embedded into lean production workflows to proactively deter theft (Limbasiya et al., 2022). When security is treated as a core component of lean manufacturing, rather than an external add-on, it enhances both protection and operational performance. This integrated approach enables automotive firms to produce safer, more intelligent, and efficient vehicles tailored to South Africa's unique security challenges.

RESEARCH METHODS

Research Design

This study used a quantitative, survey-based approach to explore the relationship between lean manufacturing principles and vehicle security in South Africa's automotive sector. While effective for identifying statistical trends from dealer perspectives, the design is exploratory and does not establish causality, serving instead as a foundation for future multi-stakeholder, design-focused research.

Data Collection

Data was gathered through a 28-item structured survey, distributed digitally and in print to automotive industry professionals in South Africa. Questions focused on lean manufacturing awareness, vehicle security system usage,

and perceived effectiveness. The instrument was validated for clarity and relevance by the STATKON unit at the University of Johannesburg before distribution.

Population and Sample

The study targeted employees from 26 automotive dealerships in Johannesburg’s East Rand, with 100 participants comprising technicians, engineers, and vehicle inspectors. Quota sampling was used to balance representation across job roles and experience levels, supporting the reliability and relevance of the results.

Data Analysis

Survey data were analysed using SPSS Version 29. Descriptive statistics summarised demographic and categorical responses, while Pearson’s correlation examined the relationship between lean practices and perceived vehicle security effectiveness. These analyses informed the conceptual development of a lean-based security prototype for the automotive sector.

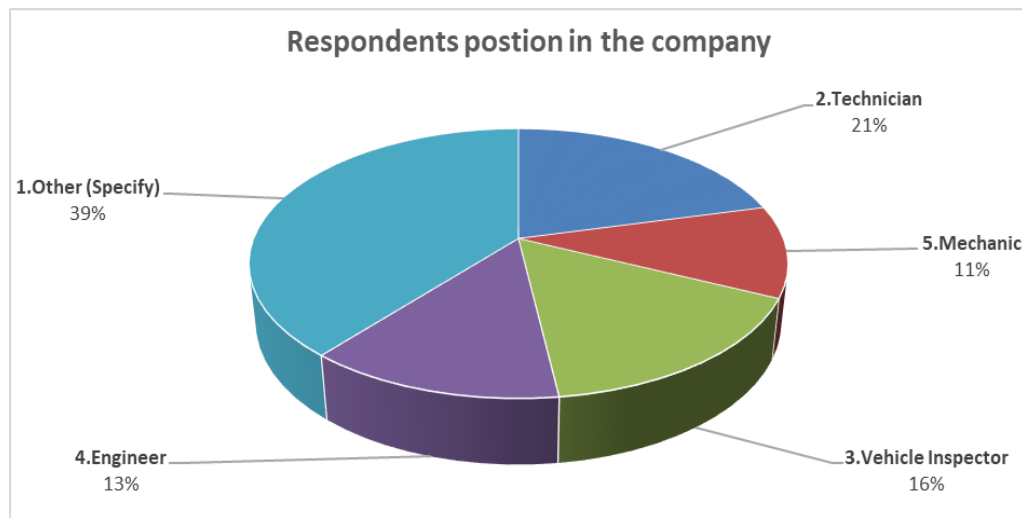
Reliability and Validity

The internal consistency of the questionnaire was evaluated using Cronbach’s alpha, with all measured constructs achieving scores above 0.90. This indicates a high level of reliability, confirming that the instrument consistently measured the intended variables. The strong reliability also supports the overall validity of the findings, reinforcing the credibility of the results derived from the survey data.

RESULTS AND DISCUSSION

Respondents’ Position

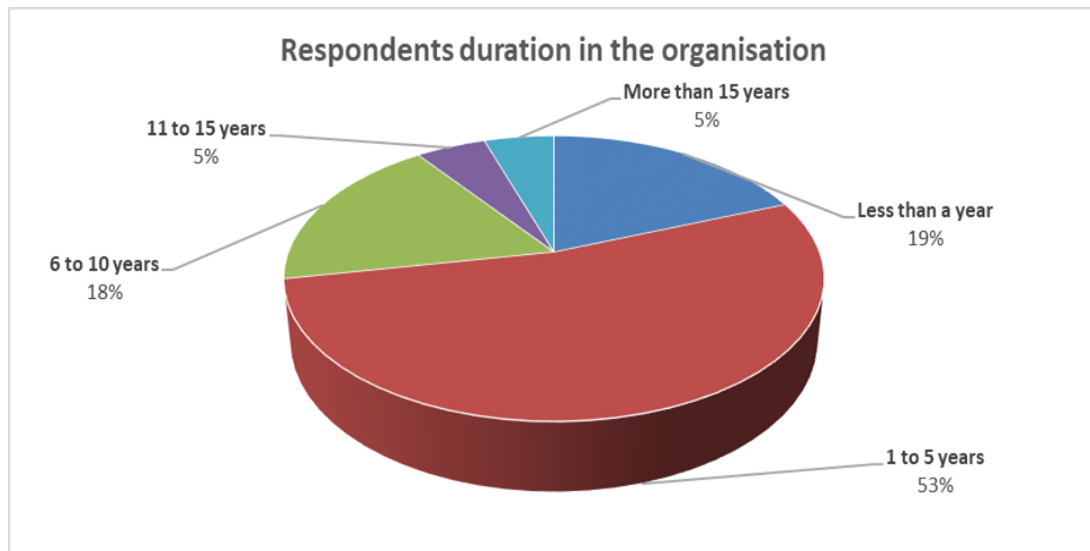
Figure 1: Respondents' positions in the company.



An analysis of participant roles (Figure 1) revealed a diverse workforce composition across the surveyed automotive dealerships. The largest proportion of respondents (39%) fell into the “Other” category, encompassing roles such as general workers, sales executives, and administrative staff. Technicians accounted for 21% of the sample, while mechanics represented the smallest group at 11%. These findings suggest that the predefined role categories may require refinement, as the broad use of the “Other” category and underrepresentation of key technical roles point to potential classification and sampling limitations. This distribution also highlights the need for more precise segmentation in future studies to better capture the full range of job functions within the automotive sector.

Respondents' Years of Experience

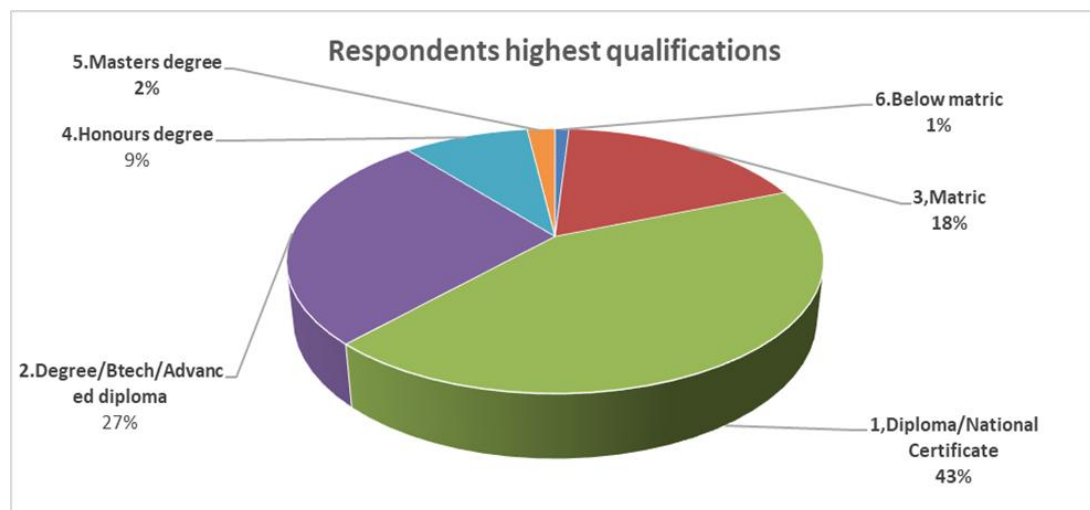
Figure 2: Respondents' years of experience in the current position.



Analysis of participant positions (Figure 2) indicates that most respondents (53%) have between 1 and 5 years of experience, followed by 19% with less than one year, and 18% with 6 to 10 years of experience. Only 5% reported 11 to 15 years of experience, with another 5% having over 15 years. This distribution suggests that most participants are in the early to mid-career stages, representing professionals who are still developing their technical and operational expertise. The low participation of highly experienced individuals may indicate a reluctance among senior professionals to engage in surveys, while the high proportion of those with less than a year's experience likely reflects an influx of recent graduates entering the automotive workforce.

Respondents' Qualifications

Figure 3: Respondents' qualifications.

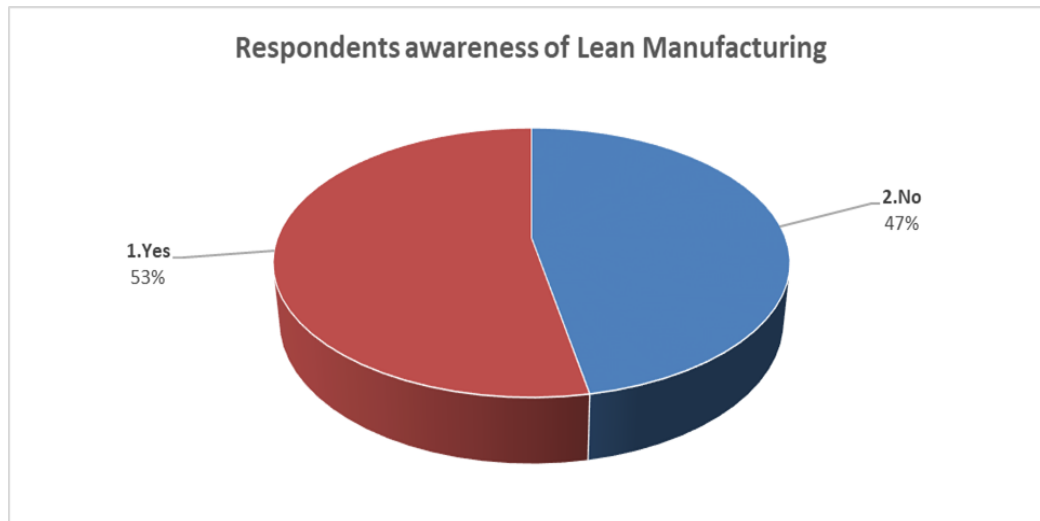


The analysis of educational qualifications (Figure 3) shows that 70% of respondents hold post-metric credentials. Among these, 43% possess Diplomas or National Certificates, followed by 27% with undergraduate degrees. Only 9% hold Honours degrees, and 2% have completed Master's level studies. These findings suggest a strong preference

for practical, work-ready qualifications that facilitate early entry into the automotive workforce. The relatively low number of participants with advanced degrees may reflect barriers such as the cost and time commitment associated with further study, as well as a greater emphasis within the industry on hands-on experience over academic advancement.

Respondents' Awareness of Lean Manufacturing

Figure 4: Respondents' awareness of lean manufacturing.



The analysis of Lean Manufacturing awareness (Figure 4) reveals that 53% of respondents are familiar with the concept, while 47% are not. This near-even split presents both an opportunity and a challenge: there is a foundational level of understanding to build upon, yet nearly half of the participants may require targeted training and awareness initiatives. The variation in familiarity likely stems from differences in job roles and levels of exposure to lean practices. Those who are knowledgeable about Lean Manufacturing are likely engaged in operational or technical roles where such methods are actively applied, whereas others may not have encountered lean principles due to limited training or departmental focus.

Use of Lean Manufacturing

Table 1: Current Anti-Theft Automotive Security Systems.

No	Statement	Mean	Std deviation
1	The current security system needs to be improved	3.84	1.051
2	The automotive security systems offer clear and effective user guidance on how to use security features.	3.68	0.963
3	The security features in most vehicles are easy for owners to understand and use properly.	3.67	1.006
4	Current automotive security systems are updated regularly to address new and emerging threats.	3.60	1.035
5	Automotive security systems are resilient to signal interference and jamming techniques.	3.58	1.084
6	Automotive manufacturers provide adequate support and training to ensure the effective use of security systems.	3.57	1.027
7	Current automotive security systems provide robust protection against physical tampering.	3.56	1.067

8	Current automotive security systems provide comprehensive protection against remote vehicle hijacking.	3.53	1.096
9	The current automotive security systems effectively protect vehicles from unauthorised access and theft.	3.52	1.049
10	Modern automotive security systems can withstand hacking attempts and cyberattacks effectively.	3.51	1.020

The findings from Table 1 indicate that Lean Manufacturing is perceived to have a positive impact on various aspects of automotive security systems. Respondents rated defect reduction as the most significant benefit (mean = 3.76), followed by improvements in production speed, responsiveness (mean = 3.69), and cost-effectiveness (mean = 3.66). Employee engagement, waste reduction, collaboration, and innovation also received moderately high scores. However, quality improvement was rated the lowest (mean = 3.58), suggesting it may be less consistently achieved. Standard deviations, particularly for defect reduction and collaboration, indicate some variability in how lean practices are applied or experienced, pointing to the need for more consistent implementation across roles and departments.

Inferential Analysis: Correlation Matrix

Table 2: Correlation Matrix.

		Awareness of lean manufacturing	Use of lean manufacturing
Use of lean manufacturing	Pearson Correlation	.809**	
	N	100	
Rating of current anti-theft automotive security systems	Pearson Correlation	.610**	.757**
	N	100	100
**. Correlation is significant at the 0.01 level (2-tailed).			

The correlation analysis in Table 2 reveals strong, statistically significant relationships between awareness and use of lean manufacturing and the effectiveness of automotive security systems. A very strong correlation ($r = 0.809$) exists between awareness and actual use of lean practices, indicating that greater awareness leads to higher implementation. Additionally, the use of lean manufacturing is strongly associated with more favourable ratings of current anti-theft security systems ($r = 0.757$), while awareness alone also shows a moderately strong correlation ($r = 0.610$). These findings suggest that both understanding and applying lean principles contribute positively to the perceived effectiveness of vehicle security measures.

The findings align with previous studies that associate lean manufacturing with improved operational responsiveness and system efficiency (Deshmukh et al., 2022; Panwar et al., 2015). However, unlike earlier research that focused primarily on productivity and waste reduction, this study extends the application of lean principles to vehicle security and theft prevention. The strong correlations identified between lean awareness, lean implementation, and perceived security effectiveness suggest that lean thinking may also improve the integration and responsiveness of anti-theft technologies. These findings further support Dibaei et al. (2020), who argued that security systems are often implemented in fragmented ways without sufficient operational integration. The present study therefore contributes a more proactive and system-oriented perspective to automotive security management. Nevertheless, the findings should be interpreted cautiously, as the study relied on perception-based responses from dealership employees rather than objective measures of theft reduction or security performance. While the results indicate positive associations, they do not confirm direct causality between lean implementation and reduced vehicle theft.

Managerial and Policy Implications

The findings of this study provide important implications for automotive manufacturers, dealership managers, and policymakers within South Africa's automotive sector. Managers should move beyond viewing vehicle security as a standalone technological feature and instead integrate security objectives into lean operational processes across the

automotive value chain. This includes embedding technologies such as RFID tracking, biometric authentication, GPS geo-fencing, and AI-powered monitoring systems early within production and distribution workflows to improve responsiveness and reduce vulnerabilities. Automotive firms should further invest in lean-focused training programmes that increase employee awareness and application of continuous improvement practices related to vehicle security management. Improved cross-functional collaboration between production, logistics, and security departments may also enhance the consistency and effectiveness of anti-theft strategies.

From a policy perspective, government agencies and industry regulators should encourage the development of integrated vehicle security standards that combine operational efficiency with advanced security technologies. Incentives supporting smart manufacturing, digital security systems, and Industry 4.0 adoption within the automotive sector may further strengthen national efforts to reduce organised vehicle theft in South Africa.

CONCLUSION

This study explored the application of lean manufacturing principles as a strategic approach to improving vehicle security within South Africa's automotive sector. The findings revealed strong positive relationships between lean awareness, lean implementation, and the perceived effectiveness of vehicle security systems, suggesting that lean thinking can contribute to more integrated, responsive, and proactive anti-theft strategies. Unlike traditional approaches that treat security systems as isolated technological solutions, this study demonstrates the potential value of embedding security objectives within operational workflows and continuous improvement practices. The study therefore extends the application of lean manufacturing beyond operational efficiency towards security innovation within the automotive industry.

The findings further suggest that integrating technologies such as RFID, biometric systems, AI-powered monitoring, and GPS tracking within lean-oriented processes may improve both operational performance and vehicle protection. These insights provide practical guidance for automotive manufacturers, dealerships, and policymakers seeking cost-effective and sustainable approaches to reducing vehicle theft in South Africa.

AI Declaration: This paper utilised artificial intelligence tools, including ChatGPT, to assist with language editing and structural refinement. All core ideas, analysis, and conclusions are the original work of the author(s). The author(s) accept full responsibility for the accuracy, integrity, and originality of the content.

REFERENCES

- Bernardini, C., Asghar, M. R., & Crispo, B. (2017). Security and privacy in vehicular communications: Challenges and opportunities. *Vehicular Communications*, 10, 13–28.
- Chiarini, A., Baccarani, C., & Mascherpa, V. (2018). Lean production, Toyota Production System and Kaizen philosophy: A conceptual analysis from the perspective of Zen Buddhism. *The TQM Journal*, 30(4), 425–438.
- Deshmukh, M., Gangele, A., Gope, D. K., & Dewangan, S. (2022). Study and implementation of lean manufacturing strategies: A literature review. *Materials Today: Proceedings*, 62, 1489–1495.
- Dibaei, M., et al. (2020). Attacks and defences on intelligent connected vehicles: A survey. *Digital Communications and Networks*, 6(4), 399–421.
- Jacobs, C. (2023). Crime statistics in South Africa 2.0. *South African Police Service*. <https://www.saps.gov.za/services/crimestats.php>
- Kaneku-Orbegozo, J., Martinez-Palomino, J., Sotelo-Raffo, F., & Ramos-Palomino, E. (2019). Applying lean manufacturing principles to reduce waste and improve process in a manufacturer: A research study in Peru. *IOP Conference Series: Materials Science and Engineering*, 689(1), 012020.

- Kempen, A. (2019). Crime statistics 2018/2019. *Servamus Community-Based Safety and Security Magazine*, 112(11), 10–13.
- Limbasiya, T., Teng, K. Z., Chattopadhyay, S., & Zhou, J. (2022). A systematic survey of attack detection and prevention in connected and autonomous vehicles. *Vehicular Communications*, 100515.
- Maluleke, W., & Dlamini, S. (2019). The prevalence of organized cross-border crimes in South Africa: A non-empirical statistical data analysis on stock theft and hijacking of motor vehicles. *International Journal of Social Sciences and Humanity Studies*, 11(1), 116–145.
- Palange, A., & Dhattrak, P. (2021). Lean manufacturing is a vital tool to enhance productivity in manufacturing. *Materials Today: Proceedings*, 46, 729–736.
- Panwar, A., Nepal, B. P., Jain, R., & Rathore, A. P. S. (2015). On the adoption of lean manufacturing principles in process industries. *Production Planning & Control*, 26(7), 564–587.
- Sharma, J., Tyagi, M., Pandey, P., & Sachdeva, A. (2023). Modelling of barriers encumbering the advancement of processing technologies towards lean manufacturing principles. *Materials Today: Proceedings*. Advance online publication.
- South African Police Service. (2023). *Department of police website*. <https://www.saps.gov.za/services/crimestats.php>
- Thangarajan, A. S., Ammar, M., Crispo, B., & Hughes, D. (2019). Towards bridging the gap between modern and legacy automotive ECUs: A software-based security framework for legacy ECUs. In *Proceedings of the IEEE 2nd Connected and Automated Vehicles Symposium* (pp. 1–5). IEEE.
- Tseng, P. Y., Lin, P. C., & Kristianto, E. (2023). Vehicle theft detection by generative adversarial networks on driving behaviour. *Engineering Applications of Artificial Intelligence*, 117, 105571.

BANKRUPTCY PREDICTION INDICATORS APPROACH (BPIA) FACTORS AFFECTING FINANCIAL DISTRESS WITHIN DIFFERENT JOHANNESBURG STOCK EXCHANGE (JSE) INDUSTRIES

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ABSTRACT

Financial distress and company failure remain a continue to present substantial risks to stakeholders throughout financial markets, highlighting the necessity for dependable early-warning financial distress signals. This study assesses whether the factors comprising the Bankruptcy Prediction Indicators Approach (BPIA) are statistically significant predictors of financial distress. The study also evaluates the Bankruptcy Prediction Indicators Approach (BPIA)'s efficacy as a practical instrument for measuring and anticipating financial failure. A quantitative research design was adopted, with secondary data sourced from the IRESS database. Using purposive sampling, a research sample of nine companies delisted from the Johannesburg Stock Exchange (JSE) in 2022 was selected based on pre-defined eligibility criteria. Statistical analysis was conducted using SPSS to test the study's objective and examine the predictive capacity of the Bankruptcy Prediction Indicators Approach (BPIA) factors. The findings reveal that 55% of the variance in financial distress outcomes can be explained by the Bankruptcy Prediction Indicators Approach (BPIA), with the results demonstrating statistical significance, confirming the factor's strong explanatory and predictive power. These results establish the Bankruptcy Prediction Indicators Approach (BPIA) factors as a credible and reliable instrument for identifying early warning signs of financial distress before failure becomes irreversible. The study makes a meaningful empirical contribution to corporate governance and financial risk literature by providing stakeholders with a validated analytic tool. Those charged with governance are urged to integrate Bankruptcy Prediction Indicators Approach (BPIA) assessments into routine financial oversight practices, enabling the early detection of distress signals and the timely implementation of corrective measures. Regular Bankruptcy Prediction Indicators Approach (BPIA) monitoring equips management to act proactively, reducing the likelihood of corporate failure and protecting stakeholder value.

Keywords: efficiency, financial distress, financial ratios, liquidity, profitability.

INTRODUCTION

Financial statements serve as a critical tool for company management and external parties, providing a clear picture of a business's financial position and performance. Investors must review these documents to evaluate viability and risks. In this context, financial distress of a company is defined as a situation in which it has difficulty paying its short-term financial obligations, and it is an important topic of both academic and practical interest. Although widely researched, variations in findings on factors determining financial distress and on how these factors act remain under debate

Financial distress is generally characterised by a company's inability to pay its financial obligations when they are due. As Dance and Made (2019) indicated, if left untreated, this can lead to formal bankruptcy. Likewise, Veganzones and Severin (2020) define financial distress as a type of organisational failure characterised by a broad range of financial difficulties, often occurring at the company level, as evidenced by a company's shares being delisted from a public exchange. This usually follows a prolonged period of unprofitability that reduces a company's ability to meet its obligations and, eventually, can lead to insolvency. An analysis of a company's financial statements can often

help determine its vulnerability to financial distress. In this, key financial ratios can give an early warning. According to Cassim (2021) liquidity reflects a company's ability to pay short-term obligations and the higher the liquidity, the lower the risk of distress. Similarly, profitability is crucial, if a firm can sustain profitability, it will have sufficient resources to avoid financial instability (Yin & Yang, 2022).

This study aims to extend this knowledge base and explore the interrelationships among liquidity, profitability, efficiency, and financial distress. The investigation targets a group of nine companies from six industries that are delisted from the Johannesburg Stock Exchange (hereafter JSE). Platt and Platt (2012) found small-sample designs useful in financial distress studies. When the number of observations in a data set is very small, and they are enhanced by suitable predictive modelling standards, Goh et al., (2021) analysed the Altman (1968) Z-score for bankruptcy. This demonstrates that, when appropriate forecasting methodologies are applied, smaller samples can yield statistically significant results. These nine companies were purposively chosen for analysis as they experienced financial difficulties. Multiple linear regression was used to analyse the data. The results show that profitability ratios are the strongest indicators of financial distress in this sample.

LITERATURE REVIEW

Signaling Theory

Using signaling theory, companies send positive signals to users of financial statements, such as reporting profits or paying dividends, or negative signals, such as reporting losses or a high debt ratio (Von Deimling et al., 2022). This is crucial for investors, as it provides information about the company's historical, current and prospective sustainability. The theory of signaling indicates the information provided to outside parties about the company's future situation (Fadah et al., 2020). Information irregularity, however, implies that management has greater knowledge and sometimes provides false information (Santoso et al., 2023). Investors often find it hard to tell good companies from bad ones. To help with this, companies can take steps to send clear, positive signals to the market. This can improve their value. (Tamara et al., 2020).

Financial Distress

Financial distress is defined as a level of "significant financial difficulty" that a company may face, ranging from deteriorating fiscal health to bankruptcy if not handled properly (Platt & Platt, 2012). This condition is critical to monitor because it will affect the investor or creditor's decision to invest in or lend to the company. It is therefore vital to maintain and demonstrate strong company performance to secure and retain this crucial financial support (Chen et al., 2020).

The contexts associated with financial distress are multifaceted. While financial distress is often linked to poor operational performance, scholarly research, according to Platt and Platt (2012) indicates that the fundamental cause frequently lies in the malfunctioning of corporate governance structures. The debt-equity ratio is one of the measures used to assess a company's risk of entering financial distress (Utama et al., 2023). The effects of the debt-to-equity ratio and times interest earned ratio on banking companies' share price performance are mediated by return on assets. This ratio is used to gauge the degree of financial leverage a firm uses while determining its financial obligations. This ratio measures the firm's financial leverage based on its financial obligations to shareholders (Thim et al., 2011).

Theoretical synthesis suggests that financial distress is not a one-size-fits-all phenomenon. However, it has multiple dimensions: failures based on profitability, liquidity crises and failures due to inefficiency. The study may reflect a sample bias toward profitability-motivated failures due to the dominance of profitability metrics. This is consistent with Platt and Platt's (2012) multidimensional perspective on corporate failure, and methods such as the cluster analysis approach could be used in future studies to distinguish different categories of distress.

Emerging Market

In examining bankruptcy prediction, traditional bankruptcy models, such as Altman's (1968) Z-score, focus on internal financial ratios. However, factors in the external macro-environment have a significant impact on firms in emerging market economies (Dohan et al., 2025). According to Xu et al. (2020) traditional internal metrics often fail to capture market integration complexities. The 2018–2022 period exposed vulnerabilities from pandemics and trade disruptions. Therefore, predicting bankruptcy in these cases requires a wide-ranging approach that includes global economic indicators and recognising that local bankruptcy indicators, such as the Bankruptcy Prediction Indicators Approach (hereafter BPIA), are insufficient

Profitability and Financial Distress

This study employs two primary proxies for profitability: Return on Assets (ROA) and Return on Equity (ROE). ROA indicates how effectively companies use their assets to generate net profit. When ROA is higher, it means that the conversion of asset investments into earnings is more effective, indicating that the company's management is effective at generating profit from its assets (Giovanni et al., 2020). On the other hand, ROE measures return on shareholders' equity, an important indicator for shareholders to evaluate their investment returns. A shrinking ROE can be an early warning sign and may put the sustainability of earnings under pressure (Cassim, 2021)

From a theoretical point of view, strong profitability closely related to a reduced risk of financial distress. High profits increase shareholder welfare, attract additional investment and demonstrate successful operational performance, thereby providing a buffer against insolvency (Diyanto, 2020). This is corroborated by Sugiarto and Mahanani (2020), who conducted a study and found that profitability has a significantly negative impact on the possibility of financial distress. They argue that consistent profitability is vital for meeting obligations and avoiding bankruptcy.

However, this situation is neither universally nor academically accepted. The results in this article contradict those of Jannah and Handayani (2022), as the profitability variable does not significantly influence the prediction of financial distress. This is a sign of the complexity of corporate failure: profitability is an important measure of corporate health, but may not be a single, reliable measure in all circumstances.

H₁: Profitability affects financial distress

Liquidity and Financial Distress

The short-term solvency of a firm is closely related to its financial health, where one of the main indicators of financial distress is illiquidity (Gunawan & Putra, 2021). A company's ability to pay its short-term obligations is measured by a set of liquidity ratios that are used to evaluate this relationship. A liquid company can meet these obligations, but an illiquid company is at greater risk. Current assets, in particular cash flow, can cushion the effects of financial pressures and prevent a crisis (Runis et al., 2021).

This study particularly uses the Cash Flow to Total Debt ratio to evaluate the company's ability to use operational cash flow to pay off debt, as one of the parameters that determines the company's financial risk (Karas & Režňáková, 2020). However, there is no consensus among academics about that link either. The findings of several studies, such as Arini et al., (2021), support the idea that liquidity has a significant negative effect on the risk of financial distress. Other researchers, Restiasti and Agustina (2018), however, conclude that liquidity has no statistically significant influence. This disagreement underscores the multifaceted/ambiguous character of financial distress, indicating that liquidity is an important, but not necessarily predictable, aspect of the distress. This further illustrates the importance of cash flow in the smooth running of company activities (Dirman, 2020).

H₂: Liquidity affects financial distress

Efficiency and Financial Distress

Efficiency ratios indicate how effectively a company uses its assets and runs its operations to generate income (Correia et al., 2019). The interest cover and Total Asset Turnover ratios are proxies used for the efficiency ratio. The interest coverage ratio is a measure of a company's ability to pay its debts by dividing its earnings before interest and taxes (EBIT) by its interest expense. The higher the ratio, the stronger the ability to meet interest payments, providing a cushion against how much income could fall short before the company would have financial problems (Correia et al., 2019). Not fulfilling these requirements can significantly affect profitability and result in bankruptcy due to creditor actions (Setiany, 2021)

Limajatini and Anggraeni (2022) explains the Total Asset Turnover (TATO) measures how efficiently companies generate sales from total assets. Higher TATO generally indicates stronger operational performance and efficiency. Theory suggests TATO is negatively associated with financial distress. Empirical evidence on this relationship remains mixed and inconclusive (Ngabito, 2024). Some studies support an inverse relationship between TATO and distress. Other studies find TATO's impact statistically insignificant (Karimah & Sukarno, 2023). This separation highlights that financial distress is multifaceted. A high or low sales level is not the sole determinant; companies must also consider interconnected factors like liquidity, capital adequacy, and overall debt burden to fully assess their financial vulnerability.

H₃: Efficiency affects financial distress

RESEARCH METHODOLOGY

This study adopted a quantitative research design to empirically investigate the relationship between specific BPIA measures and the likelihood of financial distress. The objective was to determine whether these BPIA financial ratios hold predictive value in forecasting corporate failure. To achieve this, the research utilised a secondary data, purposive sampling, and multiple regression analysis statistical testing.

Data Source

Data is the heart of any study, and for this research, secondary data were used. This is because the financial information used was already available, rather than collecting new data from surveys or experiments (Mazhar et al., 2021). IRESS is a well-known, comprehensive financial data platform, and all the data was sourced from it.

Sampling

A purposive sampling method was used to obtain a strong, relevant sample from a population of companies listed on the JSE that were delisted in 2022. This non-probability technique was considered most suitable, as stated by Golzar et al., (2024), as it can be based on the deliberate selection of a sample that is informative and related to the research objectives. Nine companies were chosen for the final sample, following the criteria below:

- **Criterion 1:** There should be easy access to all relevant data of the sampled companies on IRESS for the 5-year period to be reviewed (2018-2022). It was necessary to ensure data integrity and prevent biases arising from missing data.
- **Criterion 2:** The company must be delisted from the JSE in 2022 after listing for five consecutive years.
- **Criterion 3:** The companies should not be in the financial and mining sectors. This exclusion was required as these industries are regulated by specific accounting standards and regulations (Robbetze & Swanepoel, 2022). This flexible multi-stage sampling process selected a focused sample of non-financial, non-mining companies that had clearly experienced a failure event, to create an analytical frame in which the companies were in a controlled setting

In summary, the present study analyses the failures of nine non-financial and non-mining industry companies delisted from the Johannesburg Stock Exchange, consisting of a total of 45 observations across six different industries (healthcare, consumer goods, industrial, technology, telecommunications and consumer services) between 2018 and

2022 due to structural issues. The information in the 2018–2022 dataset represents a variety of economic conditions. Venter and Wolhuter (2023) show that turning points occurred: a low in 2018, a peak in 2019, followed by a decline from 2020 to 2022, thus indicating a recovery from the pandemic. They believe that a "turning point" describes a period between growth above the long-term growth requirements and periods of decline or slower growth. This timeframe covers pre-pandemic, pandemic, and early recovery phases. The research excludes the mining sector owing to external price volatility and the financial sector due to differing regulatory requirements (Robbetze & Swanepoel, 2022), following a methodology established in a localised emerging market economy (EME) study (Yacobus & KP, 2021).

The scope for depth analysis in the present study is possible because it focuses on unique corporate failures during the unpredictable Covid-19 pandemic, despite the study's small sample size. Because of industry differences, this analysis does not rely on specific economic distress measures; instead, it uses the BPIA as an overall measure of economic distress. Potential survivor bias is acknowledged; the dataset solely includes delisted companies, excluding those that have recovered or are experiencing early distress to dissect terminal trajectories. Instead of seeing the BPIA as a tool that cannot make mistakes, it is now seen as a diagnostic system that is continuously changing to make the most of small datasets and their unique situations. Ultimately, this mindset urges users to act like medical doctors reading blood work: the BPIA provides the initial symptoms, but the analyst must adjust for the context of the specific patient. Also, the linear regression model might not be considered as non-linear dynamics. Validity and reliability are also met as the financial statements obtained from the J S E must be audited

Data Collection and Analytical Technique

Financial data was collected from IRESS for each of the nine sampled companies over a five-year period, from 2018 to 2022. Moore (2020) explains that the longitudinal approach allows for the observation of trends and patterns leading up to the point of delisting. The variables extracted were one dependent variable as well as independent variables. The dependent variable for this study is financial distress, serving as a proxy for financial distress is debt to equity ratio. The independent variables comprise five key financial metrics, each with an expected inverse relationship with the financial distress ratio. The definitions of the variables and their expected relationships are indicated in the table below.

Table 1: Variable Definition and Expected Relationship.

Variable	Proxy For	Measurement	Expected Sign	Justification
Dependent Variable				
Debt-to-Equity (D/E)	Financial Distress	Total Debt / Total Equity	Positive	Higher leverage implies greater distress risk, signifies heightened financial leverage and potential solvency issues, placing a company at a greater risk of distress.
Independent Variables				
X ₁ = Return on Equity (ROE)	Profitability	Net Income / Total Equity	Negative	Lower profitability from the shareholders' perspective increases distress risk. It is assumed that a lower ROE associated with a higher D/E ratio, as poor profitability may force companies to seek debt financing, increasing distress risk.
X ₂ = EBIT to Interest (EBITI)	Efficiency	EBIT / Interest Expense	Negative	A lower coverage ratio reduces the capacity to service debt, increasing distress. A lower EBITI is expected to correlate with a higher D/E, signalling inadequate earnings to cover interest payments.
X ₃ = Return on Assets (ROA)	Profitability	EBIAT / Total Assets	Negative	Lower efficiency in terms of generating profits from assets signals higher distress, a decline in ROA is speculated to lead to a higher D/E, as inefficient asset use erodes profitability and increases reliance on debt.
X ₄ = Cash Flow to Debt (CFTD)	Liquidity	CF / Total Debt	Negative	Lower operating cash flow relative to debt heightens default risk. A lower CFTD is expected

				to be associated with a higher D/E, indicating a heightened risk of default.
$X_5 = \text{Total Asset Turnover (TATO)}$	Efficiency	Sales / Total Assets	Negative	Lower asset utilisation efficiency suggests operational weakness, leading to higher distress. It is hypothesised that a lower TATO will result in a higher D/E, because inefficient revenue generation can trigger financial strain.

Source: Cassim (2021).

The primary analytical method employed was multiple regression analysis. The collected data was analysed using SPSS (Statistical Package for the Social Sciences), version 27. This method was selected to determine if there was a statistically significant relationship between the BPIA factors (independent variables) and the likelihood of a company falling into financial distress (dependant variable). The regression model was used to test the null hypothesis that no significant relationship exists between the BPIA measures and financial distress, thereby assessing the collective and individual predictive power of these financial indicators (Robbetze & Swanepoel, 2022). The following model was estimated to examine the determinants of financial distress:

$$D/E = \beta_0 + \beta_1(ROE) + \beta_2(EBITI) + \beta_3(ROA) + \beta_4(CFTD) + \beta_5(TATO) + \varepsilon$$

Ethical Considerations

This research adhered to all recognised ethical standards for academic research. As the study used publicly available data, all procedures adhered to the ethical principles of research. The study received formal ethical clearance from the Vaal University of Technology (FREMS-15052024-182), ensuring that the research conducted was responsible and met all required academic guidelines. The findings that emerged from this process are detailed and interpreted in the following sections.

DATA ANALYSIS

Based on the regression results obtained from SPSS as indicated below: Financial distress:

$$(D/E) = 2.684 - 0.074(ROE) - 0.407(EBITI) + 0.511(ROA) + 0.009(CFTD) - 1.421(TATO) + \varepsilon$$

Table 2: Results and Interpretation.

Dependent Variable	Debt to Equity		
Independent Variable	Coefficients	t-statistics	Probability
Constant	2.684		
$X_1 = ROE$	-.074	-6.861	0.001
$X_2 = EBITI$	-.407	-1.467	0.150
$X_3 = ROA$	0.511	2.505	0.017
$X_4 = CFTD$	0.009	.146	0.885
$X_5 = TATO$	-1.421	-0.851	0.400
R-squared	0.557		
Adjusted R-squared	0.500		
F-statistics	9.813		

Source: Author's Calculations.

The findings are grouped into three classic categories of financial analysis: Profitability, Efficiency, and Liquidity. The strength of each relationship is determined by its statistical significance, where a p-value of less than 0.05 indicates the finding is reliable and not likely due to random chance. As seen in Table 2, ROE and ROA have significant relationship with the dependent variable.

Profitability and Financial Distress

Profitability has an inverse relationship with financial distress. This is consistent with H₁, which stated that there is a negative relationship between financial distress and profitability. Profitability ratios measure a company's ability to generate earnings, meaning that profitability will determine whether a company will fall in the dilemma of financial distress. Interestingly, the two main profitability metrics tell contrasting stories about their relationship with debt. ROA is a significant positive link. ROA measures how efficiently a company is using its total assets to generate profit. The analysis reveals a statistically significant positive relationship ($p = 0.017$). For every one-unit increase in ROA, the company's financial distress is predicted to increase by 0.511 units. The present study reveals a positive relationship between Return on Assets (ROA) and Financial Distress (coefficient = 0.511, $p = 0.017$), contradicting traditional financial distress theories that promote a negative correlation. This paradox may be influenced by survivorship dynamics, temporal sequencing of ROA, and potential accounting quality issues related to earnings management. Companies that are highly effective at generating profits from their assets tend to have higher debt levels. This can be interpreted as a sign of confidence: Lenders are more willing to extend credit to profitable companies because they are seen as less risky. Furthermore, these companies might be deliberately using debt to finance further growth, believing that they can earn a return on borrowed money that exceeds the interest cost.

ROE has a strong and significant negative influence. ROE measures the return generated for shareholders' equity investments. This analysis found a very strong and highly statistically significant negative relationship ($p < 0.001$). For every one-unit increase in ROE, the financial distress is predicted to decrease by 0.074 units. Companies that deliver high returns to their shareholders tend to use less debt. This could be the case because they are so profitable from their core operations that they do not need to borrow as much. They can fund growth internally through retained earnings. A high ROE with low debt is often seen as a sign of a very healthy, low-risk business that is not overly dependent on borrowed money.

Liquidity and Financial Distress

Liquidity also has an inverse relationship with financial distress, and this supports H₂, which stated that there is a negative relationship between financial distress and liquidity. Liquidity has a minimal and insignificant impact on financial distress. Liquidity ratios assess a company's ability to meet its short-term obligations. The liquidity metric here showed almost no influence on debt levels. CF:TD showed an insignificant influence; this ratio compares the cash generated from operations to total debt, indicating how readily a company could pay down its debt with its current cash flow. The coefficient is virtually zero (0.009), and the p-value is very high (0.885). The cash flow to debt ratio is one of the primary indicators of liquidity, with the higher the ratio, the lower the risk of bankruptcy (Rane & Kanetkar, 2024). The ratio shows a positive but insignificant relationship with financial distress, contrary to expectations. Cash flow indicators remain important for assessing financial health and predicting corporate failure. Their importance increases during periods of economic uncertainty and market instability (Cassim, 2021). The insignificant relationship may reflect sample size limitations rather than underlying economic conditions.

Efficiency and Financial Distress

Efficiency indicates inverse relationship with financial distress and supports H₃. Efficiency ratios gauge how well a company manages its assets and obligations. In this specific analysis, the efficiency metrics examined did not show a statistically reliable connection to the financial distress. The Interest Cover (IC) is a ratio with no reliable predictive value and is used to assess a company's ability to service its interest payments on debt. A high ratio means it can easily cover its interest payments. Despite a calculated coefficient suggesting a negative relationship, the high p-value (0.150) indicates this result is not statistically significant. This means that we cannot confidently say that a company's ability to cover its interest expenses directly influences its decision to take on more or less debt in this model. TATO also shows no meaningful connection. TATO measures how efficiently a company uses its assets to generate sales. It shows how many rands in sales a company creates for each rand invested in assets. The analysis showed a large coefficient, but an extremely high p-value (0.400). This means that while the model calculated a strong-looking relationship, it is statistically unreliable. The connection between how efficiently a company generates sales and its financial distress is, based on this data, likely due to random chance. The limitations of efficiency ratios like interest coverage and TATO in assessing a company's operational health and ability to manage debt.

Financial distress theory states that profitability, liquidity and efficiency should reduce distress risk, but the results of the present study are mixed. ROE shows a negative correlation with financial distress, whereas ROA shows a positive correlation. Yulianto and Witiastuti (2023) point out several factors may explain this mismatch between theoretical expectations and empirical findings. Pecking Order Theory suggests profitable firms increase debt to finance expansion opportunities. Risk-shifting theory proposes distressed, leveraged firms may pursue riskier investment projects. Measurement timing may obscure financial deterioration when annual statements fail capturing trends. Consequently, firms approaching distress may appear financially stable in reported statements.

Liquidity refers to the cash flow theory of distress, which states that an inadequate liquidity position increases the risk of bankruptcy. However, empirical results indicate that the relation is not significant. This mismatch could stem from endogeneity meaning that at the same time financial distress influences liquidity and liquidity influences distress, and may indicate complex non-linear relationship between liquidity and financial distress in this sense it cannot be concluded that the liquidity is a sufficient condition for distress, as when financial distress is high, companies can try to window dress their liquidity, which corresponds to what Karas & Režňáková (2020) call 'financial distress window dressing'. The efficiency ratios did not appear to have much impact, perhaps because if a company is suffering from severe profitability problems, efficiency will not make much difference: nothing can save a company from itself. In addition, grouping six industries without any specific controls makes it hard to discern meaningful patterns, because what is "efficient" varies across industries. Last, but not least, inefficiencies tend to emerge years before collapse, as we measure final-stage leverage this creates a timing mismatch that reduces the correlation.

RESULTS AND INTERPRETATIONS

The hypothesis testing was done to determine how much the independent variables, profitability (ROE and ROA); Liquidity (CF:TD) and efficiency (IC and TATO) affect the dependent variable (financial distress (D:E). The threshold of significance is 0.05 or 5 percent, and the grounds for making a choice are:

- (1) If the significance value is greater than 0.5, then the null hypothesis is accepted, the tested hypothesis is then rejected – meaning that the partial effect of each regression coefficient is not significant.
- (2) If the significance value is less than 0.5, then the null hypothesis is rejected, and the tested hypothesis is accepted, indicating that the partial effects of each regression coefficient are significant.

Based on financial data analysis, data was examined using hypotheses testing on the overall three key performance categories: profitability, liquidity, and efficiency. The effects on the proposed hypothesis testing in the research have yielded the following results as discussed below.

Effects of Profitability on Financial Distress

H₁: Profitability affects financial distress:

The present study uncovers a complex relationship between profitability and financial distress. While one study found that higher profits lead to less distress, the other found that higher profits lead to more distress. This contradiction, similar to or overlapping with the results found by Jannah and Handayani (2022), indicates that the relationship is not necessarily negative, is influenced by context and is most likely influenced by the modelling variables, namely multicollinearity. There is a strong positive relationship between ROA and financial distress. It follows that as ROA goes up, financial distress tends to increase in a predictable way as it moves in the same direction together. The p value is very low; indeed, well below the usual 0.05 (5%) threshold. This suggests that there is only a 1.7% probability that this strong positive pattern is a coincidence in the data. This means that there is significant evidence of a real, positive relationship. A higher ROA is consistently associated with higher level of financial distress.

The ROE it shows that there is a negative relationship and it is extremely weak, nearly non-existent. The negative sign suggests that while ROE goes up, financial distress might decrease, but the effect is so small that it is practically significant. The p-value is extremely low, only 0.1%, - but this result is statistically significant. It means that there is a 99.9% level of confidence that this observed weak negative trend in the data is real and not random. Therefore, there is a statistically certainty there is a negative relationship; however, for all practical purposes, it is so weak that ROE has virtually no meaningful connection with financial distress. Focusing on ROA, this was found to be strong, and a positive relationship is both statistically significant and important for the economy. The ROE result is statistically significant, but it is too weak to matter.

Effect of Liquidity on Financial Distress

H₂: Liquidity affects financial distress:

This result shows virtually no relationship between the variables that change in CF:TD. This variable does not have any real effect on changes in the D:E variable, and therefore there is no correlation between liquidity and financial crisis. The p-value, which means that the conventional level of confidence is normally 5% (0.05) is very high, indicating that the result is based on random chance; at 88.5%, we are nowhere near confident of the result. The null hypothesis (H₀) that posits no relationship between the variables must therefore be accepted. Subsequently, the tested hypothesis (H₂) is rejected due to the absence of effects between liquidity and financial distress, as indicated by a p-value exceeding 0.05, which significantly surpasses the 0.05 threshold. There is no detectable relationship between the data; it is not an example of a "weak" relationship, but a case of no measurable relationship. This means that, according to this model, a company's cash flow relative to its debt has no statistically significant effect on its financial distress. The effect is so small it is practically meaningless.

Our analysis found that a company's liquidity, or its cash flow to total debt, does not have a meaningful impact on its risk of financial distress. This result is surprising, as liquidity is typically a strong predictor of financial distress. The finding is more likely due to a limitation in our data than a real-world economic reality. The results are in accordance with the study conducted by Kuraesin et al., (2021).

Effect of Efficiency on Financial Distress

H₃: Efficiency affects financial distress:

Interest coverage (IC) ratio and total asset turnover (TATO) ratio were analysed for their relationships with the dependant financial distress variable. The IC ratio indicates a negative relationship, implying that an increase in IC results in a decrease in the outcome variable by an average of 0.407 units. However, with a p-value of 0.150, which is higher than the usual 0.005 threshold for statistical significance, this finding does not yield sufficient evidence to support a real effect. The findings align with Vo's study (2023) and contradict Rijanto's (2022) research.

Likewise, the TATO ratio shows a stronger negative relationship, with an average decrease of 1.421 units per increase in TATO. The p-value is 0.400, meaning that the probability that this is a random event is 40%. This indicates that there is no significant relationship between TATO and financial distress. This discovery aligns with Amoa-Gyarteng's (2021) study.

Statistically, neither of the efficiency variables demonstrate a statistically reliable relationship with financial distress, because both were found to be not statistically significant ($p > 0.05$), suggesting that any relationships are likely coincidental. Based on the data, no reliable evidence could be found that either efficiency measure (IC and TATO) has a meaningful impact, positive or negative. Statistically, what appeared like trends were too weak to trust. This finding supports the acceptance of the null hypothesis for each coefficient, rejecting the proposed H₃ hypothesis testing whether efficiency effects financial distress. More data is needed to better answer that question.

This statistical model is a good explanation of the variability in the dependent variable (financial distress). The R-squared value of 0.557 indicates that the five predictors in the model explain 55.7% of the variation in financial distress. This is a meaningful relationship, and not an overfitting effect, as the adjusted R-squared is 0.500. An overall F-statistic of 9.813 and a highly significant p-value ($p < 0.001$) support the model's overall significance. This indicates that the findings are unlikely to be due to chance and provide strong evidence of the reliability of the predictors, thereby indicating that the predictors accurately explain the outcome.

Limitations

However, due to sample limitations, the study's findings are limited to the JSE delistings sample (n=9) and the time frame (2018-2022). They may not be generalised to other developmental stages, excluded sectors or firms experiencing different degrees of distress, excluded sectors, or differently distressed firms. Industry heterogeneity

complicates analysis due to a low number of companies per sector. Survivor bias further limits insights, since only delisted firms were assessed, leaving out firms that recovered or are in early distress. Moreover, the linear regression model may overlook non-linear dynamics.

CONCLUSION AND RECOMMENDATION

This study establishes the BPIA model as a statistically significant tool for predicting corporate failure on the JSE, with an overall predictive capacity of $R^2 = 0.557$ that explains 55.7% of the variance in financial distress. In social and business sciences, this indicates a strong and meaningful predictive ability. Confirmed by a significant F-statistic ($F = 9.813$) measures the overall significance of the regression model. The value confirms that the model as a whole is a reliable fit for the data and $p < 0.001$ indicates the probability that these results happened by chance. A value this small ($< 0.1\%$) means the model's predictive power is statistically highly significant. The findings emphasise that only internal profitability metrics, specifically Return on Equity (ROE) and Return on Assets (ROA), maintain predictive weight, while liquidity and operational efficiency metrics became statistically insignificant in the post-pandemic time period. This suggests that traditional indicators like cash flow and efficiency may not reliably signal corporate distress during severe economic downturns, underscoring the need for a focus on sustained profitability for assessing corporate viability.

The following key recommendations for the future implications of the results of this study on stakeholders: **Corporate Boards and Risk Managers:** Internal tracking systems must prioritise a dual-monitoring matrix of both financial health and monitor profitability (ROE/ROA) utilisation trends, rather than relying strictly on short-term liquidity cushions – which this study proves can mask structural failure during systemic crises. These measures are crucial for identifying early signs of financial distress and ensuring sustainable financial practices like reducing debt when profits fail.

Regulators and Public Policymakers: Listed entities with a sustained negative ROE (profitability indicator), regardless of their current liquidity buffers, should be subject to independent audit interventions and structural oversight committees. Regulatory bodies should require firms whose profit margins have been severely and consistently declining to report, the report suggests, to establish a formal reporting structure to guide regulators in intervening.

Credit Analysts and International Investors: Risk models navigating emerging markets should dynamically de-weight efficiency ratios during global macro-shocks, shifting predictive analytical frameworks heavily toward core profitability indicators to minimise exposure to sudden corporate delistings. Credit analysts should update their risk models to include profitability trends, adjusting loan terms and monitoring borrowers automatically while for policymakers the recommended reforms include requiring independent oversight committees for struggling firms and using broad profitability data to spot sector-wide risks.

REFERENCES

- Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, 23(4), 589-609.
- Amoa-Gyarteng, K. (2021). Corporate financial distress: The impact of profitability, liquidity, asset productivity, activity and solvency. *Journal of Accounting, Business and Management (JABM)*, 28(2), 104-115.
- Arini, S. A., Samrotun, Y. C., & Masitoh, E. (2021). Determinant of financial ratio analysis to financial distress. *Jambura Science of Management*, 3(1), 26-35.
- Cassim, R. J. (2021). *Development and validation of bankruptcy prediction indicators of JSE listed companies* (Doctoral dissertation, North-West University, South Africa).
- Chen, C. C., Chen, C. D., & Lien, D. (2020). Financial distress prediction model: The effects of corporate governance indicators. *Journal of Forecasting*, 39(8), 1238-1252.

Correia, C., Flynn, D., Uliana, E., Wormald, M., Dillon, J. (2019). *Financial management*. Cape Town: Juta.

Dance, M. and Made, S. I. (2019) 'Financial ratio analysis in predicting financial conditions distress in Indonesia stock exchange', *Russian Journal of Agricultural and Socio-Economic Sciences*, 86(2), 155–165. doi: 10.18551/rjoas.2019-02.18.

Dirman, A. (2020). Financial distress: the impacts of profitability, liquidity, leverage, firm size, and free cash flow. *International Journal of Business, Economics and Law*, 22(1), 17-25.

Diyanto, V. (2020). The effect of liquidity, leverage and profitability on financial distress. *Indonesian Journal of Economics, Social, and Humanities*, 2(2), 127-133.

Dohan, K., Gian Maria, M. (2025). External finance in emerging markets and developing economies: a tale of differences in vulnerabilities. *Policy Research Working Paper*; 11274. World Bank. <http://hdl.handle.net/10986/44062> License: CC BY 3.0 IGO. DOI <https://doi.org/10.1596/1813-9450-11274>. <https://hdl.handle.net/10986/44062>

Fadah, I., Ayuningtyas, A., Puspitasari, N., & Yuswanto, I. B. (2020). Analysis of financial and non-financial factors affecting bond ratings. *IOP Conference Series: Earth and Environmental Science*, 485(1). <https://doi.org/10.1088/1755-1315/485/1/012019>

Giovanni, A., Utami, D. W. & Widiyaningrum, E. (2020). Size, growth, profitability and capital structure., *Jurnal REKOMEN*, 4(1), 81–90

Golzar, J., Noor, S., & Tajik, O. (2024). Purposive sampling. *International Journal of Education & Language Studies*, 2(2), 1-9. DOI: 10.22034/ijels.2025.490681.1029

Goh, E., Roni, S. M., & Bannigidadmah, D. (2021). Thomas cook(ed): using Altman's z-score analysis to examine predictors of financial bankruptcy in tourism and hospitality businesses. *Asia Pacific Journal of Marketing and Logistics*, 34(3), 475-487. <https://doi.org/10.1108/apjml-02-2021-0126>

Gunawan, B., & Putra, H. C. (2021, January). Determinant of financial distress. In *4th International Conference on Sustainable Innovation 2020-Accounting and Management (ICoSIAMS 2020)* (pp. 113-120). Atlantis Press.

Jannah, R., & Handayani, A. (2022). The effect of profitability, liquidity, and solvency on the value of health companies listed on the Indonesia stock exchange. *Indonesian Vocational Research Journal*, 1(2), 1-14.

Karimah, I., & Sukarno, A. (2023). Analisis pengaruh current ratio, total asset turnover, return on asset dan debt to equity ratio terhadap financial distress. Studi Kasus pada Perusahaan otomotif dan komponen yang terdaftar di Bursa Efek Indonesia (BEI) tahun 2018-2021. *Jurnal Ilmiah Manajemen Kesatuan*, 11(1), 145-152

Karas, M., & Režňáková, M. (2020). Cash flows indicators in the prediction of financial distress. *Engineering Economics*, 31(5), 525-535.

Kuraesin, A., Susanti, S., & Azis, Y. M. (2021). Financial ratio analysis in predicting financial distress of food and beverage companies with logistic regression. *Sinergi: Jurnal Ilmiah Ilmu Manajemen*, 11(2), 43-49.

Limajatini., Susanti, M., & Anggraeni, R. D. (2022). The effect of debt to asset ratio, return on assets and total assets turn over on financial distress (empire study on chemical sub-industry companies listed on the Indonesia stock exchange in 2018-2020). *ECo-Buss*, 5(2), 700–710. <https://doi.org/10.32877/eb.v5i2.588>

Mazhar, S. A., Anjum, R., Anwar, A. I., & Khan, A. A. (2021). Methods of data collection: A fundamental tool of research. *Journal of Integrated Community Health*, 10(1), 6-10.

Moore, L. (2020). Measuring impacts of legal services—a literature review on research design and methodology.

- Ngabito, R. A. (2024). Pengaruh likuiditas, aktivitas, profitabilitas dan leverage terhadap financial distress. *Syntax Literate Jurnal Ilmiah Indonesia*, 9(1), 7–18. <https://doi.org/10.36418/syntax-literate.v9i1.14685>
- Platt, H., & Platt, M. (2012). Corporate board attributes and bankruptcy. *Journal of Business Research*, 65(8), 1139–1143.
- Rane, J. V., & Kanetkar, M. (2024). Adequateness of applying models to predict potential financial distress.
- Restianti, T., & Agustina, L. (2018). The effect of financial ratios on financial distress conditions in sub industrial sector companies. *Accounting Analysis Journal*, 7(1), 25–33. <https://doi.org/10.15294/aaaj.v5i3.18996>
- Rijanto, A. (2022). Political connection status decisions and benefits for firms experiencing financial difficulties in emerging markets. *Problems and Perspectives in Management*, 20(3), 164.
- Robbetze, N., & Swanepoel, M. J. (2022). Viability of risk-return trade-off within a South African context. *Journal of Accounting and Investment*, 23(3), 413–430.
- Runis, A., Arifin, D. S., Masud, A., & Kalsum, U. (2021). The influence of liquidity, leverage, company size and profitability on financial distress. *International Journal of Business and Social Science Research*, 2(6), 11–17.
- Santoso, B., Qizam, I., Jusoh, W. N. H. W., & Viktorovna, L. O. (2023). The implementation of stakeholder, asymmetry, signaling, and agency theories on the determinant of Shariah Bond (Sukuk) Rating. *International Business and Accounting Research Journal*, 7(2), 224–252.
- Setiany, E. (2021). The effect of investment, free cash flow, earnings management, and interest coverage ratio on financial distress. *Journal of Social Science*, 2(1), 64–69.
- Sugiarto, S., & Mahanani, S. (2020). Effect of profitability, leverage, liquidity and activity against financial distress conditions. *EkBis: Jurnal Ekonomi dan Bisnis*, 4(2), 456–468.
- Susanti, N., Latifa, I., & Sunarsi, D. (2020). The effects of profitability, leverage, and liquidity on financial distress on retail companies listed on Indonesian Stock Exchange. *Jurnal Ilmiah Ilmu Administrasi Publik*, 10(1), 45–52.
- Tamara, A. G., Muslih, M., & Isynewardhana, D. (2020). The influence of profitability, assets structure and firm size on capital structure (study on food and beverage manufacturing sub sector companies listed on the Indonesia stock exchange period 2013–2017). *E-Proceeding of Management* 7, 2355–2357.
- Thim, C. K., Choong, Y. V., & Nee, C. S. (2011). Factors affecting financial distress: The case of Malaysian public listed firms. *Corporate Ownership and Control*, 8(4), 345–351
- Utama, S., Purmono, B. B., Malini, H., Mustarudin, M., & Wendy, W. (2023). The influence of debt equity ratio and times interest earned ratio through return on assets on banking companies' share price. *International Journal of Applied Finance and Business Studies*, 11(3), 418–429.
- Veganzones, D. and Severin, E. (2020). Corporate failure prediction models in the twenty-first century: a review. *European Business Review*, (in print). doi: 10.1108/EBR-12-2018-0209.
- Venter, J. C., & Wolhuter, A. (2023). The South African business cycle from 2013 to 2022. *South African Reserve Bank Quarterly Bulletin*, 307, 107–120.
- von Deimling, C., Eßig, M., & Glas, A. H. (2022). Signalling theory. In *Handbook of Theories for Purchasing, Supply Chain and Management Research* (pp. 445–470). Edward Elgar Publishing.
- Vo, D. H. (2023). Market risk, financial distress and firm performance in Vietnam. *PloS one*, 18(7), e0288621.

Xu, Z., Elomri, A., Kerbache, L., & El Omri, A. (2020). Impacts of COVID-19 on global supply chains: Facts and perspectives. *IEEE Engineering Management Review*, 48(3), 153-166. doi: 10.1109/EMR.2020.3018420. PMCID: PMC8768947

Yacobus, A., & KP, H. N. (2021). Analysis of the effect of financial distress conditions on activity/efficiency ratios in manufacturing companies in Indonesian stock exchange during the Covid period. In *RSF Conference Series: Business, Management and Social Sciences* (Vol. 1, No. 3, p. 9). Research Synergy Foundation.

Yin, L., & Yang, Z. (2022). The profitability effect: Insight from a dynamic perspective. *International Review of Financial Analysis*, 80, 102059.

Yulianto, A., & Witiastuti, R. S. (2023). Signalling or pecking order theory: an evidence from mining and energy sector. *International Journal of Professional Business Review*, 8(8), 74.

DRIVERS OF STUDENT ATTITUDES TOWARDS CHATGPT: THE ROLE OF HUMAN LIKENESS AND EXPECTANCY

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ABSTRACT

Higher education institutions (HEIs) are increasingly influenced by artificial intelligence (AI) tools, such as ChatGPT, particularly as students employ these technologies to support academic activities like information seeking, writing assistance, and problem-solving. As generative AI becomes more relied upon in higher education, it is important for HEIs to understand students' attitudes towards such tools, as attitudes shape how AI technologies are evaluated and engaged with in academic contexts. This study examines the influence of performance expectancy, effort expectancy, and anthropomorphism on students' attitudes towards ChatGPT, and how these attitudes impact the intention to use ChatGPT among Generation Z university students. A quantitative research design was adopted, with data collected through a self-administered questionnaire distributed to Generation Z students at a university. The data were analysed using partial least squares structural equation modelling to evaluate the measurement and structural models. The results indicate that performance expectancy and anthropomorphism have a significant and positive influence on attitude towards ChatGPT, suggesting that perceived usefulness and human-like interaction are central to favourable evaluations of generative AI tools. In contrast, effort expectancy has no significant effect on attitude. However, attitude exerts a strong and positive influence on intention to use ChatGPT. These findings contribute to research on AI in higher education by demonstrating the importance of attitudes and offering insights into how HEIs understand their students' attitudes towards ChatGPT, leading to it being seen as a supportive and value-enhancing learning tool.

Keywords: student attitudes, ChatGPT, human likeness, expectancy, HEIs.

INTRODUCTION

Artificial intelligence (AI) use has become increasingly prevalent across various industries, transforming how organisations and individuals operate and execute tasks (Kassa & Worku, 2025). The rapid pace of AI adoption has positioned it as a strategic asset, enabling organisations to enhance operational efficiency, decision-making, and overall business performance (Strzelecki, 2024). Beyond organisational contexts, AI has also become part of consumers' everyday activities, influencing how individuals access information, solve problems, and interact with digital technologies (Ribeiro et al., 2025). One sector where AI has been particularly disruptive is higher education, as higher education institutions (HEIs) increasingly integrate AI-driven tools to support teaching, learning, assessment, and administrative processes (Mallillin et al., 2025). Generative AI, mainly ChatGPT, has emerged as one of the most widely used AI platforms due to its ability to generate human-like responses, complete various tasks, and offer personalised academic assistance (Zafar et al., 2024). Students use ChatGPT to increase their efficiency and creativity, receive academic support, and improve their productivity (Mahapatra, 2024). This is evident amongst Generation (Gen) Z students who are digitally savvy, innovation-orientated, comfortable using AI (Chan & Lee, 2023), and make up majority of the university student population. Research (e.g., Dempere et al., 2023; Tarchi et al., 2024) highlights that ChatGPT offers various benefits, including facilitating problem-solving, improving writing quality, providing support to students, and offering immediate feedback. However, with its various benefits, ChatGPT also presents significant concerns, such as the potential for misinformation, breaches in academic integrity, and overreliance on AI (Bin-Nashwan et al., 2023) – all concerns for HEIs and Gen Z students, a cohort influenced by ethics (Medina-Molina et al., 2025). Thus, these opportunities and concerns suggest that attitudes towards ChatGPT are likely to be nuanced, and understanding students' attitudes towards ChatGPT becomes critical, as attitude is crucial in shaping how individuals respond to, engage with, and use technology (Davis, 1989; Venkatesh et al., 2003).

When understanding how consumers utilise or adopt technology, the two most cited models used as the theoretical foundation are the technology acceptance model (TAM) and the unified theory of acceptance and use of technology (UTAUT). Both emphasise performance expectancy and effort expectancy as central predictors of behaviour (Venkatesh et al., 2003, 2012) where performance expectancy, defined as “the degree to which users believe a technology enhances task performance” (Davis, 1989), consistently emerges as one of the strongest predictors of attitude and behavioural intention (Strzelecki, 2024). Similarly, effort expectancy, which refers to the degree of ease in using technology, is an important determinant, particularly in early stages of technology adoption (Davis, 1989; Venkatesh et al., 2003). Although the two models are considered reliable in their prediction of technology adoption, AI offers human-like interactions that were not necessarily available when the TAM and UTAUT were conceptualised. ChatGPT’s conversational interface and natural language generation capabilities can evoke anthropomorphism, where users attribute human-like qualities to an AI system (van Es & Nguyen, 2024). Research indicates that anthropomorphism can enhance engagement, emotional comfort, and perceived relational closeness with AI agents (Alabed et al., 2022), potentially shaping attitudes towards generative AI more strongly than traditional usability factors (Daly et al., 2025). Nevertheless, few empirical studies have explored anthropomorphism as a determinant of attitudes within higher education. As Gen Z students use AI regularly, they demonstrate strong preferences for personalised, immediate, and technology-enhanced learning experiences (Kavitha & Joshith, 2025). This cohort forms most university populations globally and understanding their attitudes and intentions towards using ChatGPT becomes strategically essential for HEIs seeking to leverage AI effectively and encourage its use responsibly. Accordingly, this study examines the determinants of attitude (on performance expectancy, effort expectancy, and anthropomorphism) and behavioural intention to use ChatGPT among Gen Z students within a HEI context. Therefore, the study is guided by the following research questions: *RQ1: What is the influence of performance expectancy, effort expectancy, and anthropomorphism on student attitudes towards ChatGPT? RQ2: How does attitude towards ChatGPT influence students' behavioural intention to use it?*

BACKGROUND AND PROPOSED HYPOTHESES

AI is increasingly reshaping higher education, influencing how students learn, access information, and engage with academic tasks (Klimova & Pikhart, 2025). Generative AI, specifically ChatGPT, has rapidly become one of the most widely adopted educational technologies due to its ability to provide human-like conversational assistance, personalised feedback, and support for complex cognitive tasks (D. Lee et al., 2024; Wang & Fan, 2025). Students use ChatGPT to enhance writing quality, clarify difficult concepts, summarise, and improve their academic productivity (Rabiev et al., 2025). Although this could be perceived as a negative impact on learning, research consistently shows that ChatGPT can facilitate inquiry-based learning and problem-solving, while providing immediate responses that reduce cognitive load and time spent on academic activities (Essel et al., 2024). However, this does not diminish the concerns that persist regarding misinformation, academic dishonesty, lack of transparency, and ethical risks associated with generative AI (Khalifa & Albadawy, 2024). This raises the concern that students may be unable to identify the inaccuracies generated by AI, thereby diminishing their ability to think critically (Zhai et al., 2024). Gen Z students prefer personalised and immediate feedback, and are comfortable with AI interactions (Rahman et al., 2025). Research suggests that Gen Z is more open to adopting AI tools than previous generations, largely due to their early exposure to technologies (Chan & Lee, 2023), which makes them an important population for studying their intention to use AI within higher education (Koteczki & Balassa, 2025). This is imperative given the influence that AI has in HEI. By understanding how Gen Z intends to use ChatGPT, HEIs will be in a better position to maximise the educational benefits that ChatGPT presents, while balancing the ethical and responsible use of AI (Rahman et al., 2025).

Performance Expectancy

Performance expectancy, a construct drawn from the Unified Theory of Acceptance and Use of Technology (UTAUT; Venkatesh et al., 2003), refers to the degree to which individuals believe a technology will enhance their task performance. Research demonstrates that performance expectancy is one of the strongest predictors of technology adoption across contexts, including educational technologies (Davis, 1989; Venkatesh et al., 2012). In studies of AI in higher education, performance expectancy has consistently emerged as a primary factor shaping user attitudes and intention to use generative AI tools (Strzelecki, 2024; Zhai et al., 2024) like ChatGPT. Students often perceive ChatGPT as useful because it can enhance efficiency, support academic writing, generate explanations, and assist with problem-solving (Mehrvarz et al., 2025) – enhancing their ability to perform tasks. Thus, it is expected that

performance expectancy will significantly predict student attitudes towards ChatGPT, and the following hypothesis is proposed: H1: Performance expectancy has a significant and positive influence on the attitude towards ChatGPT.

Effort Expectancy

Effort expectancy, also derived from UTAUT (Venkatesh et al., 2003), refers to the degree of ease associated with using technology (Venkatesh et al., 2003). This differs slightly to perceived ease of use (conceptualised in TAM), which focuses on the belief of the effort in using the technology and is often closely related to perceived usefulness. The effort is important within technology, as technologies that require minimal effort to learn and operate are more likely to be adopted (Davis, 1989). In the context of AI, ease of interaction, clarity of instructions, and the intuitive functionality influence user confidence and satisfaction (Lee & Breckon, 2025). Previous studies have highlighted that ChatGPT's conversational interface and natural language responses decrease the effort required to use the tool, leading to positive perceptions of the effort it takes to use ChatGPT (Zhai et al., 2024). Furthermore, research indicates that effort expectancy is crucial in the early stages of adoption, as users assess whether a tool (e.g., ChatGPT) aligns with their existing digital skills or whether further effort is required (Kim et al., 2024). However, some studies suggest that for users who are digitally savvy, such as Gen Z, effort may not be as influential as the use of technology is more intuitive to this cohort (Bista, 2025). Thus, the following hypothesis is proposed: H2: Effort expectancy does not have a significant influence on the attitude towards ChatGPT.

Anthropomorphism

Anthropomorphism refers to the extent to which individuals perceive technology as possessing human-like qualities (Alabed et al., 2022). With advances in AI, systems are increasingly displaying human characteristics, such as empathy and personality (Fang et al., 2025). Research suggests that anthropomorphism increases engagement, relational closeness, and emotional comfort, thereby shaping users' attitudes towards AI tools (Nguyen, 2025). In the HEI context, anthropomorphism may enhance perceptions of interaction quality, reduce anxiety, and improve user experience (Alabed et al., 2022). This is especially true for ChatGPT's natural language capabilities that enable it to communicate in conversational and intuitive ways, increasing the likelihood that users will perceive it as human-like (Jo & Park, 2024). According to Kuhail et al. (2025), this is important for Gen Z, who prefer emotionally engaging and individualised feedback from AI platforms. Therefore, it is hypothesised: H3: Anthropomorphism has a significant and positive influence on the attitude towards ChatGPT.

Attitude towards Artificial Intelligence and ChatGPT

Within a technological context, attitude represents individuals' overall evaluative judgement of a technology (Davis, 1989). Research indicates that performance and effort expectancy influence attitude, which affects behavioural intention (Strzelecki, 2024; Venkatesh et al., 2003). Behavioural intention relates to individuals' readiness or likelihood to use a technology, and is the strongest predictor of actual use in TAM and UTAUT (Davis, 1989; Venkatesh et al., 2003). Research shows that behavioural intention towards technologies is shaped by positive attitudes (Strzelecki, 2024), highlighting the importance of encouraging positive attitudes. Gen Z's attitudes towards ChatGPT are generally positive, as they recognise the platform's benefits for learning and productivity (Suaspha, 2025). This is due to ChatGPT's human-like features and being perceived as a non-judgemental safe space (Kavitha & Joshith, 2025), but this is also balanced by their concerns regarding the ethical use of AI and privacy concerns (Rathod et al., 2025). Although Gen Z may be enthusiastic yet cautious about using AI, studies show that their intentions to use AI align with their attitudes, making attitude a central consideration in technology-based research (Guerra-Tamez et al., 2024). Hence, the following hypothesis is proposed: H4: Attitude has a significant and positive effect on the intention to use ChatGPT.

METHODOLOGY

This study applied a quantitative research design, utilising a structured online questionnaire, to examine the determinants of attitude and behavioural intention to use ChatGPT among Gen Z university students. The questionnaire comprised multiple sections: performance expectancy, effort expectancy, anthropomorphism, attitude, and behavioural intention. Established scales were adapted from prior literature to ensure validity and alignment with technology acceptance frameworks (Melián-González et al., 2021). All items were measured using a seven-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree") and were adapted from Abbad (2021), Melián-

González et al. (2021), Giovanis et al. (2015) and Terblanche and Kidd (2022). Two screening questions were included to ensure respondents were part of the Gen Z age cohort and had used ChatGPT in a university setting within the past three months. Therefore, the inclusion criteria included Gen Z students currently enrolled at a university who had used ChatGPT in a university setting within the past three months. Convenience sampling was used to recruit respondents, with the questionnaire link shared in LinkedIn and WhatsApp groups deemed appropriate given the sample. Data were collected anonymously and respondents could withdraw from the study at any point. In total, 216 responses were retained for analysis, exceeding the minimum threshold recommended for partial least squares structural equation modelling (PLS-SEM) (Hair et al., 2019). PLS-SEM was deemed appropriate given its ability to predict and assess relationships among multiple constructs (Hair et al., 2019). Before assessing the structural model, the measurement model was assessed. The reliability and validity were assessed through the factor loadings, Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE) values. Discriminant validity was assessed using the Fornell-Larcker criterion. Thereafter, the structural model was assessed, focusing on the path coefficients and *p*-values to assess the significance of the proposed relationships. Ethical clearance for this study was granted by the University of Johannesburg's School of Consumer Intelligence and Information Systems Research Ethics Committee (2024SCiIS013). The study was conducted in accordance with the policies and procedures approved for collecting data from human participants. Participation was voluntary and informed consent was obtained from all respondents prior to data collection. Anonymity and confidentiality were maintained throughout, as no personal information was collected. Respondents were informed of their right to withdraw from the study at any time without consequence.

RESULTS

All indicators relating to the measurement model were within the thresholds proposed by Hair et al. (2019) for the factor loadings, Cronbach's alpha, and CR values and Fornell and Larcker (1981) for the AVE values. The factor loadings ranged from 0.780 to 0.919, indicating that the items contributed significantly to their respective latent constructs. The internal consistency was confirmed using Cronbach's alpha and CR values, as proposed by Hair et al. (2019). All constructs were greater than 0.70, demonstrating strong reliability.

Table 1: Reliability and validity of the measurement model.

Construct and items	FL	α	CR	AVE
Effort expectancy				
My interaction with ChatGPT is clear and understandable.	0.815	0.848	0.897	0.686
I am skilful at using ChatGPT.	0.864			
Learning to use ChatGPT is easy for me.	0.780			
I find it easy to get ChatGPT to do what I want it to do.	0.853			
Performance expectancy				
I believe using ChatGPT will be useful for me.	0.851	0.858	0.904	0.702
I believe ChatGPT will provide accurate information.	0.834			
I believe ChatGPT will be quicker than other sources.	0.814			
I believe that using ChatGPT increases my productivity.	0.851			
Anthropomorphism				
It is important that the conversation with ChatGPT resembles one with a human.	0.915	0.925	0.947	0.816
Conversations with ChatGPT should be natural.	0.898			
ChatGPT should seem as if it understands the person it is interacting with.	0.902			
Conversations with ChatGPT should not be artificial.	0.900			
Attitude				
I prefer using ChatGPT compared to other chatbots.	0.891	0.927	0.948	0.820
I believe that ChatGPT offers the best experience.	0.919			
I prefer ChatGPT compared to other AI platforms.	0.916			
I have repeatedly found ChatGPT offers a better experience compared to others.	0.896			
Behavioural intention				
I intend to use ChatGPT when requiring information in future.	0.880	0.903	0.932	0.775
I predict I will use ChatGPT for information.	0.898			

Construct and items	FL	α	CR	AVE
I intend on using ChatGPT frequently.	0.883			
I would recommend ChatGPT to a friend.	0.860			

Notes: FL = factor loading; α = Cronbach's alpha.

As per Table 1, convergent validity is supported by AVE, with values ranging from 0.686 to 0.820, exceeding the 0.50 criterion. Discriminant validity was assessed using the Fornell-Larcker criterion. For each construct, the square root of AVE exceeded its correlations with other constructs, confirming all constructs were distinct. These results indicated the measurement model met all reliability and validity requirements, supporting its suitability for structural analysis.

The structural model was evaluated to test the hypothesised relationships between the constructs. As shown in Table 2, anthropomorphism has a significant positive influence on attitude ($\beta = 0.360$; $p = 0.000$), suggesting that Gen Z students respond more favourably to ChatGPT when they perceive it as natural, intuitive, and human-like in communication. Performance expectancy also significantly influenced attitude ($\beta = 0.343$; $p = 0.002$), suggesting that Gen Z students believe ChatGPT provides accurate and useful information, responds faster than other sources, and increases their productivity. While positively signed, effort expectancy did not significantly predict attitude ($\beta = 0.141$, $p = 0.113$). This suggests that effort expectancy is not a decisive factor for Gen Z students, aligning with the description of Gen Z as being digitally savvy. Finally, attitude strongly predicted behavioural intention ($\beta = 0.750$; $p = 0.000$), indicating that favourable evaluations of ChatGPT increases students' likelihood of using it for academic tasks. This strong effect highlights the role attitude plays in shaping behavioural intention towards ChatGPT. Furthermore, the model demonstrated moderate to substantial explanatory power with $R^2 = 0.537$ (attitude) and $R^2 = 0.563$ (behavioural intention), indicating that anthropomorphism, performance expectancy, and effort expectancy collectively explained 53.7% of the variance in attitude, while attitude explained 56.3% of the variance in behavioural intention.

Table 2: Path coefficient results.

Construct	β	t-value	p-value	Result
Anthropomorphism → attitude	0.360	3.490	0.000	Supported
Performance expectancy → attitude	0.343	3.175	0.002	Supported
Effort expectancy → attitude	0.141	1.584	0.113	Not supported
Attitude → behavioural intention	0.750	14.625	0.000	Supported

DISCUSSION

This study examines the determinants of Gen Z students' attitudes and behavioural intentions to use ChatGPT in higher education, focusing on the influence that performance expectancy, effort expectancy, and anthropomorphism have on attitude towards ChatGPT and how attitude influences intention to using ChatGPT. The results reveal performance expectancy is a significant predictor of attitudes towards ChatGPT. Performance expectancy's influence aligns with established technology acceptance frameworks, such as TAM and UTAUT, which consistently identify perceived usefulness as one of the strongest drivers of favourable technology evaluations (Davis, 1989; Venkatesh et al., 2003). The results show Gen Z students believe ChatGPT is useful, provides accurate information, is faster in providing information, and increases their productivity, which influences their attitudes positively, resulting in H1 being accepted. The significant effect of anthropomorphism demonstrates the unique role of conversational and human-like qualities in shaping students' perceptions of generative AI. This finding aligns with literature indicating that natural language interaction and perceived intelligence enhance trust, comfort, and engagement with AI tools (Alharbi et al., 2025). Unlike traditional educational technologies, ChatGPT operates as an interactive agent, rather than a functional tool, and students appear to value the intuitive, conversational nature of their interactions. This supports arguments that human-like characteristics are becoming increasingly important in technology research (Kaya et al., 2022), particularly on AI, suggesting that technology's use extends beyond its functional capabilities.

In contrast, effort expectancy does not significantly influence Gen Z's attitudes towards ChatGPT. This is consistent with recent literature describing Gen Z as digitally savvy and comfortable with technology, meaning they are unlikely to perceive modern interfaces as challenging (Ngo et al., 2025). For this cohort, ease of use may be taken for granted. Thus, effort expectancy becomes less important in shaping attitudes because most digital tools, including ChatGPT, meet their baseline expectations of usability. This result offers a novel insight, as it suggests that traditional

usability constructs may be losing predictive power for digitally savvy cohorts, requiring models of technology acceptance to adapt to emerging generational behaviours. Finally, attitude strongly predicts behavioural intention, reflecting its central role in technology acceptance (Davis, 1989; Venkatesh et al., 2012). Students with favourable attitudes towards ChatGPT are significantly more likely to use it, which reinforces the importance of attitude in understanding consumer behaviour (Timilsena & Ghimire, 2024).

IMPLICATIONS

The results offer implications not only for theory, but also for HEIs to gain a better understanding of their students' intentions to use ChatGPT. First, the findings reinforce the central role of performance expectancy within established models like TAM and UTAUT (Davis, 1989; Venkatesh et al., 2003). The strong predictive effect of perceived usefulness on attitude confirms that Gen Z students primarily evaluate ChatGPT based on its academic value. This suggests that institutions must effectively communicate the pedagogical value of AI tools, including how AI can be used to support academic writing and enhance problem-solving and their academic performance (Ahn, 2024). Second, the study supports anthropomorphism as a key determinant of attitudes. While prior research establishes that human likeness enhances engagement and trust in AI systems (Jeong & Shin, 2020), anthropomorphism's influence on attitudes remains limited. This study demonstrates that when students perceive ChatGPT's conversations as natural, intuitive, and human-like, they form more positive attitudes. This highlights the need for a TAM to evolve and include anthropomorphism as a possible influencing factor. As students respond positively to tools that feel intuitive, conversational, and responsive, HEIs should recognise the benefit in leveraging these tools to be used in a way that enhances relational engagement while balancing academic resources.

Third, the non-significance of effort expectancy reveals a generational shift. For digitally savvy cohorts, effort may no longer be the primary determinant of attitude, challenging traditional acceptance models' assumptions. This finding suggests that future frameworks may need to revise the role of usability constructs for younger technology users who consider intuitive digital interfaces an expectation, rather than a competitive advantage. From an HEI perspective, it suggests that students are able to utilise AI and other technological tools without much support. The emphasis should be on ethical use, critical evaluation of AI-generated content, and strengthening students' AI literacy, rather than basic operational guidance. Finally, the strong relationship between attitude and behavioural intention reinforces the role of attitude within technology adoption, particularly in contexts involving AI platforms like ChatGPT. For HEIs, this suggests students have positive attitudes towards ChatGPT and the more positive their attitudes, the more likely their intention to use ChatGPT. This calls for HEIs to ensure there are transparent policies, ethical frameworks, and responsible-use guidelines implemented to support positive attitudes of AI while ensuring academic integrity.

LIMITATIONS, FUTURE RESEARCH AND CONCLUSION

Despite its contributions, this study has several limitations that provide avenues for future research. First, the study employs a cross-sectional design, capturing perceptions at a single point in time. As generative AI evolves rapidly, longitudinal studies would offer deeper insights into how attitudes and usage behaviour develop over time. Second, the sample consists of Gen Z students, which limits generalisability to older student populations or staff members. Future studies should examine differences across student cohorts (e.g., undergraduate, postgraduate, and different age groups), academic disciplines, and academics. Third, the model focuses on three key predictors of attitude. Other factors, such as trust, perceived risk, or academic integrity concerns, may also influence the use of AI within HEIs and require further investigation.

In conclusion, this study examined the determinants of attitude and behavioural intention to use ChatGPT among Gen Z students in higher education, grounded in the UTAUT framework and extended to include anthropomorphism. The findings demonstrate that performance expectancy and anthropomorphism are significant positive predictors of attitude towards ChatGPT, while effort expectancy does not significantly influence attitude, a finding attributed to Gen Z's inherent digital fluency. Attitude, in turn, strongly predicts behavioural intention to use ChatGPT, confirming its central mediating role in AI adoption. These findings contribute to the technology acceptance literature by extending UTAUT to incorporate anthropomorphism as a theoretically relevant construct in generative AI contexts. Practically, HEIs should prioritise communicating the academic utility of ChatGPT and design AI-supported learning environments that leverage the tool's conversational and human-like qualities. Simultaneously, institutions must invest in ethical AI frameworks, responsible-use policies, and AI literacy programmes to ensure that

students' positive attitudes translate into academically appropriate and critically informed engagement with generative AI tools.

REFERENCES

- Ahn, H. Y. (2024). AI-powered e-learning for lifelong learners: Impact on performance and knowledge application. *Sustainability*, 16(20), Article 9066. <https://doi.org/10.3390/su16209066>
- Alabed, A., Javornik, A., & Gregory-Smith, D. (2022). AI anthropomorphism and its effect on users' self-congruence and self-AI integration: A theoretical framework and research agenda. *Technological Forecasting and Social Change*, 182, Article 121786. <https://doi.org/10.1016/j.techfore.2022.121786>
- Alharbi, N., Din, F. U., Paul, D., & Sadgrove, E. (2025). Driving AI chatbot adoption: A systematic review of factors, barriers, and future research directions. *Journal of Open Innovation: Technology, Market, and Complexity*, 11(3), Article 100590. <https://doi.org/10.1016/j.joitmc.2025.100590>
- Bin-Nashwan, S. A., Sadallah, M., & Bouteraa, M. (2023). Use of ChatGPT in academia: Academic integrity hangs in the balance. *Technology in Society*, 75, Article 102370. <https://doi.org/10.1016/j.techsoc.2023.102370>
- Bista, S. (2025). Discourse on AI vs. human interaction among Generation Z: Trends, challenges, and future directions. *BIC Journal of Management*, 2(1), 135–150. <https://doi.org/10.3126/bicjom.v2i1.84332>
- Chan, C. K. Y., & Lee, K. K. (2023). The AI generation gap: Are Gen Z students more interested in adopting generative AI such as ChatGPT in teaching and learning than their Gen X and millennial generation teachers? *Smart Learning Environments*, 10(1), Article 60. <https://doi.org/10.1186/s40561-023-00269-3>
- Daly, S. J., Wiewiora, A., & Hearn, G. (2025). Shifting attitudes and trust in AI: Influences on organizational AI adoption. *Technological Forecasting and Social Change*, 215, Article 124108. <https://doi.org/10.1016/j.techfore.2025.124108>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Dempere, J., Modugu, K., Hesham, A., & Ramasamy, L. K. (2023). The impact of ChatGPT on higher education. *Frontiers in Education*, 8, Article 1206936. <https://doi.org/10.3389/educ.2023.1206936>
- Essel, H. B., Vlachopoulos, D., Essuman, A. B., & Amankwa, J. O. (2024). ChatGPT effects on cognitive skills of undergraduate students: Receiving instant responses from AI-based conversational large language models (LLMs). *Computers and Education: Artificial Intelligence*, 6, Article 100198. <https://doi.org/10.1016/j.caeai.2023.100198>
- Fang, C. M., Liu, A. R., Danry, V., Lee, E., Chan, S. W. T., Pataranutaporn, P., Maes, P., Phang, J., Lampe, M., Ahmad, L., & Agarwal, S. (2025). How AI and human behaviors shape psychosocial effects of extended chatbot use: A longitudinal randomized controlled study. *ArXiv*. <https://doi.org/10.48550/arXiv.2503.17473>
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.1177/002224378101800104>
- Guerra-Tamez, C. R., Kraul Flores, K., Serna-Mendiburu, G. M., Chavelas Robles, D., & Ibarra Cortés, J. (2024). Decoding Gen Z: AI's influence on brand trust and purchasing behavior. *Frontiers in Artificial Intelligence*, 7, Article 1323512. <https://doi.org/10.3389/frai.2024.1323512>
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2–24. <https://doi.org/10.1108/EBR-11-2018-0203>
- Jeong, M., & Shin, H. H. (2020). Tourists' experiences with smart tourism technology at smart destinations and their behavior intentions. *Journal of Travel Research*, 59(8), 1464–1477. <https://doi.org/10.1177/0047287519883034>
- Jo, H., & Park, D.-H. (2024). Effects of ChatGPT's AI capabilities and human-like traits on spreading information in work environments. *Scientific Reports*, 14(1), Article 7806. <https://doi.org/10.1038/s41598-024-57977-0>

- Kassa, B. Y., & Worku, E. K. (2025). The impact of artificial intelligence on organizational performance: The mediating role of employee productivity. *Journal of Open Innovation: Technology, Market, and Complexity*, 11(1), Article 100474. <https://doi.org/10.1016/j.joitmc.2025.100474>
- Kavitha, K., & Joshith, V. P. (2025). Exploring Gen Z's satisfaction and continuance intention towards ChatGPT 4o in higher education: PLS-SEM insights using the ECM. *Journal of Educational Technology Systems*, 54(2), 407–430. <https://doi.org/10.1177/00472395251380294>
- Kaya, F., Aydin, F., Schepman, A., Rodway, P., Yetişensoy, O., & Demir Kaya, M. (2024). The roles of personality traits, AI anxiety, and demographic factors in attitudes toward artificial intelligence. *International Journal of Human-Computer Interaction*, 40(2), 497–514. <https://doi.org/10.1080/10447318.2022.2151730>
- Khalifa, M., & Albadawy, M. (2024). Using artificial intelligence in academic writing and research: An essential productivity tool. *Computer Methods and Programs in Biomedicine Update*, 5, Article 100145. <https://doi.org/10.1016/j.cmpbup.2024.100145>
- Kim, Y., Blazquez, V., & Oh, T. (2024). Determinants of generative AI system adoption and usage behavior in Korean companies: Applying the UTAUT model. *Behavioral Sciences*, 14(11), Article 1035. <https://doi.org/10.3390/bs14111035>
- Klimova, B., & Pikhart, M. (2025). Exploring the effects of artificial intelligence on student and academic well-being in higher education: A mini-review. *Frontiers in Psychology*, 16, Article 1498132. <https://doi.org/10.3389/fpsyg.2025.1498132>
- Koteczki, R., & Balassa, B. E. (2025). Exploring Generation Z's acceptance of artificial intelligence in higher education: A TAM and UTAUT-based PLS-SEM and cluster analysis. *Education Sciences*, 15(8), Article 1044. <https://doi.org/10.3390/educsci15081044>
- Kuhail, M. A., Mrabet, J., Hijazi, R., & Thomas, J. (2025). Why would I befriend a bot? Assessing factors influencing the usage of social chatbots for digital natives. *Human Behavior and Emerging Technologies*, 2025(1), Article 8825536. <https://doi.org/10.1155/hbe2/8825536>
- Lee, D., Arnold, M., Srivastava, A., Plastow, K., Strelan, P., Ploeckl, F., Lekkas, D., & Palmer, E. (2024). The impact of generative AI on higher education learning and teaching: A study of educators' perspectives. *Computers and Education: Artificial Intelligence*, 6, Article 100221. <https://doi.org/10.1016/j.caeai.2024.100221>
- Lee, M. C., & Breckon, D. (2025). Factors affecting customer engagement in AI marketing. *Telematics and Informatics Reports*, 19, Article 100230. <https://doi.org/10.1016/j.teler.2025.100230>
- Mahapatra, S. (2024). Impact of ChatGPT on ESL students' academic writing skills: A mixed methods intervention study. *Smart Learning Environments*, 11, Article 9. <https://doi.org/10.1186/s40561-024-00295-9>
- Mallillin, L. L. D., Enriquez, B. B., & Yee, C. C. (2025). Artificial intelligence (AI) in the higher education institutions (HEIs) practices: A transformation trends in teaching and learning. *European Journal of Education Studies*, 12(2), 97–116. <http://dx.doi.org/10.46827/ejes.v12i2.5811>
- Medina-Molina, C., Pérez-Macías, N., Rey-Tienda, S., & López-Sanz, M. E. (2025). Do ethical issues influence the interest of young people in using artificial intelligence? An integrated application of qualitative comparative analysis. *Sustainable Technology and Entrepreneurship*, 4(3), Article 100108. <https://doi.org/10.1016/j.stae.2025.100108>
- Mehrvarz, M., Salimi, G., Abdoli, S., & McLaren, B. M. (2025). How does students' perception of ChatGPT shape online learning engagement and performance? *Computers and Education: Artificial Intelligence*, 9, Article 100459. <https://doi.org/10.1016/j.caeai.2025.100459>
- Melián-González, S., Gutiérrez-Taño, D., & Bulchand-Gidumal, J. (2021). Predicting the intentions to use chatbots for travel and tourism. *Current Issues in Tourism*, 24(2), 192–210. <https://doi.org/10.1080/13683500.2019.1706457>
- Ngo, T. T. A., Phan, T. Y. N., Nguyen, T. K., Le, N. B. T., Nguyen, N. T. A., & Le, T. T. D. (2025). Understanding continuance intention toward the use of AI chatbots in customer service among Generation Z in Vietnam. *Acta Psychologica*, 259, Article 105468. <https://doi.org/10.1016/j.actpsy.2025.105468>

- Nguyen, M. (2025). Enhancing employee engagement and knowledge collecting: Impact of anthropomorphic features in company generative AI systems. *Knowledge Management Research & Practice*. <https://doi.org/10.1080/14778238.2025.2555856>
- Rabiev, H., Sadidan, I., & Nurhidayah, N. A. S. (2024). Exploring the use of ChatGPT in academic assignments: Frequency, benefits, and perceptions among university students. *IC-ITECHS*, 5(1), 465–469. <https://doi.org/10.32664/ic-itech.v5i1.1669>
- Rahman, M. K., Ismail, N. A., Hossain, M. A., & Hossen, M. S. (2025). Students' mindset to adopt AI chatbots for effectiveness of online learning in higher education. *Future Business Journal*, 11(1), Article 30. <https://doi.org/10.1186/s43093-025-00459-0>
- Rathod, C. B., Patel, C. R., Mistri, V. R., Karnavat, B. M., & Vagadia, A. (2025). AI and Generation Z: Exploring perceptions, attitudes, and usage intentions. *Journal of Information Systems Engineering and Management*, 10(2), 155–168. <https://doi.org/10.52783/jisem.v10i2.1535>
- Ribeiro, A., Rivero, A. J. L., & Abrantes, J. L. (2025). The impact of artificial intelligence on consumer behavior towards brands: A systematic review. *Electronic Commerce Research*. <https://doi.org/10.1007/s10660-025-10063-7>
- Strzelecki, A. (2024). Students' acceptance of ChatGPT in higher education: An extended unified theory of acceptance and use of technology. *Innovative Higher Education*, 49, 223–245. <https://doi.org/10.1007/s10755-023-09686-1>
- Suasapha, A. H. (2025). Will Generation z use ChatGPT for tourism recommendations. *Tourism and Hospitality Management*, 31(3), 483–491. <https://doi.org/10.20867/thm.31.3.11>
- Tarchi, C., Zappoli, A., Casado Ledesma, L., & Brante, E. W. (2025). The use of ChatGPT in source-based writing tasks. *International Journal of Artificial Intelligence in Education*, 35(2), 858–887. <https://doi.org/10.1007/s40593-024-00413-1>
- Timilsena, N., & Ghimire, S. B. (2024). Factors influencing students' attitude towards using ChatGPT for educational and learning purpose. *Asia Pacific Journal of Advanced Education and Technology*, 3(4), 1–16. <https://doi.org/10.54476/apjaet/26057>
- van Es, K., & Nguyen, D. (2025). “Your friendly AI assistant”: The anthropomorphic self-representations of ChatGPT and its implications for imagining AI. *AI & Society*, 40(5), 3591–3603. <https://doi.org/10.1007/s00146-024-02108-6>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>
- Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157–178. <https://doi.org/10.2307/41410412>
- Wang, J., & Fan, W. (2025). The effect of ChatGPT on students' learning performance, learning perception, and higher-order thinking: Insights from a meta-analysis. *Humanities and Social Sciences Communications*, 12(1), Article 621. <https://doi.org/10.1057/s41599-025-04787-y>
- Zafar, S., Shaheen, F., & Rehan, J. (2024). Use of ChatGPT and generative AI in higher education: Opportunities, obstacles and impact on student performance. *iRASD Journal of Educational Research*, 5(1), 1–12. <https://doi.org/10.52131/jer.2024.v5i1.2463>
- Zhai, C., Wibowo, S., & Li, L. D. (2024). The effects of over-reliance on AI dialogue systems on students' cognitive abilities: A systematic review. *Smart Learning Environments*, 11(1), Article 28. <https://doi.org/10.1186/s40561-024-00316-7>

EXPLORING THE RELATIONSHIP BETWEEN E-WASTE AND CONSUMER BEHAVIOUR IN NIGERIA: A CONCEPTUAL PERSPECTIVE ON SUSTAINABLE TRANSITIONS

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ABSTRACT

Electronic waste (e-waste) presents escalating environmental, health, and governance challenges, particularly in developing economies. Drawing on interdisciplinary literature, this study examines the effectiveness of e-waste awareness initiatives in relation to consumer purchasing behaviour and regulatory contexts, with a specific focus on Nigeria. Evidence indicates that information-based campaigns are insufficient in the absence of supportive regulatory frameworks, economic incentives, and institutional capacity. The analysis highlights the role of extended producer responsibility, economic instruments, and community-based engagement in strengthening public participation, while also acknowledging the dominance of informal recycling networks. The study contributes context-sensitive insights to inform more coordinated, inclusive, and sustainable e-waste management strategies in Nigeria and comparable settings.

Keywords: e-waste, consumer purchasing behaviour, extended producer responsibility, environmental governance, Nigeria.

INTRODUCTION

Electronic waste (e-waste) has become a critical environmental and socio-economic challenge in the contemporary digital economy. Rapid technological innovation, shortened product lifecycles, and changing consumer purchasing behaviour have significantly increased the volume of discarded electrical and electronic equipment worldwide. Although e-waste contains valuable recoverable materials, improper disposal practices pose substantial risks to environmental quality and public health, particularly in developing economies where regulatory capacity and formal recycling infrastructure remain limited (Hieronymi et al., 2012; Brindhadevi et al., 2023). In this context, consumer behaviour and awareness play a central role in shaping e-waste generation and disposal pathways. This paper examines the interaction between awareness initiatives, regulatory mechanisms, and purchasing practices, with specific attention to the Nigerian context, where informal recycling systems dominate and policy enforcement remains fragmented. The current study aims to address the following questions:

How do consumer awareness initiatives, regulatory mechanisms, and purchasing behaviours interact to shape e-waste generation and disposal practices in Nigeria?

What institutional, behavioural, and policy conditions are necessary to align consumer participation with sustainable e-waste management and circular economy objectives in developing economy contexts such as Nigeria?

LITERATURE REVIEW

The effectiveness of e-waste awareness campaigns is strongly influenced by their design and implementation. Evidence from developed regions suggests that successful initiatives typically integrate public education with regulatory enforcement and economic incentives, rather than relying on information provision alone (Hieronymi et al., 2012). For example, extended producer responsibility (EPR) legislation in Switzerland has reduced financial barriers to consumer participation by shifting part of the recycling costs to manufacturers, thereby strengthening formal collection and recycling systems (Khetriwal et al., 2009). By contrast, Nigeria lacks a comparable regulatory framework to support the coordinated implementation of such policies, which results in fragmented

and largely informal e-waste management practices (Osibanjo & Nnorom, 2007). Research further indicates that public participation in recycling initiatives is particularly low in contexts where there is mistrust in a government's capacity to implement and sustain such programmes effectively (Widanapathirana et al., 2023). Consequently, awareness campaigns in Nigeria must be context-specific and take into account local perceptions of waste disposal, prevailing economic constraints, and the dominant role of informal recycling networks (Masud et al., 2019). Studies show that more interactive approaches, such as community-based e-waste collection events, school-based educational programmes, and digital engagement initiatives, are more successful in generating public participation than passive strategies, including static advertisements or regulatory notices (Safdar et al., 2020).

Consumer purchasing behaviour also plays a critical role in shaping the volume and composition of e-waste. Accelerated technological development and the widespread adoption of planned obsolescence have contributed to shorter product lifespans and increased rates of device replacement (Bozkurt & Stowell, 2016; Ozuem et al 2024). In many developing countries, affordability constraints limit consumer choices to second-hand or refurbished electronics, which are often imported from developed economies and enter the market with limited remaining usability (Thapa et al., 2023). Nigeria is among the largest recipients of second-hand electronic equipment from Europe and North America; much of this equipment reaches end-of-life shortly after importation, thereby exacerbating domestic e-waste generation (Shittu et al., 2021). The absence of stringent import controls and end-of-life regulations allows outdated and unsafe electronic devices to circulate freely within the market, which further intensifies the e-waste burden (Nnorom & Osibanjo, 2008). Previous research suggests that promoting more sustainable purchasing practices, such as prioritising energy-efficient, durable, and repairable products, can significantly reduce e-waste generation at source (Ofori & Opoku Mensah, 2022). Developed e-waste management systems, particularly within the European Union, have strengthened consumer participation in recycling through structured take-back and collection schemes, thereby lowering environmental impacts and supporting circular economy objectives (Sundar et al., 2023).

Drawing on existing literature, this study adopts an interdisciplinary approach to develop a conceptual framework that integrates e-waste management with consumer purchasing behaviour; it incorporates insights from environmental science, behavioural economics, and policy analysis (Gaur et al., 2024). Prior research indicates that circular economy models centred on repair, refurbishment, and reuse do not emerge organically, but instead require coordinated institutional and policy support (Hieronymi et al., 2012). In the Nigerian context, the implementation of circular economy models would necessitate strengthened regulatory oversight, the promotion of formal recycling systems, and the expansion of public awareness initiatives (Bimir, 2020). Policy instruments such as EPR have been shown to realign incentives by encouraging manufacturers to account for end-of-life management in product design and distribution (Khetriwal et al., 2009). Complementarily, consumer awareness programmes must be sensitive to cultural norms and economic constraints that shape everyday consumption and disposal practices (Oeztuerk, 2015).

Although awareness and regulatory interventions are necessary, evidence suggests that they are insufficient in the absence of supportive economic mechanisms (Sundar et al., 2023). Economic incentives, including deposit refund schemes and buy-back programmes, have demonstrated significant potential to increase consumer participation in e-waste recycling (Safdar et al., 2020). In Nigeria, where informal recycling networks dominate, integrating informal sector workers into formalised collection and recycling systems could simultaneously enhance economic opportunities and improve environmental outcomes (Attia et al., 2021). Furthermore, the use of digital platforms to coordinate e-waste collection has been shown to improve accessibility and participation rates (Kang et al., 2020). Long-term behavioural change may also be supported through the incorporation of environmental education into school curricula, which could foster sustainable disposal practices among future generations (Dias et al., 2018).

The urgency of addressing Nigeria's e-waste challenge stems not only from its environmental and public health impacts, but also from the lost economic opportunities associated with improper waste management (Brindhadevi et al., 2023). Despite global progress in e-waste governance, Nigeria continues to face persistent challenges related to policy enforcement, public engagement, and infrastructural development (Naem et al., 2023). Consumer behaviour remains a critical determinant of e-waste outcomes, as purchasing habits directly influence waste generation volumes and disposal pathways (Ramzan et al., 2019). Accordingly, a comprehensive approach that integrates public education, economic incentives, and regulatory frameworks has the potential to significantly improve e-waste management and promote sustainable consumer behaviour in Nigeria (Gaur et al., 2024). However, the long-term effectiveness of such interventions depends on coordinated action among regulators, industry stakeholders, and consumers, thus underscoring the need for systemic and collaborative solutions.

The introduction of e-waste management has emerged as a significant area of academic and policy concern due to its escalating environmental, economic, and public health implications (Bhaskar & Turaga, 2018; Brindhadevi et al., 2023). Rapid technological advancement and increasing consumer demand for electronic devices have accelerated consumption patterns, shortened product lifespans, and consequently intensified the generation of e-waste (Bhaskar & Turaga, 2018). Although e-waste contains valuable recoverable materials, including gold, silver, and palladium, it also comprises hazardous substances such as lead, mercury, and cadmium, which pose serious environmental and health risks when improperly managed (Brindhadevi et al., 2023). To mitigate these risks and enable resource recovery through sustainable recycling practices, effective e-waste management strategies are essential (Shittu et al., 2021). However, significant challenges persist globally, particularly in developing economies, where inadequate infrastructure, weak regulatory frameworks, and low levels of consumer awareness hinder responsible e-waste disposal (Ofori & Opoku Mensah, 2022). Addressing these gaps is critical to the development of sustainable waste management systems that align with broader environmental objectives and circular economy principles (Sundar et al., 2023).

This study is important because it seeks to inform both policy and practice by examining the structural and behavioural challenges that undermine effective e-waste management, while also identifying contextually relevant solutions. Stringent regulatory mechanisms that require manufacturers to assume responsibility for end-of-life product management, such as EPR, have been successfully implemented in many developed countries (Khatriwal et al., 2009). These mechanisms have contributed to improved recovery rates and the diversion of e-waste from landfills to organised recycling programmes (Bhaskar & Turaga, 2018). By contrast, many developing regions rely heavily on informal recycling systems, where e-waste is dismantled under unsafe conditions that expose workers and nearby communities to toxic substances and heavy metal contamination (Nnorom & Osibanjo, 2008). This disparity highlights the need for research that evaluates the applicability of existing e-waste policies across diverse socio-economic contexts, while also exploring alternative models suited to developing countries (Thapa et al., 2023).

A major concern within the e-waste sector relates to the methods used in dismantling and processing e-waste. Informal and unregulated practices contribute to soil contamination, water pollution, and air quality degradation, with long-term consequences for ecosystems and human health (Rautela et al., 2021). Many electronic devices contain flame retardants and persistent organic pollutants that leach into the environment; this leads to chronic exposure risks and ecological disruption (Brindhadevi et al., 2023). As international awareness of the adverse effects of e-waste continues to grow, there is an increasing emphasis on the need for sustainable management practices and robust legal frameworks to regulate disposal and recycling activities (Osibanjo & Nnorom, 2007). Given the complexity of e-waste-related environmental impacts, advancing knowledge in this area is essential for informing policy interventions that prioritise pollution control, enforce safe disposal standards, and support environmentally sound recycling systems (Gaur et al., 2024). Furthermore, such research can contribute to the development of innovative recycling technologies that enhance resource recovery while minimising ecological harm, thereby supporting long-term sustainability and circular economy objectives (Hieronymi et al., 2012).

E-waste represents one of the most pressing environmental challenges of the contemporary digital age, with far-reaching economic implications, particularly within the context of resource efficiency and circular economy transitions (Sundar et al., 2023). Beyond its environmental burden, e-waste presents significant opportunities for resource recovery, as discarded electronic devices contain valuable precious metals and rare earth elements that can be reintegrated into manufacturing supply chains, thereby reducing reliance on virgin material extraction (Dias et al., 2018). Despite this potential, many regions continue to experience inefficient and ineffective recycling systems, which are compounded by limited investment in advanced processing technologies and formal recovery infrastructure (Ofori & Opoku Mensah, 2022). Research suggests that the development of efficient and scalable recycling approaches could address these gaps while simultaneously unlocking economic value through material recovery (Bhaskar, 2015). Moreover, studies on EPR policies highlight their capacity to enhance manufacturer accountability for end-of-life product management, thereby encouraging more sustainable production and disposal practices (Thapa et al., 2023).

The effectiveness of e-waste management strategies is, however, strongly shaped by consumer behaviour. Levels of awareness and participation in sustainable disposal practices remain low across many regions, thus they limit the success of formal recycling initiatives (Ramzan et al., 2019). This challenge is exacerbated by limited consumer knowledge regarding the environmental impacts of discarded electronics and a lack of awareness of available formal recycling options (Attia et al., 2021). Accordingly, this research contributes to the understanding of consumer e-waste disposal behaviour and supports the development of communication strategies aimed at motivating public engagement in sustainable waste management (Kariwala et al., 2023). Although previous studies have emphasised the role of digital awareness campaigns, economic incentives, and

community-based recycling initiatives, their effectiveness varies considerably across cultural and economic contexts; this outcome warrants further empirical evaluation (Newaz & Appolloni, 2024). An additional dimension of this research concerns the integration of e-waste management within sustainable business models and broader circular economy frameworks (Sundar et al., 2023). Although many organisations have adopted take-back schemes and designed products for recyclability, such initiatives often suffer from limited scale and restricted impact (Bozkurt & Stowell, 2016). Consequently, the role of businesses in advancing sustainable e-waste management, and the conditions under which circular economy principles can be effectively embedded into corporate sustainability strategies, remains insufficiently explored (Alblooshi et al., 2022). Further research in this area has the potential to inform industry regulation, stimulate private sector investment in waste management solutions, and strengthen cross-sector collaboration among manufacturers, policymakers, and recycling firms (Khetriwal et al., 2009).

The significance of this research is further heightened by the substantial health risks associated with improper e-waste management. In many developing countries, informal e-waste recyclers are routinely exposed to hazardous substances released during the manual dismantling and open burning of electrical and electronic equipment; this exposure leads to severe occupational health risks (Nnorom & Osibanjo, 2008). Empirical studies have linked e-waste exposure to respiratory illnesses, neurological disorders, and developmental impairments, particularly among children living in affected communities (Brindhadevi et al., 2023). Addressing these risks requires an in-depth examination of informal recycling practices alongside the promotion of safer, regulated recycling systems (Osibanjo & Nnorom, 2007). Findings from this research can therefore inform health and safety standards and support the formalisation of e-waste recycling operations (Gaur et al., 2024).

Policy and governance constitute another critical area within the e-waste literature. Although legislative frameworks exist in some countries, enforcement remains inconsistent due to weak governance structures and fragile regulatory systems (Bhaskar & Turaga, 2018; Shittu et al., 2021). Greater insight into regulatory barriers can inform policy recommendations aimed at strengthening enforcement mechanisms, improving compliance, and enhancing coordination between national and international e-waste governance regimes (Thapa et al., 2023). In this regard, the present study seeks to identify policy gaps and propose reforms aligned with the United Nations' Sustainable Development Goals and global best practices in waste management (Nnorom & Osibanjo, 2008). Emerging digital technologies also present new opportunities to improve e-waste management systems. Innovations such as blockchain, artificial intelligence, and the Internet of Things offer potential for improving traceability, transparency, and efficiency across waste collection and recycling processes (Kang et al., 2020; Safdar et al., 2020; Ozuem & Willis, 2025). Data-driven solutions can optimise collection routes, monitor regulatory compliance, and track materials throughout the supply chain, thereby contributing to more effective and sustainable waste management systems (Latha et al., 2022). As these technologies mature, they are expected to play a transformative role in enhancing the economic and environmental performance of e-waste management practices (Newaz & Appolloni, 2024).

Finally, this research recognises that e-waste management extends beyond environmental and economic considerations to encompass issues of social equity and environmental justice (Thapa et al., 2023). Low-income and marginalised communities are disproportionately affected by e-waste pollution, as hazardous waste sites are frequently located in close proximity to vulnerable populations (Osibanjo & Nnorom, 2007). Addressing these inequities requires a critical examination of waste flows, responsibility allocation, and community participation, alongside human-centred solutions that disrupt harmful disposal pipelines (Bimir, 2020). Emphasising the ethical dimensions of e-waste governance can therefore support the development of policies that promote both environmental justice and equitable access to sustainable waste management services (Ofori & Opoku Mensah, 2022). The accelerating global e-waste crisis necessitates urgent investigation into effective management strategies that account for its environmental, economic, and social dimensions. This research is significant in that it contributes knowledge capable of informing policy development, advancing recycling technologies, and strengthening consumer awareness, while also mitigating the health and environmental risks associated with improper e-waste disposal. Furthermore, the study offers important implications for circular economy transitions by providing insights that can support the refinement of existing principles and stimulate innovation in sustainable waste management practices. By addressing persistent governance challenges surrounding e-waste, this research contributes to broader efforts aimed at fostering resource efficiency, institutional accountability, and long-term sustainability.

METHODOLOGY

This study adopted a conceptual research design grounded in an integrative review of existing literature on e-waste management, consumer behaviour, and circular economy frameworks. Peer-reviewed journal articles, policy reports, and authoritative institutional publications were systematically examined to identify dominant themes, theoretical perspectives (Newaz & Appolloni, 2024; Ozuem et al 2025), and empirical insights relevant to e-waste awareness, regulatory instruments, and purchasing behaviour. The literature was analysed using a thematic synthesis approach that enabled the comparison of developed and developing economy contexts, with particular attention paid to Nigeria (Alblooshi et al., 2022). Concepts drawn from environmental science, behavioural economics, and policy analysis were iteratively integrated to develop a coherent conceptual framework. This framework elucidates the interrelationships between consumer awareness, economic incentives, regulatory structures, and informal recycling systems; it provides a theoretically grounded basis for future empirical investigation and policy development.

DISCUSSION

Building on an analysis of systemic constraints, this study identifies several pathways through which Nigeria's e-waste management system could be repositioned towards more sustainable outcomes (Widanapathirana et al., 2023). A primary and immediate opportunity lies in the structured integration of the informal sector. Informal recyclers already perform a critical function in the collection and recovery of e-waste, albeit under unregulated and hazardous conditions. Consistent with prior research, collaboration between formal and informal actors has been shown to improve collection efficiency and environmental performance when supported by appropriate governance mechanisms (Hieronymi et al., 2012; Dias et al., 2018). Incorporating informal workers into EPR schemes or local authority programmes could therefore enhance system coverage while addressing deficits in technical knowledge, occupational safety, and regulatory oversight.

A second pathway concerns the alignment of consumer behaviour with institutional objectives through contextually appropriate regulatory and economic incentives. Existing studies demonstrate that financial and quasi-financial incentives can substantially increase participation in e-waste recycling when embedded within traceable and transparent systems (Safdar et al., 2020; Sharma et al., 2020). In urban contexts such as Lagos, digital and mobile-based incentive mechanisms offer a scalable means of engagement. From a theoretical perspective, such approaches operationalise principles of compliance and social influence, while also addressing material constraints that limit pro-environmental behaviour. The integration of economic nudges with accessible collection infrastructure may therefore serve as a catalyst for behavioural change.

Institutional credibility and visibility emerge as a third critical determinant of public engagement. Rebuilding trust requires demonstrable institutional presence through transparent reporting, consistent monitoring, and collaboration with community leaders. As Bhaskar and Turaga (2018) argued, decentralised enforcement models, in which local governments assume responsibility for awareness and collection activities, foster proximity, ownership, and responsiveness. When aligned with national sustainability strategies, these arrangements can achieve both top-down coherence and bottom-up legitimacy, thereby narrowing the governance distance perceived by citizens. The findings indicate that behavioural and institutional shortcomings in Nigeria's e-waste system are deeply interconnected. Cognitive factors, such as risk perception and knowledge gaps, interact with relational and institutional dimensions, including policy disillusionment and governance distance. These dynamics help explain the persistence of informal recycling systems despite their environmental and health costs, alongside the limited uptake of formal recycling channels. Addressing e-waste challenges in Nigeria therefore requires systemic interventions that simultaneously engage consumers, strengthen institutions, and formalise existing informal practices, rather than isolated awareness or regulatory efforts.

CONCLUSION AND LIMITATIONS

This study advances understanding of e-waste management in Nigeria by highlighting the interdependence between consumer behaviour, institutional capacity, and governance structures. Drawing on an interdisciplinary conceptual approach, the paper demonstrates that awareness initiatives alone are insufficient to change disposal practices in contexts characterised by weak regulation, limited public trust, and economic constraints. Instead, sustainable progress depends on coordinated interventions that integrate informal recycling actors, align consumer incentives with institutional objectives, and strengthen regulatory visibility and accountability. The proposed conceptual framework contributes to existing literature by situating behavioural drivers within broader structural and policy environments; it offers a context-sensitive lens through which e-waste challenges in developing

economies can be interpreted. By emphasising the role of economic incentives, decentralised governance, and formal–informal collaboration, the study provides actionable insights for policymakers seeking to promote circular economy transitions and environmentally responsible consumption in Nigeria. Notwithstanding these contributions, the study is subject to several limitations. As a conceptual paper, the analysis relies primarily on existing literature and illustrative qualitative insights, rather than large-scale empirical data. In addition, the study does not differentiate systematically between rural and urban contexts, where access to infrastructure, digital tools, and recycling services may vary considerably. Finally, while the paper acknowledges the growing role of digital technologies in e-waste management, it does not empirically assess their feasibility or adoption barriers within low-income or marginalised communities. Future research could address these limitations through mixed methods designs, comparative cross-country analyses, and longitudinal studies examining behavioural change over time.

REFERENCES

- Alblooshi, B. G. K. M., Ahmad, S. Z., Hussain, M., & Singh, S. K. (2022). Sustainable management of electronic waste: Empirical evidences from a stakeholders' perspective. *Business Strategy and the Environment*, 31(4), 1856–1874.
- Attia, Y., Soori, P. K., & Ghaith, F. (2021). Analysis of households' e-waste awareness, disposal behavior, and estimation of potential waste mobile phones towards an effective e-waste management system in Dubai. *Toxics*, 9(10), 236. <https://doi.org/10.3390/toxics9100236>
- Azemi Y, Ozuem W (2026), "Paid search advertising across stages of the customer shopping journey: a shopping goal theory perspective". *Information Technology & People*, Vol. 39 No. 8 pp. 32–49, doi: <https://doi.org/10.1108/ITP-03-2023-0223>
- Bhaskar, K. (2015, October 3). Changes in electronic waste management: From E-Waste (Management Handling) Rules 2011 to Draft E-Waste Management Rules 2015. *Economic and Political Weekly*, 50(40). <https://www.epw.in/journal/2015/40/web-exclusives/changes-electronic-waste-management.html>
- Bhaskar, K., & Turaga, R. M. R. (2018). India's e-waste rules and their impact on e-waste management practices: A case study. *Journal of Industrial Ecology*, 22(4), 930–942.
- Bimir, M. N. (2020). Revisiting e-waste management practices in selected African countries. *Journal of the Air & Waste Management Association*, 70(7), 659–669.
- Bozkurt, Ö., & Stowell, A. (2016). Skills in the green economy: Recycling promises in the UK e-waste management sector. *New Technology, Work and Employment*, 31(2), 146–160.
- Brindhadevi, K., Barceló, D., Lan Chi, N. T., & Rene, E. R. (2023). E-waste management, treatment options and the impact of heavy metal extraction from e-waste on human health. *Environmental Research*, 217, 114926.
- Dias, P., Bernardes, A. M., & Huda, N. (2018). Waste electrical and electronic equipment (WEEE) management: An analysis on the Australian e-waste recycling scheme. *Journal of Cleaner Production*, 197, 750–764.
- Gaur, T. S., Yadav, V., Mittal, S., & Sharma, M. K. (2024). A systematic review on sustainable e-waste management: Challenges, circular economy practices, and a conceptual framework. *Management of Environmental Quality*, 35(4), 858–884.
- Hieronimi, K., Kahhat, R., & Williams, E. (2012). *E-waste management: From waste to resource*. Routledge.
- Kang, K. D., Kang, H., Ilankoon, I. M. S. K., & Chong, C. Y. (2020). Electronic waste collection systems using Internet of Things (IoT): Household electronic waste management in Malaysia. *Journal of Cleaner Production*, 252, 119801.
- Kariwala, P., Kandpal, S. D., Dixit, S., Singh, A. K., Pathak, A., & Singh, S. (2023). Knowledge, attitude and practices regarding electronic waste management among users of electronic equipment in India. *Indian Journal of Community Health*, 35(1), 38–45.
- Khetriwal, D. S., Kraeuchi, P., & Widmer, R. (2009). Producer responsibility for e-waste management: Key issues for consideration - Learning from the Swiss experience. *Journal of Environmental Management*, 90(1), 153–165.

- Latha, C. J., Kalaiselvi, K., Ramanarayan, S., Srivel, R., Vani, S., & Sairam, T. V. M. (2022). Dynamic convolutional neural network-based e-waste management and optimized collection planning. *Concurrency and Computation: Practice and Experience*, 34(17). <https://doi.org/10.1002/cpe.6941>
- Masud, M. H., Akram, W., Ahmed, A., Ananno, A. A., Mourshed, M., Hasan, M., & Joardder, M. U. H. (2019). Towards effective e-waste management in Bangladesh: A review. *Environmental Science and Pollution Research*, 26(2), 1250–1276.
- Naeem, M. A., Appiah, M., Karim, S., & Yarovaya, L. (2023). What abates environmental efficiency in African economies? Exploring the influence of infrastructure, industrialization, and innovation. *Technological Forecasting and Social Change*, 186, 122172. <https://doi.org/10.1016/j.techfore.2022.122172>
- Newaz, M. S., & Appolloni, A. (2024). Evolution of behavioral research on e-waste management: Conceptual frameworks and future research directions. *Business Strategy and the Environment*, 33(2), 477–503. <https://doi.org/10.1002/bse.3503>
- Nnorom, I. C., & Osibanjo, O. (2008). Electronic waste (e-waste): Material flows and management practices in Nigeria. *Waste Management*, 28(8), 1472–1479.
- Oeztuerk, T. (2015). Generation and management of electrical–electronic waste (e-waste) in Turkey. *Journal of Material Cycles and Waste Management*, 17(3), 411–421.
- Ofori, D., & Opoku Mensah, A. (2022). Sustainable electronic waste management among households: A circular economy perspective from a developing economy. *Management of Environmental Quality*, 33(1), 64–85.
- Osibanjo, O., & Nnorom, I. C. (2007). The challenge of electronic waste management in developing countries. *Waste Management & Research*, 25(6), 489–501.
- Ozuem, W., Willis, M., Ranfagni, S., & Fandi Omeish. (2025). Thematic Analysis in an Artificial Intelligence-Driven Context: A Stage-by-Stage Process. *International Journal of Qualitative Methods*, 24. <https://doi.org/10.1177/16094069251362982>
- Ozuem, W & Willis, M (2025) *Digital Marketing Strategies for Value Co-Creation: Models and Approaches for Online Brand Communities*, London: Palgrave
- Ozuem, W., Ranfagni, S., Willis, M., Salvietti, G., & Howell, K. (2024). Exploring the relationship between chatbots, service failure recovery and customer loyalty: A frustration–aggression perspective. *Psychology & Marketing*, 41, 2253–2273. <https://doi.org/10.1002/mar.22051>
- Ramzan, S., Liu, C. G., Munir, H., & Xu, Y. (2019). Assessing young consumers' awareness and participation in sustainable e-waste management practices. *Environmental Science and Pollution Research*, 26(19), 20003–20013.
- Rautela, R., Arya, S., Vishwakarma, S., Lee, J., Kim, K.-H., & Kumar, S. (2021). E-waste management and its effects on the environment and human health. *Science of the Total Environment*, 773, 145623.
- Safdar, N., Khalid, R., Ahmed, W., & Imran, M. (2020). Reverse logistics network design of e-waste management. *Journal of Cleaner Production*, 272, 122662.
- Sharma, M., Joshi, S., & Kumar, A. (2020). Assessing enablers of e-waste management in circular economy using DEMATEL method: An Indian perspective. *Environmental Science and Pollution Research*, 27(12), 13325–13338. <https://doi.org/10.1007/s11356-020-07765-w>
- Shittu, O. S., Williams, I. D., & Shaw, P. J. (2021). Global e-waste management: Can WEEE make a difference? *Waste Management*, 120, 549–563.
- Sundar, D., Mathiyazhagan, K., Agarwal, V., Janardhanan, M., & Appolloni, A. (2023). From linear to circular economy in the e-waste management sector: UK experience. *Business Strategy and the Environment*, 32(7), 4282–4298.

Thapa, K., Vermeulen, W. J. V., Deutz, P., & Olayide, O. (2023). Ultimate producer responsibility for e-waste management: The case of European electronic equipment exported to Nigeria. *Business Strategy & Development*, 6(1), 33–52.

Widanapathirana, S., Perera, I. J. J. U. N., & Bellanthudawa, B. K. A. (2023). E-waste recycling and management strategies in South Asia: A systematic review. *Waste Disposal & Sustainable Energy*, 5(4), 559–575.

ZIMBABWE GOLD (ZiG) CURRENCY REFORM AND THE SURVIVAL OF RETAIL SMEs: INSIGHTS FROM MANICALAND PROVINCE, ZIMBABWE

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ABSTRACT

This study investigates the impact of the Zimbabwe Gold (ZiG) currency on Small and Medium-Sized Retail Enterprises (SMREs) in Manicaland Province, Zimbabwe. Grounded in Survival-Based Resource Dependence Theory (SRDT) and Exchange Rate Pass-Through (ERPT) framework, the study evaluates enterprise coping mechanisms, pricing responses, and institutional support under monetary transition. A convergent parallel mixed-methods design integrated quantitative surveys (N = 240) with qualitative interviews and focus groups (N = 18) across major commercial hubs. The findings reveal that while ZiG was introduced as a stabilization tool, SMREs encounter ongoing liquidity bottlenecks, rapid price revisions, and persistent trust deficits. In response, retailers utilize defensive strategies including dual pricing, inventory compression, and digital platform adoption. Institutional support via SMEDCO was evaluated as reactive and insufficiently resourced. The study concludes that monetary reform alone cannot ensure enterprise resilience without coordinated credit support, financial infrastructure, and transparent communication.

Keywords: Zimbabwe Gold (ZiG), Small and Medium-Sized Retail Enterprises (SMERs), currency reform, enterprise resilience, Zimbabwe economy.

INTRODUCTION

Monetary reforms have long influenced enterprise performance in developing economies, particularly where macroeconomic instability, inflationary pressures, and exchange rate volatility persist. In Zimbabwe, repeated episodes of hyperinflation and frequent changes in currency regimes have significantly disrupted business operations, especially among Small and Medium-Sized Retail Enterprises (SMREs), which often operate with limited financial buffers and high exposure to market uncertainty. The introduction of the Zimbabwe Gold (ZiG) currency in 2024 represented another major policy intervention aimed at restoring price stability, rebuilding public confidence, and strengthening the use of a domestically anchored currency reportedly backed by gold reserves. While the reform was intended to stabilize the broader economy, its practical success depends not only on sound monetary policy but also on the confidence of market actors, the consistency of policy implementation, and the ability of enterprises to adapt to a new transactional environment. In contexts where institutional credibility has previously been weakened, the transition to a new currency often presents both opportunities and risks for business sustainability.

SMREs occupy a strategic position in Zimbabwe's retail sector through their contribution to employment creation, household incomes, and local economic development. Their importance is particularly evident in provinces such as Manicaland, where many households depend on small-scale commercial activity for livelihoods. However, these enterprises are highly sensitive to liquidity shortages, exchange rate fluctuations, policy uncertainty, and shifts in consumer confidence. The transition to ZiG required many firms to revise pricing structures, reconfigure accounting systems, renegotiate supplier arrangements, and strengthen cash flow management practices. Such adjustments can be costly and difficult, especially for enterprises with limited managerial capacity or weak access to finance. Previous

studies note that SMEs in Zimbabwe remain vulnerable to external shocks and unstable operating environments, which can undermine their resilience and competitiveness (Makore & Chikutuma, 2025; Matsvai, 2025).

The role of support institutions becomes especially critical during periods of monetary transition. In Zimbabwe, the Small and Medium Enterprises Development Corporation (SMEDCO) is mandated to assist enterprises through financing, business training, technical support, and advisory services. Ideally, such institutions should cushion firms against transition risks while enhancing their capacity to adapt to new economic conditions. However, questions remain regarding whether these interventions have been sufficiently proactive, adequately funded, and responsive to the realities faced by retailers in provinces such as Manicaland. Existing evidence suggests that many enterprises continue to encounter barriers such as regulatory ambiguity, low financial literacy, constrained access to foreign currency, and declining confidence among suppliers and consumers (Mwamba et al., 2022). In districts such as Chipinge, reported resistance to transacting in ZiG reflects deeper concerns about institutional trust and policy consistency. These challenges suggest that the anticipated stabilization benefits of the new currency may not yet be fully realized at the microenterprise level.

Research Objectives

1. Identify systemic adaptation challenges and evaluate institutional support provided by SMEDCO during ZiG adoption.
2. Assess the operational, pricing, and liquidity effects of ZiG on SMRE competitiveness using the ERPT lens.
3. Evaluate the alignment of current currency support mechanisms with Sustainable Development Goals 8 (Decent Work and Economic Growth) and 9 (Industry, Innovation, and Infrastructure).

This study offers significant, multi-faceted contributions that advance scholarly discourse, enterprise management, and public policy during transitional monetary regimes. Theoretically, the research enriches Survival-Based Resource Dependence Theory (SRDT) by extending its application to currency-deprived environments. It demonstrates that under conditions of acute monetary instability and institutional resource scarcity, multi-currency diversification moves beyond a simple coping tactic to function as a vital, self-derived organizational survival asset. By illustrating how small retail firms actively manage currency choice to insulate themselves from systemic liquidity shocks, the study deepens our theoretical understanding of enterprise resilience within hyperinflation-prone border economies.

From a practical perspective, the findings yield substantive contributions for both business practitioners and policy architects. For retail managers, the study provides actionable, field-tested operational strategies including dynamic pricing mechanisms, shortened inventory procurement cycles, and digital payment integrations that enable firms to protect working capital and maintain competitiveness during swift monetary shifts. Concurrently, it offers a robust policy contribution by outlining evidence-based frameworks for monetary authorities and support institutions such as SMEDCO. These frameworks emphasize the design and deployment of decentralized SME liquidity facilities and targeted credit interventions, ensuring that micro-level business realities are directly accounted for during broader macroeconomic currency reforms

LITERATURE REVIEW

This section critically reviews existing scholarship to establish current knowledge on the adaptation of SMREs to currency reforms, while identifying unresolved empirical gaps.

Empirical Evidence on Currency Volatility and SMEs

Currency volatility creates substantial operational uncertainty by inflating transaction costs, narrowing profit margins, and complicating financial forecasting (Beck & Mavis, 2020; IMF, 2020). Global and regional empirical evidence demonstrates that SMEs in developing nations face heightened vulnerability to exchange rate shifts. In Nigeria, exchange volatility has constrained manufacturing imports while producing mixed trade outcomes (Ikpe Michael et al., 2024). In South Africa, exchange rate instability directly links to depressed export performance, reduced trade openness, and elevated domestic inflation (Miyajima, 2020). Furthermore, studies across Kenya and Mauritius indicate that volatile monetary environments discourage foreign direct investment (FDI) and weaken retail supply chain stability.

Global and Regional Empirical Foundations

Currency volatility distorts business budgeting, elevates transaction friction, and erodes profit margins, particularly for small enterprises without financial derivative instruments (Beck & Mavis, 2020; IMF, 2020). Across Sub-Saharan Africa, exchange rate shifts yield varying micro-level impacts. In Nigeria, foreign exchange controls hampered retail imports while driving informal sourcing (Ikpe Michael et al., 2024). In South Africa, exchange rate depreciation transmitted directly into domestic inflation and reduced trade openness (Miyajima, 2020). These regional insights demonstrate that macro-monetary shifts consistently reconfigure micro-level retail dynamics.

The Zimbabwean and Manicaland Retail Context

Zimbabwe's recent monetary history from the 2019 reintroduction of the Zimbabwean Dollar (ZWL) to partial dollarization illustrates acute exchange rate pass-through and rapid inflation (Masiyandima et al., 2021). In Manicaland Province, a crucial cross-border trading portal bordering Mozambique, exchange volatility distorts supply chains, incentivizes informal trade, and forces daily retail price recalibrations (Makoni, 2021; Mutasa & Chari, 2020). While formal policies such as currency auctions sought to stabilize foreign exchange, unequal institutional access left rural and small-scale retailers dependent on parallel market rates (Marara & Ncube, 2021).

Integrated Theoretical Framework

To avoid disconnected literature arguments, this study synthesizes two complementary theoretical streams:

To establish a logically coherent analytical foundation and avoid disconnected empirical arguments, this study synthesizes two complementary theoretical perspectives: Survival-Based Resource Dependence Theory (SRDT) and the Exchange Rate Pass-Through (ERPT) framework. Through the theoretical lens of SRDT, small enterprises are conceptualized as vulnerable organizations that depend heavily on critical external resources such as foreign exchange reserves, institutional credit, and reliable supplier inventory which are governed by external macroeconomic actors. Under conditions of heightened monetary instability, when state-mandated support institutions like the Small and Medium Enterprises Development Corporation (SMEDCO) fail to adequately provision these vital operational inputs, small and medium-sized retail enterprises (SMREs) execute autonomous coping mechanisms. Tactics such as dual-currency pricing and foreign exchange hoarding are thus employed strategically to minimize enterprise vulnerability and systematically reduce reliance on the domestic currency regime.

Complementing this structural perspective, the ERPT framework provides an operational explanation of firm-level pricing dynamics during periods of monetary transition. ERPT measures the degree and speed with which fluctuations in the exchange rate transmit into domestic price structures. In import-reliant retail environments, where inventory cost structures are intrinsically linked to foreign currency valuation, exchange rate depreciation exerts immediate upward pressure on consumer prices. Retail managers are consequently forced to execute rapid, frequent price recalibrations as a defensive operational necessity, thereby preserving working capital, protecting inventory replacement cost capacity, and ensuring baseline enterprise survival within volatile economic contexts.

Summary of Key Literature and Research Gap

To synthesize the existing body of knowledge, **Table 1** outlines key studies across global, regional, and national contexts.

Table 1: Summary Matrix of Key Literature on Currency Volatility and SME Performance.

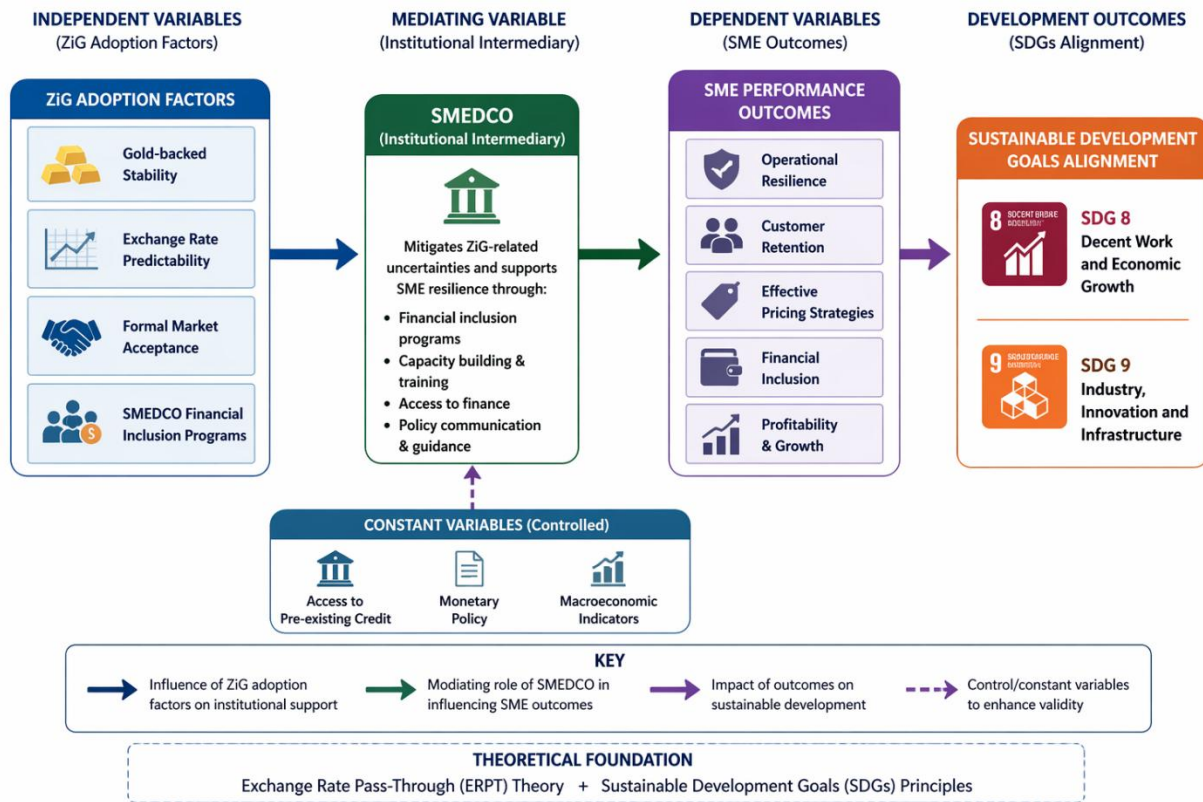
Context / Authors	Core Focus	Key Findings	Identified Research Gap
Global / International (Beck & Mavis, 2020; IMF, 2020)	Exchange volatility & firm planning	Volatility increases transaction costs and disrupts enterprise budgeting due to lack of hedging tools.	Focuses predominantly on developed/diversified markets with access to complex hedging tools.
Sub-Saharan Africa (Ikpe Michael et al., 2024; Miyajima, 2020)	Macro-stability & trade in Nigeria & South Africa	Currency instability depresses imports/exports, dampens GDP growth, and accelerates inflation.	Examines broad macroeconomic indicators rather than micro-level SME survival strategies.
Zimbabwe (National) (Masiyandima et al., 2021; Matsvai, 2025)	Multi-currency dynamics & hyperinflation	Rapid currency depreciation destroys purchasing power and distorts pricing mechanisms.	Concentrates on national macro-aggregates without provincial or sector-specific granularity.
Manicaland Province (Present Study)	ZiG adoption, institutional support, & SMRE survival	Evaluates localized retail adaptation, pricing behavior, and SMEDCO's institutional adequacy.	Fills the gap by providing empirical micro-level evidence on ZiG adoption in border-region SMREs.

Conceptual Framework

The conceptual framework guiding this study positions ZiG adoption factors such as currency stability, market acceptance, and financial inclusion initiatives as independent variables influencing enterprise outcomes. These outcomes include resilience, pricing behaviour, liquidity management, competitiveness, and profitability. Institutional support through SMEDCO is viewed as a mediating factor that can either strengthen or weaken enterprise adaptation. Ultimately, the framework links these firm-level outcomes to broader developmental objectives, particularly SDG 8 and SDG 9. This perspective underscores the need for context-sensitive evidence on whether monetary reform can genuinely support sustainable enterprise development in Zimbabwe.

Figure 1 presents an integrated conceptual model that combines the Survival-Based Resource Dependence Theory (SRDT) and the Exchange Rate Pass-Through (ERPT) framework to assess both the structural and operational effects of the Zimbabwe Gold (ZiG) currency on Small and Medium-Sized Retail Enterprises (SMREs) in Manicaland Province. Through the SRDT lens, the framework explains how enterprises depend on external resources such as finance, supplier networks, and institutional support for survival during periods of economic transition. Through the ERPT perspective, it examines how exchange rate movements and currency uncertainty influence domestic pricing behaviour, liquidity management, and competitiveness. The model further recognises the strategic role of the Small and Medium Enterprises Development Corporation (SMEDCO) in facilitating enterprise adaptation through ZiG-denominated loans, business development support, and partnership creation. These interventions are considered important in advancing Sustainable Development Goal (SDG) 8 on decent work and economic growth, and SDG 9 on industry, innovation, and infrastructure. To capture these multidimensional relationships, the study adopts a mixed-methods approach that combines qualitative assessments of enterprise resilience with quantitative analysis of exchange rate and pricing dynamics, thereby offering a comprehensive understanding of the socio-economic implications of ZiG adoption.

Figure 1: Conceptual framework.



Source: (authors compilation, 2026)

Research Gap

Although existing studies consistently show that currency instability, exchange rate volatility, and weak institutional support negatively affect Small and Medium Enterprises (SMEs) in developing economies, current evidence on Zimbabwe remains largely concentrated at the national level and provides limited insight into the experiences of Small and Medium-Sized Retail Enterprises (SMREs) in Manicaland Province. Local conditions such as market structures, supplier relationships, consumer trust, and cross-border trade dynamics may significantly shape how enterprises respond to the ZiG currency, yet these contextual realities remain underexplored. Furthermore, while SMEDCO is expected to support SME adjustment through finance, training, and advisory services, there is little empirical evidence evaluating the adequacy and effectiveness of its interventions during the ZiG transition. Limited research also exists on how enterprises in districts such as Chipinge are managing pricing volatility, liquidity shortages, and currency acceptance in daily operations. This study therefore addresses both a contextual and institutional gap by examining the systemic challenges faced by SMREs in adapting to ZiG and by assessing the effectiveness of SMEDCO's response in Manicaland Province.

METHODOLOGY

Research Design

This study adopted a mixed-methods research design in order to generate a comprehensive understanding of the impact of the Zimbabwe Gold (ZiG) currency on Small and Medium-Sized Retail Enterprises (SMREs) in Manicaland Province, Zimbabwe. The mixed-methods approach was considered appropriate because the research problem

encompasses both measurable operational outcomes, such as liquidity conditions, pricing adjustments, and transaction volumes, as well as subjective dimensions including trust, confidence, and perceptions of institutional support (Saunders et al., 2021). More specifically, the study employed a convergent parallel mixed-methods design, in which quantitative and qualitative data were collected during the same phase of the research process, analysed independently, and subsequently integrated during interpretation. This design enabled triangulation of findings, thereby enhancing the robustness, credibility, and explanatory depth of the study (Creswell & Plano, 2018). While the quantitative strand generated statistical evidence on the economic effects of ZiG adoption, the qualitative strand provided nuanced insights into enterprise adaptation, lived experiences, and contextual realities.

Research Philosophy and Approach

The study was guided by the philosophy of pragmatism, which prioritises practical solutions to real-world problems and recognises the value of methodological pluralism. Pragmatism is particularly suitable for policy-oriented research because it permits the integration of positivist assumptions associated with quantitative inquiry and interpretivist assumptions associated with qualitative inquiry (Saunders et al., 2019). In line with this philosophical orientation, the quantitative component followed a deductive approach, drawing on Survival-Based Resource Dependence Theory (SRDT) and the Exchange Rate Pass-Through (ERPT) framework to test relationships between currency instability and enterprise performance. Simultaneously, the qualitative component adopted an inductive approach, allowing themes related to trust, resilience, adaptation, and institutional adequacy to emerge directly from participants' experiences.

Study Area and Target Population

The study was conducted in Manicaland Province, Zimbabwe, with particular attention to major commercial centres including Mutare, Rusape, Chipinge, and Nyanga. Manicaland was purposively selected because of its strategic economic importance, strong cross-border trade linkages with Mozambique, and significant concentration of retail SMEs whose operations are highly sensitive to foreign currency dynamics. These characteristics made the province an appropriate setting for examining the enterprise-level implications of monetary reform. The target population comprised both formal and informal SMREs operating within the province, together with key institutional stakeholders involved in SME development. These included officials from the Small and Medium Enterprises Development Corporation (SMEDCO) and representatives from financial institutions engaged in SME lending and support. Including both enterprise actors and institutional stakeholders ensured a balanced understanding of business realities and the broader support ecosystem shaping enterprise adaptation (Creswell & Creswell, 2023).

Sampling Strategy and Sample Size

A multi-stage sampling strategy was employed to enhance representativeness and analytical depth. First, stratified sampling was used to classify enterprises into micro, small, and medium-sized categories, ensuring adequate representation across enterprise scales. Within each stratum, simple random sampling was then applied to select respondents for the quantitative survey, thereby minimising selection bias and strengthening statistical reliability (Saunders et al., 2021). For the qualitative strand, purposive sampling was initially used to identify information-rich participants such as SMEDCO officials, leaders of business associations, and experienced enterprise owners. Thereafter, snowball sampling was utilised to recruit additional participants through referrals. This was particularly useful for identifying long-serving business operators with deep experiential knowledge of Zimbabwe's successive currency regimes. Using Cochran's (1977) formula for finite populations, a total of 240 retail SMREs were selected for the quantitative survey. For the qualitative component, 18 key informant interviews and supplementary interviews with enterprise owners and managers were conducted until data saturation was reached, indicated by recurring themes and the absence of substantially new insights.

Data Collection Instruments and Procedures

Quantitative Data Collection

Primary quantitative data were collected through a structured questionnaire administered to owners and managers of retail enterprises. The questionnaire consisted mainly of Likert-scale items designed to measure key constructs relevant to enterprise performance under the ZiG regime. These included perceptions of liquidity stability, frequency of price changes, access to foreign currency, sales performance trends, and competitiveness. Prior to the main survey, the instrument was pilot tested to assess clarity, relevance, and ease of administration. Reliability of the scale items was subsequently examined using Cronbach's alpha coefficient. Questionnaires were distributed physically during business hours across the selected districts.

Qualitative Data Collection

Qualitative data were gathered through multiple complementary techniques to ensure depth and diversity of perspectives. These included:

- Semi-structured interviews with enterprise owners and managers;
- Key informant interviews with SMEDCO officials and financial sector representatives;
- Focus group discussions with retail traders.

Interview guides were developed around core themes such as adaptation strategies, confidence in ZiG, perceptions of institutional support, and alignment with the Sustainable Development Goals (SDGs). With informed consent, all interviews were audio-recorded and later transcribed verbatim for analysis.

Secondary data were sourced from official and scholarly publications, including reports from the Reserve Bank of Zimbabwe (RBZ), Ministry of Finance publications, SMEDCO annual reports, academic journal articles, and policy briefs. These sources provided important macroeconomic context relating to monetary reform, exchange rate developments, and SME support initiatives. The use of secondary data also strengthened triangulation and contextual interpretation.

Data Collection Procedure

Quantitative and qualitative data were collected concurrently in line with the convergent mixed-methods design. Surveys were administered directly to enterprise respondents, while interviews were conducted face-to-face at respondents' business premises or agreed locations. The full data collection process was completed over a period of approximately six weeks.

Data Analysis

Quantitative Data Analysis

Quantitative data were analysed using the Statistical Package for the Social Sciences (SPSS). The analysis commenced with descriptive statistics, including frequencies, means, and standard deviations, to summarise respondent characteristics and key business variables (Fetters et al., 2022). Thereafter, correlation analysis was conducted to examine the strength and direction of relationships between ZiG adoption and selected enterprise performance indicators. Finally, multiple regression analysis was used to determine the predictive effect of ZiG adoption on variables such as liquidity management, pricing stability, and competitiveness. Statistical significance was assessed at the 5 percent level ($p < 0.05$).

Qualitative Data Analysis

Qualitative data were analysed using thematic analysis following the framework outlined by Bryman (2020). The process involved repeated reading of transcripts for familiarisation, open coding of meaningful text segments, grouping of related codes into broader categories, refinement of themes, and interpretation in relation to the theoretical

frameworks guiding the study. Prominent themes that emerged included currency distrust, dual pricing strategies, institutional inadequacy, and survival adaptation, reflecting the complex realities experienced by SMREs under the ZiG regime (Bhaskar, 2020; Quaye et al., 2024).

Reliability, Validity, and Trustworthiness

Several strategies were employed to ensure methodological rigour. Content validity was established through expert review of the research instruments to ensure adequate coverage of the constructs under investigation (Field, 2020). Construct validity was maintained by aligning measurement items with SRDT and ERPT concepts. For the quantitative component, internal consistency reliability was assessed using Cronbach's alpha, with a threshold of $\alpha \geq 0.70$ considered acceptable. For the qualitative component, trustworthiness was enhanced through triangulation, prolonged engagement with the data, and member checking, whereby participants were invited to verify interpretations (Morgan, 2020).

Ethical Considerations

The study adhered to recognised ethical standards for social science research (Bova et al., 2023). Informed consent was obtained from all participants after clear explanation of the study's objectives, procedures, and expected outcomes. Participation was voluntary, and respondents retained the right to withdraw at any stage without penalty. Confidentiality and anonymity were guaranteed throughout the study, and no identifying information was disclosed in the reporting of results. All data were securely stored and used strictly for academic purposes. Ethical clearance was obtained from the Manicaland State University of Applied Sciences ethics review board prior to commencement of fieldwork.

Limitations of the Study

Although the mixed-methods design strengthened the breadth and depth of inquiry, several limitations were acknowledged. First, reliance on self-reported financial information may have introduced response bias due to recall limitations or strategic disclosure by participants (Endris & Kassegn, 2022). Second, prevailing currency volatility during the data collection period may have influenced respondents' perceptions and experiences. Third, some informal enterprises may have been underrepresented because of accessibility constraints and the absence of formal registration records. Nevertheless, the use of methodological triangulation and multiple data sources enhanced the credibility, contextual relevance, and overall robustness of the findings (Turyakira et al., 2024).

This section outlined the methodological framework adopted to investigate the impact of the ZiG currency on SMREs in Manicaland Province. Guided by a pragmatic worldview and a convergent mixed-methods design, the study integrated quantitative surveys with qualitative interviews to generate comprehensive empirical evidence. The subsequent section presents the results, discussion of findings, and implications for policy and sustainable enterprise development.

FINDINGS AND DISCUSSION

This section presents the major findings of the study in relation to the stated research objectives. The results are interpreted through the lenses of Survival-Based Resource Dependence Theory (SRDT) and the Exchange Rate Pass-Through (ERPT) framework, while also being situated within the broader empirical literature on currency reforms, institutional support systems, and small enterprise resilience in developing economies. The discussion demonstrates that although the Zimbabwe Gold (ZiG) currency was introduced as a macroeconomic stabilisation measure, its practical effects at enterprise level were mixed and often constrained by operational realities, institutional weaknesses, and persistent trust deficits.

Objective 1: Adaptation Challenges and Institutional Response

Quantitative data indicates that 54% of surveyed SMREs suffered severe liquidity disruption following ZiG adoption. Qualitative interviews confirmed low market confidence, with retailers noting supplier demands for USD settlement.

In accordance with SRDT, retailers instituted dual-pricing strategies to cushion against exchange fluctuations (Chiduza & Moyo, 2021). Institutional evaluation showed that while SMEDCO provided basic informational workshops, it lacked the capital liquidity required to disburse low-interest transition credit.

Objective 2: Pricing Behavior and Competitiveness (ERPT Analysis)

Regression results demonstrated a strong, statistically significant effect of exchange rate uncertainty on retail price adjustment frequencies ($p < 0.05$). Retailers reported weekly or daily price recalibrations, confirming high exchange rate pass-through in import-reliant retail segments (Mashizha & Choga, 2022). Retailers with foreign currency reserves sustained higher stock availability and profit margins, whereas ZiG-dependent businesses suffered stock depletion and shrinking margins.

Objective 3: SDG Alignment Evaluation

Alignment with SDG 8 (Decent Work) and SDG 9 (Infrastructure/Innovation) remains limited. Liquidity constraints suppressed wage growth and employment stability, while incomplete point-of-sale (POS) coverage and digital payment transaction fees restricted enterprise innovation under SDG 9.

Broader Discussion and Implications

Comparison with International Literature

The findings from Manicaland strongly reflect wider international experiences regarding currency transitions in emerging markets. Similar to small business adaptations documented in Ghana during currency redenomination and in Nigeria during foreign exchange scarcity regimes (Ikpe Michael et al., 2024; Quaye et al., 2024), Zimbabwean SMREs relied heavily on informal hedging, inventory compression, and informal dollarization to insulate operations. This confirms that in transition economies lacking structural policy credibility, micro-enterprises default to resource preservation strategies regardless of formal policy mandates.

Theoretical Contributions

This study extends **Survival-Based Resource Dependence Theory (SRDT)** by demonstrating that under extreme monetary uncertainty, currency choice itself becomes a vital strategic resource managed by firms to ensure survival. Furthermore, it validates the **Exchange Rate Pass-Through (ERPT)** framework by proving that pass-through speed accelerates in small retail firms operating on thin margins within developing border economies.

Theoretical Integration

The empirical findings of this study both validate and enrich theoretical understandings of enterprise adaptation during transitional monetary regimes. By demonstrating that small and medium-sized retail enterprises (SMREs) actively manage currency selection as a vital operational buffer, the evidence extends Survival-Based Resource Dependence Theory (SRDT) beyond traditional resource constraints, establishing multi-currency diversification as a core survival asset in volatile environments. Simultaneously, the results reinforce Exchange Rate Pass-Through (ERPT) principles, illustrating that in small retail firms operating on thin profit margins, exchange rate movements transmit into domestic pricing structures with remarkable speed, a phenomenon exacerbated when the domestic currency suffers from a central credibility deficit. Together, these theoretical mechanisms reveal how micro-level pricing and currency management choices serve as immediate structural responses to macro-level monetary uncertainty.

Managerial and Policy Implications

Translating these theoretical insights into practice underscores critical imperatives for both retail managers and public policy architects. For retail operators navigating border economies, maintaining resilience requires moving beyond ad-hoc coping measures toward structured operational strategies, such as adopting flexible procurement cycles,

integrating multi-currency accounting software, and leveraging cooperative buying syndicates to strengthen supplier bargaining power. From a policy standpoint, the study demonstrates that currency reforms cannot succeed in isolation; monetary authorities and institutions like SMEDCO must support currency transitions with targeted SME credit facilities, low-cost Point-of-Sale (POS) infrastructure, and transparent communication regarding backing reserves to anchor long-term market confidence.

CONCLUSION AND POLICY IMPLICATIONS

Interpretation of Key Findings and Objective Confirmation

The empirical evaluation of this study confirms that while the introduction of the Zimbabwe Gold (ZiG) currency represented a strategic macroeconomic stabilization initiative, its practical execution presented severe transitional hurdles for small and medium-sized retail enterprises (SMREs). Assessing the first objective reveals that enterprise coping mechanisms were overwhelmingly self-driven, as official support through the Small and Medium Enterprises Development Corporation (SMEDCO) was widely perceived as reactive, underfunded, and limited in reach. Furthermore, the findings for the second objective confirm acute Exchange Rate Pass-Through (ERPT) dynamics, where persistent exchange rate uncertainty triggered frequent, upward price recalibrations. This pass-through effect intensified operational disparities, widening the competitive divide between well-capitalized, USD-funded retailers and vulnerable, ZiG-dependent businesses struggling to preserve their inventory replacement capacity.

Evaluating the third objective demonstrates that the current currency transition framework achieves only partial alignment with broader international development benchmarks, specifically Sustainable Development Goals 8 and 9. Systemic liquidity bottlenecks, coupled with high transaction costs associated with point-of-sale infrastructure and digital payment systems, restricted enterprise growth, suppressed real wage stability, and constrained workforce retention, thereby undermining contributions to decent work and economic growth under SDG 8. Concurrently, these operational barriers slowed technological adoption and infrastructure integration among regional retailers, limiting the realization of SDG 9 objectives centered on industrial innovation and resilience. Ultimately, these results highlight that macroeconomic monetary reforms cannot drive sustainable development in isolation without parallel investment in robust institutional support systems and inclusive financial infrastructure.

To mitigate operational disruptions and enhance small enterprise resilience during transitional monetary regimes, several coordinated policy interventions are warranted. First, the Reserve Bank of Zimbabwe (RBZ) in conjunction with the Ministry of Finance should establish targeted, concessional ZiG-denominated liquidity and credit facilities to supply essential working capital to retail Small and Medium Enterprises (SMEs) (Heras-Saizarbitoria, 2022). Complementing macro-level liquidity provisions, institutional capacity must be reinforced through the capitalization and strategic decentralization of the Small and Medium Enterprises Development Corporation (SMEDCO), enabling the delivery of localized financial assistance, digital transformation guidance, and volatility management training directly to regional enterprises (Heras-Saizarbitoria, 2022). Furthermore, accelerating digital financial infrastructure expansion specifically through integrated Point-of-Sale (POS) systems and reduced digital transaction tax burdens is critical to lowering physical currency dependency and advancing financial inclusion in alignment with Sustainable Development Goal 9 (Turyakira et al., 2024). Finally, monetary authorities must prioritize policy transparency regarding the gold-reserve backing mechanisms of the ZiG currency to rebuild market trust, stabilize consumer expectations, and effectively curb speculative price adjustments across the retail sector (Baldé & Tesfaye, 2025; Sibanda et al., 2025).

Limitations of the Study

Notwithstanding the methodological rigor employed in this research, several limitations should be acknowledged. First, the study relied partly on self-reported financial performance data from respondents, which may have introduced reporting bias through underestimation, overestimation, or selective disclosure of business performance indicators. Second, the study was confined to Manicaland Province and, while this context offers valuable insights, the findings may not fully capture variations in enterprise experiences across other provinces of Zimbabwe with different economic structures and market dynamics. Third, the research primarily examined the short-term adaptation effects of the Zimbabwe Gold (ZiG) currency, and therefore longer-term outcomes relating to enterprise growth, sustainability, and

macroeconomic stabilization remain uncertain. Finally, the study was conducted during a period of continued macroeconomic volatility, which may have influenced respondents' perceptions and shaped their assessments of the new currency regime. These limitations, however, do not diminish the relevance of the findings, but rather provide context for their interpretation and application.

Areas for Further Research

The present study opens several avenues for future scholarly inquiry. First, longitudinal studies are recommended to examine the long-term effects of ZiG on SME survival, growth trajectories, and competitiveness across multiple provinces of Zimbabwe. Such studies would provide deeper insight into whether short-term adaptation strategies evolve into sustainable business models over time. Second, comparative sectoral studies involving retail, manufacturing, agriculture, and service enterprises would broaden understanding of how currency reforms affect sectors differently depending on their structure and exposure to foreign exchange markets. Third, future quantitative research could model the employment effects of new monetary regimes in order to provide stronger evidence on outcomes linked to Sustainable Development Goal (SDG) 8, particularly decent work and inclusive growth. Finally, further investigation into digital financial innovation including mobile payments, fintech solutions, and platform-based commerce as resilience mechanisms in volatile economies would make an important contribution to both policy and enterprise strategy.

Recommendations

To foster small enterprise resilience and promote sustainable economic growth during transitional monetary regimes, a coordinated set of policy and managerial interventions is essential. Policymakers specifically the Reserve Bank of Zimbabwe, the Ministry of Finance, and SMEDCO must implement a structured SME transition framework that provides targeted liquidity facilities, concessional working capital loans, and exchange rate risk mitigation tools to cushion retail SMREs operating on thin margins. Simultaneously, strengthening SMEDCO through increased capitalization, provincial decentralization, enhanced capacity-building programs, and robust monitoring systems is critical to delivering timely financial and advisory support. To advance SDG 9 (Industry, Innovation, and Infrastructure), the government and financial institutions should accelerate digital infrastructure investments by deploying affordable Point-of-Sale (POS) systems, improving platform interoperability, and lowering transaction fees to diminish reliance on physical cash. At the firm level, retail managers should mitigate currency exposure through diversified supply chains, shortened inventory cycles, legal foreign currency reserves, and cooperative purchasing syndicates supported by business associations. Furthermore, monetary authorities must overcome persistent credibility gaps by maintaining transparent communication regarding ZiG reserve backing, policy targets, and stabilization benchmarks to curb speculative behavior. Finally, aligning SME policy with SDG 8 (Decent Work and Economic Growth) and SDG 9 requires introducing tax incentives for employment retention alongside innovation grants for digital adoption, thereby ensuring inclusive, long-term enterprise sustainability.

CONCLUSION

This study examined the impact of the Zimbabwe Gold (ZiG) currency on Small and Medium-Sized Retail Enterprises (SMREs) in Manicaland Province, situating the analysis within broader debates on monetary reform and enterprise resilience in volatile developing economies. Guided by a mixed-methods research design and informed by Survival-Based Resource Dependence Theory and the Exchange Rate Pass-Through framework, the findings demonstrate that although ZiG represents a strategic attempt at macroeconomic stabilization, its immediate enterprise-level effects have been mixed. Retail SMREs continued to experience liquidity constraints, pricing volatility, uneven competitiveness, and limited confidence in the currency's long-term sustainability. At the same time, enterprises displayed notable resilience through adaptive responses such as dual-currency pricing systems, diversified transactional practices, and reduced inventory exposure. However, institutional support structures, particularly those associated with SMEDCO, were widely perceived as insufficiently proactive and inadequately resourced to effectively support businesses during the transition. While the reform aligns conceptually with national development priorities and the Sustainable Development Goals, implementation gaps and persistent trust deficits constrained its short-term stabilizing impact at the microeconomic level. Overall, the study concludes that monetary reform alone cannot guarantee sustainable SME development. Effective stabilization requires synchronized macroeconomic policy, targeted institutional support,

stronger financial infrastructure, and sustained confidence-building measures. By addressing these structural and institutional weaknesses, Zimbabwe can enhance the resilience and productivity of its SME sector and ensure that currency reform contributes meaningfully to inclusive economic growth, enterprise sustainability, and long-term national development.

REFERENCES

- Baldé, A., & Tesfaye, B. (2025). Macroeconomic policy coordination and currency stability in emerging economies. *Journal of Development Economics*, 160, 103102.
- Beck, T., & Mavis, C. (2020). Exchange rate volatility and firm performance in emerging markets. *Journal of International Money and Finance*, 108, 102170
- Bhaskar, R. (2020). *Enlightened common sense: The philosophy of critical realism*. Routledge.
- Bova, E., Medhora, R., & Trew, A. (2023). Structured currencies and economic resilience in hyperinflationary economies. *Journal of Development Economics*, 157, 102876. <https://doi.org/10.1016/j.jimonfin.2023.102876>
- Bryman, A. (2020). *Social research methods* (6th ed.). Oxford University Press.
- Chiduzza, H., & Moyo, L. (2021). Exchange rate pass through in Zimbabwe's retail industry:
- Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). John Wiley & Sons.
- Creswell, J. W., & Creswell, J. D. (2020). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Thousand Oaks, CA: Sage Publications
- Endris, E., & Kassegn, A. (2022). The role of micro, small and medium enterprises (MSMEs) to the sustainable development of sub-Saharan Africa and its challenges: A systematic review of 58 evidence from Ethiopia. *Journal of Innovation and Entrepreneurship*, 11(1), 20. <https://doi.org/10.1186/s13731-022-00221-8>
- Fetters, M. D., & Molina-Azorin, J. F. (2020). Utilizing a mixed methods approach for conducting interventional evaluations. *Journal of Mixed Methods Research*, 14(2), 131–144. <https://doi.org/10.1177/1558689820912856>
- Heras-Saizarbitoria, I. (2022). Organisation' engagement with sustainable development goals: From cherry-picking to SDG-washing? *Corporate Social Responsibility and Environmental Management*. Advance online publication. <https://doi.org/10.1002/csr.2202>
- Ikpe Michael, A., et al. (2024). Exchange rate volatility and import-export performance in sub-Saharan Africa. *African Development Review*, 36(1), 45–59.
- IMF. (2020). *World economic outlook: Exchange rates and trade spillover effects*. International Monetary Fund
- Makoni, T. (2021). Cross-border trade dynamics and currency instability in border provinces. *Journal of Southern African Studies*, 47(3), 411–428
- Makore, I., & Chikutuma, C. N. (2025). Exchange Rate Volatility and Its Impact on International Trade: Evidence from Zimbabwe. *Journal of Risk and Financial Management*, 18(7), 376. <https://doi.org/10.3390/jrfm18070376>
- Marara, R., & Ncube, F. (2021). Evaluation of foreign currency auction systems in transitional economies. *African Journal of Economic Policy*, 28(2), 89–112.

- Masiyandima, N., et al. (2021). Hyperinflation dynamics and domestic currency reintroduction in Zimbabwe. *RBZ Working Paper Series*, No. 4.
- Matsvai, S. (2025). Exchange Rates and Inflation Dynamics in multicurrency regimes: The case of Zimbabwe (2014 to 2024). *International Journal of Financial Studies*, 13(2), 93. <https://doi.org/10.3390/ijfs13020093>
- Miyajima, K. (2020). Exchange rate pass-through in South Africa: Panel evidence. *IMF Working Papers*, 2020(042).
- Moyo, T., & Sibanda, M. (2021). Exchange rate reforms and SME competitiveness in Zimbabwe. *Journal of African Economies*, 30(4), 512–530. <https://doi.org/10.1093/jae/ejab009>
- Mutasa, F., & Chari, F. (2020). Currency volatility and retail price adjustments in Zimbabwe: Evidence from Mutare. *Journal of Retailing and Consumer Services*, 57, 102231. <https://doi.org/10.1016/j.jretconser.2020.102231>
- Mwamba, S., Chigumira, G., Mudenda, D., Simuchimba, B., & Mudzonga, E. (2022). Innovation support programs for small and medium-sized enterprises: Evidence from Zambia and Zimbabwe. <http://hdl.handle.net/10625/62097>
- Pandey, P., & Pandey, M. M. (2021). Research methodology tools and techniques. Bridge Center.
- Quaye, W., Akon-Yamga, G., Akuffobe-Essilfie, M., & Onumah, J. A. (2024). Technology adoption, competitiveness and new market access among SMEs in Ghana: What are the limiting factors? *African Journal of Science, Technology, Innovation and Development*, 16(7), 1023–1037. <https://doi.org/10.1080/20421338.2024.2414949>
- Reserve Bank of Zimbabwe (RBZ). (2024). Quarterly economic review. <https://www.rbz.co.zw>
- Reserve Bank of Zimbabwe. (2023). History of currency in Zimbabwe. <https://www.rbz.co.zw>
- Saunders, M., Lewis, P., & Thornhill, A. (2021). Research methods for business students (9th ed.). Pearson.
- Sibanda, P., Kuzakwacho, P., Moyo, G., & Nhiziyo, M. (2025). Exploring public trust in Zimbabwe Gold-backed currency (ZiG). *Modern Economy*, 16, 385–398. <https://doi.org/10.4236/me.2025.163018>
- SMEDCO. (2020). Annual report 2020: Empowering SMEs for sustainable development. SMEDCO Publications.
- AllAfrica. (2024, September 10). Informal traders reject ZiG currency amid trust concerns. Retrieved from <https://allafrica.com/stories/202409100425.html>
- Turyakira, P., et al. (2024). Digital financial innovations and business resilience among small enterprises in sub-Saharan Africa. *Journal of Small Business Management*, 62(3), 512–534.

STRATEGIES TO SUPPORT EMPLOYEES WITH DISABILITY IN CORPORATE ENVIRONMENTS IN KUWAIT

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ABSTRACT

This research examines strategies to support employees with disabilities in Kuwait's corporate sector through a mixed-methods design integrating semi-structured interviews, an online questionnaire, and document analysis. Situated within the Social Model of Disability, Inclusive Leadership Theory, Stakeholder Theory, and Organisational Culture Theory, the research addresses a gap in Gulf-focused empirical literature by providing one of the first multi-layered corporate analyses of disability inclusion in Kuwait. Findings reveal a persistent policy-practice gap. Organisations demonstrate formal compliance with legislative requirements; however, inclusion is largely enacted through informal, leader-driven adjustments rather than embedded organisational systems. Cultural perceptions, leadership behaviour, and organisational norms emerge as central determinants of inclusion outcomes. While global and regional frameworks provide useful benchmarks, their application requires careful cultural adaptation. The research contributes to existing scholarship by extending disability inclusion theory into a Gulf context, demonstrating how cultural and religious narratives reshape the implementation of Western-derived models. It further highlights the central role of leadership and organisational culture in translating policy into practice. Practically, the research proposes targeted strategies, including leadership development, structured training, formalised feedback systems, and investment in accessibility and assistive technologies. These findings support organisational and policy-level efforts aligned with Kuwait Vision 2035.

Keywords: disability inclusion, inclusive leadership, organisational culture, Kuwait corporate sector, stakeholder engagement.

INTRODUCTION

Workplace inclusion has become a central concern within organisational research, reflecting both ethical obligations and its contribution to organisational performance, innovation, and resilience (Shore et al., 2011; Ferdman and Deane, 2014). Despite this growing focus, disability inclusion remains comparatively under-examined, particularly within corporate environments in the Gulf region, where cultural norms, organisational structures, and legislative frameworks differ significantly from Western contexts (Al-Mutairi, 2020; Alenezi, 2020).

In Kuwait, economic transformation under Vision 2035 has heightened the importance of workforce participation and inclusion. National commitments, including the ratification of the United Nations Convention on the Rights of Persons with Disabilities and the implementation of Law No. 8 of 2010, signal institutional intent. However, evidence suggests that implementation within corporate environments remains uneven, with organisations often demonstrating compliance without embedding inclusive practices into organisational systems (UNDP, 2023).

This gap reflects a broader limitation in existing research. While global literature provides structured models of disability inclusion, these frameworks are largely developed in Western contexts and assume institutional enforcement, rights-based norms, and organisational transparency. There remains limited empirical research examining how disability inclusion is interpreted and enacted within Gulf corporate settings, particularly from the perspectives of leaders, HR professionals, and employees with disabilities (Mor Barak, 2015).

Research Problem

Despite formal commitments, Kuwaiti corporate organisations continue to struggle to translate policy into practice. Disability inclusion is often characterised by symbolic compliance, limited accessibility, and restricted career progression opportunities. Cultural perceptions—particularly those rooted in charitable or medicalised interpretations of disability—further complicate the adoption of rights-based inclusion models. At the organisational level, leadership capability, training gaps, and weak policy integration contribute to inconsistent inclusion outcomes. While these issues are acknowledged in isolated studies, there is limited research examining how leadership, organisational culture, and stakeholder dynamics interact to shape disability inclusion in practice.

Research Aim

The aim of this research is to examine how disability inclusion is understood, implemented, and sustained within Kuwait’s corporate sector, with a focus on leadership, organisational culture, and stakeholder dynamics.

Research Objectives

- To examine organisational and stakeholder perceptions of disability inclusion within Kuwaiti corporate environments.
- To evaluate the implementation of disability inclusion policies and identify gaps between policy and practice.
- To analyse the role of leadership and organisational culture in shaping inclusion outcomes.
- To assess the transferability of international inclusion models within Kuwait’s cultural context.

Research Questions

- What are the key barriers to disability inclusion in Kuwait’s corporate sector?
- To what extent are disability inclusion policies implemented in practice?
- How can international inclusion models be adapted to support culturally appropriate strategies in Kuwait?

LITERATURE REVIEW

Disability inclusion has gained increasing attention within organisational scholarship; however, its development remains uneven across regions. In Western contexts, inclusion is supported by structured policies, legal enforcement, and rights-based frameworks. In contrast, Gulf regions present more complex environments shaped by cultural norms, hierarchical organisational structures, and varying levels of regulatory enforcement (Al-Mutairi, 2020).

Social Model of Disability and Cultural Adaptation

The Social Model of Disability conceptualises disability as a product of social and organisational barriers rather than individual impairment (Oliver, 1990). This framework underpins many international inclusion policies by emphasising accessibility, equality, and organisational responsibility. However, its application in non-Western contexts is not straightforward. In Kuwait, disability is often interpreted through religious and cultural frameworks that emphasise compassion, protection, and charity (Alenezi, 2020). While these values encourage support, they may also reinforce paternalistic attitudes, positioning employees with disabilities as beneficiaries rather than contributors. This creates a hybrid model in which rights-based and charitable perspectives coexist, influencing organizational behaviour and decision-making.

Inclusive Leadership and Workplace Inclusion

Inclusive Leadership Theory highlights the role of leaders in fostering inclusive environments through behaviours such as empathy, openness, and fairness (Carmeli et al., 2010). Research demonstrates that leadership behaviours significantly influence disclosure, access to accommodations, and employee engagement. In hierarchical organisational contexts such as Kuwait, leadership is centralised and authority-driven. This structure can limit

employee voice and reduce willingness to disclose disability-related needs. As a result, inclusion often depends on individual leader disposition rather than institutionalised processes, leading to inconsistent implementation.

Stakeholder Theory and Policy–Practice Misalignment

Stakeholder Theory explains how organisational decisions are shaped by competing stakeholder priorities (Freeman, 1984). In the context of disability inclusion, organisations balance the interests of regulators, customers, employees, and broader societal expectations. In Kuwait, corporate social responsibility initiatives often prioritise external visibility, such as customer-facing accessibility, rather than internal workforce inclusion. This contributes to a policy–practice gap, where organisations demonstrate compliance but fail to embed inclusive practices within HR systems.

Organisational Culture and Inclusion

Organisational Culture Theory highlights the role of underlying values and assumptions in shaping behaviour (Schein, 2017). In Kuwaiti organisations, cultural norms—including collectivism, hierarchy, and religious values—play a significant role in shaping perceptions of disability. While organisations may adopt visible inclusion practices, deeper cultural assumptions—such as risk aversion or paternalistic attitudes—can limit genuine inclusion. This suggests that structural changes alone are insufficient without cultural transformation.

Global and Regional Contexts

Globally, disability inclusion has progressed through structured frameworks, including benchmarking schemes and inclusive HR practices. However, critics argue that these approaches can encourage symbolic compliance rather than substantive change. Within the Gulf region, countries such as the UAE and Saudi Arabia have adopted more structured inclusion initiatives, including accessibility audits and workforce participation goals. These examples demonstrate that culturally adapted models are viable within similar contexts.

Despite these developments, there remains limited empirical research examining disability inclusion within Kuwait’s corporate sector. Existing studies focus primarily on policy or public-sector initiatives, with limited attention to leadership behaviour, organisational culture, and employee experience. This research addresses this gap by integrating multiple stakeholder perspectives and examining how inclusion is enacted within organisational settings.

THEORETICAL FRAMEWORK

This research adopts an integrated theoretical framework combining the Social Model of Disability, Inclusive Leadership Theory, Stakeholder Theory, and Organisational Culture Theory. Rather than treating these frameworks independently, the research conceptualises disability inclusion as the interaction of structural, behavioural, cultural, and stakeholder factors. The Social Model provides a structural lens for identifying barriers; however, its assumptions of rights-based systems require adaptation in Kuwait’s cultural context. Inclusive Leadership Theory explains how leadership behaviours translate into practice, but its reliance on decentralised structures limits its applicability in hierarchical organisations. Stakeholder Theory offers insight into policy–practice dynamics but does not sufficiently account for cultural and power asymmetries that influence stakeholder prioritisation. Organisational Culture Theory addresses this gap by highlighting the role of underlying assumptions in shaping inclusion outcomes. Alternative perspectives, including institutional theory and socio-technical systems theory, could further enhance analysis by examining legitimacy pressures and human–technology interactions. However, the integrated framework adopted here provides sufficient flexibility to capture the complexity of disability inclusion in Kuwait’s corporate context.

METHODOLOGY

The research adopts a qualitative-dominant mixed-methods design aligned with an interpretivist philosophy. Semi-structured interviews formed the primary data source, supported by an online questionnaire and document analysis. Participants were selected through purposive sampling to ensure representation across organisational roles and sectors. The sample included HR professionals, line managers, senior leaders, and employees with disabilities across finance,

retail, healthcare, and education sectors. The questionnaire included 30 respondents, with diverse representation across organisational roles and experience levels. Interviews were conducted with seven participants occupying managerial and professional roles, ensuring insight into both strategic and operational perspectives. The sample reflects variation in gender, sector, and organisational hierarchy, enabling comparison between policy-level perspectives and lived experiences. While sample size remains modest, it is sufficient for thematic analysis and reflects constraints associated with organisational access.

While the mixed-methods design provides depth and contextual richness, several limitations should be acknowledged. The use of purposive sampling introduces potential selection bias and limits generalisability beyond the sampled organisations. Access constraints and organisational gatekeeping may also have influenced participant composition. The reliance on self-reported data may introduce response bias, particularly social desirability bias. Participants may overstate organisational inclusivity or leadership effectiveness. Additionally, cross-sectional design limits the ability to capture changes over time, which is significant given that inclusion practices evolve gradually. The application of Western-derived constructs in a culturally specific context also raises questions of construct validity. Although grounded in established theory, these constructs may not fully capture local interpretations of inclusion. These limitations do not undermine the value of the findings but suggest that conclusions should be interpreted as indicative and contextually grounded rather than universally generalisable.

RESULTS AND DISCUSSION

This section presents the integrated findings from semi-structured interviews, survey responses, and organisational document analysis. The analysis adopts a reflexive thematic approach, examining not only what participants reported but how their perspectives reflect the broader cultural, organisational, and institutional context of Kuwait's corporate sector. The findings are structured across six interrelated themes: Understanding Inclusion, Leadership and Organisational Culture, Policy and Implementation, Barriers and Enablers, Stakeholder Engagement, and Recommended Actions. These themes align directly with the research questions and theoretical framework, enabling a coherent interpretation of disability inclusion as a multi-layered organisational phenomenon.

Understanding Inclusion: Compliance versus Lived Practice

Participants consistently described disability inclusion as a dual construct encompassing both formal compliance and lived organisational experience. Compliance was primarily associated with visible measures, including physical accessibility, regulatory inspections, and policy documentation. However, lived inclusion was described in terms of flexibility, dignity, and psychological safety. Managers tended to emphasise tangible adjustments, such as workstation adaptation or modified job roles, whereas employees and support professionals highlighted the importance of informal practices, such as flexible working arrangements and supportive managerial behaviour. This distinction reveals that inclusion is often experienced not through policy frameworks but through day-to-day interactions and organisational culture. Survey responses reinforce this interpretation. While a majority of respondents perceived their organisations as inclusive, a significant proportion expressed uncertainty regarding the existence or clarity of formal policies. This suggests that inclusion is not consistently institutionalised, but instead operates through informal, interpersonal mechanisms. From a theoretical perspective, this aligns partially with the Social Model of Disability, which emphasises the removal of structural barriers. However, the findings also highlight its limitations, as cultural and attitudinal barriers remain central. References to “helping”, “supporting”, and “caring” indicate the persistence of charitable framings of disability. These cultural narratives coexist with, and sometimes override, rights-based interpretations, reinforcing a hybrid inclusion model.

Leadership and Organisational Culture

Leadership behaviour emerged as the most significant determinant of inclusion outcomes. Participants identified empathetic leadership, flexibility, and direct engagement as key enablers of inclusion. Leaders who actively supported employees with disabilities through mentoring, flexible scheduling, or informal dialogue were perceived as creating inclusive environments. However, a critical gap was identified at the middle-management level. While senior leadership often expressed commitment to inclusion, middle managers frequently lacked the training or confidence to

implement inclusive practices. Survey data confirmed this, with a majority of respondents reporting the absence of disability-specific training within their organisations.

This inconsistency reflects Kuwait's hierarchical organisational structure, where authority is centralised and leadership behaviour is highly personalised. In such contexts, inclusion becomes dependent on individual leaders rather than institutionalised systems. From a theoretical perspective, these findings support Inclusive Leadership Theory, particularly in relation to empathy and psychological safety. However, they also reveal its limitations in hierarchical settings where leadership practices are not standardised. Organisational Culture Theory further explains why visible inclusion initiatives do not translate into consistent practice. While artefacts such as policies or accessibility measures are present, underlying assumptions regarding disability—particularly those linked to stigma or dependency—remain largely unchanged. As a result, inclusion is not fully embedded within organisational culture.

Policy and Implementation: The Policy–Practice Gap

The findings reveal a clear disconnect between formal policy frameworks and organisational practice. Although most organisations reported compliance with national legislation, policies were often described as unclear, inconsistently communicated, or weakly embedded within HR systems. Participants highlighted that policy frameworks frequently prioritise customer accessibility over employee inclusion. While organisations meet regulatory requirements, internal processes such as recruitment, career progression, and performance management remain insufficiently developed for employees with disabilities. Survey responses reinforce this gap, with many respondents unable to confirm whether organisational policies align with national disability frameworks. This suggests limited internal awareness and weak policy integration. This pattern reflects organisational decoupling, where formal policies exist primarily for compliance or reputational purposes but are not fully enacted in practice. Stakeholder Theory provides a useful lens for interpreting this behaviour, as organisations appear to prioritise external stakeholders—such as regulators and customers—over internal employee groups. The findings suggest that policy effectiveness is contingent not only on design, but on communication, leadership, ownership, and cultural acceptance.

Barriers and Enablers of Inclusion

The research identifies a set of recurring barriers that collectively constrain disability inclusion in Kuwaiti organisations. These include stigma, cultural perceptions of disability, insufficient training, accessibility limitations, and resource constraints. Cultural perceptions were particularly influential. Disability is frequently framed through benevolence or protection, which can reduce expectations of capability and limit investment in long-term inclusion strategies. This framing also contributes to hesitancy in disclosing disability or requesting accommodations. Structural barriers were also evident, particularly in relation to inconsistent accessibility standards and limited use of assistive technologies. Survey data indicate that while basic adjustments such as flexible working and workstation adaptation are common, more advanced inclusion measures remain underdeveloped. Despite these challenges, several enabling factors were identified. Leadership commitment, flexible working arrangements, and informal engagement practices were consistently cited as facilitating inclusion. These findings suggest that inclusion is possible even in constrained environments, but remains unevenly distributed. From a theoretical perspective, these findings reinforce the combined relevance of structural and cultural explanations. While the Social Model highlights the importance of removing barriers, Organisational Culture Theory explains why such barriers persist despite formal commitments.

Stakeholder Engagement and Employee Voice

Engagement with employees with disabilities emerged as both a strength and a limitation. Participants highlighted the value of informal communication, particularly one-to-one discussions and counselling sessions, in building trust and addressing individual needs. However, these practices remain largely informal and inconsistent. The absence of structured feedback mechanisms limits organisational learning and reduces accountability. Employees who are less comfortable engaging directly with managers may be excluded from these processes. Survey findings indicate a willingness among employees to engage more formally, suggesting potential for developing structured feedback systems. However, organisational culture - particularly hierarchical norms - may limit the effectiveness of such mechanisms unless carefully implemented. Stakeholder Theory highlights the importance of balancing diverse perspectives, yet the findings suggest that employees with disabilities remain underrepresented within formal decision-making processes. Strengthening employee voice is therefore critical for improving inclusion outcomes.

Integrated Interpretation

Across all themes, a consistent pattern emerges: disability inclusion in Kuwaiti corporate environments is characterised by a tension between formal compliance and informal practice. Compliance provides a necessary baseline, supported by legislation and regulatory frameworks. However, meaningful inclusion is shaped by leadership behaviour, cultural perceptions, and organisational systems. Leadership acts as a critical mediator, translating policy into practice. However, the absence of structured training and accountability limits its effectiveness. Cultural narratives further shape inclusion outcomes, reinforcing hybrid models in which charitable and rights-based perspectives coexist. Importantly, the findings demonstrate that disability inclusion is not a purely technical or policy-driven process. It is a socially embedded phenomenon, influenced by organisational culture, leadership dynamics, and stakeholder relationships.

Summary of Findings

The research identifies several key conclusions:

- Disability inclusion is understood as both compliance and lived experience, with the latter often more influential in shaping outcomes
- Leadership behaviour is the most significant enabler, but remains inconsistent due to limited training and institutionalisation
- A clear policy–practice gap exists, driven by weak integration of inclusion policies into organisational systems
- Cultural perceptions of disability significantly influence organisational behaviour
- Informal engagement practices support inclusion but limit accountability and scalability

These findings provide the foundation for the concluding section, which synthesises the implications for theory, practice, and policy.

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Conclusions

The findings demonstrate that disability inclusion in Kuwait’s corporate sector is shaped by a complex interaction between formal policy structures and informal organisational practices. While legislative frameworks and organisational policies provide a necessary foundation for inclusion, they remain insufficient to ensure consistent and meaningful outcomes. Instead, the research reveals that inclusion is predominantly mediated through leadership behaviour, organisational culture, and culturally embedded perceptions of disability. Across organisations, a recurring pattern emerges in which compliance-based approaches coexist with informal and leader-dependent practices. This duality reflects a transitional landscape, where organisations are moving beyond symbolic commitment but have yet to fully institutionalise inclusion within organisational systems. Cultural narratives—particularly those rooted in benevolence and protection—continue to influence how disability is perceived and addressed, shaping both organisational decision-making and employee experience. Collectively, the research highlights that advancing disability inclusion requires not only structural change but also a shift in organisational mindsets, leadership capability, and stakeholder engagement. In this context, disability inclusion is best understood as a socially embedded process rather than a purely policy-driven outcome.

Building on this synthesis, the following sections address each of the research questions in turn, providing a focused interpretation of how barriers, implementation processes, and strategic approaches shape disability inclusion within Kuwait’s corporate environment.

RQ1: What are the key barriers to disability inclusion in Kuwait’s corporate sector?

The findings demonstrate that disability inclusion in Kuwaiti corporate environments is constrained by a combination of structural and cultural barriers, with cultural perceptions emerging as the most influential factor.

While infrastructural limitations, policy inconsistencies, and resource constraints are evident, they do not operate independently. Instead, they are mediated through deeply embedded cultural narratives that frame disability in terms of benevolence, protection, and dependency. These perceptions influence organisational behaviour at multiple levels. Employees with disabilities may hesitate to disclose needs or request accommodations due to stigma, while employers may prioritise support over empowerment, reinforcing paternalistic structures. As a result, inclusion is often enacted in ways that limit autonomy and progression rather than enabling full participation. This finding extends the Social Model of Disability by demonstrating that structural barriers are intertwined with cultural interpretations. In this context, disability inclusion is shaped less by the availability of resources and more by how disability is understood within organisational and societal frameworks.

RQ2: To what extent are disability inclusion policies implemented in practice?

The research identifies a clear and persistent policy–practice gap across Kuwaiti corporate environments. Although organisations generally comply with legislative requirements, including accessibility standards and formal policy provisions, implementation remains inconsistent and fragmented. Policies are frequently oriented towards external visibility and compliance rather than internal integration. Accessibility measures are more evident in customer-facing contexts than within employee-focused systems such as recruitment, performance management, or career development. This results in a form of symbolic compliance, where organisations satisfy regulatory expectations without embedding inclusion into organisational processes. Leadership plays a central mediating role in this gap. Where leaders demonstrate empathy, flexibility, and engagement, inclusion is more likely to be enacted in practice. However, the absence of structured training and accountability frameworks leads to inconsistency, particularly at the middle-management level. This pattern reflects insights from Stakeholder Theory, where organisational priorities favour external stakeholders over internal employee needs. It also reinforces Organisational Culture Theory, which suggests that formal policies cannot independently drive behavioural change without corresponding shifts in underlying assumptions.

RQ3: How can international disability inclusion models be adapted to Kuwait’s context?

The findings indicate that international models of disability inclusion offer valuable guidance but require significant cultural adaptation to be effective within Kuwait’s corporate environment. Frameworks such as structured leadership development, accessibility audits, and accountability mechanisms provide clear strategic direction; however, their effectiveness depends on alignment with local organisational and cultural norms. Direct transfer of Western models is limited by differences in organisational hierarchy, communication patterns, and cultural expectations. In Kuwait, where authority structures are centralised and social harmony is prioritised, inclusion strategies must be implemented through culturally sensitive leadership approaches. Successful adaptation requires reframing inclusion from a purely rights-based concept to one that integrates both organisational performance and cultural values. This includes positioning disability inclusion as a strategic capability rather than a compliance obligation or charitable practice.

This research demonstrates that disability inclusion in Kuwait’s corporate sector is a socially embedded, leadership-driven process rather than a purely structural or policy-driven activity. While legislative frameworks provide a necessary foundation, meaningful inclusion depends on the interaction between leadership behaviour, organisational culture, and stakeholder dynamics. The findings highlight a transition phase in which organisations are moving from compliance-based approaches towards more integrated models of inclusion, but progress remains uneven. Advancing inclusion requires coordinated efforts across leadership development, organisational systems, cultural transformation, and policy implementation.

IMPLICATIONS

Theoretical Implications

The research contributes to theoretical development by extending disability inclusion scholarship into a Gulf context, demonstrating the need for contextual adaptation of existing frameworks. The Social Model of Disability is strengthened but also challenged, as findings show that structural barriers alone cannot explain exclusion without considering cultural and attitudinal influences. Inclusive Leadership Theory is validated in its emphasis on behavioural influence but requires adaptation to hierarchical organisational structures where leadership is centralised and personalised. Stakeholder Theory is extended by demonstrating how stakeholder prioritisation is influenced by cultural

and reputational factors, rather than purely rational decision-making processes. Organisational Culture Theory is reinforced, highlighting the gap between visible artefacts and underlying assumptions. Overall, the research suggests that disability inclusion should be conceptualised as a dynamic interaction between structural, cultural, and behavioural dimensions, rather than a linear process driven by policy implementation alone.

Practical Implications

The findings have direct implications for organisational leaders, HR practitioners, and policymakers. For organisational leaders, the research highlights the importance of moving beyond compliance towards embedding inclusion within organisational strategy. Leadership behaviour must be supported through formal training, performance evaluation, and accountability mechanisms to ensure consistency. For HR practitioners, the findings emphasise the need to institutionalise inclusion practices. This includes developing structured recruitment processes, career development pathways, and formalised adjustment procedures that are consistently applied across the organisation. For policymakers, the research suggests that legislative frameworks should be complemented by enforcement mechanisms, training initiatives, and organisational support systems. Clear communication of policy expectations and alignment with organisational practices are critical in reducing the policy–practice gap.

Implications for Practice

At an operational level, several key actions emerge from the findings:

- Organisations should prioritise manager training to address capability gaps and ensure consistent implementation of inclusion practices
- Inclusion should be embedded into organisational metrics, ensuring accountability beyond compliance
- Employee voice should be formalised through structured feedback mechanisms to support continuous improvement
- Investment in accessibility and assistive technologies should be increased to address structural barriers
- Cultural awareness initiatives should be implemented to shift perceptions of disability towards capability and contribution

These actions collectively support a move towards employee-centred, sustainable inclusion practices.

RECOMMENDATIONS

Organisational Recommendations

Organisations should adopt a structured approach to disability inclusion that integrates leadership, culture, and systems. First, leadership development programmes should be implemented to ensure that managers are equipped to support inclusion. Training should focus on practical skills, including communication, accommodation processes, and bias awareness. Second, inclusion should be embedded within organisational systems. Recruitment, performance evaluation, and promotion processes should reflect inclusive principles, ensuring equal access to opportunities. Third, organisations should formalise feedback mechanisms. Employee councils, surveys, and structured consultations can provide valuable insight into lived experiences and support continuous improvement.

Policy Recommendations

Policymakers should strengthen the alignment between legislation and organisational practice. This includes introducing accountability measures that extend beyond compliance, such as monitoring employee progression and retention. Training programmes and funding initiatives should be developed to support organisations in implementing inclusion practices. Regional collaboration should also be encouraged to facilitate knowledge sharing and benchmarking across Gulf countries.

Strategic Recommendations

To support long-term change, organisations should adopt a strategic approach to inclusion. Inclusion should be positioned as a core organisational capability linked to performance and innovation. Investment in technology, infrastructure, and training should be prioritised, while cultural transformation initiatives should address stigma and promote awareness. These recommendations align with broader national priorities and support the transition from compliance-driven inclusion to sustainable organisational practice.

In summary, the research demonstrates that advancing disability inclusion in Kuwait's corporate sector requires a shift from symbolic compliance to systemic integration. This transition depends on aligning leadership, organisational culture, policy implementation, and stakeholder engagement within a coherent framework. By addressing these interconnected dimensions, organisations can create environments that not only accommodate employees with disabilities but actively enable their participation, development, and contribution.

REFERENCES

- Abidi, J., Sharma, D. & Sharma, R. (2017). Disability, inclusion and compliance in Gulf organisations. *Journal of Disability Studies*, 12(3), pp. 45–62.
- Al-Mutairi, F. (2020). 'Disability inclusion in Gulf workplaces', *Middle East HR Review*, 12(3), pp. 40–55.
- Alenezi, M. (2020). Disability and social inclusion in Kuwait. *Journal of Social Policy in the Middle East*, 8(2), pp. 21–38.
- Booyesen, L. (2013). 'Barriers to workplace inclusion', *Equality, Diversity and Inclusion*, 32(2), pp. 102–118.
- Braun, V. and Clarke, V. (2006) 'Using thematic analysis in psychology', *Qualitative Research in Psychology*, 3(2), pp. 77–101.
- Carmeli, A., Reiter-Palmon, R. & Ziv, E. (2010). 'Inclusive leadership and employee involvement', *Leadership Quarterly*, 21(3), pp. 443–458.
- Chartered Institute of Personnel and Development (CIPD). (2018). *Line manager behaviour and disability inclusion*. London: CIPD.
- Crenshaw, K. (1991). 'Mapping the margins: Intersectionality, identity politics, and violence against women of colour', *Stanford Law Review*, 43(6), pp. 1241–1299.
- Ferdman, B.M. & Deane, B.R. (2014). *Diversity at Work: The Practice of Inclusion*. San Francisco: Jossey-Bass.
- Freeman, R.E. (1984). *Strategic Management: A Stakeholder Approach*. Boston: Pitman.
- Meyer, J.W. & Rowan, B. (1977). 'Institutionalised organisations: Formal structure as myth and ceremony', *American Journal of Sociology*, 83(2), pp. 340–363.
- Mor Barak, M.E. (2015). *Managing Diversity: Toward a Globally Inclusive Workplace*. 3rd edn. Thousand Oaks, CA: SAGE.
- Oliver, M. (1990). *The Politics of Disablement*. London: Macmillan.
- PADA. (2023). *Annual Disability Statistics Report*. Kuwait City: Public Authority for Disability Affairs.
- Schein, E.H. (2017). *Organizational Culture and Leadership*. 5th edn. London: Routledge.
- Shakespeare, T. (2014). *Disability Rights and Wrongs Revisited*. 2nd edn. London: Routledge.

Shore, L.M., Cleveland, J.N., & Sanchez, D. (2011). 'Inclusive workplaces', *Human Resource Management Review*, 21(4), pp. 311–326.

UNDP. (2023). *Kuwait Disability Inclusion Report*. New York: United Nations Development Programme.

THE PERCEIVED EFFECT OF ENTREPRENEURSHIP EDUCATION ON ENTREPRENEURIAL INTENTIONS OF TVET STUDENTS IN JOHANNESBURG

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ABSTRACT

In search for ways to address high unemployment rates, there has been an increased focus among educators, practitioners and policymakers towards interventions that can facilitate entrepreneurship development. Amongst other interventions, over the past two decades there has been increasing research on the impact of entrepreneurship education. Researchers argue that entrepreneurship education can drive entrepreneurship development by shaping individuals' mindsets and developing their skills, knowledge and competencies to start, manage and grow their own businesses. This study assessed the effect of entrepreneurship education on entrepreneurial intentions of technical vocational education and training (TVET) students in Johannesburg by employing the theory of planned behaviour. A cross-sectional quantitative design was conducted using 267 final-year Business Studies students at two TVET colleges in Johannesburg. Data were analysed using quantile regression analysis. The results indicate that entrepreneurship education has a statistically significant positive link with attitude towards behaviour and perceived behavioural control. However, there was no association between entrepreneurship education and subjective norms. The findings revealed further that attitude towards behaviour and perceived behavioural control significantly influenced entrepreneurial intentions, while subjective norms had no significant effect. Based on those findings, it is recommended that educational establishments and policymakers should develop techniques that could assist students to further their entrepreneurial aspirations. Since entrepreneurial intention determines entrepreneurial behaviour, entrepreneurship educators should create active learning environments that are practice-oriented, which facilitate exposure to entrepreneurial role models to raise the impact of entrepreneurship education on the antecedents of entrepreneurial intention.

Keywords: theory of planned behaviour, entrepreneurship education, Gauteng, Technical and Vocational Education and Training Colleges.

INTRODUCTION

Entrepreneurship is an integral part of human activity and has a major contribution to the socio-economic development of a country (Tokhirovna and Khasanovich, 2024). Consequently, academics, practitioners and policymakers view entrepreneurship as a vital factor to global economic growth (Bacq et al., 2025) and have therefore devoted their efforts towards understanding its determinants. Prior studies have shown that central to entrepreneurial activity are individuals' intentions to start and grow their businesses (Mhlongo et al., 2025; Douglas, 2013; Shirokova et al., 2016; Mothibi et al., 2024; Mothibi and Malebana, 2025). Due to joblessness among the youth in South Africa (Statistics South Africa, 2026), stimulating entrepreneurial intentions (EntInt) among the youth is vital to help them create jobs for themselves and others (Malebana and Mothibi, 2023).

Entrepreneurship education (EntEdu) is considered one of the interventions that can channel the youth towards the entrepreneurial career option to help curb poverty and high unemployment rates (Li et al., 2022; Bahaw et al., 2026; Kiyomi et al., 2022). Consequently, over the past two decades a plethora of studies concentrated on examining the impact of EntEdu on entrepreneurship, and EntInt and its antecedents (Galloway and Brown, 2002; Screenvisan and Suresh, 2023). EntEdu has been shown to positively influence entrepreneurial activity (Galloway and Brown, 2002; Rauch and Hulsink, 2015; Maziriri and Chivandi, 2020; Mothibi et al., 2024; Mothibi and Malebana, 2025). EntEdu is widely acknowledged as vital in influencing students' entrepreneurial mindsets, attitudes and

enhancing their skills to discover and act on business opportunities (Habib et al., 2020; Zhang et al., 2022; Wang et al., 2023; Ncube and Matlala, 2024). EntEdu serves as a platform that enables students to access information and acquire experience on how to create and run new ventures (Handayati et al., 2020).

The theory of planned behaviour (TPB) is an important framework for explaining the effects of EntEdu on entrepreneurial behaviour and intentions (Rauch and Hulsink, 2015; Shirokova et al., 2016; Adeel et al., 2023; Mothibi et al., 2024; Mothibi and Malebana, 2025). As a result, early studies that have adopted this theory have shown that it is vital in shedding light on the role of EntEdu in the shaping the formation of EntInt (Liñán, 2004; Fayolle et al., 2006). However, besides extensive research that has been testing the impact of EntEdu using the TPB, there are still conflicting findings on the relationship between EntEdu and EntInt (Lavelle, 2021; Mothibi and Malebana, 2025).

The government of South Africa has mandated TVET colleges to equip students with technical skills and entrepreneurial mindset through skills-based education that can respond to market demands (Mbanjwa, 2025). However, most TVET graduates prefer conventional jobs over self-employment (Ambo, 2023; Yen et al., 2026). Additionally, despite numerous entrepreneurial initiatives that are being integrated into the TVET system, the number of graduates who successfully establish their own businesses is still quite low (Bantwini, 2023). It is therefore vital to study the determinants of EntInt of TVET students (Ambo, 2023). Few studies have investigated the impact of EntEdu particularly among TVET institutions in developing countries, as most studies focus on universities students (Ambo, 2023; Ncube and Matlala, 2024). The influence of EntEdu on the EntInt of TVET students should be extensively explored to generate findings that could guide policymakers and entrepreneurship educators on interventions that could stimulate EntInt and entrepreneurial behaviour among these students (Bahaw et al., 2024). Hence study investigated the effects of EntEdu on EntInt and its antecedents using the TPB.

LITERATURE REVIEW

The Theory of Planned Behaviour

The TPB to date is the most prominent socio-psychological model for understanding and predicting human behaviour (Ajzen, 2015). According to this theory, attitude towards behaviour, subjective norm (SN), and perceived behavioural control (PBC) determine intention (Ajzen, 2015). Intention is considered an immediate antecedent of a certain behaviour. Generally speaking, the more favourable one's attitude and SN are regarding the behaviour and their greater confidence in their own capability, the stronger will be their intention to perform the behaviour (Ajzen, 2015). Predictors of entrepreneurial intention are discussed in more detail below.

Attitude is defined as an individual's positive or negative assessment of behaviour (Ajzen, 2015). Attitude towards behaviour, herein referred to attitude towards entrepreneurship (ATE), is an individual's assessment of behaviour, which is based on the expected positive and negative outcomes associated with that behaviour (Ajzen, 1991; 2015). When perceived advantages of performing the behaviour are greater than its perceived disadvantages, people will have favourable ATE. In this way, people develop positive attitudes towards behaviours that produce favourable outcomes and form negative attitudes towards behaviours produce unfavourable outcomes (Ajzen, 2015).

PBC refers to one's assessment of their capability to perform the behaviour (Ajzen, 2015), which is based on beliefs about the availability of factors that could aid in performing the behaviour. PBC can have a direct influence on behaviour and can also have an indirect influence through its effect on intentions (Ajzen, 2015).

SN refer to the perception of social pressure to perform or not perform the behaviour due to the perceived expectations of important referents (normative belief). SN are influenced by whether "important others" also engage in the same behaviour (Ajzen, 2015).

The results of a study that was carried out among final year TVET students in Pakistan asserted that ATE, PBC and SN positively influence EntInt (Shah et al., 2024). Similarly in Trinidad and Tobago, it was discovered that ATE, PBC and SN determine EntInt among TVET students (Noel and Yiadom, 2025). The results are in line with Anhwere et al. (2026), who reported that ATE and SN have a positive relationship with EntInt while PBC emerged as the strongest predictor of EntInt among students in Ghana. These results are further supported by Milohnić and Licul

(2025) as they discovered a positive and a notable relationship between ATE, PBC and SN with EntInt among students in Croatia.

However, in partial contrast, Mothibi and Malebana (2025), discovered that although ATE and PBC determined EntInt among students in Gauteng, South Africa, SN was not supported. SN was further discovered to have a negative relationship with EntInt while ATE and PBC had a positive and a notable relationship at a Polytechnic Kuching Sarawak in Malaysia (Suud et al., 2024). The results concur with those of Bhinder and Kaur (2025) as they argue that ATE and PBC portray a positive and a notable relationship with EntInt, while SN displays a negative relationship among Technical University students in Punjab. Moreover, in Johor it was discovered that ATE and SN have a positive and notable relationship with EntInt. However, PBC has a negative relationship with EntInt among students (Siran et al., 2025).

In Cameroon, Tchokot'e et al. (2025) revealed that ATE is positively related to EntInt whereas SN and PBC displayed a negative relationship while in Germany, Romania and Ukraine, Bordean et al. (2025) reported ATE as the most predictor of EntInt among business students. Yasir et al. (2025) discovered that ATE, SN and PBC have a positive association with EntInt of TVET students in Pakistan. Additionally, all the antecedents of EntInt predicted EntInt of rural Indian students (Chaudhari and Singh, 2024). Other South African studies based on different samples revealed that PBC and ATE positively affect EntInt while SN does not (Mothibi and Malebana, 2025). Based on the above review, it is hypothesised that:

Ho₁: There is no association between EntInt and the determinants of EntInt among TVET students in Johannesburg.

The Effect of Entrepreneurship Education on Entrepreneurial Intentions

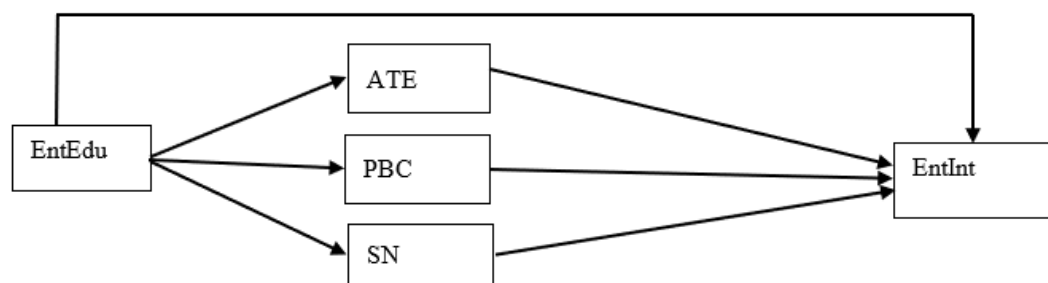
Studies among TVET and university students and entrepreneurs have shown varying effects of EntEdu on EntInt and its antecedents. In Indonesia, Mahfud et al. (2025) reported the significant effect of EntEdu on EntInt and all its antecedents. Matsheke and Chinomona (2026) found that EntEdu positively affects SN, ATE, PBC (self-efficacy) and EntInt among TVET students in Gauteng, South Africa. Mothibi and Malebana (2025) and Ngo et al. (2024) noted that EntEdu significantly influences SN, ATE, and PBC but not EntInt among TVET and university students in South Africa and university students in Vietnam. The findings of Diepolder et al. (2025) show that EntEdu positively affects EntInt of secondary school learners and all its antecedents while Xu and Lee (2025) found that EntEdu is positively related to SN, PBC and ATE but not EntInt. Fan et al. (2024) reported that EntEdu positively influenced EntInt and attitudes among Chinese TVET students. Bahaw et al. (2026) indicates that EntEdu raises EntInt and its three antecedents, while Belgaroui and Shili (2025) found that EntEdu is positively associated with ATE, PBC and EntInt but not SN. EntEdu affected ATE, PBC and SN positively among university students in Indonesia (Pahrudin et al., 2026). Additionally, a study that involved entrepreneurs in Gauteng revealed that EntEdu positively influences ATE and PBC but not SN (Mothibi et al., 2024). Therefore, the following hypothesis is proposed:

Ho₂: There is no notable association between EntEdu and EntInt among TVET students in Johannesburg.

Ho₃: There is no notable association between EntEdu and the determinants of EntInt among TVET students in Johannesburg.

Figure 1 is a depiction of the conceptual model for this study, which guided the hypotheses testing.

Figure 1: Conceptual Model.



Source: developed by the authors based on Ajzen (1991).

RESEARCH METHODOLOGY

Target Population and Sampling

This study adopted a quantitative research approach which is based on a cross-sectional survey design. The study population of this research was limited to full-time, final-year students who were registered for Business Studies at two TVET colleges in Johannesburg. According to the figures received from both colleges, the total number of students who fit the aforementioned criteria was 609 for the 2021 academic year. These students were selected for the study as they were easily accessible, in their final year of study, and were most relevant to assist in answering the research question. A total sample of 280 questionnaires were distributed to the respondents. Out of this the researcher received a total of 267 questionnaires that were fully answered and analysed.

Data Collection

It took four weeks (9 September–5 October 2021) to complete data collection. Campus managers requested heads of the respective departments of business studies to seek assistance from the lecturers. Lecturers helped the researcher with distribution of the questionnaires in class. Participants completed the questionnaires in class within 15–20 minutes and returned them to the lecturer. The researcher then collected 267 completed questionnaires from the lecturers.

The study used a structured questionnaire as a method of data collection. The design of the questionnaire for this study was adopted from previous EntInt literature that had developed measures for the variables related to the TPB, such as those designed by (for example Malebana 2012 and Liñán et al., 2011). The questionnaire comprised of close ended questions which were divided into six sections covering the respondents' biographical information, EntEdu, EntInt, ATE, PBC and SN.

A nominal scale was used to measure the respondent's biographical information and their EntInt. A five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was employed for testing the independent and dependent variables. The dependent variable was EntInt, and the independent variables were EntEdu, ATE, PBC, and SN. The link between EntEdu and antecedents of intentions was measured by a nominal scale.

Profile of the Respondents

It transpired that 64.4% of the 267 participants were males, 35.2% were females, and 0.4% other. The age groups were recorded as follows: 98% of the respondents were below 35 years of age, 67% belonged to the 14–24 age group, and 31% were in the 25–34 age group. With regards to their field of studies, 27% studied financial management, 25% business management, 21% marketing management, 20% human resource management, and 6% public management. These were all courses falling under an umbrella of N6 business management.

Reliability and Validity of Test Results

Exploratory factor analysis was applied to verify the validity of the measuring instrument. In order to extract factors, principal component analysis was applied using Varimax rotation method. The Kaiser-Meyer-Olkin (KMO) statistic value was 0.938 which exceeds the minimum criterion of 0.5 and is categorised as “marvellous” (Field, 2013). Bartlett's test of Sphericity was significant at $p = 0.000$, Approx. Chi-Square: 4472.510, $df = 351$ (Field, 2013). The significant value of the Bartlett's test of Sphericity means that there were no problems with the data.

Cronbach's alpha was applied for reliability analysis. All constructs recorded Cronbach alpha scores above 0.8 ranging between 0.82 and 0.92, suggesting that the measuring instrument was therefore considered had a good reliability (Field, 2013). EntInt was measured using nine items (Cronbach alpha = 0.92), ATE with six items (Cronbach alpha = 0.87), PBC with nine items (Cronbach alpha = 0.86) and SN with three items (Cronbach alpha = 0.82).

RESULTS

Due to the nature of the data, quantile regression was used for modelling. Quantile regression is mainly used when data violate the assumptions of ordinary least squares regression such as linearity, homoscedasticity, independence, or normality. The results in Table 1 show that EntEdu had a positive and statistically notable association with EntInt ($\beta = 3, p = 0.017$). Thus, if there is an increase of one in the median value of EntEdu, EntInt would increase by 3% in the median value (at the 50% quantile). The results indicate that EntEdu influences EntInt among the TVET students in Johannesburg.

Table 1: Results of the regression analysis between entrepreneurial intentions and entrepreneurship education.

	Coef.	Std. err.	T	$p > t$	[95% Conf. interval]	
EntEdu	3	1.245	2.41	0.017	0.548	5.452
Constant	34	1.048	32.45	0	31.937	36.063

As shown in Table 2, EntEdu had a positive and statistically notable association with ATE ($\beta = 3, p < 0.000$). Thus, if there is an increase of one in the median value of EntEdu, the ATE would increase by 3% in the median value (at the 50% quantile). The results indicate that EntEdu influences ATE among students at TVET colleges in Johannesburg.

Table 2: Results of the regression analysis between attitude towards entrepreneurship and entrepreneurship education.

	Coef.	Std. err.	T	$p > t$	[95% Conf. interval]	
EntEdu	3	0.669	4.48	0.00	1.683	4.317
Constant	23	0.563	40.86	0.00	21.892	24.108

Moreover, the results (Table 3) revealed that EntEdu had a positive and statistically notable association with PBC ($\beta = 3, p = 0.002$). Thus, if there is an increase of one in the median value of EntEdu, PBC would increase by 3% in the median value (at the 50% quantile). The results show that EntEdu had a positive influence on PBC among Johannesburg TVET students.

Table 3: Results of the regression analysis between perceived behavioural control and entrepreneurship education.

	Coef.	Std. err.	T	$p > t$	[95% Conf. interval]	
EntEdu	3	0.957	3.13	0.002	1.116	4.884
Constant	31	0.805	38.5	0	29.414	32.586

As shown in Table 4, EntEdu was not statistically significant in predicting SN. This means that students could not experience any social pressure to engage in entrepreneurship arising from exposure to EntEdu.

Table 4: Results of the regression analysis between subjective norms and entrepreneurship education.

	Coef.	Std. err.	T	$p > t$	[95% Conf. interval]	
EntEdu	0.00	0.22299	0	1.00	0.439	0.439
Constant	12	0.187612	63.96	0.00	11.631	12.369

Quantile regression was further employed to test whether ATE, PBC, and SN significantly predicted EntInt. The results (Table 5) show that ATE ($\beta = 1.025, p < 0.000$), and PBC ($\beta = 0.333, p < 0.000$) significantly predicted

EntInt, but SN ($\beta = -0.106$, $p = 0.365$) was not statistically significant. While holding other variables constant, ATE and PBC were positively related to EntInt, which increased by 1% for every one percent increase in median value of ATE, and by 0.3% for every one percent increase in median value of PBC (at the 50% quantile). SN had a negative relationship with EntInt and was not statistically significant.

Table 5: Multiple regression model for the relationship between ATE, PBC, SN and EntInt.

	Coef.	Std. err.	T	$p > t$	[95% Conf. interval]	
ATE	1.025	0.080	12.82	0.000	0.868	1.183
PBC	0.333	0.057	5.89	0.000	0.222	0.445
SN	-0.106	0.117	-0.91	0.365	-0.336	0.124
Constant	1.333	1.530	0.87	0.384	-1.680	4.347

DISCUSSION

This study employed the TPB model to ascertain whether it could explain EntInt of TVET students in Johannesburg. The results revealed that EntInt can be predicted by ATE and PBC while SN was not significant. These results provide partial support for Ho₁. Findings suggest that favourable evaluation of entrepreneurship and strong belief in one's capability increase EntInt. These results contradict those of Jepchirchir et al. (2019); Alamineh (2020); Mahlaole and Malebana (2021); Chaudhari and Singh (2024); Noel and Yidom (2025); Milohnić and Licul (2025) and Anhwere et al. (2026) on the insignificant effect of SN on EntInt. With regards to the significant effect of ATE and PBC on EntInt, the findings concur with those of Buli and Yesuf (2015); Mwiya et al. (2017); Galvão et al. (2018); Vejayaratham et al. (2019); Lavelle (2021); Safaruddin et al. (2021); Malebana (2021); Bhinder and Kaur (2025) and Pahrudin et al. (2026). These results partially support the TPB as a valuable model for the prediction of EntInt among TVET students in Johannesburg.

Furthermore, findings showed that EntEdu has a positive association with EntInt, PBC and ATE but not with SN. Therefore, Ho₂ is rejected while Ho₃ partially supported. These findings concur with past studies that reported the positive effect of EntEdu on EntInt (Malebana, 2021; Alamineh, 2022; Malebana and Mothibi, 2023; Bahaw et al., 2026; Fan et al., 2024; Rauch and Hulsink, 2015; Mahlaole and Malebana, 2021). They further support those studies that have found the positive effect of EntEdu on PBC and ATE (Rauch and Hulsink, 2015; Mothibi et al., 2024). However, the results do not align with those that have found a significant association between EntEdu and SN (Ngo et al., 2024; Xu and Lee, 2025; Diepolder et al., 2025; Pahrudin et al., 2026; Bahaw et al. 2026) and those that reported the positive effect of EntEdu on EntInt (Alamineh, 2022; Mothibi and Malebana, 2025; Matsheke and Chinomona, 2026).

In view of the above findings, this study contributes to the EntInt literature by showing that ATE and PBC are vital for the development EntInt among TVET students in Johannesburg. As a result, efforts directed at enhancing these predictors would contribute to youth entrepreneurship development among TVET students. EntEdu has been shown by the results as one of the interventions that could shape both ATE, PBC and EntInt. The results further revealed that societal norms play an insignificant role in shaping EntInt among these students.

IMPLICATIONS

It can be concluded from the findings that the TPB is partially supported as a tool for predicting EntInt among TVET students in Johannesburg. The significant association between ATE, PBC, and EntInt demonstrates that interventions directed at changing attitudes towards entrepreneurship and enhancing the capability to start a business are crucial and should be implemented. However, the fact that SN yielded insignificant results might be confirmation that the entrepreneurial career is not encouraged or supported in the immediate environments of the respondents. The government can improve this situation by partnering with media to report on and emphasise the importance of entrepreneurship, raise awareness of entrepreneurial support and increase access to available support. Entrepreneurship educators can help generate positive attitudes towards entrepreneurship and develop capability to start a business by utilising case studies of successful entrepreneurs, inviting entrepreneurs to serve as guest speakers

and offering practice-oriented lessons, which provide students with the opportunity to experiment with the theory they are learning.

Higher education institutions could stimulate such interest in entrepreneurial careers by holding competitions and providing awards for innovative entrepreneurship ideas. Establishing start-up incubators may be another method of encouraging and preparing students to be better prepared for entrepreneurship after graduation. Furthermore, various government institutions, which offer entrepreneurial support programmes should be invited to lectures to provide students with first-hand information on how those programmes could be accessed and the criteria to be met.

LIMITATIONS AND FUTURE RESEARCH

The study was cross-sectional and limited to TVET colleges in Johannesburg and therefore, findings do not represent all TVET colleges in South Africa. Given that this study's geographical reach has been limited to TVET colleges in Johannesburg, it is suggested that future research should expand by including TVET colleges in other provinces of South Africa. Future research could conduct comparative studies between TVET students and university students to determine whether the findings would produce similar results. This study was limited to testing the effect of EntEdu on EntInt and to determine whether the TPB can predict EntInt of TVET students in Johannesburg. Further studies could therefore apply the TPB to explore the effect of EntEdu on entrepreneurial behaviour among TVET college students.

CONCLUSION

The findings of this study proved that EntEdu has a positive and notable contribution towards EntInt of TVET students. They further confirmed a notable association between PBC and ATE with the exception of SN. Hence it can be concluded that EntEdu can help shape the entrepreneurial goals of TVET students in Johannesburg. Therefore, policymakers and academic institutions need to find ways of encouraging more students in the development of their entrepreneurial goals through EntEdu. The findings of this study show that the TPB offers a solid and well tested model that can be valuable to educators and policymakers in evaluating the effects of their interventions that are aimed at entrepreneurship development.

REFERENCES

- Anhwere, D.K., Quayson, E., Abdul-Gafaar, E., & Manu, H.N. (2026). Determinants of Career Choice Intentions Among Business Education Students in a Ghanaian University: Leveraging the Theory of Planned Behaviour. *Science Mundi*, 6(1):118-132.
- Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50(2): 179–211.
- Ajzen, I. (2015). Consumer Attitudes and Behavior: The Theory of Planned Behavior Applied to Food Consumption Decisions. *Rivista Di Economia Agraria*, 2: 121-138.
- Alamineh, H. (2020). Students' Entrepreneurial Intentions and Determinants in Technical Vocational Education and Training (TVET) Colleges: Lessons from Gurage Zone, Ethiopia. *Management*, 10(3): 71-80.
- Alamineh, H.G. (2022). A Comparative Study on Influencing of University and Technical Students and Vocational and Training (TVET) Graduate Students Intentions Towards Entrepreneurship: Evidence from Addis Ababa City, Ethiopia. *Journal of Global Research*, 12: 83-96. <https://doi.org/10.1007/s40497-022-00310-8>.
- Ambo, A.A. (2023). Determinates of Entrepreneurial Intention Among Graduating Students of Bonga Polytechnic College, Kaffa Zone, Ethiopia. *International Journal of Entrepreneurship, Business and Creative Economy*, 3(2): 135-151.

- Bacq, S., Guerrero, M., Siegel, D., & Pinto, J. (2025) Entrepreneurship as an Academic Field: Taking Stock and New Directions. *International Journal of Management Reviews*, 27: 457–465. <https://doi.org/10.1111/ijmr.70001>.
- Bahaw, A., Baboolal, A., Mack, A.J., & Cater-Rogers, K. (2024). Exposure to Entrepreneurship Education Interventions Reveal Improvements to Vocational Entrepreneurial Intent: A Two Wave Longitudinal Study. *Discover Education*, 3: 145 <https://doi.org/10.1007/s44217-024-00241-4>
- Bahaw, P., Sookhai, S., Stephens, A., Mack, A.J., Brunetti, A., Munroe-Nials, O., & Patterson, C. (2026). Advancing Decent Work Through TVET-based MSME Training: Post-training Outcomes. *Journal of the International Council for Small Business*, <https://doi.org/10.1080/26437015.2026.2623458>.
- Bantwini, L. (2023). *Cultivating Entrepreneurship Through TVET Curriculum*. Paper Delivered at 2024 TIPS Annual Forum of Small Business, Inclusive Growth and Industrial Policy in South Africa, Johannesburg. https://forum.tips.org.za/images/forum%20papers/2024/papers/Lusanda_2024_07_TIPS_Forum_2024_paper.pdf. Date of access: 21 Feb. 2026.
- Belgaroui, R., & Shili, A. (2025). Extending the Theory of Planned Behaviour to Understand Entrepreneurial Intention Among Female University Students in Saudi Arabia: The Role of Entrepreneurship Education. *Journal of Posthumanism*, 5(5): 4226 – 4246.
- Bhinder, H.S., & Kaur, G. (2025). Exploring the Relationship between Antecedents of Entrepreneurial Intention and Entrepreneurial Intention of University Students Perusing Technical Education. *Journal of Global Entrepreneurship Research*, 15(1): 1-19.
- Bordean, O.N., Pop, Z. C., Rizun, N., Bopp, R., & Estad, T. (2025). Comparative Analysis of Entrepreneurial Intention Among Students: A Cross-Country Study. *Sage Open*, 15(1): 1-8.
- Buli, B.M., & Yesuf, W.M. (2015). Determinants of Entrepreneurial Intentions. *Education and Training*, 55(8): 891-907.
- Chaudhari, T., & Singh, M. (2024). Prediction of Entrepreneurial Intention in Rural India: A PLS-SEM Approach. *Empirical Economic Letters*, 23(4): 73-92.
- Diepolder, C.S., Huwer, J., & Wietzel, H. (2025). Effect of Competence – Based Sustainable Entrepreneurship Education on Secondary School Students’ Sustainable Entrepreneurial Intention. *Sustainable Energy and Entrepreneurship*, 4(2): 1-11.
- Douglas, E.J. (2013). Reconstructing Entrepreneurial Intentions to Identify Predisposition for Growth. *Journal of Business Venturing*, 28:633-651.
- Fan, J., Hu, J., & Wang, J. (2024). How Entrepreneurship Education Affects College Students’ Entrepreneurial Intention: Samples from China. *Heliyon*, 10(10): 30776 <https://doi.org/10.1016/j.heliyon.2024.e30776>.
- Fayolle, A., Gailly, B., & Lassas-Clerc, N. (2006). Assessing the Impact of Entrepreneurship Education Programmes: A New Methodology. *Journal of European Industrial Training*, 30(9): 701–720.
- Field, A. (2013). *Discovering Statistics Using IBM SPSS Statistics (4th ed.)*. SAGE Publication Limited.
- Galloway, L., & Brown, W. (2002). Entrepreneurship Education at University: A Driver in the Creation of High Growth Firms. *Education and Training*, 44(8/9): 398–405.
- Galvão, A., Marques, C.S., & Marques, C.P. (2018). Antecedents of Entrepreneurial Intentions Among Students in Vocational Training Programmes. *Education and Training*, 60(3): 719-734.

- Jepchirchir, J., Korir, M., & Lagat, C. (2019). Determinants of Entrepreneurial Intention among TVET Students in North Rift Region, Kenya. *Journal of Business Management*, 21(11): 7-16.
- Lavelle, B.A. (2021). Entrepreneurship Education's Impact on Entrepreneurial Intention Using the Theory of Planned Behaviour: Evidence from Chinese Vocational College Students. *Entrepreneurship Education and Pedagogy*, 4(1): 30-51.
- Liñán, F. (2004). Intention-based Models of Entrepreneurship Education. Retrieved from: <http://alojamientos.us.es/gpyde/DOWNLOAD/a9.pdf>.
- Liñán, F., Urbano, D., & Guerrero, M. (2011). Regional Variations in Entrepreneurial Cognitions: Start-Up Intentions of University Students in Spain. *Entrepreneurship and Regional Development*, 23(3): 187-215.
- Mahfud, T., Kasuma, B.J., Channa, K., & Dang, V.H. (2025). Entrepreneurship Education Impact on Entrepreneurial Intention: Theory of Planned Behaviour Approach. *Journal of Education and Learning*, 19(4): 2097- 2106.
- Mahlaole, S.T., & Malebana, M.J. (2021). The Effects of Entrepreneurship Education on Students' Entrepreneurial Intentions at a South African University of Technology. *Journal of Entrepreneurship Education*, 24(2): 1-16.
- Mahmoud, M.A., Garbal, S.A., Abdullah, Y.A., & Ali, A.L. (2020). Assessment of Entrepreneurship Education on the Relationship between Attitude, Subjective Norms, Perceived Behavioral Control and Entrepreneurial Intention. *International Journal of Business and Entrepreneurship*, 10(2): 197-210.
- Malebana, M.J. (2012). *Entrepreneurial Intent of Final-Year Commerce Students in the Rural Provinces of South Africa*, Doctoral Thesis, Pretoria, University of South Africa.
- Malebana, M.J. (2021). Relationship Between Entrepreneurial Support, Business Information Seminars and Entrepreneurial Intention. *Journal of Entrepreneurship Education*, 4(1): 1-15.
- Malebana, M.J., & Mothibi, N.H. (2023). Relationship Between Prior Entrepreneurship Exposure and Entrepreneurial Intention Among Secondary School Learners in Gauteng, South Africa. *Journal of Innovation and Entrepreneurship*, 12(1): 43.
- Matsheke, M.J., & Chinomona, R. (2026). Entrepreneurship Education as a Predictor of Attitudinal, Social and Psychological Outcomes Among TVET Students. *Eureka: Social and Humanities*, 2, <https://doi.org/10.21303/2504-5571.2026.004215>.
- Maziriri, E. T., & Chivandi, A. (2020). Modelling Key Predictors that Stimulate the Entrepreneurial Performance of Small and Medium-Sized Enterprises (SMEs) and Poverty Reduction: Perspectives from SME Managers in an Emerging Economy. *Acta Commercii*, 20(1): 1-15 <https://doi.org/10.4102/ac.v20i1.773>.
- Mbanjwa, S.T. (2025). Barriers to Entrepreneurial Development in Technical and Vocational Education (TVET) Colleges: A Cross-Sectional Mixed Methods Study of Students Perspectives. *Student's Journal of Health Research Africa*, 6(9):3006 -1059 <https://doi.org/10.51168/sjhrafrica.v6i9.1979>.
- Mhlongo, Z., Ntshangase, S.D., & Ezeudji, I.O. (2025). Entrepreneurial Intention Among Youths: The Role of Entrepreneurial Education and Passion. *The South African Journal of Entrepreneurship and Small Business Management*, 14(1): a982 <https://doi.org/10.4102/SAJESBM.V17I1.982>.
- Milohnić, I., & Licul, I. (2025). The Factors Influencing Students' Entrepreneurial Intentions: An Analysis using the Theory of Planned Behavior. *Ekonomski Horizonti*, 27(1): 79–95.
- Mothibi, N.H., & Malebana, M.J. (2025). Entrepreneurship Education, Role Models, and Risk-Taking Propensity as Predictors of Entrepreneurial Intention and Behaviour: Evidence from TVET and University Students in Gauteng, South Africa. *Administrative Sciences*, 15(10): 374. <https://doi.org/10.3390/admsci15100374>.

- Mothibi, N.H., Malebana, M.J. & Rankhumise, E.M. (2024). Munificent Environment Factors Influencing Entrepreneurial Intention and Behaviour: The Moderating Role of Risk-taking Propensity. *Administrative Sciences*, 14(230): 1-22.
- Mwiya, B., Wang, Y., Shikaputo, C., Kaulungombe, B., & Kayekesi, M. (2017). Predicting the Entrepreneurial Intentions of University Students: Applying the Theory of Planned Behaviour in Zambia, Africa. *Open Journal of Business and Management*, 5: 592-610.
- Ncube, T. R., & Matlala, M. E. (2024). The Impact of Entrepreneurship Education on the Entrepreneurial Competences of Students in TVET Colleges In South Africa. *Managing Higher Education and Enterprises in Developing Countries beyond COVID-19: Proceedings of the 9th International Conference on Business and Management Dynamics*, 197–219. <https://doi.org/10.9734/bpi/mono/978-81-969907-8-7/CH10>.
- Ngo, T.V.N., Le, T.L., Pham, T.T.H., Nguyen, T.T.T., & Duong, C.D. (2024). Empowering Entrepreneurs: Bridging the Attitude-Intention Behaviour Gap Through Dynamic Entrepreneurship Education. *Asia Pacific Journal of Education and Entrepreneurship*, 18(4): 355-374.
- Noel, E.A., & Yaidom. M.B. (2025). Entrepreneurial Education and Integrated Entrepreneurial Factors Affecting Entrepreneurial Intentions: A Case from TVET Institution in Trinidad and Tobago. *Journal of Entrepreneurship and Public Policy*, 14: 1-20. <https://doi.org/10.1108/JEPP-02-2025-0062>.
- Pahrudin, P., Liu, L., Caraka, R.E., Gustina, A., Yunikawati, N.A., Gio, P.G., & Tsai, C. (2026). Does the Entrepreneurship Environment in Higher Education Give Entrepreneurial Intent to Start a Business? Evidence from Universities in Indonesia. *The International Journal of Management Education*, 24(101381): <https://doi.org/10.1016/j.ijme.2026.101381>.
- Rauch, A., & Hulsink, N. (2015). Putting Entrepreneurship Education Where the Intention to Act Lies: An Investigation into the Impact of Entrepreneurship Education on Entrepreneurial Behaviour. *Academy of Management Learning and Education*, 2: 187-204.
- Safaruddin, S.E., Tarigan, L., & Siregar, E. (2021). Engineering Students' Entrepreneurial Intention: Comparison Analysis Between University and Polytechnics. *International Journal of Innovative Research in Engineering and Multidisciplinary Physical Sciences*, 9(2): 10-20.
- Shah, N., Bano, S., Saraih, U.N., Abdelwahed, N.A.A., & Soomro, B.A. (2024). Boosting Entrepreneurial Intentions Among Potential TVET Entrepreneurs of Higher Education Institutes. *Entrepreneurship + Training*, 66(7): 981-1006.
- Shirokova, G., Osiyevskyy, O., & Bogatyreva, K. (2016). Exploring the Intention Behaviour Link in Student Entrepreneurship: Moderating Effects of Individual and Environmental Characteristics. *European Management Journal*, 34(1): 386-399.
- Siran, S., Wahab, K.A., & Salleh, N.M. (2025). Student Readiness for the field of Entrepreneurship: A Survey of Polytechnic and Community Colleges in Johor. *International Action Research TVET Conference*, 10(2): 1052-1060.
- Statistics South Africa (2026). Quarterly Labour Force Survey, Quarter 4, 2025. Retrieved 06 March, 2026 from <https://www.statssa.gov.za/publications/P0211/P02114thQuarter2025.pdf>.
- Suud, J., Ibrahim, H., & Muldiani, R. F. (2024). Evaluating Entrepreneurial Intentions of TVET Students Through The Business Pro Workshops Using the Theory of Planned Behavior. *Journal of Lifelong Learning*, 8(2):70-80.
- Tchokot'e, I.D., Bawack, R., & Nana, A. (2025). Attitude over Norms: Revealing the Dominance of Attitude in Shaping Entrepreneurial Intentions Among Higher Education Students in Global South Countries. *The International Journal of Management Education*, 23(2): 101129 <https://doi.org/10.1016/j.ijme.2024.101129>.

- Yasir, N., Xiaohong, Q., Yi, S., Ying, W., Samad, S., Alhitmi, H.K., & Braithwaite, R.R. (2025). Environmental and Sociological Factors Shape Sustainable Entrepreneurial Intentions Among Pakistani University Students. *Scientific Reports*, 15:39293 <https://doi.org/10.1038/s41598-025-22930-2>.
- Vejayaratnam, N., Paramasivam, T., & Mustaki, S.S. (2019). Digital Entrepreneurial Intention Among Private Technical and Vocational Education (TVET) students. *International Journal of Academic Research in Business and Social Sciences*, 9(12): 110-120.
- Wang, X.H., You, X., Wang, H.P., Wang, B., Lai, W.Y., & Su, N. (2023). The Effect of Entrepreneurship Education on Entrepreneurial Intention: Mediation of Entrepreneurial Self-Efficacy and Moderating Model of Psychological Capital. *Sustainability*, 15(3): 2562 <https://doi.org/10.3390/su15032562>.
- Xu, D., & Lee, C. (2025). Mechanism Linking Restaurant Entrepreneurship Education to Graduating Hospitality Students' Entrepreneurial Intentions: Validating the Theory of Planned Behaviour. *Sage Open*, 15(1): 1-9.
- Yen, W.T.M., Omar, S.S., Choy, S.C., Hong, T.L., & Wei, C.C. (2026). Nurturing Future Women TVETpreneurs: A Study on Female TVET Students' Entrepreneurial Intentions. *PaperASIA*, 41(6b) <https://doi.org/10.59953/paperasia.v41i6b.833>.
- Zhang, W., Li, Y., Zeng, Q., Zhang, M., & Lu, X. (2022). Relationship Between Entrepreneurship Education and Entrepreneurial Intention Among College Students: A Meta-Analysis. *International Journal of Environmental Research and Public Health*, 119(19): 12158 <https://doi.org/10.3390/ijerph191912158>.

INCLUSIVE ENTREPRENEURSHIP AND SUSTAINABLE DEVELOPMENT IN AFRICAN ECONOMIES: THE ROLE OF DIGITAL INNOVATION

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ABSTRACT

Inclusive entrepreneurship is increasingly recognised as a mechanism for widening economic participation and advancing sustainable development in contexts marked by structural inequality. Yet, in many African economies, entrepreneurial opportunities remain unevenly distributed, particularly for smallholder farmers, women, rural youth, and informal entrepreneurs. This study uses a PRISMA-informed systematic literature review to examine how digital innovation shapes inclusive entrepreneurship and sustainable development, with particular attention to agricultural value chains. The review synthesises peer-reviewed scholarship, policy reports, and development frameworks through a transparent process of identification, screening, eligibility assessment, and thematic analysis. The evidence indicates that mobile platforms, digital finance, online marketplaces, AI-enabled advisory systems, and data-driven tools can improve market access, productivity, financial inclusion, and resilience. However, these benefits are conditional on enabling infrastructure, digital literacy, affordable access, coherent policy support, and institutional trust. The paper contributes to the literature by developing a capability-mediated conceptual framework explaining how digital innovation can translate into inclusive entrepreneurial participation and, ultimately, more equitable and environmentally sustainable development outcomes in African economies.

Keywords: inclusive entrepreneurship, digital innovation, sustainable development, agricultural value chains, financial inclusion.

INTRODUCTION

African economies continue to face significant challenges, including poverty, youth unemployment, inequality, institutional weaknesses, and limited industrial diversification, which disproportionately affect women, youth, rural populations, informal entrepreneurs, and smallholder farmers (World Bank, 2024; UNDP, 2022). Inclusive entrepreneurship is therefore important for expanding access to economic opportunities by addressing barriers related to finance, markets, skills, infrastructure, and institutional support (OECD/European Union, 2019; Kabeer, 2012).

Digital innovation has emerged as a key enabler of this process. Technologies such as mobile platforms, digital finance, e-commerce, blockchain, AI, and data-driven systems can reduce transaction costs, improve access to information, strengthen market participation, and enhance agricultural value chains (Aker & Mbiti, 2010; Manyika et al., 2016). These innovations have particular potential to improve productivity, resilience, financial inclusion, and market access among smallholder farmers.

However, the benefits of digital transformation are not automatically inclusive. Challenges such as inadequate infrastructure, affordability constraints, limited digital literacy, gender inequalities, weak governance, and low institutional trust can restrict participation and reinforce existing disparities (GSMA, 2023; Mazzucato, 2018). Consequently, digital innovation contributes to sustainable development only when supported by inclusive policies and capability-building initiatives that enable marginalised entrepreneurs to participate effectively and equitably in economic value chains.

Problem Statement

Although studies on inclusive entrepreneurship, digital finance, agriculture, and sustainable development are growing, the literature remains fragmented. Three gaps are most important: digital innovation is often treated as a general growth enabler rather than an inclusion mechanism; agricultural value chains are frequently analysed as production systems rather than entrepreneurial ecosystems; and few studies integrate Diffusion of Innovation Theory, the Resource-Based View, and Sustainable Development Theory to explain how digital access becomes capability and then equitable development.

This paper addresses these gaps by synthesising evidence on mobile platforms, FinTech, digital marketplaces, AI-enabled advisory tools, and data systems in African agricultural value chains. Its contribution is a critical, capability-mediated synthesis of the conditions under which digital innovation advances inclusion rather than reinforcing exclusion.

Research Objectives

The objectives of this paper are:

- To examine how digital innovation can strengthen inclusive entrepreneurship and promote sustainable development in African economies within agricultural value chains and marginalized entrepreneurial communities.
- To evaluate the extent to which digital innovation can reduce structural inequalities in African entrepreneurial ecosystems.
- To analyse the opportunities and challenges associated with digital innovation in advancing economic modernization, equitable development, poverty reduction, and sustainability in Africa.
- To identify the structural, institutional, and socio-economic barriers limiting inclusive digital entrepreneurship.

Research Questions

The study is guided by the following research questions:

1. How does inclusive entrepreneurship contribute to sustainable development in African economies?
2. What role does digital innovation play in strengthening entrepreneurship across African value chains in the agriculture sector?
3. What structural barriers limit the effectiveness of digital inclusion strategies?
4. How can policymakers and institutions create more inclusive digital entrepreneurial ecosystems?

LITERATURE REVIEW

Inclusive Entrepreneurship in African Economies

Inclusive entrepreneurship promotes equitable access to entrepreneurial opportunities for marginalised groups, including women, youth, rural populations, informal workers, and smallholder farmers, by addressing barriers related to finance, markets, skills, and institutional support (OECD/European Union, 2019; Kabeer, 2012). In Africa, it is increasingly recognised as a strategy for tackling poverty, unemployment, inequality, and the challenges associated with the dominance of informal economic activities (ILO, 2022; World Bank, 2024).

Research indicates that inclusive entrepreneurship contributes to poverty reduction, job creation, social mobility, and community resilience by broadening participation in economic activities beyond traditionally advantaged groups (Nwagbara & Mordi, 2020). Women entrepreneurs, youth-led enterprises, cooperatives, and

smallholder agribusinesses play a significant role in local economic development, yet they often face challenges in finance, education, technology, land rights, and institutional support (Kabeer, 2012; Brixiová et al., 2015).

Agricultural entrepreneurship is particularly important because agriculture remains a key source of employment and food security across Africa. Integrating smallholder farmers into value chains by improving access to technology, finance, markets, and institutional support can strengthen productive capacities and promote inclusive growth (Deichmann et al., 2016). However, inclusive entrepreneurship remains constrained by limited access to credit, weak governance, inadequate infrastructure, low educational attainment, and fragmented institutional systems, underscoring the need for supportive entrepreneurial ecosystems that address broader socio-economic exclusion (Beck et al., 2007).

Digital Innovation and Entrepreneurial Transformation

Digital innovation is transforming entrepreneurship by enhancing productivity, value creation, market access, and institutional connectivity in African economies (Manyika et al., 2016). Technologies such as mobile platforms, FinTech, AI, blockchain, and digital marketplaces help entrepreneurs overcome barriers related to finance, information, and market participation while reducing transaction costs and improving information flows (Aker & Mbiti, 2010).

Mobile money services, including M-Pesa, have expanded financial inclusion by providing access to financial services for previously unbanked populations (Jack & Suri, 2014). In addition, digital marketplaces improve market access, while AI-powered tools and precision agriculture technologies support productivity, decision-making, and resilience in agricultural entrepreneurship (Deichmann et al., 2016). Blockchain technologies further enhance transparency and efficiency within supply chains.

Despite these benefits, the impact of digital innovation is constrained by inequalities in internet access, affordability, infrastructure, digital literacy, and gender inclusion (GSMA, 2023). Therefore, inclusive governance and supportive policies are essential to ensure that digital transformation promotes broad-based entrepreneurial opportunities rather than reinforcing existing inequalities (Mazzucato, 2018).

Agricultural Value Chains and Sustainability

Agriculture remains a critical sector in African economies, contributing to employment, food security, rural livelihoods, and export earnings, particularly for smallholder farmers and rural communities (World Bank, 2024). Agricultural value chains, which encompass production, processing, distribution, marketing, and consumption activities, offer significant opportunities to promote inclusive entrepreneurship and sustainable development (Kaplinsky & Morris, 2016).

Digital innovations such as mobile advisory services, digital finance platforms, precision farming, blockchain traceability systems, and climate-smart technologies can enhance productivity, market access, efficiency, and climate resilience while reducing transaction costs (Goyal, 2010). These technologies enable farmers to access real-time information, improve decision-making, and strengthen participation in higher-value markets.

Sustainable agricultural entrepreneurship requires integrating economic growth with environmental sustainability, social inclusion, and climate resilience (UNDP, 2022). Digital technologies can support these objectives by improving resource efficiency and environmental monitoring. However, their effectiveness depends on equitable access, supportive institutions, and inclusive implementation, as structural inequalities may limit the participation and benefits of marginalised groups.

Theoretical Framework

This study is primarily grounded in Sustainable Development Theory (WCED, 1987), which emphasises the integration of economic growth, social inclusion, and environmental sustainability. The theory provides an appropriate framework for analysing how digital innovation can promote inclusive entrepreneurship while contributing to sustainable development outcomes in African economies. Within this context, entrepreneurship is viewed not only as an economic activity but also as a mechanism for reducing poverty, creating employment, ensuring food security, and promoting social empowerment.

The framework further recognises the importance of digital technologies, institutional support, and entrepreneurial capabilities in strengthening inclusive participation among marginalised groups such as women, youth, and smallholder farmers.

METHODOLOGY

Research Design

This study adopts a systematic literature review (SLR) guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. The SLR enables a transparent synthesis of existing knowledge, supports the identification of recurring mechanisms and constraints, and provides a defensible basis for developing an integrative conceptual framework.

Search Strategy and Data Sources

A structured search strategy guided by the five stages of PRISMA was used to identify literature on inclusive entrepreneurship, digital innovation, agricultural value chains, and sustainable development in Africa. The review combined peer-reviewed academic sources from Scopus, Web of Science, and Google Scholar with policy and development reports from organisations such as the World Bank, UNDP, GSMA, ILO, and OECD. Including publications from development agencies helped capture policy interventions, institutional programmes, and real-time development data that are often absent from academic journals. Boolean search terms were used to refine the search, focusing mainly on English-language studies published between 2010 and 2026.

Search Keywords and Boolean Strategy

The literature search used selected keywords related to inclusive entrepreneurship, digital innovation, sustainability, and African development to identify relevant studies. Core terms included “inclusive entrepreneurship,” “digital innovation,” “sustainable development,” “agricultural value chains,” “digital agriculture,” and “smallholder farmers' digital transformation.” Boolean operators such as “AND” were used to combine keywords into targeted search strings, including “inclusive entrepreneurship” AND “Africa” and “digital innovation” AND “agricultural value chains” AND “Africa.” This strategy improved the relevance and comprehensiveness of the review by capturing interdisciplinary studies across entrepreneurship, agriculture, sustainability, and digital transformation in African contexts.

Inclusion Criteria

The study applied clear inclusion criteria to ensure relevance and quality. Only English-language peer-reviewed journal articles, scholarly books, edited volumes, and reputable policy reports were included. The review focused on studies of African economies and publications published between 2015 and 2026 to capture recent developments in digital innovation, entrepreneurship, and sustainability. Selected studies were required to address themes such as inclusive entrepreneurship, digital innovation, sustainable development, agricultural value chains, or marginalised entrepreneurial groups, ensuring alignment with the study objectives.

Exclusion Criteria

The review excluded non-English publications, duplicate studies, and opinion-based articles lacking empirical or analytical depth. Studies focused solely on non-African contexts, with no relevance to African development, were also omitted. In addition, publications unrelated to entrepreneurship, digital innovation, sustainability, or development, as well as studies with unclear methodologies, were excluded. These criteria ensured a focused, credible, and high-quality body of literature relevant to inclusive entrepreneurship and sustainable development in African economies.

Screening and Selection Process

The PRISMA process provided a transparent pathway from broad identification to focused evidence synthesis. Records from academic databases and institutional repositories were screened for relevance to African development contexts, digital entrepreneurship, agricultural value chains, and sustainability. Titles, abstracts, and keywords were reviewed to remove duplicates and unrelated records. Full texts were then assessed against the inclusion and exclusion criteria, with attention to methodological quality, conceptual relevance, and evidence on inclusive entrepreneurship, digital innovation, and sustainable development. The final corpus informed the thematic synthesis and conceptual framework. This structured process strengthened the credibility of the review by ensuring that the analysis drew on sources aligned with the research objectives and questions.

Data Extraction and Analysis

The selected studies were systematically coded and analysed based on themes such as inclusive entrepreneurship, digital innovation, agricultural applications, barriers to digital inclusion, sustainability outcomes, and policy implications. The analysis considered factors such as infrastructure, digital literacy, institutional support, and technological access across African economies. A thematic synthesis approach was used to identify recurring patterns, conceptual relationships, and key debates across the literature. This method enabled the integration of interdisciplinary evidence and supported a deeper understanding of how digital innovation and inclusive entrepreneurship contribute to sustainable development and agricultural transformation in Africa.

Thematic Synthesis Framework

Figure 1 summarises the coding path and thematic network used to organise the synthesis.

Figure 1: ATLAS.ti Themes Path and Thematic Network Diagrams.

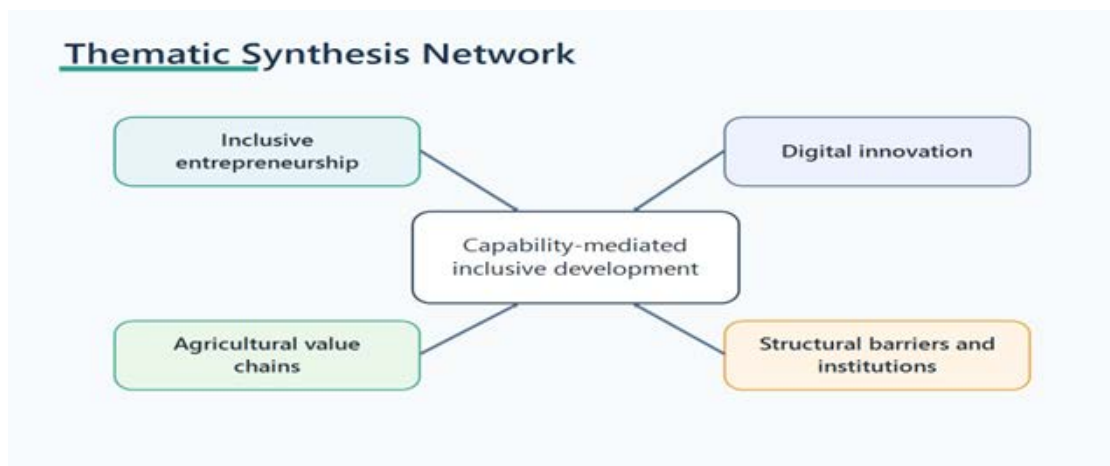


Figure 1 presents four interconnected themes that shape inclusive and sustainable development in African economies: inclusive entrepreneurship, digital innovation, agricultural value chains, and structural barriers. The

thematic analysis demonstrates that entrepreneurship can enhance economic participation among smallholder farmers, women, rural youth, and informal entrepreneurs when supported by adequate institutions, finance, skills development, and market access (Acs et al., 2018; Stam & Van de Ven, 2021).

The review further shows that digital technologies can improve productivity, information access, and market connectivity while reducing transaction costs, particularly within agricultural and rural economies (Manyika et al., 2016; Aker & Mbiti, 2010). Agricultural value chains are identified as critical pathways for promoting food security, employment creation, climate resilience, and poverty reduction (Kaplinsky & Morris, 2016; World Bank, 2024). However, persistent barriers, including weak infrastructure, financial exclusion, limited internet access, low digital literacy, and fragmented policy environments, continue to constrain inclusive development (GSMA, 2023). Overall, the framework highlights that digital innovation, entrepreneurship, and sustainability are interdependent, with institutions playing a crucial role in ensuring that technological advancements translate into equitable and inclusive development outcomes (Mazzucato, 2018; UNDP, 2022).

Reliability, Validity, and Limitations

The use of PRISMA enhances reliability by making the search and screening process explicit, while including multiple databases improves coverage and reduces reliance on a narrow evidence base. Combining peer-reviewed studies with policy reports also enhances contextual relevance, particularly because digital entrepreneurship in Africa is shaped by rapidly evolving practices, regulations, and development programming. However, certain limitations remain. Restricting the review to English-language publications may exclude valuable francophone, lusophone, or Arabic African scholarship. Similarly, the rapidly evolving nature of digital innovation means that some emerging technologies may outpace published academic literature. Despite these limitations, the methodological design provided a robust and credible foundation for synthesising current knowledge.

FINDINGS AND DISCUSSION

Table 1: Evidence-Based Synthesis of Core Themes.

Theme	Representative Evidence	Synthesis Insight	Implication
Digital platforms and market access	Mobile applications, e-commerce, and digital marketplaces reduce search and transaction costs.	Digital platforms improve reach and price transparency but depend on connectivity and trust.	Invest in rural connectivity, platform governance, and market-information systems.
Digital finance and inclusion	Mobile money, FinTech, microfinance digitization, and digital payments expand access to financial services.	Financial inclusion can support enterprise growth when paired with literacy and consumer protection.	Strengthen digital financial literacy, affordable credit, and regulatory safeguards.
Agritech and productivity	AI advisory tools, weather information, digital extension, and data systems improve decision-making.	Productivity gains are strongest where farmers can access devices, data, and complementary inputs.	Integrate digital advisory services with extension, input finance, and local-language support.
Structural exclusion risks	Gender gaps, affordability barriers, infrastructure deficits, and weak policy coordination limit adoption.	Digital innovation may reproduce inequality when access and capability gaps remain unresolved.	Design targeted inclusion policies for women, youth, rural entrepreneurs, and smallholders.

The key findings from the systematic literature review on the intersection of digital innovation, inclusive entrepreneurship, and sustainable development in African economies are presented below. The findings are organised into thematic categories derived from the analysis and are aligned with the study's research questions.

Digital Platforms and Market Access

The review found that digital platforms, e-commerce systems, and online marketplaces enhance market access by connecting entrepreneurs directly with customers, reducing transaction costs, and improving access to market information. These technologies enable entrepreneurs to reach wider markets and increase business opportunities. However, the findings indicate that the benefits of digital platforms are greatest where entrepreneurs possess adequate digital skills, reliable internet connectivity, trust in digital systems, and access to supporting logistics infrastructure. The review also revealed that limited connectivity, low digital literacy, and resource constraints can restrict participation, often leaving rural and informal entrepreneurs at a disadvantage.

Financial Inclusion Through Digital Systems

The review found that digital financial systems, including mobile money, digital banking, and FinTech solutions, play a significant role in expanding access to financial services for underserved populations. These technologies improve access to savings, payments, credit, insurance, and business financing, thereby supporting entrepreneurial activities and economic participation. However, the findings indicate that the effectiveness of digital financial systems is often constrained by low levels of financial literacy, regulatory challenges, and limited trust in digital platforms. The review further revealed that meaningful financial inclusion depends not only on the availability of digital technologies but also on supportive institutional frameworks and user confidence in digital financial services.

Data-Driven Innovation and Productivity Enhancement

The review found that data-driven technologies, including artificial intelligence (AI), analytics, mobile advisory applications, and climate information systems, contribute to improved productivity and business performance among entrepreneurs. These technologies support informed decision-making by providing timely information on market conditions, weather patterns, resource management, operational efficiency, and risk mitigation. The findings indicate that the use of data-driven tools can enhance productivity, improve resource utilization, and strengthen the resilience of agricultural and small business enterprises. However, the review also revealed significant disparities in technology adoption, driven by factors such as high implementation costs, inadequate infrastructure, limited technical expertise, and low data literacy. As a result, the benefits of these technologies tend to be concentrated among better-resourced entrepreneurs, highlighting the need for inclusive diffusion strategies to ensure broader access and equitable productivity gains.

Social Inclusion Outcomes

The review found that digital entrepreneurship promotes social inclusion by creating economic opportunities for women, youth, rural communities, and informal entrepreneurs. Digital platforms help reduce barriers to market participation by improving access to customers, financial services, information, and entrepreneurial networks. The findings also indicate that digital technologies support women's economic participation, provide self-employment opportunities for youth, and help rural entrepreneurs overcome geographic constraints. However, several barriers continue to limit inclusiveness, including gender disparities in device ownership, low digital literacy, socio-cultural constraints, educational inequalities, and income disparities. Overall, the findings suggest that while digital entrepreneurship can advance social inclusion, its benefits remain unevenly distributed, highlighting the need to address structural inequalities that hinder meaningful participation in digital entrepreneurial ecosystems.

Structural Barriers to Inclusive Digital Entrepreneurship

Despite the transformative potential of digital innovation, the review identifies persistent barriers to inclusive digital entrepreneurship: limited infrastructure, unreliable connectivity, limited access to finance, low digital literacy, weak institutional support, policy fragmentation, gender inequality, and socio-economic exclusion. Figure 2 presents these barriers as an interconnected system rather than isolated constraints.

The critical implication is that exclusion is cumulative. Poverty reduces access to devices and connectivity; weak infrastructure reduces platform reliability; limited skills reduce productive use; and fragmented policy weakens trust and investment. Integrated interventions are therefore required across infrastructure, finance, skills, governance, and institutional support.

Figure 2: Barriers Network diagram.

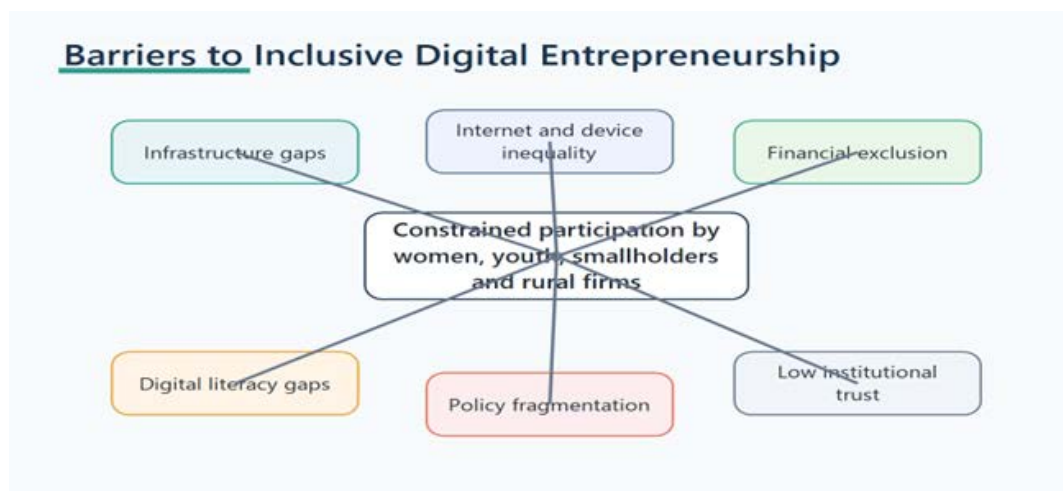


Figure 2 shows that access, capability, finance, and institutional constraints reinforce one another. These barriers particularly affect rural communities, smallholder farmers, women, and low-income entrepreneurs, reducing their capacity to participate in digital markets and value chains. Figure 2, therefore, supports a systems view of inclusive entrepreneurship: digital access must be paired with training, finance, policy coherence, and institutional trust if digital innovation is to produce sustainable development outcomes.

Critical Synthesis and Discussion

The literature indicates that digital innovation can enhance inclusive entrepreneurship by improving access to finance, markets, information, and productive capabilities (Manyika et al., 2016; Aker & Mbiti, 2010). Technologies such as FinTech, digital platforms, AI, and data-driven systems can strengthen entrepreneurial participation, productivity, and resilience. However, their effectiveness depends on enabling conditions such as infrastructure, affordability, digital literacy, institutional support, and user trust (GSMA, 2023; Mazzucato, 2018).

The review suggests that digital technology should be viewed as an enabling infrastructure rather than a development outcome. Meaningful inclusion occurs when entrepreneurs are able to transform digital access into capabilities such as market knowledge, financial inclusion, production efficiency, bargaining power, and resilience, particularly within agricultural value chains where smallholders face challenges related to finance, logistics, information asymmetries, and climate risks (Deichmann et al., 2016; Kaplinsky & Morris, 2016).

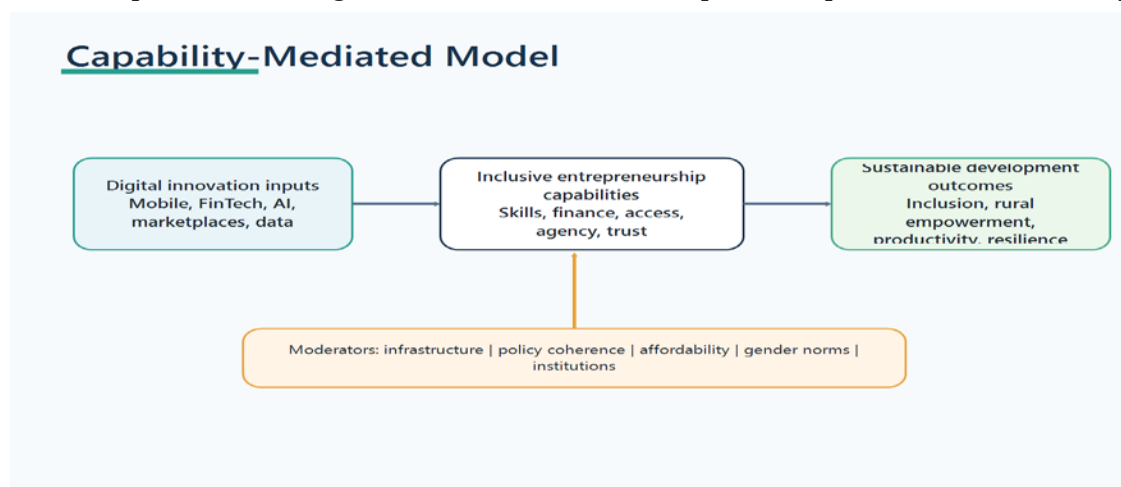
The findings also extend theoretical understanding by demonstrating that technology adoption is influenced by structural and institutional conditions, supporting insights from Diffusion of Innovation Theory (Rogers, 2003). Similarly, the Resource-Based View highlights the importance of ecosystem-enabled capabilities, including digital literacy, financial access, institutional support, and platform participation, rather than solely firm-owned resources (Barney, 1991). Furthermore, Sustainable Development Theory emphasises that the success of digital entrepreneurship should be evaluated through its economic, social, and environmental contributions (UNDP, 2022).

Overall, the evidence suggests that inclusive digital entrepreneurship requires coordinated investments in infrastructure, education, regulation, finance, gender inclusion, and local innovation ecosystems. Without such integrated interventions, digital transformation may improve market efficiency while perpetuating existing socio-economic inequalities (Mazzucato, 2018; World Bank, 2024).

PROPOSED MODEL

Building on the systematic review, theoretical foundations, and thematic synthesis, this paper proposes a capability-mediated model linking digital innovation, inclusive entrepreneurship, and sustainable development. Digital innovation is treated as an enabling condition, inclusive entrepreneurship as the mediating mechanism, and sustainable development as the multidimensional outcome. (See Figure 3)

Figure 3: Conceptual Model of Digital Innovation, Inclusive Entrepreneurship, and Sustainable Development.



The model shows how digital inputs become sustainable development outcomes only when they are converted into inclusive entrepreneurial capabilities and supported by infrastructure, policy coherence, literacy, affordability, gender inclusion, institutional support, and trust.

Digital Innovation as the Enabling Driver

Digital innovation is the enabling driver in the model. Mobile technologies, FinTech, AI, digital marketplaces, blockchain-enabled supply chains, advisory platforms, and analytics improve connectivity, information access, operational efficiency, financial participation, and market reach. In African contexts, these tools can reduce transaction costs and bridge institutional voids, particularly for underserved entrepreneurs and smallholder farmers (Manyika et al., 2016). Their developmental value, however, depends on whether access is affordable, reliable, trusted, and supported by relevant skills. Within agricultural value chains, digital advisory systems, climate-smart applications, supply-chain platforms, and market intelligence tools can improve decision-making, productivity, and resilience. Digital innovation, therefore, serves as a strategic enabler rather than a stand-alone solution.

Inclusive Entrepreneurship as the Transformative Mechanism

Inclusive entrepreneurship is the model's transformative mechanism. It determines whether the opportunities created by digital transformation reach women entrepreneurs, youth innovators, smallholder farmers, rural enterprises, and informal-sector actors rather than remaining concentrated among already advantaged groups. The mechanism works through capability formation: access to digital tools, financial services, entrepreneurial skills, market information, and institutional support enables marginalised groups to participate more effectively in value creation (OECD/European Union, 2019). Inclusive entrepreneurship, therefore, bridges technological advancement and development justice by converting digital access into socio-economic agency, resilience, and equitable participation.

Moderating Variables

The relationship between digital innovation and inclusive entrepreneurship is influenced by several enabling factors, including infrastructure, policy support, financial inclusion, education, digital literacy, affordability, gender norms, institutional capacity, and trust. Reliable infrastructure such as electricity, broadband connectivity, mobile networks, logistics systems, and access to digital devices is essential for the productive use of digital technologies, particularly in rural areas (Chavula, 2013).

Supportive and coherent policies, including innovation incentives, entrepreneurship programmes, and public-private partnerships, can foster inclusion, whereas fragmented governance may hinder participation and reduce trust. Financial inclusion is also critical, as access to mobile banking, microfinance, credit, insurance, and digital payment systems enables entrepreneurs to invest in technology adoption and business growth (Jack & Suri, 2014). Furthermore, education and digital literacy play a vital role in transforming technological access into entrepreneurial capability. Without adequate skills, training, and confidence in using digital tools, technology adoption is likely to remain limited, reducing its potential contribution to inclusive development.

Sustainable Development Outcomes

The model identifies sustainable development outcomes across economic, social, environmental, and institutional dimensions. Economic inclusion is reflected in wider participation, employment, income opportunities, and reduced inequality. Rural empowerment occurs when digital entrepreneurship connects isolated communities to markets, finance, information, and productive networks. In agriculture, this can strengthen productivity, competitiveness, food security, and local resilience. Climate resilience and environmental sustainability emerge when AI, analytics, traceability, and climate-smart tools improve risk management, resource efficiency, and transparent value chains. Taken together, the model shows that digital innovation supports sustainable development when institutions help marginalised entrepreneurs convert access into capability, agency, and resilient value creation.

CONTRIBUTION

This paper contributes to theory in three ways. First, it extends Diffusion of Innovation Theory by showing that adoption in African entrepreneurial ecosystems is shaped by affordability, infrastructure, institutional support, trust, and gendered access. Second, it advances the Resource-Based View by emphasising ecosystem-enabled capabilities, including digital literacy, financial inclusion, platform access, and data-use capacity. Third, it strengthens Sustainable Development Theory by linking digital entrepreneurship to economic inclusion, social equity, and environmental sustainability. Overall, the paper proposes a capability-mediated model of inclusive digital entrepreneurship, arguing that digital technologies create developmental value only when marginalised populations can use them to participate productively and equitably in entrepreneurial ecosystems and value chains.

PRACTICAL IMPLICATIONS

The findings suggest that digital innovation can support inclusive and sustainable development when accompanied by adequate infrastructure, supportive institutions, effective policies, access to finance, and capacity-building for entrepreneurs. Policymakers should focus on expanding rural broadband, reliable electricity, affordable digital access, inclusive entrepreneurship policies, and digital financial services that benefit women, youth, smallholder farmers, and rural enterprises.

Universities can contribute by integrating entrepreneurship and digital literacy into curricula, establishing innovation hubs and incubators, and providing training opportunities for underserved communities. Development agencies, NGOs, funders, and private-sector organisations should collaborate to strengthen infrastructure, innovation ecosystems, financial inclusion, and skills development programmes targeting vulnerable entrepreneurial groups. Overall, the study highlights that inclusive digital entrepreneurship should be recognised as a key development

strategy for addressing poverty, food insecurity, gender inequality, youth unemployment, climate challenges, and sustainable rural development.

LIMITATIONS AND FUTURE RESEARCH

This study is limited by its reliance on secondary data from academic literature, policy reports, and institutional publications. Although the PRISMA-informed approach improves transparency, the findings depend on the availability and quality of existing sources. The English-language focus may also exclude francophone, lusophone, and Arabic African scholarship, while broad continental analysis may understate country-specific variation.

Directions for Future Research

Future research should use fieldwork, surveys, interviews, mixed-methods, and longitudinal designs to examine how entrepreneurs, smallholder farmers, women, and youth experience digital innovation across diverse African contexts. Comparative regional studies are needed to assess institutional and infrastructural variation. Further research should also examine gender and youth inclusion, non-agricultural sectors such as health, renewable energy, education, manufacturing, and creative industries, and the effectiveness of interventions such as rural broadband, entrepreneurship hubs, digital literacy programmes, and financial inclusion initiatives.

CONCLUSION

Inclusive entrepreneurship offers a strategic pathway for widening economic participation and advancing sustainable development in African economies. This review shows that entrepreneurship becomes developmentally meaningful when marginalised groups gain the capabilities, resources, institutions, and market access needed to participate productively. Digital innovation can accelerate this process through mobile banking, FinTech, AI, digital marketplaces, blockchain systems, and data-driven agricultural tools. In agricultural value chains, these technologies can improve market access, productivity, resilience, financial inclusion, and value creation for smallholder farmers, rural communities, women entrepreneurs, and youth innovators.

The study also cautions that digital transformation is not inherently inclusive. Infrastructure gaps limited digital literacy, weak policy frameworks, internet inequality, gendered access, and financial exclusion can prevent digital systems from producing equitable outcomes. Sustainable development, therefore, depends on integrating digital transformation into inclusive entrepreneurial ecosystems through coordinated policy, rural infrastructure investment, financial democratisation, digital literacy, institutional reform, and context-specific innovation systems.

The paper concludes that digital innovation should be understood as a development instrument rather than a technological upgrade. When supported by appropriate institutions, capabilities, and infrastructure, it can promote economic inclusion, rural empowerment, agricultural productivity, climate resilience, and environmental sustainability.

AI Declaration: The authors confirm that AI-assisted tools were used solely for language refinement, grammar improvement, and clarity enhancement. All intellectual content, analysis, and interpretations presented in this manuscript are entirely the original work of the authors.

REFERENCES

- Acs, Z. J., Stam, E., Audretsch, D. B., & O'Connor, A. (2018). The lineages of the entrepreneurial ecosystem approach. *Small Business Economics*, 49(1), 1–10.
- Aker, J. C., & Mbiti, I. M. (2010). Mobile phones and economic development in Africa. *Journal of Economic Perspectives*, 24(3), 207–232.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2007). Finance, inequality and the poor. *Journal of Economic Growth*, 12(1), 27–49.

- Brixiova, Z., Ncube, M., & Bicaba, Z. (2015). Skills and youth entrepreneurship in Africa: Analysis with evidence from Swaziland. *World Development*, 67, 11–26.
- Chavula, H. K. (2013). Telecommunications development and economic growth in Africa. *Information Technology for Development*, 19(1), 5–23.
- Deichmann, U., Goyal, A., & Mishra, D. (2016). Will digital technologies transform agriculture in developing countries? *Agricultural Economics*, 47(S1), 21–33.
- Food and Agriculture Organization (FAO). (2024). *Digital agriculture and rural transformation in Africa*. FAO.
- George, G., Merrill, R. K., & Schillebeeckx, S. J. D. (2021). Digital sustainability and entrepreneurship: How digital innovations are helping tackle climate change and sustainable development. *Entrepreneurship Theory and Practice*, 45(5), 999–1027.
- Goyal, A. (2010). Information, direct access to farmers, and rural market performance in central India. *American Economic Journal: Applied Economics*, 2(3), 22–45.
- GSMA. (2023). *The mobile economy Sub-Saharan Africa 2023*. GSMA Intelligence.
- GSMA. (2025). *Mobile economy Africa report 2025*. GSMA.
- International Labour Organization (ILO). (2022). *Global employment trends for youth 2022: Investing in transforming futures for young people*. ILO.
- Jack, W., & Suri, T. (2014). Risk sharing and transaction costs: Evidence from Kenya's mobile money revolution. *American Economic Review*, 104(1), 183–223.
- Kabeer, N. (2012). *Women's economic empowerment and inclusive growth: Labour markets and enterprise development* (Discussion Paper No. 29). International Development Research Centre.
- Kaplinsky, R., & Morris, M. (2016). Thinning and thickening: Productive sector policies in the era of global value chains. *European Journal of Development Research*, 28(4), 625–645.
- Manyika, J., Lund, S., Singer, M., White, O., & Berry, C. (2016). *Digital finance for all: Powering inclusive growth in emerging economies*. McKinsey Global Institute.
- Mazzucato, M. (2018). *The entrepreneurial state: Debunking public vs. private sector myths* (2nd ed.). Penguin.
- Nwagbara, U., & Mordi, C. (2020). Inclusive entrepreneurship and sustainable development in sub-Saharan Africa. *Journal of Entrepreneurship in Emerging Economies*, 12(3), 321–339.
- OECD. (2022). *Inclusive entrepreneurship policies*. OECD Publishing.
- OECD/European Union. (2019). *The missing entrepreneurs 2019: Policies for inclusive entrepreneurship*. OECD Publishing.
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
- United Nations Development Programme (UNDP). (2022). *Human development report 2021/2022: Uncertain times, unsettled lives*. UNDP.
- United Nations Development Programme (UNDP). (2024). *Sustainable entrepreneurship in emerging economies*. UNDP.
- World Bank. (2023). *Digital economy for Africa initiative*. World Bank.
- World Bank. (2024). *Africa's pulse: An analysis of issues shaping Africa's economic future* (Vol. 29). World Bank.
- World Commission on Environment and Development (WCED). (1987). *Our common future*. Oxford University Press.

STRATEGIC MANAGEMENT IN THE AI ERA: A LITERATURE REVIEW ON COMPETITIVE ADVANTAGE AND HUMAN-AI DYNAMICS

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ABSTRACT

The shift toward data-intensive discovery and large-scale computational analysis is redefining the foundations of competitive advantage in the digital era. Within this landscape, Artificial Intelligence (AI) has become a central driver of strategic renewal, reshaping how firms create value, differentiate, and adapt to technological change. This paper examines how Artificial Intelligence (AI) is reshaping the sources of competitive advantage by comparing the historical role of human capabilities with the emerging role of intelligent systems. Using a narrative literature review of recent strategic management studies, we synthesize insights from the Resource-Based View, Knowledge-Based View, and Dynamic Capabilities to explore when AI technologies can substitute for or complement human expertise. Our analysis finds that AI alone rarely confers sustainable advantage – instead, firms achieve lasting differentiation when AI is combined with unique data assets, deep organizational integration, ethical governance, and human-centered leadership. We identify conditions under which human–AI collaboration outperforms either humans or AI alone, highlighting that AI augments human decision-making in data-intensive tasks while humans provide contextual judgment and creativity. These findings update classical strategy theory for the AI era by demonstrating that dynamic, data-driven capabilities are now as critical as traditional human knowledge. Practically, the study implies that managers should develop hybrid human–AI teams, invest in continuous reskilling programs, and implement robust AI governance to mitigate bias and build trust. In sum, sustainable competitive advantage in the digital age arises not from AI in isolation, but from strategic complementarities between advanced AI systems and uniquely human insight.

Keywords: strategic management, Artificial Intelligence (AI), competitive advantage, human-AI collaboration.

INTRODUCTION

In the digital era, data-intensive discovery and large-scale computational analysis have become central to organisational competitiveness, reshaping how firms generate and sustain advantage (Cao, 2018; Elshawi et al., 2018). Traditional sources of competitive advantage are increasingly insufficient in fast-moving, technology-driven environments, while classic strategic tools such as SWOT analysis and Porter’s Five Forces are widely criticised for their static nature and limited ability to capture the dynamics of digital competition (Nonaka and Takeuchi, 2021). As a result, strategic management has shifted inward, focusing on firm-specific resources, knowledge and adaptive capabilities.

This shift is reflected in contemporary theoretical perspectives. The Resource-Based View (RBV) emphasises unique and inimitable resources as drivers of superior performance (Kero and Bogale, 2023), while the Knowledge-Based View (KBV) positions knowledge as the most strategically significant and difficult-to-replicate

asset (Assensoh-Kodua, 2019; Cuthbertson and Furseth, 2022). Dynamic Capabilities further highlight firms' ability to sense, seize and reconfigure resources in response to technological turbulence (Doz, 2020; Sjödin et al., 2023). Within this context, Artificial Intelligence (AI) has emerged as a strategic meta-capability that transforms static resources into dynamic ones through continuous learning, adaptation and data-driven insight generation (Jaiswal et al., 2022; Sjödin et al., 2023).

Across industries, AI enables predictive maintenance, personalisation, enhanced decision-making and data-driven business model innovation, but its adoption also raises significant concerns related to algorithmic bias, data quality, explainability, privacy and organisational dehumanisation (Makridakis, 2017; Enholm et al., 2022). At the workforce level, AI's growing ability to perform cognitive tasks has intensified debates about substitution versus complementarity between human and machine intelligence (Krakowski et al., 2023). While some studies emphasise job displacement risks, others underline emerging roles in oversight, interpretation and ethical governance (Sathyanarayana and Harsha, 2025). Despite extensive research, clear guidance on when AI should operate autonomously and when human intervention is required remains limited, constraining the development of sustainable workforce strategies and effective governance mechanisms.

Against this background, this study examines how AI reshapes the sources of competitive advantage by comparing the historical role of human capabilities with the emerging role of intelligent systems. Using a narrative literature review, it analyses how competitive advantage has traditionally been derived from human expertise, how AI creates new strategic opportunities across sectors, and under which conditions humans or AI outperform one another. The study focuses on strategic and organisational implications rather than technical development, offering an integrated perspective on how human and AI capabilities co-evolve in shaping sustainable competitive advantage.

LITERATURE REVIEW

Competitive advantage is traditionally defined as a firm's ability to implement value-creating strategies that competitors cannot easily imitate (Assensoh-Kodua, 2019). Early strategic management frameworks, such as the Market-Based View and Porter's Five Forces, focused on external industry structure, entry barriers and competitive rivalry (Pangarkar and Prabhudesai, 2024). However, these models are increasingly criticised for their static assumptions and limited applicability in digitally intensive environments characterised by blurred industry boundaries and accelerated innovation cycles (Cuthbertson and Furseth, 2022; Nonaka and Takeuchi, 2021).

In response, strategic attention shifted toward firm-specific resources and capabilities. The Resource-Based View argues that sustainable advantage stems from resources that are valuable, rare, inimitable and organisationally embedded (Kero and Bogale, 2023). The Knowledge-Based View extends this logic by highlighting tacit knowledge and experiential expertise as the most strategically significant assets (Assensoh-Kodua, 2019; Nonaka and Takeuchi, 2021). Dynamic Capabilities further explain how firms sustain advantage in volatile environments through continuous sensing, seizing and reconfiguring of resources (Doz, 2020; Sjödin et al., 2023). Together, these perspectives emphasise that competitive advantage depends not only on possessing valuable assets but also on an organization's agility in learning and adaptation.

Within this theoretical landscape, Artificial Intelligence (AI) emerges as a meta-capability that reshapes how firms sense opportunities, interpret information and act strategically. AI refers to a system's ability to learn from data and apply insights adaptively (Sjödin et al., 2023). Importantly, AI is not simply a stand-alone technology; its strategic value arises when integrated with complementary elements such as robust data infrastructure, advanced algorithms, skilled human experts, and an organizational culture receptive to data-driven decision-making (Peretz-Andersson et al., 2024). By automating routine analytical tasks and augmenting human judgment in complex decisions, AI can increase a firm's capacity to respond swiftly to environmental change (Enholm et al., 2022; Reim et al., 2020).

The AI ecosystem supporting this meta-capability is grounded in several technological pillars. Data Science and Big Data analytics enable firms to extract value from large-scale, heterogeneous data sets (Cao, 2018; Amin et al., 2022). Machine Learning and Deep Learning support pattern recognition and adaptive optimisation, while IoT and cyber-physical systems generate real-time data streams that feed AI models (Gupta and Gupta, 2016; Oliveira et al., 2024). Technologies such as digital twins further extend these capabilities by enabling simulation and experimentation in risk-free environments (Elahi et al., 2023; Ghosh et al., 2018). A particularly transformative development is

Generative AI, which shifts AI's role from prediction to creation, reducing the marginal cost of expertise and accelerating business model innovation (Gao et al., 2024; Kanbach et al., 2024). Strategically, firms face a trade-off between rapid adoption of off-the-shelf models and the development of customised systems enriched with proprietary data to build defensible advantage (Dzreke, 2024; Wang et al., 2025).

Overall, the convergence of strategic management theory and AI technologies reveals a fundamental shift: sustainable competitive advantage increasingly arises from the dynamic interplay of data, technology, human expertise and organisational learning. This framework provides the foundation for analysing, in subsequent sections, the respective and combined roles of human capital and AI as sources of competitive advantage.

METHODOLOGY

This study adopts a narrative literature review approach to explore how Artificial Intelligence (AI) influences competitive advantage and human–AI dynamics in organizations. A narrative review is appropriate because our goal is conceptual integration across diverse streams of research, rather than a comprehensive systematic cataloging of all literature on the topic (Baumeister and Leary, 1997; Green, et al., 2006). We conducted searches in leading scholarly databases and search engines, focusing on literature from roughly the past decade. Key search terms centered on “artificial intelligence”, “competitive advantage”, “strategic management”, and “human–AI collaboration”. Priority was given to peer-reviewed journal articles and high-impact conference papers in strategy, information systems, and related fields, along with seminal theoretical works, such as resource-based and knowledge-based views, to ground the analysis.

Relevant sources were reviewed iteratively and thematically analyzed (Torraco, 2016) to identify common insights and divergent viewpoints. This process yielded a set of recurring themes, which form the basis of our findings in Section 4. We acknowledge that this is a narrative (qualitative) review – not a systematic review – and therefore we did not employ PRISMA protocols or quantitative meta-analysis (Tranfield et al., 2003). Instead, we aimed for a broad yet integrative synthesis that connects insights from multiple disciplines. The chosen methodology trades exhaustive coverage for depth analysis and theoretical development, aligning with the study's purpose of building a holistic understanding of AI's strategic impact.

FINDINGS

This section synthesizes the findings of the literature review into four thematic areas that explain how competitive advantage is shaped in the AI era: (1) human capital as an enduring strategic resource, (2) AI as a conditional source of competitive advantage, (3) cross-industry transformations enabled by AI, and (4) the evolving relationship between AI and human labor.

Human Capital as a Source of Competitive Advantage

The literature consistently shows that human capital remains a core source of sustainable competitive advantage, even as AI adoption accelerates. From a Resource-Based View perspective, employees' knowledge, skills, creativity, and experience can constitute a VRIO resource because they are valuable, rare, difficult to imitate, and embedded within organizational routines (Kero & Bogale, 2023). The inimitability of human capital stems from causal ambiguity and social complexity, as tacit knowledge, trust, and culture cannot be easily replicated by competitors or algorithms (Anastasiu et al., 2020; Nonaka & Takeuchi, 2021). Rather than disappearing, the strategic value of human labor is shifting toward “evergreen” skills—such as creativity, leadership, empathy, and contextual judgment—that AI cannot easily reproduce (Jaiswal et al., 2022; Kanbach et al., 2024).

Accordingly, Human Resource Management is evolving from an administrative function into a strategic capability that enables human–AI collaboration. HR increasingly acts as an organizational architect, redesigning roles, workflows, and incentive systems to support hybrid teams that combine domain expertise with AI capabilities (Chowdhury et al., 2024). This includes fostering resource fluidity and cross-functional collaboration so that talent can be redeployed as new AI-enabled opportunities emerge (Doz, 2020; Peretz-Andersson et al., 2024). HR is also

responsible for overseeing the invisible labor behind AI systems, such as data curation and annotation, which is essential for reliable AI performance (Chowdhury et al., 2024).

Organizational learning thus becomes a strategic capability. Firms invest heavily in upskilling and reskilling initiatives to develop data literacy and critical evaluation skills, enabling employees to act as curators or editors of AI-generated outputs rather than passive users (Kanbach et al., 2024). AI-enabled personalized learning platforms further enhance this process by tailoring training to individual needs (Huang et al., 2023; Stone et al., 2024). At the leadership level, an “AI mindset” combined with emotional intelligence and psychological safety is increasingly emphasized to support experimentation and adaptation (Doz, 2020; Enholm et al., 2022).

While AI-driven HR analytics improve evidence-based decision-making in recruitment, performance management, and talent development, they also introduce ethical risks related to bias, privacy, and transparency (Enholm et al., 2022). To address these challenges, organizations adopt human-in-the-loop oversight, fairness audits, and Trustworthy AI principles (Perifanis & Kitsios, 2023). Overall, the literature confirms that AI amplifies—but does not replace—the socially complex and tacit dimensions of human capital, making effective human–AI complementarity a critical source of sustained competitive advantage.

Artificial Intelligence as a Source of Competitive Advantage

AI has evolved into a strategic capability that reshapes how firms sense opportunities, optimize operations, and innovate. However, the literature is clear that AI alone rarely constitutes a durable competitive advantage, as algorithms and foundational models are increasingly commoditized (Cuthbertson & Furseth, 2022). Sustainable advantage instead arises from how firms integrate AI with proprietary data, domain expertise, and organizational routines (Dzreke, 2024).

From an RBV perspective, AI creates value when it enhances prediction accuracy, efficiency, or innovation, but rarity and inimitability depend on complementary assets such as exclusive datasets, scarce AI-related skills, and socially complex workflows (Dzreke, 2024). These conditions are difficult for competitors to replicate, especially when AI is embedded within human-in-the-loop decision systems and long-standing organizational processes.

Viewed through the Dynamic Capabilities lens, AI strengthens firms’ abilities to sense, seize, and transform (Hossain et al., 2022). AI enhances sensing by processing large-scale, real-time data to detect emerging trends and risks (Sjödin et al., 2023). It supports seizing by accelerating decision-making and enabling rapid resource reallocation, particularly in operations and supply chains (Dzreke, 2024). AI also facilitates transformation by enabling continuous learning, process reconfiguration, and business model innovation (Doz, 2020; Perifanis & Kitsios, 2023).

AI contributes to both cost leadership and differentiation strategies. In cost leadership, intelligent automation and predictive maintenance reduce waste, downtime, and operating costs, particularly in asset-intensive industries (Hossain et al., 2022). In differentiation, AI enables hyper-personalization, improved customer experience, and faster innovation cycles, especially when reinforced by proprietary data loops (Kanbach et al., 2024). The literature therefore emphasizes that AI becomes a source of advantage only when embedded within supportive governance, culture, and data ecosystems (Peretz-Andersson et al., 2024).

AI Across Sectors: Cross-Industry Transformations

Across industries, AI functions as a general-purpose technology that reshapes competitive dynamics while reinforcing the importance of human oversight. In manufacturing and asset-intensive sectors, AI-driven predictive maintenance, robotics, and digital twins improve reliability, productivity, and sustainability, translating into cost and quality advantages (Gao et al., 2024; Sjödin et al., 2023). In supply chains, AI enables predictive forecasting, autonomous optimization, and resilience against disruptions, enhancing both efficiency and responsiveness (Jackson et al., 2024). In finance, AI strengthens fraud detection, risk assessment, and personalized services, but its strategic value depends on explainability and regulatory compliance (Corral de la Mata et al., 2024). In healthcare, AI improves diagnostics, personalized treatment, and operational efficiency, yet human validation remains essential due to the high-stakes nature of clinical decisions (Bekbolatova et al., 2024). Retail and professional services leverage AI for personalization,

analytics, and automation, but competitive advantage hinges on balancing efficiency gains with trust, ethics, and human judgment (Zhang et al., 2020).

Across sectors, firms that successfully integrate AI into workflows while investing in skills, governance, and organizational learning are best positioned to convert technological adoption into sustainable competitive advantage.

Artificial Intelligence vs. Human Labor: Complementarity or Substitution

The literature frames the relationship between AI and human labor as a continuum rather than a binary choice. On one hand, AI automates routine cognitive and physical tasks, contributing to job displacement and labor market polarization (Tyson & Zysman, 2022). On the other hand, extensive evidence supports augmented or hybrid intelligence, where human–AI collaboration yields superior outcomes (Sowa et al., 2021).

Human-in-the-loop systems enable AI to enhance human decision-making while preserving accountability and trust, particularly in high-stakes contexts such as healthcare and finance (Su et al., 2021). At the same time, firms must manage reskilling and workforce transitions to avoid the erosion of tacit knowledge and employee engagement (Einola & Khoreva, 2023). Strategically, organizations that design tasks and workflows to combine machine efficiency with human judgment, creativity, and ethical reasoning gain both productivity and talent advantages.

Overall, competitive advantage increasingly stems from a firm’s ability to orchestrate hybrid intelligence systems, aligning AI capabilities with human strengths in a way that competitors find difficult to replicate.

THEORETICAL AND MANAGERIAL IMPLICATIONS

This study refines classical strategic management theories by demonstrating how artificial intelligence (AI) reshapes long-established sources of competitive advantage. The Resource-Based View (RBV) and Knowledge-Based View (KBV) remain relevant: our findings affirm that unique human capital and tacit knowledge continue to provide rare, inimitable advantages in the AI era. At the same time, AI functions as a dynamic capability that can enhance a firm’s ability to sense and seize opportunities, yet it alone cannot produce sustainable advantage unless integrated deeply with such human and organizational assets. This insight aligns with recent research that highlights the synergy of human–AI collaboration; for instance, combining human judgment with AI tools yielded superior performance in decisions and competition settings. While some early commentators predicted that AI would independently revolutionize competitive dynamics (e.g. Makridakis, 2017), our analysis supports a more nuanced view in line with recent work (e.g. Krakowski et al., 2023) emphasizing that AI’s strategic power is contingent on human-driven resources and capabilities. We contribute to the literature by clarifying that competitive advantage in the digital era arises from blending human insight with AI-driven data capabilities – a finding that updates existing RBV/KBV frameworks for the age of intelligent systems.

From a managerial perspective, the results indicate that business leaders should proactively orchestrate human–AI complementarities within their organizations. Managers need to ensure that AI deployments are accompanied by organizational change: this includes investing in upskilling and reskilling programs to build digital and data literacy in the workforce, redesigning jobs for hybrid human–AI teams, and fostering a culture of experimentation and trust in data-driven decision-making. Additionally, effective AI governance and ethical oversight are crucial to manage issues like algorithmic bias and to maintain stakeholder trust. Ultimately, managers must recognize that competitive advantage will come from those firms that use AI to augment, rather than replace, human capabilities – leveraging AI to amplify human creativity, context-awareness, and strategic thinking in ways that rivals cannot easily replicate.

POLICY IMPLICATIONS

The review also underscores important directions for policymakers to support the integration of AI into the economy while safeguarding societal interests. Workforce development should be a priority: governments can invest in education and training programs for digital skills and AI literacy, ensuring that the labor force is prepared for new roles created by AI. This includes supporting reskilling and upskilling initiatives in collaboration with industry, to

help workers transition from roles at risk of automation into emerging occupations where human–AI collaboration is essential. Such measures can mitigate potential job displacement, aligning with calls to address the skills transition rather than focusing solely on job losses (e.g., Willcocks, 2020).

Policymakers should also advance ethical AI governance frameworks. This means establishing standards and regulations for transparency and accountability in AI decision-making, especially in high-stakes domains like finance, healthcare, and public services. National and international bodies can create guidelines for algorithmic bias auditing, data privacy protection, and AI safety testing, thereby building public trust and responsible innovation. Furthermore, supportive policies such as incentives for AI-driven innovation and digital infrastructure development can help firms – especially small and medium enterprises – adopt AI in a way that strengthens competitiveness. By focusing on education, upskilling, and robust governance, policymakers will lay the groundwork for harnessing AI’s benefits while promoting inclusive growth and societal well-being.

CONCLUSION

In conclusion, our analysis shows that sustainable competitive advantage in the AI era arises from a strategic synergy between human and artificial intelligence. While advanced AI systems offer unprecedented capabilities for data-driven innovation and efficiency, they do not inherently guarantee lasting differentiation. Instead, organizations achieve durable advantages by embedding AI within unique configurations of human expertise, proprietary data, and adaptive processes. While the classic lenses of RBV, KBV, and dynamic capabilities remain fundamental, our analysis confirms that these frameworks must be updated to reflect an era in which data, AI, and human expertise co-evolve as dynamic strategic assets (Cuthbertson and Furseth, 2022; Huang et al., 2023). Advanced AI systems greatly extend a firm’s capacity for learning, prediction, and innovation, yet they do not automatically yield durable competitive advantages, as algorithms alone are increasingly commoditized and easily replicated.

Instead, sustainable advantage arises when AI is deeply embedded within a firm’s unique configuration of human expertise, proprietary data, and adaptive processes, creating synergistic capabilities that competitors cannot readily imitate (Dzreke, 2024; Kanbach et al., 2024). This perspective aligns with emerging evidence that human–AI teams can outperform either humans or AI alone, underlining how complementarity between people and intelligent systems is a key enabler of superior performance (Krakowski et al., 2023). Thus, by integrating artificial intelligence into the Resource-Based and dynamic capability paradigms, this study provides an updated socio-technical view of strategy in the digital age. It highlights that the power of AI in strategy is fundamentally mediated by human and organizational factors, and that competitive leadership will increasingly favor those firms that intentionally blend machine intelligence with human insight, ethical governance, and continuous innovation into a cohesive, co-evolving system of capabilities.

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REFERENCES

- Amin, F., Abbasi, R., Mateen, A., Ali Abid, M., & Khan, S. (2022). *A step toward next-generation advancements in the Internet of Things technologies*. *Sensors*, 22(20), 8072.
- Anastasiu, L., Gavriş, O., & Maier, D. (2020). *Is human capital ready for change? A strategic approach adapting Porter’s five forces to human resources*. *Sustainability*, 12(6), 2300.
- Assensoh-Kodua, A. (2019). *The resource-based view: A tool of key competency for competitive advantage*. *Problems and Perspectives in Management*, 17(3), 143–152.
- Baumeister, R. F., & Leary, M. R. (1997). *Writing narrative literature reviews*. *Review of General Psychology*, 1(3), 311–320.

- Bekbolatova, M., Mayer, J., & Husain, G. (2024). *Machine learning for medical image classification*. Academia Medicine and Health, 1(4), Article 23 December.
- Cao, L. (2018). *Data science: A comprehensive overview*. ACM Computing Surveys, 50(3), 1–42.
- Chowdhury, S., Budhwar, P., & Wood, G. (2024). *Generative artificial intelligence in business: Towards a strategic human resource management framework*. British Journal of Management, 35(3), 1680–1691.
- Corral de la Mata, D., García de Blanes Sebastián, M., & Carvajal Camperos, M. (2024). *Hybrid artificial intelligence: Application in the banking sector*. Revista Científica Signos, 56(1), 123–136.
- Cuthbertson, R. W., & Furseth, P. I. (2022). *Digital services and competitive advantage: Strengthening the links between RBV, KBV, and innovation*. Journal of Business Research, 152, 168–176.
- Doz, Y. (2020). *Fostering strategic agility: How individual executives and human resource practices contribute*. Human Resource Management Review, 30(1), 100693.
- Dzreke, S. S. (2024). *The competitive advantage of AI in business: A strategic imperative*. International Journal of Multidisciplinary Research, 10(2), 15–27.
- Einola, K., & Khoreva, V. (2023). *Best friend or broken tool? Exploring the co-existence of humans and artificial intelligence in the workplace ecosystem*. Human Resource Management, 62(1), 117–135.
- Elahi, M., Afolaranmi, S. O., Lastra, J. L. M., & Pérez García, J. A. (2023). *A comprehensive literature review of the applications of AI techniques through the lifecycle of industrial equipment*. Discover Artificial Intelligence, 3(1), 43.
- Elshawi, R., Sakr, S., Talia, D., & Trunfio, P. (2018). *Big data systems meet machine learning challenges: Towards big data science as a service*. Big Data Research, 14, 1–11.
- Enholm, I. M., Papagiannidis, E., Mikalef, P., & Krogstie, J. (2022). *Artificial intelligence and business value: A literature review*. Information Systems Frontiers, 24(6), 1709–1734.
- Gao, R. X., Krüger, J., Merklein, M., Möhring, H.-C., & Váncza, J. (2024). *Artificial intelligence in manufacturing: State of the art, perspectives, and future directions*. CIRP Annals, 73(2), 723–749.
- Ghosh, A., Chakraborty, D., & Law, A. (2018). *Artificial intelligence in Internet of Things*. CAAI Transactions on Intelligence Technology, 3(4), 208–218.
- Green, B. N., Johnson, C. D., & Adams, A. (2006). *Writing narrative literature reviews for peer-reviewed journals: Secrets of the trade*. Journal of Chiropractic Medicine, 5(3), 101–117.
- Hossain, M. A., Agnihotri, R., Rashid, M. R. I., Rahman, M. S., & Sumi, S. F. (2022). *Marketing analytics capability, artificial intelligence adoption, and firms' competitive advantage: Evidence from the manufacturing industry*. Industrial Marketing Management, 106, 240–255.
- Huang, X., Yang, F., Zheng, J., Feng, C., & Zhang, L. (2023). *Personalized human resource management via HR analytics and artificial intelligence: Theory and implications*. Asia Pacific Management Review, 28(4), 598–610.
- Jackson, I., Ivanov, D., Dolgui, A., & Namdar, J. (2024). *Generative artificial intelligence in supply chain and operations management: A capability-based framework for analysis and implementation*. International Journal of Production Research, 62(16), 6120–6145.
- Jaiswal, A., Arun, C. J., & Varma, A. (2022). *Rebooting employees: Upskilling for artificial intelligence in multinational corporations*. The International Journal of Human Resource Management, 33(7), 1179–1208.
- Jowarder, R. A., & Jowarder, M. I. (2025). *AI-driven strategic insights: Enhancing decision-making processes in business development*. International Journal of Innovative Research in Science, Engineering and Technology, 14(1), 23–37.
- Kanbach, D. K., Heiduk, L., Blöcher, G., Schreiter, M., & Lahmann, A. (2024). *The GenAI is out of the bottle: Generative artificial intelligence from a business model innovation perspective*. Review of Managerial Science, 18(4), 1189–1220.

- Kero, C. A., & Bogale, A. T. (2023). *A systematic review of resource-based view and dynamic capabilities of firms and future research avenues*. *International Journal of Sustainable Development and Planning*, 18(9), 3137–3154.
- Krakowski, S., Luger, J., & Raisch, S. (2023). *Artificial intelligence and the changing sources of competitive advantage*. *Strategic Management Journal*, 44(7), 1425–1452.
- Makridakis, S. (2017). *The forthcoming artificial intelligence (AI) revolution: Its impact on society and firms*. *Futures*, 90, 46–60.
- Mishra, P., & Tripathi, S. (2021). *Impact of data network effects on AI-driven business models: A comprehensive review*. (Unpublished manuscript).
- Nonaka, I., & Takeuchi, H. (2021). *Humanizing strategy*. *Long Range Planning*, 54(6), 102070.
- Oliveira, F., Costa, D. G., Assis, F., & Silva, I. (2024). *Internet of intelligent things: A convergence of embedded systems, edge computing and machine learning*. *Internet of Things*, 26, 101153.
- Pangarkar, N., & Prabhudesai, R. (2024). *Using Porter's five forces analysis to drive strategy*. *Global Business and Organizational Excellence*, 43(2), 24–34.
- Peretz-Andersson, E., Tabares, S., Mikalef, P., & Parida, V. (2024). *Artificial intelligence implementation in manufacturing SMEs: A resource orchestration approach*. *International Journal of Information Management*, 77, 102781.
- Perifanis, V., & Kitsios, F. (2023). *Trustworthy AI in HRM: Ethical challenges and organizational implications*. (Working paper). University of Macedonia.
- Reim, W., Åström, J., & Eriksson, O. (2020). *Implementation of artificial intelligence (AI): A roadmap for business model innovation*. *AI*, 1(2), 180–191.
- Sathyanarayana, H., & Harsha, H. (2025). *Navigating the future of work: The impact of artificial intelligence on jobs, skills, and workforce dynamics*. *International Journal of Business and Management Invention*, 14(1), 67–79.
- Sjödin, D., Parida, V., & Kohtamäki, M. (2023). *Artificial intelligence enabling circular business model innovation in digital servitization: Conceptualizing dynamic capabilities, AI capacities, business models and effects*. *Technological Forecasting and Social Change*, 197, 122903.
- Stone, D. L., Lukaszewski, K. M., & Johnson, R. D. (2024). *Will artificial intelligence radically change human resource management processes?* *Organizational Dynamics*, 53(4), 101034.
- Torraco, R. J. (2016). *Writing integrative literature reviews: Using the past and present to explore the future*. *Human Resource Development Review*, 15(4), 404–428.
- Tranfield, D., Denyer, D., & Smart, P. (2003). *Towards a methodology for developing evidence-informed management knowledge by means of systematic review*. *British Journal of Management*, 14(3), 207–222.
- Wang, L., Chen, T., Wang, X., & Cheng, M. (2025). *The impact of artificial intelligence on corporate strategic decision-making: Convergence or differentiation?* In *Proceedings of the 2025 International Conference on Digital Economy and Intelligent Computing* (pp. 187–191). ACM.
- Zhang, Y., Xiong, F., Xie, Y., Fan, X., & Gu, H. (2020). *The impact of artificial intelligence and blockchain on the accounting profession*. *IEEE Access*, 8, 110461–110477.
- Zhylynska, O. I., & Gitko, I. V. (2025). *Key tools for assessing and managing enterprise competitiveness based on benchmarking*. *Business Inform*, 2, 463–468.

UNDERSTANDING THE INFLUENCE OF USER-GENERATED CONTENT ON SUSTAINABLE FASHION CONSUMPTION

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ABSTRACT

Previous research has examined the influence of user-generated content (UGC) on consumer attitudes and behaviours; however, little attention has been paid to its role in promoting sustainable consumption within the fashion industry. This study addresses this gap by exploring how UGC shapes consumers' awareness, evaluation, and adoption of sustainable fashion practices. Drawing on social influence theory and sustainability literature, the paper examines the mechanisms through which UGC affects ethical decision making and perceptions of sustainability. The findings suggest that UGC can encourage sustainable consumption by enhancing information transparency, peer credibility, and consumer engagement. Nevertheless, the study highlights the need for further research.

Keywords: User-Generated Content (UGC), sustainable consumption, fashion industry, social influence theory.

INTRODUCTION

The development of Web 2.0 technologies and the widespread adoption of social media platforms have fundamentally reshaped how value is created, shared, and interpreted in digital environments. These developments have enabled consumers to move beyond passive information consumption towards active participation in content creation through user-generated content (UGC). Such participation has altered traditional producer–consumer boundaries and facilitated new forms of value co-creation within online communities (Chen et al., 2018). Through UGC, individuals share experiences, opinions, and evaluations that influence collective sense-making processes and shape how information circulates within digital networks (Ransbotham et al., 2012).

UGC manifests in multiple formats, including textual reviews, images, videos, and social media interactions; these formats reflect diverse motivations, levels of engagement, and social contexts (Naeem & Ozuem, 2022). Prior research highlights that UGC is not only a communication mechanism but also a social process embedded within networks, where influence unfolds across multiple stages and intensifies through relational ties (De Bruyn & Lilien, 2008; Haenlein, 2013). Within online brand communities, user engagement through UGC strengthens social interaction, enhances perceived authenticity, and contributes to collective meaning construction around brands and products (Ibrahim et al., 2017; Lim & Schumann, 2019). From a managerial perspective, UGC provides firms with access to unsolicited consumer insights that can inform positioning strategies and reveal latent preferences, which are not always captured through firm-generated content (Moon & Kamakura, 2017).

The growing prominence of UGC has important implications for sustainability, particularly in the fashion industry where consumption decisions are increasingly shaped by social visibility and peer influence. UGC enables consumers to publicly evaluate brands' ethical practices, sustainability claims, and production processes, thereby increasing transparency and accountability within the marketplace (Naeem & Ozuem, 2022). Research suggests that experience sharing within digital communities can foster normative pressures that encourage more responsible consumption behaviours, especially when sustainability narratives are embedded within peer-to-peer interactions (Chen et al., 2018). At the same time, the credibility and value of UGC are contingent on network structures, participant roles, and perceived authenticity, which can either amplify or weaken its influence on sustainable decision making (Ransbotham et al., 2012; Cuomo et al., 2020).

Despite its potential to promote sustainability, UGC also presents challenges related to information reliability, performative self-presentation, and the strategic manipulation of sustainability narratives (Lim & Schumann, 2019). Understanding how UGC simultaneously enables empowerment and reproduces consumption norms is therefore critical. Against this backdrop, the present study seeks to address the following research questions:

1. In what ways does UGC facilitate or hinder sustainable consumption in the fashion industry?
2. To what extent does UGC influence sustainable consumption and consumer purchase intentions in the fashion industry?

Extant research suggests that UGC plays an influential role in shaping consumer behaviour and has the potential to support the adoption of sustainable practices across industries, particularly within the fashion sector (Cuomo et al., 2020; Naeem & Ozuem, 2022). As consumers increasingly demand transparency and ethical production, UGC provides a platform through which individuals share experiences, articulate sustainability-related concerns, and influence the evaluations and choices of others (García-Torres et al., 2017). For brands, engagement with UGC offers insights into evolving consumer expectations while simultaneously increasing exposure to normative and reputational pressures to align with sustainability-oriented values (McNeill & Moore, 2015). However, the extent to which UGC translates into sustainable consumption outcomes depends on factors such as perceived authenticity, credibility, and consumers' willingness to act upon peer-shared information (Kim & Johnson, 2016). These dynamics underscore the need for further research to examine how UGC may both enable and constrain sustainable practices within the fashion industry.

LITERATURE REVIEW

The significance of UGC in shaping customer perceptions and influencing decision making is evident across various industries. Research suggests that UGC has a profound impact on consumer trust and credibility, particularly when compared to traditional marketing content (Daugherty et al., 2008). Other studies recognized UGC for its ability to enhance brand engagement and consumer participation, which in turn affect purchase decisions (Ozuem et al., 2023a). In the tourism and hospitality sectors, for example, customer reviews and online ratings significantly influence consumer choices (Ozuem & Willis, 2022; Filieri et al., 2015). The use of UGC in e-commerce platforms has been found to directly affect product sales and customer satisfaction. Social media platforms, in particular, serve as a powerful channel for UGC; they amplify its influence on brand perception and purchase behaviours. Kaplan and Haenlein (2010) defined UGC as “online content generated by consumers” (p. 61) and highlighted its central role in the digital landscape. This broad definition includes various forms of material created and distributed by individuals online. Research has consistently supported this conceptualization and emphasized the multifaceted nature of UGC, which encompasses written content such as online reviews and social media comments, visual media such as images and videos, and interactive formats like user-generated games and polls (Berthon et al., 2008).

The Organisation for Economic Co-operation and Development (OECD, 2007) defined UGC as content that is created outside of professional routines, made publicly accessible on the internet, and exhibits a degree of creative contribution. This definition underscores that UGC comprises both content developed via technology-driven platforms and collaborative efforts among users with the intention of sharing it with a broader audience. The distinction between professional content creation and the spontaneous, individual contributions typical of UGC highlights the authenticity and personalized characteristics of this form of media, which can increase its influence on consumer behaviours (Wang et al., 2019; Munar & Jacobsen, 2014; Ozuem et al., 2023b).

It is also essential to recognize that platforms often provide their own interpretations of UGC in their terms of service. For example, YouTube (2023) defines UGC as content developed and uploaded by individual users on its platform. This more limited definition emphasizes the specific conditions and ownership related to the platform. Research has highlighted the importance of platform-specific definitions, as they influence the processes of content creation, dissemination, and consumption within distinct online environments (Chen et al., 2018). Hence, precise definitions of UGC depend on the particular context, research objectives, and marketing strategies under consideration.

Dimensions of UGC and their Influence on Consumer Behaviour

Previous scholarly work has explored multiple dimensions of UGC and their effects on consumers' purchase intentions, particularly in the realm of social commerce. These dimensions – authenticity, informativeness, social influence, and engagement – offer critical insights into how UGC influences consumer behaviours (Smith et al., 2012; Naeem & Ozuem, 2021; Hajli, 2014). Each of these dimensions will be discussed in turn.

Authenticity

Authenticity is a crucial aspect of UGC, as it relates to the perceived truthfulness and reliability of the content. Authentic UGC refers to content that is impartial, unaltered, and not driven by commercial interests. Consumers are more likely to trust and engage with UGC when they perceive it as transparent and reflective of the genuine experiences and opinions of other users. As a result, authentic UGC has a significant influence on consumer confidence and participation (Karjaluoto et al., 2016).

In a world dominated by sponsored content and marketing communications, authentic UGC stands out as a symbol of transparency and trust. Consumers value it for offering unfiltered perspectives and firsthand accounts; authentic UGC enhances the trust and connection between content creators and consumers (Kolar & Zabkar, 2010; Audrezet et al., 2020). Authenticity, therefore, plays a vital role not only in consumer preferences but also in maintaining the integrity of online communities and platforms. Genuine UGC fosters a trustworthy environment where users feel free to express their experiences without fear of manipulation (Wang et al., 2019).

However, achieving authenticity in UGC poses challenges, especially in an era marked by misinformation and content manipulation. Content creators and platform managers must balance promoting authenticity while safeguarding against misuse. Effective strategies, such as robust verification processes and transparent moderation, can create an environment where genuine UGC thrives (Zhou et al., 2023; García-Torres et al., 2017).

Informativeness

Informativeness, in the context of UGC, refers to the degree to which content provides consumers with valuable and relevant information. Informative UGC helps consumers make well-informed decisions by offering insights into product specifications, performance, and practical usage. Such content typically includes detailed explanations, reviews, and personal experiences that allow consumers to assess the benefits and potential drawbacks of products or services (Moore et al., 2021; Park et al., 2007).

Informativeness enhances consumer confidence by presenting content that is seen as credible and trustworthy (Zhou et al., 2023). Consumers are more likely to engage with UGC that offers meaningful information that can positively influence their attitudes and purchasing decisions (Cheung & Thadani, 2012). Moreover, the broader impact of informative UGC extends to improving the quality of online interactions and fostering knowledge-sharing communities. Content creators who prioritize accuracy and relevance contribute to a digital environment that encourages informed decision making (Smith et al., 2012).

Social Influence

UGC exerts a strong social influence by shaping users' attitudes and behaviours through peer-to-peer interactions. This dimension underscores the impact of engagement metrics, such as likes, shares, and comments, which serve as indicators of popularity and social validation. When UGC receives significant interaction, it signals social approval and boosts its persuasive power. Consumers often view content that garners widespread engagement as more credible and trustworthy, as it reflects the collective endorsement of their peers.

UGC's social influence extends beyond mere popularity metrics. It plays a critical role in shaping social norms and identities within online communities (Ozuem et al., 2021). Social proof – the phenomenon where individuals rely on the behaviours of others as cues for their own decision making – drives much of UGC's influence (Wang et al., 2012). Brands can leverage the social dynamics of UGC to enhance consumer perceptions and drive desired outcomes, such as increased purchase intentions and brand loyalty (Chen et al., 2018).

Engagement

Engagement is a vital element of UGC, which encompasses the level of interaction and participation that consumers demonstrate with this content. Engagement goes beyond passive consumption; it involves active behaviours such as commenting, sharing, and creating new content in response to existing UGC (Hollebeek et al., 2014). This engagement fosters a sense of co-creation and community; it encourages users to become more involved with both the content and the brand or product associated with it (Naeem & Ozuem, 2021).

Higher levels of engagement can have a positive effect on consumer behaviours, including purchase intentions and brand loyalty (Yoo et al., 2021). When consumers actively engage with UGC, they establish deeper connections with the brand, which enhances visibility and the potential for virality (Ozuem et al., 2021). Engagement, therefore, serves as a key metric for assessing the effectiveness of UGC and its influence on consumer perceptions and actions. Brands can use engagement strategically to build stronger relationships with their audiences and stimulate more active participation.

Social Influence Theory and UGC

Social influence theory, as originally proposed by Kelman (1958), posits that individuals' attitudes and behaviours are profoundly shaped by the social groups to which they belong. This theory emphasizes the role of social norms and peer influence in decision-making processes and identifies three distinct mechanisms through which social influence operates: compliance, identification, and internalization. Compliance occurs when individuals conform to the expectations of others to gain approval or avoid disapproval. Identification happens when individuals adopt behaviours or attitudes to establish or maintain a meaningful relationship with a person or group. Internalization, the deepest form of influence, takes place when individuals accept influence because the behaviours or attitude aligns with their own value system (Kelman, 1958).

In the digital age, UGC, defined as content created by ordinary consumers rather than professional marketers, serves as a powerful form of social influence. UGC derives its influence from the credibility and relatability of peers, as opposed to the authority of brands. By sharing personal experiences, opinions, and recommendations, consumers become influencers and impact the perceptions and behaviours of others. This dynamic aligns with the concept of social proof, a psychological phenomenon where individuals rely on the actions and opinions of others, particularly in uncertain situations, to guide their own behaviour (Cialdini, 2009).

Within the fashion industry, UGC frequently functions as a form of social proof by offering potential customers insights into the experiences and opinions of their peers. When individuals observe that others have purchased and enjoyed a fashion item, they are more likely to view the product as desirable and of high quality. This process, known as social validation, reflects a form of social influence where the approval of others leads individuals to adopt what they perceive as socially accepted behaviours or trends (Burnkrant & Cousineau, 1975). In essence, social validation serves as a catalyst for conformity within consumer behaviour, particularly in industries, such as fashion, that are heavily influenced by social norms and trends.

METHODOLOGY

This paper adopts a conceptual research design grounded in a critical review and synthesis of existing literature. Relevant studies on UGC, consumer behaviour, and sustainable consumption in the fashion industry were identified through a structured review of leading academic journals and databases (e.g., Cheung & Thadani, 2012; Kozinets et al., 2010; McNeill & Moore, 2015). Rather than generating primary empirical data, the study integrates and compares established theoretical perspectives from social influence theory and sustainability research to develop a conceptual understanding of how UGC shapes sustainable consumption (Ajzen, 1991; Berger, 2014; White et al., 2019). The literature was analysed thematically to identify recurring constructs (Ozuem et al., 2025), relationships, and theoretical gaps, which informed the development of the paper's conceptual arguments and theoretical insights.

DISCUSSION

Fashion, as an industry, is particularly susceptible to social influence due to its inherent ties to appearance, identity, and social acceptance. Consumers often consider the fashion choices of their peers when making purchasing decisions. When UGC features real people styling and wearing a brand's products, it offers potential customers authentic, relatable endorsements, which can increase trust in the brand and enhance the likelihood of purchase (Childers & Rao, 1992). The authenticity and peer relatability of UGC often carry more weight than traditional marketing tactics, thus making it a key driver of consumer behaviour.

Research supports the idea that when a popular fashion influencer or peer shares an outfit on social media, it can prompt others to purchase the same items to achieve similar social approval or to feel included in a trend. This reflects Kelman's (1958) identification process, in which individuals adopt behaviours or attitudes to associate themselves with a person or group. Similarly, if multiple members of a peer group showcase positive experiences with a particular fashion brand, then it can lead to compliance, where individuals purchase the product to align with group expectations, even if they are not fully convinced of the product's value (Kelman, 1958; Bearden et al., 1989; Ozuem et al., 2023c).

Moreover, UGC also facilitates the internalization process in the fashion industry. For instance, when consumers repeatedly encounter UGC that resonates with their personal values, such as sustainable or ethical fashion, they may internalize these values, which results in long-lasting changes in their attitudes and purchasing behaviours. This demonstrates the profound and pervasive influence of UGC, particularly when it aligns with a consumer's core values and beliefs (Kelman, 1958; Vermeir & Verbeke, 2006). UGC thus acts not only as a medium for peer influence but also as a vehicle for deeper, value-driven behavioural change.

MANAGERIAL IMPLICATIONS AND LIMITATIONS

UGC has become a significant factor in shaping consumer purchase intentions in the fashion industry. As digital platforms dominate consumer interactions, UGC provides an authentic alternative to traditional advertising, which is often perceived as biased or curated (Daugherty et al., 2008). The authenticity of UGC comes from real customers sharing their experiences and opinions; UGC offers relatable, genuine insights that can strongly influence purchasing decisions (Chae, 2020). Unlike traditional advertisements, UGC is seen as trustworthy because it is unsolicited and honest. The power of UGC lies in its ability to build trust and credibility. When consumers see real people, particularly peers or influencers, using and endorsing products, they are more likely to trust the brand and make a purchase (Smith et al., 2012). Fashion brands can harness this by encouraging UGC through social media challenges, where customers showcase how they style the brand's products. This not only promotes creativity but also increases community engagement and enhances the perceived value of products (Kim & Johnson, 2016). Contests and branded hashtags further amplify UGC by offering incentives and organizing content for easy discovery. Active engagement from brands, such as responding to and sharing user content, helps build stronger relationships, makes customers feel valued, and encourages more participation (Audrezet et al., 2020). UGC campaigns that align with consumer values, such as sustainability or diversity, can deepen engagement and positively impact purchase intentions (Tuten & Solomon, 2017). UGC is a vital component of modern marketing strategies for fashion brands. By fostering environments that promote UGC through challenges, contests, and engagement, brands can build trust, enhance relationships, and drive sales in a competitive market.

Although this discussion highlights the relevance of UGC in shaping purchase intentions, it is important to acknowledge the limitations inherent in a conceptual paper. As the arguments advanced are grounded in the synthesis of existing literature rather than primary empirical data, the conclusions remain theoretical and may not fully capture the complexity of consumer behaviour across different contexts or platforms. The absence of empirical validation limits the ability to assess causal relationships or the relative strength of UGC effects on purchase intentions. Consequently, future research would benefit from empirical investigation to test, refine, and contextualize the conceptual insights proposed in this study.

REFERENCES

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Audrezet, A., de Kerviler, G., & Moulard, J. G. (2020). Authenticity under threat: When social media influencers need to go beyond self-presentation. *Journal of Business Research*, 117, 557–569.
- Azemi Y, Ozuem W (2026), "Paid search advertising across stages of the customer shopping journey: a shopping goal theory perspective". *Information Technology & People*, Vol. 39 No. 8 pp. 32–49, doi: <https://doi.org/10.1108/ITP-03-2023-0223>
- Bearden, W. O., Netemeyer, R. G., & Teel, J. E. (1989). Measurement of consumer susceptibility to interpersonal influence. *Journal of Consumer Research*, 15(4), 473–481.
- Berger, J. (2014). Word of mouth and interpersonal communication: A review and directions for future research. *Journal of Consumer Psychology*, 24(4), 586–607. <https://doi.org/10.1016/j.jcps.2014.05.002>
- Berthon, P. R., Pitt, L. F., & Campbell, C. (2008). Ad lib: When customers create the ad. *California Management Review*, 50(4), 6–30.
- Burnkrant, R. E., & Cousineau, A. (1975). Informational and normative social influence in buyer behavior. *Journal of Consumer Research*, 2(3), 206–215. <https://doi.org/10.1086/208633>
- Chae, J. (2020). The role of UGC in consumer decision-making: Insights from social media engagement. *Journal of Consumer Research*, 46(4), 633–654.
- Chen, T., Drennan, J., Andrews, L., & Hollebeek, L.D. (2018). User experience sharing: understanding customer initiation of value co-creation in online communities. *European Journal of Marketing*, 52(5/6), 1154–1184.
- Cheung, C. M. K., & Thadani, D. R. (2012). The impact of electronic word-of-mouth communication: A literature analysis and integrative model. *Decision Support Systems*, 54(1), 461–470. <https://doi.org/10.1016/j.dss.2012.06.008>
- Childers, T. L., & Rao, A. R. (1992). The influence of familial and peer-based reference groups on consumer decisions. *Journal of Consumer Research*, 19(2), 198–211.
- Cialdini, R. B. (2009). *Influence: Science and practice* (5th ed.). Harlow: Pearson Education.
- Cuomo, M. T., Tortora, D., Giordano, A., Festa, G., Metallo, G., & Martinelli, E. (2020). User-generated content in the era of digital well-being: A netnographic analysis in a healthcare marketing context. *Psychology & Marketing*, 37(4), 578–587.
- Daugherty, T., Eastin, M. S., & Bright, L. (2008). Exploring consumer motivations for creating user-generated content. *Journal of Interactive Advertising*, 8(2), 16–25.
- De Bruyn, A., & Lilien, G. L. (2008). A multi-stage model of word-of-mouth influence through viral marketing. *International Journal of Research in Marketing*, 25(3), 151–163.
- Filieri, R., Alguezaui, S., & McLeay, F. (2015). Why do travelers trust TripAdvisor? Antecedents of trust towards consumer-generated media and its influence on recommendation adoption and word of mouth. *Tourism Management*, 51, 174–185.
- García-Torres, S., Rey-García, M., & Albareda-Vivo, L. (2017). Effective disclosure in the fast-fashion industry: From sustainability reporting to action. *Sustainability*, 9(12), 2256.
- Haenlein, M. (2013). Social interactions in customer churn decisions: the impact of relationship directionality. *International Journal of Research in Marketing*, 30(3), 236–248.

- Hajli, M. N. (2014). A study of the impact of social media on consumers. *International Journal of Market Research*, 56(3), 387–404.
- Hollebeek, L. D., Glynn, M. S., & Brodie, R. J. (2014). Consumer brand engagement in social media: Conceptualization, scale development, and validation. *Journal of Interactive Marketing*, 28(2), 149–165.
- Ibrahim, N., Wang, X., & Bourne, H. (2017). Exploring the effect of user engagement in online brand communities: evidence from Twitter. *Computers in Human Behavior*, 72, 321–338.
- Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of social media. *Business Horizons*, 53(1), 59–68.
- Karjaluoto, H., Munnukka, J., & Kiuru, K. (2016). Brand love and positive word of mouth: The moderating effects of experience and price. *Journal of Product & Brand Management*, 25(6), 527–537.
- Kelman, H. C. (1958). Compliance, identification, and internalization three processes of attitude change. *Journal of Conflict Resolution*, 2(1), 51–60.
- Kim, A., & Johnson, K. K. P. (2016). Power of consumers using social media: Examining the influences of brand-related UGC on brand attitudes and purchase intentions. *Fashion and Textile Studies*, 3(1), 1–12.
- Kolar, T., & Zabkar, V. (2010). A consumer-based model of authenticity: An oxymoron or the foundation of cultural heritage marketing? *Tourism Management*, 31(5), 652–664.
- Kozinets, R. V., de Valck, K., Wojnicki, A. C., & Wilner, S. J. S. (2010). Networked narratives: Understanding word-of-mouth marketing in online communities. *Journal of Marketing*, 74(2), 71–89. <https://doi.org/10.1509/jmkg.74.2.71>
- Lim, H., & Schumann, D. W. (2019). Employing a dramaturgical lens to the interpretation of brand online social networking: evidence of augmented self. *Qualitative Market Research*, 22(3), 278–300.
- McNeill, L., & Moore, R. (2015). Sustainable fashion consumption and the fast fashion conundrum: Fashionable consumers and attitudes to sustainability in clothing choice. *International Journal of Consumer Studies*, 39(3), 212–222. <https://doi.org/10.1111/ijcs.12169>
- Moon, S., & Kamakura, W. A. (2017). A picture is worth a thousand words: translating product reviews into a product positioning map. *International Journal of Research in Marketing*, 34(1), 265–285.
- Moore, K., Hopkins, D., & Raymond, B. (2021). Consumer trust in informative UGC: A pathway to increased purchase intent. *Journal of Consumer Marketing*, 38(4), 453–472.
- Munar, A. M., & Jacobsen, J. K. S. (2014). Motivations for sharing tourism experiences through social media. *Tourism Management*, 43, 46–54.
- Naeem, M., & Ozuem, W. (2021). Exploring the role of UGC in consumer engagement and behavior: A social commerce perspective. *Journal of Consumer Behavior*, 20(3), 383–397. <https://doi.org/10.1002/cb.1881>
- Naeem, M., & Ozuem, W. (2022). Understanding the different types of UGC participants and social context for fashion brands: insights from social media platforms
- OECD. (2007). *Participative web and user-created content: Web 2.0, wikis, and social networking*. OECD Publishing.
- Ozuem, W., & Willis, M. (2022). *Digital marketing strategies for value co-creation : models and approaches for online brand communities*. Cham: Palgrave Macmillan
- Ozuem, W., Willis, M., Ranfagni, S., Howell, K., & Rovai, S. (2023a). Dynamics of user-generated content and service failure recovery: evidence from millennials. *Qualitative Market Research: An International Journal*, 26(5), 600–631.
- Ozuem, W., Willis, M., Howell, K., Ranfagni, S. & Rovai, S. (2023b). Examining user-generated content, service failure recovery and customer–brand relationships: an exploration through commitment-trust theory. *Internet Research*, 34(3), 784–809.

- Ozuem, W., Willis, M., Ranfagni, S., Howell, K., & Rovai, S. (2023c). Examining the role of social media influencers in service failure and recovery strategies: an empirical investigation of millennials' views. *Information Technology & People*, 37(5), 2035–2068. <https://doi.org/10.1108/itp-05-2022-0371>
- Ozuem, W., Willis, M., Ranfagni, S., & Omeish, F. (2025). Thematic Analysis in an Artificial Intelligence-Driven Context: A Stage-by-Stage Process. *International Journal of Qualitative Methods*,
- Park, C., Lee, T. M., & Han, I. (2007). The effect of on-line consumer reviews on consumer purchasing intention: The moderating role of involvement. *International Journal of Electronic Commerce*, 11(4), 125–148.
- Ransbotham, S., Kane, G. C., & Lurie, N. H. (2012). Network characteristics and the value of collaborative user-generated content. *Marketing Science*, 31(3), 387–405.
- Smith, A. N., Fischer, E., & Yongjian, C. (2012). How does brand-related user-generated content differ across YouTube, Facebook, and Twitter? *Journal of Interactive Marketing*, 26(2), 102–113. <https://doi.org/10.1016/j.intmar.2012.01.002>
- Tuten, T. L., & Solomon, M. R. (2017). *Social Media Marketing*. SAGE Publications.
- Vermeir, I., & Verbeke, W. (2006). Sustainable food consumption: Exploring the consumer attitude–behavioral intention gap. *Journal of Agricultural and Environmental Ethics*, 19(2), 169–194.
- Wang, X., Li, Y., & Wei, Y. (2019). How user-generated content creates customer trust in social commerce: The role of social presence and cognitive trust. *Journal of Electronic Commerce Research*, 20(1), 56–73.
- Wang, X., Yu, C., & Wei, Y. (2012). Social media peer communication and impacts on purchase intentions: A consumer socialization framework. *Journal of Interactive Marketing*, 26(4), 198–208.
- White, K., Habib, R., & Hardisty, D. J. (2019). How to shift consumer behaviors to be more sustainable: A literature review and guiding framework. *Journal of Marketing*, 83(3), 22–49. <https://doi.org/10.1177/0022242919825649>
- Yoo, K. H., Sanders, K., & Moon, Y. (2021). Enhancing brand trust through social media UGC and engagement metrics. *Journal of Business Research*, 131, 153–165.
- YouTube. (2023). *Terms of service*. <https://www.youtube.com/terms>
- Zhou, X., Lu, J., & Wu, J. (2023). How authenticity in user-generated content drives consumer trust: Insights from social media marketing. *Journal of Business Research*, 158(1), 234–244.

RECONFIGURING DIAMOND BENEFICIATION IN POST APARTHEID SOUTH AFRICA

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ABSTRACT

Despite South Africa's progressive post-apartheid policy framework aimed at promoting diamond beneficiation and transformation, the industry remains characterised by limited downstream value addition and weak inclusion of historically disadvantaged South Africans. This study explores how strategic alliances can be leveraged to advance and transform South Africa's diamond beneficiation sector. Adopting an interpretivist paradigm, the research employed a qualitative methodology based on semi-structured interviews with twelve key industry stakeholders, including producers, beneficiators, and regulators. Thematic analysis revealed that fragmented governance, declining access to rough diamonds, limited financing, and high labour and operational costs have undermined beneficiation sustainability. Findings indicate that cost-based mass beneficiation is structurally unviable, necessitating a strategic shift toward alliance-driven coordination, selective high-value beneficiation, branding, and provenance-based market positioning. Participants emphasised that strategic alliances are not supplementary but foundational mechanisms for aligning state policy, industry capabilities, and financial support. The study concludes that without structured, collaborative alliance frameworks – potentially extending to regional integration within SADC – diamond beneficiation in South Africa will continue to decline. Strategic alliances thus offer a pragmatic pathway to revitalise beneficiation, deepen transformation, and reposition South Africa within global diamond value chains.

Keywords: strategic alliances, global value chains, resource-based industries, emerging market economies.

INTRODUCTION AND BACKGROUND

Since the discovery of diamonds in South Africa (SA) in 1867, the diamond industry was central in shaping the country's political economy (McKechnie, 2019). The industry developed as an extractive system dominated by colonial and apartheid-era institutions prioritising the export of rough diamonds at the expense of local downstream value addition (Moumakwa, 2014). SA has always been a top diamond-producer, but it has been absent in high-value activities such as cutting, polishing, jewelry manufacturing, and branding (Motsei, 2021).

Following the advent of democracy in 1994, the SA government sought to reverse these structural distortions through legislative and policy interventions aimed at beneficiation and transformation (Kgoale, 2019). These included the Mineral & Petroleum Resources Development Act (28 of 2002) and the Diamonds Amendment Act (29 of 2005), which sought equitable access to diamond resources, promotion of local beneficiation, and meaningful participation of Historically Disadvantaged South Africans (HDSAs) in the diamond industry (Moumakwa, 2014).

Despite these interventions, SA still exports most of its diamonds in rough form, while domestic cutting and polishing has declined. Structural constraints, such as access to finance, high costs, declining diamond extraction and regulatory rigidity, have weakened the competitiveness of local beneficiators (Motsei, 2021), making inclusivity symbolic, rather than a transformative act. Increasingly, there is a sentiment that legislation alone cannot address entrenched value-chain irregularities. Collaborative institutional mechanisms are required to align stakeholder incentives, mobilise resources, and foster coordinated decision-making in the diamond industry. Strategic alliances can advance beneficiation and transformation in the SA diamond industry (Isheloke & von Blottnitz, 2023).

RATIONALE AND RESEARCH PROBLEM

Although SA possesses a progressive policy framework supporting beneficiation and transformation, there is limited evidence that these objectives have translated into sustainable industrial outcomes. Local diamond beneficiaries, particularly HDSA-owned enterprises, cannot compete with international players, especially those operating in low-cost centers such as India. Therefore, the problem statement this research addresses is:

There is no coordinated strategic alliance framework in the SA diamond industry capable of advancing and transforming beneficiation. Fragmented policy implementation, weak public-private partnerships, less access to rough diamonds, and financial barriers have undermined beneficiation objectives.

This lack of alignment between government, diamond producers, beneficiaries, and financiers has constrained the industry's ability to adapt to global competitive pressures.

From the problem statement presented above, the primary objective of this study is:

To explore how strategic alliances can be leveraged to advance and transform the post-apartheid SA diamond beneficiation industry.

The study endeavors to investigate whether strategic alliances can function as an enabling institutional arrangement to align stakeholder incentives, mobilise resources, and enhance the competitiveness of local beneficiaries. By focusing on strategic alliances in post-apartheid South Africa, the study seeks to contribute to both academic and policy debates on how collaborative governance and inter-organisational cooperation can advance beneficiation and promote the meaningful inclusion of HDSAs in high-value segments of the diamond industry.

LITERATURE REVIEW

Whilst mineral beneficiation is viewed as important for industrialisation and transformation in a resource-based economy, SA's diamond sector has seemingly failed to realise these benefits due to historical legacies, high costs, and weak institutional coordination. This literature review argues that alliance-driven, selective, branded and collaboratively governed beneficiation the only viable route to sustainable upgrading.

Mineral Beneficiation and Development in Resource-Based Economies

Mineral beneficiation is widely regarded as a strategic mechanism for promoting industrialisation, economic diversification, and inclusive growth within resource-dependent economies (Moumakwa, 2014). Beneficiation involves adding value to raw minerals through downstream processing activities such as manufacturing, trading, and branding before export. The theoretical appeal of beneficiation lies in its potential to strengthen forward and backward linkages, expand employment, and enhance domestic value capture (Awolusi, Mbonigaba & Tipoy, 2018).

Despite its developmental promise, beneficiation outcomes across developing economies have been uneven. Studies indicate that beneficiation initiatives are often constrained by institutional capacity, financing, skills shortages, and weak integration into global markets (Nzenzema, 2016; Denhere, 2021). In diamond-producing countries, these challenges are amplified by the capital-intensive and technologically sophisticated nature of diamond processing, and the oligopolistic structure of global diamond value chains (Olsson, 2006).

Historical Foundations of the South African Diamond Industry

The SA diamond industry is embedded in its colonial and apartheid past. After discovering diamonds in Kimberley in 1867, the industry entrenched racial exclusion by limiting technical skill acquisition and ownership opportunities to Whites (Easton & Gwaindepi, 2021). De Beers Consolidated expanded rapidly, creating a vertically integrated, monopolistic industry prioritising rough diamond exports and offshore beneficiation (McKechnie, 2019).

Legislation such as the Mines & Works Act of 1911 institutionalised racial discrimination and prevented meaningful participation by indigenous populations in skilled mining and processing activities (Sithole, 2024). Although SA became a leading producer of rough diamonds, beneficiation activities such as cutting, polishing, and jewellery manufacturing developed primarily in non-diamond producing countries (Richman, 2008).

Post-Apartheid Reform and Beneficiation Policy

Following democratic transition in 1994, the SA government sought to address these distortions through reforms aimed at transformation and beneficiation. This included the Mineral and Petroleum Resources Development Act (28 of 2002) and the Diamonds Amendment Act (29 of 2005), which sought access to mineral resources, promotion of local beneficiation, and HDSA participation (Moumakwa, 2014; Kgoale, 2019).

The establishment of the SA Diamond and Precious Metals Regulator and the State Diamond Trader sought to guarantee a fair and regular supply of rough diamonds for local beneficiators (Dept of Mineral Resources, 2011; Motsei, 2021). Yet, these reforms have not resulted in the intended transformation. Regulatory hurdles, limited incentives, and weak government/industry coordination undermine local competitiveness (Sithole, 2024; Goga & Mondliwa, 2021), resulting in marginal beneficiation as SA remains an exporter of rough diamonds.

Strategic Alliance Theory and Collaborative Governance

Strategic alliances are cooperative agreements between autonomous organisations, sharing resources, knowledge, and risks to achieve mutual objectives (O'Dwyer & Gilmore, 2017). Such arrangements are particularly valuable in resource-constrained environments, where individual firms lack the capabilities required to compete independently (Aggarwal & Kapoor, 2018).

In terms of governance, strategic alliances enable coordination across public and private actors, aligning policy objectives with market realities (Saurombe & Ngulube, 2018). In extractive industries, alliances can facilitate risk-sharing, technology transfer, and market access, which are essential for beneficiation (Bieri, 2016). Yet, alliance effectiveness depends on trust, power, and institutional embeddedness, and poorly structured alliances could fail to produce intended outcomes (Wohlsetter, Smith & Mallory, 2005).

Strategic Alliances in the Global Diamond Industry

The global diamond industry offers multiple examples of alliance-driven industrial upgrading. Botswana's 50:50 joint venture with De Beers (Debswana) is often cited as a benchmark case, enabling Botswana to secure institutional capacity and downstream beneficiation activities (Maennling & Toledano, 2018; World Bank, 2014). Namibia's partnership with Namdeb and the Namibia Diamond Trading Company shows how alliances can support partial beneficiation and domestic value retention (Ndjaba, 2025).

By contrast, SA's beneficiation efforts lack such alliances. International alliances are commonplace in SA's mining sector, but post-apartheid governance has struggled to replace exclusionary yet coordinated systems with inclusive, developmental arrangements (Moumakwa, 2014; Sithole, 2024). This has weakened beneficiation outcomes and limited the impact of transformation efforts.

Cost Structures, Labour Dynamics, and Competitive Constraints

It would seem as though global cost differentials exist in diamond manufacturing. India's dominance in diamond cutting and polishing is attributed to low labour costs and economies of scale (Dash, 2023). SA's high labour costs, regulatory compliance requirements, and energy expenses significantly reduce competitiveness in mass diamond processing (Mbayi, 2016; Denhere, 2021). Replicating India's cost-based beneficiation model in SA will be economically unsustainable (Mbayi, 2016), and therefore, a strategic shift has occurred toward selective beneficiation, niche production, and value-based upgrading rather than volume-driven processing.

Branding, Provenance, and Value-Chain Upgrading

It also appears as though branding, provenance, and ethical certification are leveraged to create value in global diamond value chains (Bieri, 2016). Consumer awareness regarding ethical sourcing, and sustainability has strengthened demand for diamonds of verifiable origin (Shah, 2025). Countries who have successfully branded their diamonds (eg. Canada) utilize such narratives for premium pricing of their diamonds and to strengthen downstream participation in diamond

value chains (Dash, 2023). For SA, these can be viable strategies to overcome cost disadvantages and to sustain beneficiation (Motsei, 2021; Sithole, 2024).

RESEARCH METHODOLOGY

This study employed an Interpretivist research paradigm to explore how strategic alliances can be leveraged to advance and transform the SA diamond beneficiation industry. Interpretivism is premised on the assumption that social reality is constructed through human interactions, experiences, and meanings, making it particularly appropriate for examining complex institutional arrangements and stakeholder perceptions (Creswell, 2014; Muzari, Shava & Shonhiwa, 2022). In line with an Interpretive paradigm, qualitative methods were employed, allowing for insights to emerge from participants' lived experiences.

The study population comprised key stakeholders in the SA diamond beneficiation industry, such as government regulators, diamond producers, and diamond beneficiaries. These groups were selected due to their central roles in policymaking, production, and downstream value addition in the industry. Purposive sampling was utilized in this study, as it allowed for the selection of suitable participants with extensive experience and direct involvement in diamond beneficiation and strategic alliances (Saunders, Lewis & Thornhill, 2019). The final sample consisted of 12 participants, which is considered sufficient to achieve thematic saturation in qualitative research where participants share a common knowledge domain (Creswell, 2014; Saunders, et al, 2019).

Data were collected through semi-structured interviews, conducted via MS Teams. Semi-structured interviews were selected for their flexibility and ability to facilitate in-depth exploration of participant perspectives while maintaining alignment with the research objectives (Kallio, Pietilä, Johnson & Kangasniemi, 2016). This enabled probing of issues related to strategic alliances, beneficiation constraints, and future industry trajectories. The study employed Thematic Analysis as the primary data analysis method. This method was deemed appropriate due to its systematic yet flexible capacity to identify and analyse meaningful patterns in qualitative data (Kiger & Varpio, 2020; Patton, 2015). Data analysis followed six iterative stages: (1) familiarisation with the data, (2) initial coding, (3) theme development, (4) theme review, (5) theme naming, and (6) report generation.

Trustworthiness was ensured through credibility, transferability, dependability, and confirmability (Ahmed & Ishtiaq, 2021). Credibility was enhanced through prolonged engagement with the data, triangulation with existing literature, and careful transcription review. Dependability and confirmability were supported through detailed documentation of methodological decisions and analytic processes. Ethical clearance for the study was obtained from the University of Johannesburg Department of Business Management Research Ethics Committee. All participants provided informed consent, were assured of confidentiality and anonymity through the use of pseudonyms, and were informed of their right to withdraw from the study at any stage without consequence (Saunders et al., 2019).

FINDINGS

This section presents the empirical findings forthcoming from the interviews conducted with key stakeholders in the South African diamond beneficiation industry. Participants' experience in the diamond industry ranged from five to 20 years. Interviews lasted between 60 – 75 minutes and were recorded after informed consent was obtained. Coding was conducted manually to maintain engagement with the data and to ensure contextual sensitivity.

Five themes emerged from the analysed data, which will now be expounded upon in turn. In the interest of brevity, evidence from interviews to corroborate claims presented are kept to a minimum, but more evidence is available from the authors upon request.

Theme 1: Strategic Alliances as Enablers of Transformation and Beneficiation

A strong and consistent finding was that strategic alliances were regarded as indispensable for the advancement and transformation of the SA diamond beneficiation industry. Participants emphasised that beneficiation cannot succeed in isolation. Participants also criticised the lack of coordination between government and industry, arguing that post-apartheid regulatory reforms weakened previously existing collaborative mechanisms. Several respondents

contrasted the current environment with the pre-2005 regulatory picture, which they perceived as more aligned with industry realities.

The following are excerpts from interviews to confirm these findings:

<i>"The sooner we establish that strategic partnerships are important because we are dependent on one another...the conversation changes. Producers, what are your challenges? Manufacturers, what are your challenges? We need diamond businesses now that are actually growing." (Beneficiator 7)</i>
<i>"The Diamond Amendment Act regulated the inverse of the old 80/20 rule. We ended up circulating non-economic diamonds locally while the viable ones went outside. There was no strategic alliance with producers to manage that properly." (Beneficiator 9)</i>

These findings are supported by literature, which emphasises that industrial upgrading in resource sectors requires coordinated institutional arrangements rather than fragmented policy enforcement (Wohlstetter, et al, 2005).

Theme 2: Sustainability of the Industry.

Several participants expressed pessimism regarding the long-term future of the local diamond beneficiation industry, thereby flagging the sustainability of the industry as a major concern. Decreasing rough diamond production levels, limited diamond exploration, and inadequate access to finance were viewed as pertinent threats. Access to finance was consistently identified as a major structural barrier, particularly for HDSA-owned businesses. Participants argued that without state-facilitated funding mechanisms, transformation objectives remain unattainable.

These findings are supported by the following selections from the interviews conducted:

<i>"Most of our diamond mines are in their decline phase. We're not discovering new mines. In a way our industry is towards the end. Banks don't finance the diamond industry anymore. That should tell you that transformation cannot work without government stepping in." (Beneficiator 1)</i>
<i>"There's an exploration fund announced by government, but diamonds are not even included. That tells you how serious the commitment really is." (Beneficiator 7)</i>

This aligns with prior research, where beneficiation initiatives fail as organisations' capital structures are not aligned with policy objectives (Nzenzema, 2016; Denhere, 2021).

Theme 3: Labour and Factory Cost Constraints in South Africa

Research participants were all of the opinion that South Africa could not compete globally in the mass diamond cutting and polishing space. This was, according to research participants, due to excessively high labour and operational costs. Several respondents provided stark cost comparisons between South Africa and India. Participants did not dispute South Africa's technical ability to process diamonds but pointed out that cost-based competition was unrealistic under existing labour and regulatory frameworks.

The quotes below support the findings presented above:

<i>"Polishers here charge around \$120 a carat. In India it's maybe \$10 or \$20. With those numbers, a factory cannot survive here." (Beneficiator 12)</i>
<i>"It's not that we can't polish diamonds here. We can. But the bulk of goods are simply not economical to manufacture in South Africa." (Beneficiator 4)</i>

This supports literature which cautions against replicating low-cost beneficiation models in high-cost economies and instead advocates for selective upgrading strategies (Mbayi, 2016).

Theme 4: Branding and Market Positioning as Survival Strategies

In response to cost constraints and declining production, participants promoted branding and niche positioning as viable alternatives to mass beneficiation. Many participants saw potential advantages in leveraging provenance, reputation, and ethical sourcing narratives to differentiate polished diamonds. Respondents reflected on countries such as Canada, Russia and Botswana, who have successfully branded their diamonds.

Below are extracts from the interviews in support of these findings:

<i>"If we brand South African diamonds properly, we still have a competitive advantage. It won't be mass beneficiation, but high-value niche branding."</i> (Beneficiator 1)
<i>"Botswana has just launched a national diamond brand. Canada has one. Even Russia does. But South Africa does not."</i> (Beneficiator 8)

Participants highlighted the need for government coordination, particularly through departments such as the DTIC and Brand SA, to support market access and brand development. These findings reflect global value-chain research linking branding to downstream upgrading (Bieri, 2016).

Theme 5: Future Regional Integration and Structural Reconfiguration

Several participants speculated as to the future trajectory of the industry. Participants opined that South Africa must move beyond a purely national focus and adopt a regional alliance strategy, positioning itself as a SADC diamond trading and beneficiation hub. Participants also opined about skills development without employment absorption.

The interview excerpts below support the findings presented above:

<i>"Imagine if South Africa focused on being a trading hub for the region. Goods would come closer to the source, and beneficiation would follow naturally."</i> (Beneficiator 4)
<i>"There are a lot of training programmes, but after training... then what? People are not absorbed."</i> (Beneficiator 12)

These findings suggest that future beneficiation strategies must integrate regional cooperation, skills absorption, and alliance-based industrial planning, consistent with literature on regional beneficiation (Isheloke & von Blottnitz, 2023).

Summary of Findings

Across all themes, participants consistently emphasised that strategic alliances present mechanisms through which beneficiation and transformation can be realised. Without coordinated government engagement, financing structures, and alliance-driven market access, the South African diamond beneficiation industry risks continued decline.

CONCLUSIONS FORTHCOMING FROM THE STUDY

This study wanted to explore how strategic alliances could be leveraged to advance and transform the South African diamond beneficiation industry. From the findings, it is evident that despite progressive legislative intentions, the beneficiation and transformation agenda has not achieved its outcomes. A gap exists between policy and operational realities, exacerbated by weak coordination, structural constraints, and the absence of an alliance framework.

It appears that strategic alliances are not merely supportive instruments, but constitute foundational mechanisms through which beneficiation and transformation can be realised. Fragmentation across government departments, producers, beneficiators, and financiers has undermined sustainability of the industry. Thus, beneficiation cannot be seen as a standalone policy objective, but rather as a collective outcome which needs coordinated decision-making, shared risk, and aligned incentives across the value chain.

The study also concludes that sustainability challenges threaten the long-term viability of the diamond beneficiation industry. Declining diamond production, limited exploration, and limited access to finance have weakened the industry's competitive position. Although inclusion of HDSA's has improved, the lack of enabling financial resources still restricts meaningful participation. Transformation is thus symbolic and not substantive.

It is also evident that structural limitations of cost-based beneficiation is problematic. High labour and compliance costs make large-scale diamond cutting and polishing uncompetitive. Attempting to replicate low-cost models in these areas should be avoided in favour of beneficiation strategies focusing on high-value stones, niche production, and specialised craftsmanship.

The findings also suggest that branding and market repositioning are viable pathways for sustaining beneficiation under conditions of structural constraint. By leveraging provenance, ethical sourcing, and national identity, South Africa could capture intangible value which does not rely on volume-based manufacturing. However, such strategies rely on coordinated institutional support and alliance-driven market access.

The findings seem to suggest that the future of South African diamond beneficiation must be reconceptualised beyond national boundaries, and should embrace regional integration within SADC. Positioning South Africa as a regional trading, aggregation, and beneficiation hub offers opportunities for scale, supply stability, and market relevance. The advancement and transformation of South African diamond beneficiation depends on a renewed commitment in strategic collaboration, institutional coherence, and adaptive policy design. Without structured alliances integrating government leadership, industry capability, financial support and regional cooperation, the sector risks continued global decline and marginalisation. However, if effectively utilised, strategic alliances offer a pragmatic, sustainable pathway for revitalising beneficiation, advancing transformation, and repositioning South Africa as a relevant player in the global diamond industry.

RECOMMENDATIONS AND MANAGERIAL IMPLICATIONS

The findings suggest a necessity to reorientate diamond beneficiation policy and managerial practice towards structured, alliance-driven collaboration rather than fragmented, compliance-driven interventions. At a policy level, the SA government should assume a more facilitating and coordinating role by initiating strategic alliances between producers, beneficiators, financiers, and relevant state departments. This could include the creation of a dedicated beneficiation funding mechanism under the Department of Trade, Industry and Competition, designed to support HDSA-owned enterprises. Without such mechanisms, transformation will be inclusive but economically shallow.

From an industry perspective, beneficiation strategies should move away from cost-based competition and prioritise high-value, niche beneficiation, selective polishing, and luxury jewellery manufacturing, where South Africa's skills base can be leveraged. Firms should be repositioned within the global value chain by focusing on smaller volumes, higher margins, and differentiated products. Collective action among beneficiators, such as pooled procurement, shared infrastructure, and joint marketing offer more practical means of mitigating scale constraints. Private companies and state agencies should pursue the development of a national or regional diamond brand, emphasising provenance, ethical sourcing, and craftsmanship. This could enhance price premiums, attract ethically conscious consumers, and improve access to global niche markets.

LIMITATIONS AND AVENUES FOR FUTURE RESEARCH

This study is subject to some limitations which should be acknowledged when interpreting its findings. Although the methodological approach employed in this study was appropriate for generating in-depth, context-specific insights, it limits the generalisability of findings beyond the study setting. The study might not fully represent the views of smaller firms, emerging entrants, financial institutions, or international buyers who also shape beneficiation outcomes. As with all qualitative studies relying on interview data, the findings are also shaped by participants' subjectivities and retrospective interpretations of policy and industry developments.

This presents several opportunities for future research. Future studies could adopt a mixed-methods design, combining qualitative interviews with quantitative analysis of production, employment, export, and financial data to enhance analytical robustness and triangulation. Comparative studies across SADC countries such as Botswana, Namibia, and Angola could shed light on how different types of alliance influence beneficiation outcomes. Longitudinal research examining the evolution of strategic alliances could also be considered, as such longitudinal data could provide insights into alliance durability, power relations, and adaptive capacity.

CONCLUDING REMARKS

South Africa's diamond beneficiation challenge is not a failure of vision but a failure of coordination. Strategic alliances offer pragmatic and necessary opportunities to overcome structural constraints, revive beneficiation, and position South Africa in global diamond value chains. Without such alliances, transformation remains aspirational rather than real.

REFERENCES

- Aggarwal, V. & Kapoor, M. (2018). Innovation growth from knowledge transfer in international strategic alliances, *Journal of Strategy and Management*, 11(4), 483–496.
- Ahmed, I. & Ishtiaq, S. (2021). Reliability and validity: Importance in medical research, *Methods*, 12, 2401–2406.
- Awolusi, O., Mbonigaba, J. & Tipoy, C. (2018). Mineral resources endowment and economic growth in Southern African countries, *International Journal of Diplomacy and Economy*, 4, 59-79.
- Bieri, F. (2016). *From blood diamonds to the Kimberley Process: How NGOs cleaned up the global diamond industry*. London: Routledge.
- Creswell, J.W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks: Sage.
- Dash, S. (2023). India–Botswana: Understanding the partnership of the diamond sector, *Indian Journal of African Studies*, 25(2), 71–88.
- Denhere, R. (2021). *Evaluation of beneficiation constraints for identified critical minerals in Zimbabwe*. Master's dissertation. Johannesburg: University of the Witwatersrand.
- Dept of Mineral Resources (2011) *Beneficiation strategy for the minerals industry of South Africa*. Pretoria: Dept of Mineral Resources.
- Easton, A. & Gwaindepi, A. (2021). Colonial extractivism and development: The state and private diamond extraction at the British Cape Colony, 1870–1910, *The Extractive Industries and Society*, 8(3), 100945.
- Goga, S. & Mondliwa, P. (2021). Structural transformation, economic power and inequality in South Africa, in A. Andreoni, P Modliwa, S Roberts & F Tregenna (Eds.) *Structural Transformation in South Africa: The Challenges of Inclusive Industrial Development in a Middle-Income Country*. New York: Oxford University Press, pp. 165–188.
- Isheloke, B. & von Blottnitz, H. (2023). Regional mineral beneficiation policy interventions in the SADC: Stakeholder perspectives, *International Journal of Mass Communication*, 1, 27–37.
- Kallio, H., Pietilä, A.M., Johnson, M. & Kangasniemi, M. (2016) Systematic methodological review: Developing a framework for a qualitative semi-structured interview guide, *Journal of Advanced Nursing*, 72(12), 2954–2965.
- Kgoale, T. (2019). *Transformative mineral resources beneficiation legislation: An impetus for socio-economic transformation and poverty alleviation in South Africa*. Doctoral thesis. Turfloop: University of Limpopo.
- Kiger, M.E. & Varpio, L. (2020). Thematic analysis of qualitative data, *Medical Teacher*, 42(8), 846–854.
- Maennling, N. & Toledano, P. (2018). *Botswana: Downstream linkages*. New York: Columbia Center on Sustainable Investment.
- Mbayi, L. (2016). Technological innovation and export diversification through diamond-processing capabilities in Botswana, In A. Gutowski, T. Knedlik, P.N. Osakwe, I. Ramdoo & K. Wohlmuth (Eds.) *African Development Perspectives Yearbook 2015/16*, Lit Verlag: Vienna, pp. 299–322.
- McKechnie, W.F. (2019). Diamond exploration and mining in Southern Africa: Past, current and future trends, *Journal of the Southern African Institute of Mining and Metallurgy*, 119(2), 123–131.
- Motsei, M. (2021). Mining beneficiation and industrial policy in South Africa, *Resources Policy*, 72, 102080.

- Moumakwa, O. (2014). *An overview of South Africa's diamond industry*. Pretoria: Dept of Mineral Resources.
- Muzari, T., Shava, G. & Shonhiwa, S. (2022). Qualitative research paradigm: A key research design for educational researchers, *Indiana Journal of Humanities and Social Sciences*, 3, 1–9.
- Ndjaba, S. (2025). Developing the diamond cutting and polishing industry in Namibia, *Namibia Journal of Managerial Sciences*, 6, 23–30.
- Nzenzema, N. (2016). *An investigation into the efficacy of diamond beneficiation as a fiscal resource mobilisation strategy: The case of Zimbabwe*. Master's dissertation. Harare: University of Zimbabwe.
- Olsson, O. (2006). Diamonds are a rebel's best friend, *The World Economy*, 29(8), 1133–1150.
- O'Dwyer, M. & Gilmore, A. (2017). Value and alliance capability and the formation of strategic alliances in SMEs, *Journal of Business Research*, 72, 58–68.
- Patton, M.Q. (2015). *Qualitative research and evaluation methods*. Thousand Oaks: Sage.
- Richman, B. (2008) Ethnic networks, extralegal certainty and globalisation: The diamond industry, *Law & Social Inquiry*, 31(3), 31–46.
- Saunders, M., Lewis, P. & Thornhill, A. (2019). *Research methods for business students*. Harlow: Pearson Education.
- Saurombe, N. & Ngulube, P. (2018). To collaborate or not to collaborate: Raising the profile of public archives in East and Southern Africa, *Information Development*, 34(2), 162–181.
- Shah, P. (2025). Lab-grown diamonds and their impact on global diamond markets, *EPH International Journal of Business & Management Science*, 8, 1–15.
- Sithole, T. (2024). The politics of extractive industry governance in post-apartheid South Africa, *African Renaissance*, 21, 165–182.
- Wohlstetter, P., Smith, J. & Malloy, C. (2005). Strategic alliances in action: Toward a theory of evolution, *Policy Studies Journal*, 33(3), 419–442.
- World Bank (2014). *Skills implications of Botswana's diamond beneficiation strategy*. Washington, DC: World Bank.

EXAMINING THE RELATIONSHIP BETWEEN ORGANISATIONAL CULTURE AND ENTREPRENEURIAL ORIENTATION IN TEXAS-BASED SMALL BUSINESSES

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ABSTRACT

Research on small businesses is crucial because they are the driving force of the US economy. In Texas, small businesses employ 4.8 million people, constituting 45.1% of the private workforce. Innovation is the primary driver of economic growth in Texas, allowing organisations to identify and seize new opportunities. Research on the relationship between entrepreneurial orientation (EO) and organisational culture in small businesses remains relatively limited. The lack of knowledge makes it difficult for small business leaders to understand how their businesses can gain advantages from specific organisational cultures and strategic orientation. Therefore, through this study, the researcher examined the relationship between organisational culture and EO in Texas-based small businesses. The investigation aims to enhance our understanding of the link between organisational culture and EO in small businesses. This research offers new insights into the study of organisational culture within small businesses. This study used a qualitative research method to investigate how organisational culture is related to EO in small businesses based in Texas. Only the adhocracy culture was found to predict at least one of the subsets of EO on its own. The market and clan culture types were significant, but only when combined with the adhocracy culture. The hierarchy culture was excluded from the analysis due to high multicollinearity, meaning it was too highly correlated with the other independent variables in the sample. Although the premises associated with the different cultures' predictions of EO were insignificant, there were significant results when the cultures were combined.

Keywords: organisational culture, entrepreneurial orientation, small businesses, innovativeness, proactiveness, risk-taking.

INTRODUCTION AND BACKGROUND OF THE STUDY

The ability to innovate significantly impacts the progress of small firms in terms of their competitiveness (Sullivan, Fox, Stoll, & Jacobs, 2021). Small business owners often operate with limited staff and lack flexible resources and hierarchical administrative systems compared to large business leaders, impacting their ability to create and manage innovations (Williams & Aaron, 2018). For instance, larger firms can establish dedicated departments, business lines, or network systems to explore and exploit new ideas (Kotter, 2014). Small businesses must use their resources wisely and employ creative problem-solving approaches (Sullivan et al., 2021). Research on small businesses is crucial because they are the driving force of the US economy, representing 49% of the US workforce and 97% of US exporters (U.S. Small Business Administration, 2019). In Texas, small businesses employ 4.8 million people, constituting 45.1% of the private workforce (U.S. Small Business Administration Office of Advocacy, 2020). Innovation is the primary catalyst of economic growth in Texas (Casselberry, 2021), allowing organizations to identify and seize new opportunities (Cruz & Morales, 2017). Lastly, the area of EO in small businesses is relatively underexplored in terms of organizational culture (Silva & Di Serio, 2021).

The US economy relies heavily on the success of its 30,000,000 small businesses, as they create two out of every three new private-sector jobs and employ nearly half of the nation's workforce (Sullivan et al., 2021; U.S. Small Business Administration, 2019). The strategies that small businesses implement are crucial for their success (Taneja, Pryor, & Hayek, 2016). All organizations need to innovate to address rapid technological changes and meet customer

demands for new or improved products and services (Dino, 2015); however, small businesses must innovate to survive (McGuirk, Lenihan, & Hart, 2015; Taneja et al., 2016). Innovation refers to an idea, practice, or object perceived as new by an individual and can be expressed in terms of knowledge, persuasion, or a decision to adopt (Rogers, 2003). All organizations face increasing global and economic pressures, so leaders must adopt entrepreneurial and innovative strategies to remain competitive (Ahmetoglu, Akhtar, Tsivrikos, 2018). Research shows that organizations with a high degree of EO perform better in terms of innovation output (Khedhaouria, Nakara, Gharbi, & Bahri, 2020). EO can be fostered or hindered by leaders and does not automatically exist in an organization (Brettel, Chomik, & Flatten, 2015). Therefore, leaders aiming to develop their organization's EO must learn how to create a culture of innovation and understand the key drivers in creating such a culture (Khedhaouria et al., 2020).

STATEMENT OF THE PROBLEM

All organizations need to innovate to address rapid technology changes as customers demand new or improved products and services (Dino, 2015; Saad & Mazzarol, 2014); however, small businesses must innovate to survive (McGuirk et al., 2015). Innovation does not become feasible unless executive-level leaders commit to creating a context within which innovation can occur. The first step is discovering where the innovation blockage occurs, which often lies within the structure, strategic orientation, systems, or culture of the organization (Bennett & Parks, 2015; Khedhaouria et al., 2020). Small businesses represent the largest sector of American economic growth and 45.1% of all Texas employees (U.S. Small Business Administration Office of Advocacy, 2021). The lack of knowledge makes it difficult for small business leaders to understand how small businesses can gain advantages from specific organizational cultures and strategic orientations (Khedhaouria et al., 2020). Therefore, through this study, the researcher sought to examine the relationship between organizational culture and EO in Texas-based small businesses.

OBJECTIVES OF THE STUDY

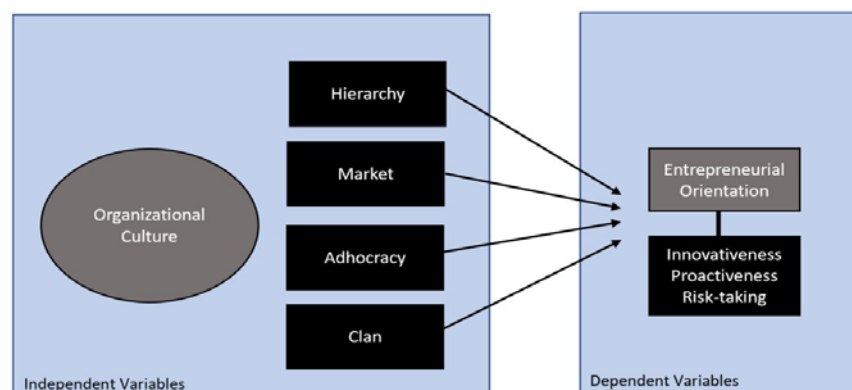
The following theoretical objectives were formulated:

- To explore the literature on organizational culture.
- To review the literature on EO.
- To carry out a literature review on Texas-based small businesses.
- To review research on organizational culture and EO in small businesses.

CONCEPTUAL FRAMEWORK

The conceptual framework for organizational culture and EO is illustrated in the figure below.

Figure 1: Conceptual framework for organizational culture.



Source: Wiener, 2023.

The conceptual framework for organizational culture and EO addressed the following independent variables:

P1: Hierarchical culture positively impacts EO in Texas-based small businesses.

P2: Market culture positively impacts EO in Texas-based small businesses.

P3: Adhocracy culture positively impacts EO in Texas-based small businesses.

P4: Clan culture positively impacts EO in Texas-based small businesses.

Definitions of Independent and Dependent Variables used in Figure 1

Organizational culture is the shared beliefs, assumptions, values, collective wisdom, and artefacts unique to an organization (Schein & Schein, 2017). According to Cameron and Quinn (2011), the following four types of organizational culture can influence organizational goals: Clan culture encompasses teamwork, collaboration, talent management, employee empowerment, and interpersonal relationships. Market culture is the dominant operational theory for market culture, which focuses on competitiveness, rapid market responses, decisiveness, overcoming barriers, and achieving goals. Hierarchy culture refers to the dominant operational theory for hierarchy culture, which focuses on stability, assessment and measurement, the control of processes, structuring, the improvement of efficiency, and quality enhancement. Adhocracy is the dominant operational theory for adhocracy culture, which promotes entrepreneurship, innovation, creativity, future-directedness, and transformation. EO encompasses the processes, practices, and strategic decision-making executed at the corporate level and leading to new market entry (Renko, Tarabishy, Carsrud, & Brännback, 2015). Miller (1983) indicates that the three dimensions characterizing EO are innovativeness, proactiveness, and risk-taking. Innovativeness is a forward-looking perspective reflecting the tendency of an organization to support employees' new and creative ideas, resulting in new products, services, or internal processes (Brettel et al., 2015; Su & Zhang, 2020). Proactiveness is another forward-looking perspective that allows employees and organizations to anticipate future problems. Proactive organizations aim to bring products and services to the market ahead of their competition (Brettel et al., 2015). Risk-taking is the propensity of organizations to make risky resource commitments in uncertain environments and with uncertain outcomes (Brettel et al., 2015).

LITERATURE REVIEW

Corporate Entrepreneurship, Entrepreneurial Orientation, Organizational Culture, and Innovation

The global economy has placed many challenges on organizations, and the need to innovate is imperative for some firms' survival, particularly small businesses (Cefis & Marsili, 2005; McGuirk, Lenihan & Hart, 2015). An organization's culture has the potential to influence the firm's decision-making practices, managerial philosophies, and employees' strategic behaviors and innovativeness (Ahmetoglu, Akhtar, Tsvirikos, & Chamorro-Premuzic, 2018; Hornsby et al., 2013).

Corporate entrepreneurship has become increasingly necessary for organizations to create a distinctive and sustainable competitive advantage (Ahmetoglu et al. 2018). As such, Ahmetoglu et al. (2018) studied the relationship between entrepreneurial culture and employees' innovation output. Specifically, Ahmetoglu et al. (2018) explored the relationship between employees' innovation output and work engagement through training, employees' perceptions of an entrepreneurial culture, leadership style, employee values, team behavior, and employee personality traits. Using four hierarchical multiple regression tests, Ahmetoglu et al. (2018) found coaching and training programs could promote entrepreneurial behaviour and the hiring of individuals who possess higher levels of entrepreneurial talent, which could increase innovation output. Finally, Ahmetoglu et al. (2018) found that fostering an entrepreneurial culture resulted in higher employee engagement, which increased innovation output (Ahmetoglu et al., 2018). Although the study conducted by Ahmetoglu et al. (2018) successfully examined the relationship between organizational culture and innovation output, their participants were not specifically from small businesses. The majority of participants (68%) worked in lower-level positions at various organisations (Ahmetoglu et al., 2018). One could apply Ahmetoglu et al.'s findings to small business culture; however, more research is needed to explore the relationship between organizational culture and innovation output in small businesses (Kuratko et al., 2015).

Organizational culture is comprised of the collectively accepted meanings, shared beliefs, and values of individuals within an organization at any given time (Pettigrew, 1979). According to Schein (1995), culture encompasses a multitude of hidden assumptions, ways of doing things, interpersonal dynamics, and organizational identity (Darling, 2017). Schein and Schein (2017) also offer a more formal definition, describing organizational culture as the accumulated shared learning of a group as it resolves external and internal challenges. Furthermore, Schein (1995) uses Kurt Lewin's change theory to explore the different levels at which organizational culture can be studied. According to Schein and Schein (2017), organizational culture is reflected at various levels, including artefacts, espoused beliefs and values, and basic underlying assumptions. Artefacts refer to visible objects and behaviors within the organization, including its products and services (Schein & Schein, 2017). Espoused beliefs and values encompass the ideals and social standards considered important by members of the culture. Basic underlying assumptions are the unspoken beliefs about reality held by members of the culture. These assumptions are deeply ingrained and challenging to change (Schein & Schein, 2017).

EO is the process where leaders develop an organizational strategy based on entrepreneurial decisions. It encompasses processes, practices, and executive-level decision-making that could lead to entering new markets (Renko et al., 2015). Miller (1983) originally defined EO as the way an organization engages in product-market innovation, undertakes somewhat risky ventures, and is the first to come up with proactive innovations, beating competitors to the punch. The three dimensions characterizing EO are innovativeness, proactiveness, and risk-taking (Miller, 1983). Innovativeness reflects the organization's support for employees' new and creative ideas, resulting in new products, services, or internal processes (Brettel et al., 2015; Su & Zhang, 2020). Proactiveness allows employees and organizations to anticipate future problems and aims to bring products and services to the market ahead of their competition (Brettel et al., 2015). Risk-taking refers to the propensity of organizations to make risky resource commitments in uncertain environments and with uncertain outcomes (Brettel et al., 2015). Covin and Lumpkin (2011) noted EO as more than a singular act or activity; rather, it is an overall strategic posture.

The roots of EO trace back to the works of Mintzberg (1973) and Khandwalla (1977). Mintzberg (1973) and Khandwalla (1977) conceptualized EO as a managerial disposition rooted in decision-making. Mintzberg (1973) theorised about strategic decision-making modes and conceived that strategy-making in the entrepreneurial mode was the active search for opportunities in uncertain environments through which an organization could realize dramatic growth. In similar pioneering work, Khandwalla (1977) advanced the concept of an entrepreneurial managerial decision-making style as the "operating set of beliefs and norms about management held by the organization's key decision makers ... [that] when translated into action, constitute the organization's strategy for survival and growth". Then, Miller and Friesen (1982) built on Mintzberg's and Khandwalla's work and posited the innovative strategy of a firm as often determined by its executives based on their goals and temperaments. In recent scholarly literature, many EO researchers credit Miller (1983) with introducing the idea of EO, although he did not use the phrase "entrepreneurial orientation" in his writing (Anderson et al., 2015; Covin & Lumpkin, 2011; Covin & Wales, 2012; Wales, 2016). The study conducted by Miller (1983) provided foundational clarity regarding how one distinguishes entrepreneurial firms from more conservatively managed firms. Despite Miller's theoretical contributions, it was not until Covin and Slevin (1989) that empirical research on firm-level entrepreneurship began (Wales et al., 2013). With insight from Miller (1983), Covin and Slevin (1989) developed a nine-item, self-rated scale that has subsequently become popular in entrepreneurship research and was the instrument used for this research.

Lumpkin and Dess (1996) noted that what it means to be entrepreneurial, or which dimensions of EO are likely to influence new market entry, largely depends on the organizational and environmental context of a firm. New market entry is central to the idea of entrepreneurship, and EO describes how one undertakes new entry (Lumpkin & Dess, 1996). Lumpkin and Dess (1996) posited that EO not only consists of innovativeness, proactiveness, and risk-taking, but also autonomy, a tendency to be aggressive toward competitors, and a tendency to be proactive relative to marketplace opportunities. The concept of EO introduced by Lumpkin & Dess (1996) is more domain-focused and specifies where to look for EO in the organization. Scholars have generally agreed that certain qualities must be present for EO to exist in an organization. At a minimum, acts of innovation must exist for an organization to be considered entrepreneurial (Covin & Wales, 2019).

The EO construct shares similarities with entrepreneurial leadership (Renko, El Tarabishy, Carsrud, & Brännback, 2015). EO is a firm-level construct sometimes used synonymously with corporate entrepreneurship; however, entrepreneurial leadership is what employees experience from their supervisors (Renko et al., 2015). Entrepreneurial leadership is a distinctive leadership style leaders can employ in an organization of any type, size, or

age (Renko et al., 2015). Entrepreneurial leadership differs from other styles of leadership because it encourages leaders to focus on entrepreneurial goals, such as opportunity recognition and the proactive exploitation of said opportunities (Renko et al., 2015). As Renko et al. (2015) stated, entrepreneurial leadership “involves influencing and directing the performance of group members toward achieving those organizational goals that involve recognizing and exploiting entrepreneurial opportunities”. Renko et al. (2015) asserted that employees at every level of the organization need to embrace entrepreneurial behaviors and attitudes to seize new opportunities and allow the organization to remain viable.

Specific actions entrepreneurial leaders can take to encourage entrepreneurial behaviors and attitudes are diluting decision-making power, encouraging initiative and creativity, providing employees with the discretion to adapt to new challenges quickly, and promoting narrow specialization, which generates high-quality work (Bretcu & Demyen, 2018). Similar to the leadership styles discussed above, the notion of entrepreneurial leadership relates to the idea that organizational culture can positively affect employee innovation (Renko et al., 2015). Renko et al. (2015) stated, “even if individual supervisors in an organization exhibit entrepreneurial leadership, a lack of top management support for entrepreneurial initiatives may prevent employees from pursuing entrepreneurial opportunities”. A review of the leadership and innovation literature shows considerable evidence that participative, ambidextrous, transformational, and entrepreneurial leadership have strong positive correlations with innovativeness, proactiveness, and risk-taking among employees (Odoardi, Battistelli, Montani & Peiro, 2019; O’Reilly & Binns, 2019). However, scholars have noted the relationship between organizational culture and entrepreneurial behavior remains underexplored (Brettel et al., 2015; Kuratko et al., 2015). High-quality and individualized relationships between leaders and followers form a good basis for innovation. Still, a broader focus on an organizational culture fostering innovation may effectively promote EO (Khedhaouria, Nakara, Gharbi, & Bahri, 2020). Executive leaders must understand what type of organizational culture they can create to nurture innovation and creativity among their employees. If implemented strategically and nurtured well, certain organizational cultures can help stimulate employees’ creativity and innovation and improve their job performance (Azaña Martínez de Luco, Moriano León, & Molero Alonso, 2013).

Texas-based Small Businesses

A small business in Texas is defined as one that meets the following criteria: (a) it has a legal entity based in the State of Texas or where at least 51% of its employees are in Texas; (b) it is independently owned; and (c) it has fewer than 100 full-time employees (U.S. Small Business Administration, 2021). Texas is home to 3,000,000 small businesses employing 4.8 million people, representing 98.8% of all Texas businesses and 45.1% of all Texas employees (U.S. Small Business Administration Office of Advocacy, 2021). Entrepreneurs generally view Texas as an attractive place to do business because of the strong economy, relatively low government involvement and regulation, lower cost of living, and absence of state income tax (Survey of Texas Small Businesses Report, 2016). Texas is a popular place for researching small businesses as it is consistently rated as one of the top places to start and operate a small business in the United States (DiFurio, 2019; U.S. Small Business Administration Office of Advocacy, 2018). Specifically, four Texas cities ranked in the top 32 best places: Austin was ranked first, Dallas ranked 17th, San Antonio ranked 30th, and Houston ranked 32nd (Survey of Texas Small Businesses Report, 2016). Another study ranked Dallas as the fourth best place to start a small business in the United States (Egan, 2021). The ability of an entire region or state to rapidly create new ideas and transform those ideas into high-growth companies is the key determinant of regional wealth creation (Casselberry, 2021). Larger Texas-based companies such as Dell, IBM, and Toyota are contributing to the growth of new ideas by partnering with school districts and offering technical training to high school students to prepare them for the jobs those companies create (Casselberry, 2021). Smaller Texas-based companies, such as Bresatech, are working to reinvent digital transformation for larger companies like Amazon and Apple (Casselberry, 2021).

Research on Organizational Culture and Entrepreneurial Orientation in Small Businesses

Ahmetoglu et al. (2018) aimed to identify the various mechanisms through which informal and formal factors influence employees’ inclination to engage in innovation. The authors explored four hypotheses and found that the relationship between entrepreneurial culture and innovation output was fully mediated by work engagement in a sample of 438 working adults. The study included participants from the United States and the European Union, holding

various positions in their respective organizations. Naranjo-Valencia, Jiménez-Jiménez and Sanz-Valle (2016) examined the link between employees' behavior, organizational culture, and their impact on innovation and company performance. They surveyed Chief Executive Officers (CEOs) of 446 organizations in Southeast Spain and found a positive relationship between organizational culture and overall firm innovation and performance. Khedhaouria et al. (2020) used Cameron and Quinn's (2011) competing values framework to study the relationship between organizational culture and small business performance, with EO as a mediator. Their research on 106 small Tunisian businesses indicated that organizational culture in small firms was fully mediated by EO and that small businesses may enhance their financial performance within a culture oriented toward adhocracy and market. Brettel et al. (2015) investigated the role of organizational culture in determining the level of innovativeness, proactiveness, and risk-taking in small and medium enterprises (SMEs). They found that organizational cultures characterized by an external focus significantly influenced an entrepreneurial organization, and organizational leaders should promote and develop types of organizational culture focused on change and development to foster EO.

CONTRIBUTIONS OF THE STUDY

The investigation aims to enhance our understanding of the link between organisational culture and EO in small businesses. It will also offer valuable insights into research methodologies for studying this relationship.

RATIONALE OF THE STUDY

This research offers new insights into the study of organizational culture within small businesses. The findings of this study are expected to significantly contribute to the profitability and long-term survival of small businesses, particularly in turbulent business environments worldwide.

RESEARCH METHODOLOGY

This study employed a qualitative research methodology, systematically collecting and analysing non-numerical data from various sources such as articles, dissertations, the internet, theses, and textbooks. Electronic databases including Emerald, Science Direct, EBSCO-Host, Nexus, Sabinet, and Sage were utilised to gather relevant data. The collected data was reviewed to understand the relationship between organisational culture and EO in Texas-based small businesses. A within-study literature analysis was conducted to identify key themes. An in-depth examination of the data and findings was performed to gain a deeper understanding of the research and its implications.

RESULTS

Hierarchical culture (P1) was excluded from the analysis due to high multicollinearity, meaning it was too highly correlated with the other independent variables. This exclusion is consistent with Rostain (2021) and Brettel et al. (2015), who found that the hierarchy culture was not significant. Market culture (P2) aimed to determine whether it could predict EO in small businesses. The results showed that market culture alone could not predict any of the EO subscales: innovativeness, proactiveness, or risk-taking. A market culture entails the belief that the external environment is hostile, and therefore, the organization must be results-oriented, competitive, and focused on productivity (Cameron & Quinn, 2011). Leaders in a market culture are focused on achieving success through gaining market share. Although market culture and EO may seem related, they are different. EO involves taking risks, sometimes resulting in significant losses, whereas market culture emphasizes winning. EO is also characterized by proactiveness and innovation, which may manifest differently in small businesses. On the other hand, larger businesses that adopt a market culture may exhibit high-value inventions and patents reflecting their proactiveness and innovativeness (Gorman, 2022). Literature supports the idea that innovation in small businesses often occurs in the form of small process improvements (Plotnikova, Romero, & Martínez-Román, 2016). Adhocracy culture (P3) aimed to determine if an adhocratic culture could predict EO. For the small businesses in this sample, adhocracy alone had a predictive relationship with innovativeness and risk-taking, indicating significant results. Adhocracy culture strives to create innovations and swiftly adapt to new opportunities. It emphasizes risk-taking, individuality, adaptability, entrepreneurship, and transformation (Cameron & Quinn, 2011). Clan culture (P4) sought to determine if clan culture could predict EO in the sample. The results indicated that clan culture alone could not predict any of the EO subscales.

This means that clan culture did not predict EO in this sample. Clan culture is characterized by teamwork, a focus on interpersonal relationships, collaboration, and employee empowerment. It is akin to an extended family, where leaders are seen as mentors or even parental figures (Cameron & Quinn, 2011).

CONCLUSION

Interestingly, although clan and market cultures did not independently predict EO in the sample, the combination of their strength with adhocracy culture did predict EO. These findings are in line with Rostain's (2021) meta-analysis of 70 papers on the impact of organizational culture on EO, where collectively, clan, adhocracy, and market cultures predicted EO, and adhocracy alone predicted EO subscales. Similar results were found in Khedhaouria et al.'s (2020) study on the relationship between organizational culture and small firm performance, with EO serving as a mediator. The researchers surveyed members of the top management teams of 106 small Tunisian businesses and found that both adhocracy and market cultures improved financial performance (Khedhaouria et al., 2020). According to the findings of this study, none of the different types of cultures was found to independently predict proactiveness. While it was expected that the adhocracy culture would predict proactiveness, it was revealed that proactiveness is not a component of the adhocracy culture as conceptualized by Cameron and Quinn (2011). Although an adhocracy culture emphasizes individuality, innovation, risk-taking, and future anticipation, proactiveness as defined by Miller (1983) entails more than just anticipation and vision; it requires action and perseverance. Without proactiveness, innovation becomes futile. Small businesses need to prioritize proactiveness to gain a competitive advantage (Khedhaouria et al., 2020). This suggests that perhaps Cameron and Quinn's characterization of adhocracy culture was incomplete, as proactiveness is essential for effective innovation. In this study, a predictive relationship with proactiveness was found when clan, market, and adhocracy cultures were combined for statistical analysis. These findings support Cameron and Quinn's (2011) assessment of the robustness of the competing values framework. Depending on an organization's goals, leaders may need to adopt a more balanced approach to culture, emphasizing characteristics from more than one culture type. This means one can still draw positive conclusions about the relationships between organizational culture and EO.

LIMITATIONS OF THE STUDY

One significant limitation to keep in mind is that this study only looked at small businesses based in Texas.

FUTURE STUDY

The success of the U.S. economy relies heavily on its 30,000,000 small businesses. These businesses are responsible for creating two out of every three new private-sector jobs and employing nearly half of the nation's workforce (Sullivan et al., 2021; U.S. Small Business Administration, 2019). Organizational culture and EO are strategic approaches that small businesses can implement to determine their success. Therefore, future studies should involve more small businesses located in both rural and urban areas in the U.S.

ETHICS DECLARATION

Ethical clearance was not required for the research.

AI DECLARATION

AI tools were not used in this study.

REFERENCES

- Ahmetoglu, G., Akhtar, R., Tsivrikos, D. and Chamorro-Premuzic, T. (2018). Entrepreneurial organisation: the effects of organisational culture on innovation output. *Consulting Psychology Journal: Practice and Research*, 1(1).
- Anderson, B. S., Covin, J. G., & Slevin, D. P. (2009). Understanding the relationship between entrepreneurial orientation and strategic learning capability: An empirical investigation. *Strategic Entrepreneurship Journal*, 3(3).
- Azanza Martínez de Luco, G., Moriano León, J. A., & Molero Alonso, F. (2013). Authentic leadership and organizational culture as drivers of employees' job satisfaction. *Journal of Work and Organizational Psychology*, 29(2).
- Bennett, N. and Parks, J. M. (2015). Struggling to innovate? Examine your structure, systems, and culture. *Business Horizons*, 58(5).
- Bretcu, A., & Demyen, S. (2018). Total quality management and the collaborative adhocracy. *Annals of the University of Oradea, Economic Science Series*, 27(1).
- Brettel, M., Chomik, C. and Flatten, T. C. (2015). How organisational culture influences innovativeness, proactiveness, and risk-taking: fostering entrepreneurial orientation in SMEs. *Journal of Small Business Management*, 53(4).
- Cameron, K. and Quinn, R. E. (2011). *Diagnosing and changing organisational culture: Based on the competing values framework*. Wiley.
- Casselberry, C. (2021). *Will innovation transform Texas?* Texas CEO Magazine.
- Cefis, E., & Marsili, O. (2005). A matter of life and death: Innovation and firm survival. *Industrial & Corporate Change*, 14(6).
- Covin, J. G. and Lumpkin, G. T. (2011). Entrepreneurial orientation theory and research: reflections on a needed construct. *Entrepreneurship: Theory and Practice*, 35(5).
- Covin, J. G., & Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. *Strategic Management Journal*, 10(1).
- Covin, J. G., & Wales, W. J. (2012). The measurement of entrepreneurial orientation. *Entrepreneurship: Theory and Practice*, 36(4).
- Covin, J. G., & Wales, W. J. (2019). Crafting high-impact entrepreneurial orientation research: Some suggested guidelines. *Entrepreneurship: Theory and Practice*, 43(1).
- Cruz, Y. M. F. and Morales, O. L. A. (2017). Proposal of an organisational culture model for innovation. *Cuadernos de Administración*, 33(59).
- Darling, J. (2017). A conversation with Edgar Schein: aligning strategy, culture, and leadership. *People & Strategy*, 40(2).
- DiFurio, D. (2019). *Why Texas is the number one state for business startups for the second year in a row*. The Dallas Morning News.
- Dino, R. N. (2015). Crossing boundaries: Toward integrating creativity, innovation, and entrepreneurship research through practice. *Psychology of Aesthetics, Creativity, and the Arts*, 9(2).
- Egan, J. (2021). *Dallas is deemed the No. 4 County in the U.S. for small businesses, says study*. Dallas Culture Map.

- Gorman, L. (2022). Why do larger firms produce higher-value inventions? *National Bureau of Economic Research*, 11(11).
- Hornsby, J. S., Kuratko, D. F., Holt, D. T., & Wales, W. J. (2013). Assessing a measurement of organizational preparedness for corporate entrepreneurship. *Journal of Product Innovation Management*, 30(5).
- Khandwalla, P. N. (1977). Some top management styles, their context and performance. *Organization & Administrative Sciences*, 7(1).
- Khedhaouria, A., Nakara, W. A., Gharbi, S., and Bahri, C. (2020). The relationship between organisational culture and small-firm performance: entrepreneurial orientation as mediator. *European Management Review*, 17(2).
- Kotter, J. P. (2014). *Building strategic agility for a faster-moving world*. Harvard Business Review Press.
- Kuratko, D. F., Hornsby, J. S., & Hayton, J. (2015). Corporate entrepreneurship: The innovative challenge for a new global economic reality. *Small Business Economics*, 45(2).
- Lumpkin, G. T., & Dess, G. G. (2001). Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle. *Journal of Business Venturing*, 16(5).
- McGuirk, H., Lenihan, H. and Hart, M. (2015). Measuring the impact of innovative human capital on small firms' propensity to innovate. *Research Policy*, 44(4).
- Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management Science*, 29(7).
- Miller, D., & Friesen, P. H. (1982). Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. *Strategic Management Journal*, 3(1).
- Mintzberg, H. (1973). Strategy-making in three modes. *California Management Review*, 16(2).
- Nau, R. (2020). *Statistical forecasting: Notes on regression and time series analysis*. Fuqua School of Business, Duke University.
- Odoardi, C., Battistelli, A., Montani, F., & Peiro, J. (2019). Affective commitment, participative leadership, and employee innovation: A multilevel investigation. *Journal of Work and Organizational Psychology*, 35(2).
- O'Reilly, C., & Binns, A. J. M. (2019). The three stages of disruptive innovation: Idea generation, incubation, and scaling. *California Management Review*, 61(3).
- Pettigrew, A. M. (1979). On studying organisational cultures. *Administrative Science Quarterly*, 24(4).
- Plotnikova, M., Romero, I. and Martínez-Román, J. A. (2016). Process innovation in small businesses: the self-employed as entrepreneurs. *Small Business Economics*, 47(4).
- Renko, M., El Tarabishy, A., Carsrud, A. L., & Brännback, M. (2015). Understanding and measuring entrepreneurial leadership style. *Journal of Small Business Management*, 53(1).
- Rogers, E. (2003). *Diffusion of innovation* (5th ed.). Free Press.
- Rostain, M. (2021). The impact of organisational culture on entrepreneurial orientation: a meta-analysis. *Journal of Business Venturing Insights*, 15(1).
- Saad, M. S. M. and Mazzarol, T. (2014). Enhancing and sustaining organisational innovative performance through transformational leadership. *Science International*, 26(5).
- Schein, E. H. (1995). Kurt Lewin's change theory in the field and the classroom: notes toward a model of managed learning". *Systems Practice*, 9(1).

- Schein, E. H. and Schein, P. (2017). *Organisational culture and leadership* (5th ed.). Wiley.
- Silva, G. and Di Serio, L. C. (2021). Innovation in small businesses: towards an owner-centred approach to innovation. *Revista Brasileira de Gestão de Negócios*, 23(3).
- Su, F. and Zhang, J. (2020). “Proactive personality and innovative behaviour: a moderated mediation model”. *Social Behaviour & Personality: An International Journal*, 48(3).
- Sullivan, D., Fox, D., Stoll, R. and Jacobs, R. (2021). Small businesses still miss the boat on social media and Internet advertising. *Journal of Marketing Development & Competitiveness*, 15(1).
- Survey of Texas Small Businesses Report. (2016). *Survey of Texas small businesses report: Identifying the barriers to success*. Office of the Texas Governor, Office of Small Business Assistance.
- Taneja, S., Pryor, M. G. and Hayek, M. (2016). Leaping innovation barriers to small business longevity. *Journal of Business Strategy*, 37(3).
- U.S. Small Business Administration. (2019). *Annual report of the Office of Economic Research*. Small-Business-Economic-Profile, Texas.
- U.S. Small Business Administration. (2018). *Strategic plan: Fiscal years 2018–2022*. Small-Business-Economic-Profile, Texas.
- U.S. Small Business Administration Office of Advocacy. (2020). *Small business profile*. Small-Business-Economic-Profile, Texas.
- U.S. Small Business Administration Office of Advocacy. (2021). *Small business profile*. Small-Business-Economic-Profile, Texas.
- U.S. Small Business Administration. (2021). *Business trends to keep top of mind in 2022*. Small-Business-Economic-Profile, Texas.
- Wales, W. J. (2016). Entrepreneurial orientation: A review and synthesis of promising research directions. *International Small Business Journal*, 34(1).
- Wiener, J. (2023). *An examination of the relationship between organisational culture and entrepreneurial orientation in Texas-based Small Businesses*. PhD Thesis, Indiana Wesleyan University.
- Williams, R. I. and Aaron, J. R. (2018). Specialisation as a small business strategic approach. *Small Business Institute Journal*, 14(2).

THE IMPACT OF MICRO, SMALL, AND MEDIUM ENTERPRISES (MSMEs) ON CHINA'S ECONOMIC GROWTH

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ABSTRACT

Micro, Small, and Medium Enterprises (MSMEs) are fundamental drivers of China's economic transformation and modernisation, underpinning sustained growth, job creation, technological advancement, and social inclusion. This study presents a comprehensive, up-to-date analysis of the multifaceted impact of MSMEs on China's economy, drawing on recent academic scholarship, policy documents, and empirical reports published between 2018 and 2025. Employing a qualitative, thematic methodology, the research traces the evolution of China's MSME sector, exploring its contributions to gross domestic product (GDP), employment, innovation, export dynamism, and regional equity. The analysis highlights persistent challenges, including restricted access to finance, regulatory burdens, talent shortages, and market volatility, while also showcasing the sector's adaptability, especially in response to shocks such as the COVID-19 pandemic. The pandemic both exposed and intensified structural vulnerabilities, prompting the government to accelerate reforms in digitalisation, credit access, and entrepreneurship support. Multiple case studies illustrate how innovative policy instruments, digital transformation, and public-private partnerships have enabled resilience and recovery among MSMEs. The findings underscore the need for a robust enabling ecosystem that integrates regulatory streamlining, talent development, and targeted digital infrastructure to sustain the competitiveness of MSMEs. Policy recommendations advocate for holistic support agencies, innovative financing, regional development incentives, and enhanced entrepreneurship education. The manuscript concludes by identifying avenues for future research, including longitudinal and comparative studies, the integration of environmental, social, and governance (ESG) principles, and the role of informal MSMEs. The study's insights are relevant not only for China but also for other emerging economies seeking to leverage MSMEs for sustainable, inclusive growth.

Keywords: MSMEs, China, economic growth, innovation, digitalisation.

INTRODUCTION

MSMEs constitute the backbone of China's economic structure and have been pivotal in driving the nation's transformation from a largely agrarian society into the world's second-largest economy (World Bank, 2023; OECD, 2022). The sector's expansion began with the "Reform and Opening Up" policy in 1978, which not only liberalized markets and encouraged private enterprise but also provided fertile ground for the proliferation of MSMEs as a critical pillar of modernization (MIIT, 2024). MSMEs account for over 99% of all registered businesses in China, contribute more than 60% of the national GDP, and generate nearly 80% of urban employment (MIIT, 2024; UNCTAD, 2024; ILO, 2022). Their contribution to poverty alleviation, regional development, and social inclusion is particularly significant in less-developed inland and western provinces, where MSMEs act as engines of entrepreneurship, employment, and economic diversification (ILO, 2022; Zhou & Liu, 2021).

MSMEs have played a leading role in pioneering new business models, such as platform-based e-commerce, digital finance, and green technology adoption, often outpacing larger firms in agility and innovation (IFC, 2024; Zheng et al., 2021). The sector has also provided a vital pathway for the economic integration of women, youth, and migrant workers, who often find their first employment or entrepreneurial opportunity in MSMEs (ILO, 2022). Despite their central role, MSMEs face persistent and evolving challenges. Access to affordable finance is a persistent bottleneck, with a significant proportion of MSMEs unable to secure formal credit due to risk aversion among banks, insufficient collateral, and weak financial infrastructure (World Bank, 2023; IFC, 2024). Regulatory complexity,

including burdensome licensing and compliance requirements, further hampers business growth, while talent shortages and market volatility compound vulnerabilities, especially during external shocks such as the COVID-19 pandemic (UNCTAD, 2024; MIIT, 2024; Wang et al., 2023). An additional layer of complexity is introduced by China's ambition to foster "high-quality growth", which places new demands on MSMEs in terms of green innovation, export competitiveness, and digital transformation (UNCTAD, 2024; World Bank, 2023).

This manuscript offers a comprehensive, evidence-based account of the impact of MSMEs on China's economic growth. Drawing on the latest policy, empirical, and theoretical literature, it provides an integrated analysis of the sector's contributions, the challenges it faces, the policy context, and the prospects for future development.

LITERATURE REVIEW

Definitions and Classification of MSMEs in China

The classification of MSMEs in China is codified by the "Regulations on the Standards for Classification of Small and Medium-sized Enterprises" (MIIT, 2022, 2024). These standards are sector-specific and are based on quantitative metrics such as the number of employees, annual operating revenue, and total assets (MIIT, 2024). By comparison, the World Bank and the European Union use different thresholds, often based on employee numbers and turnover alone, which do not fully reflect the size and complexity of Chinese MSMEs (OECD, 2022; European Commission, 2023). This heterogeneity requires adaptive policy frameworks and nuanced research approaches, as MSMEs in China range from small family workshops to rapidly growing, export-oriented technology firms (Zhou & Liu, 2021).

Evolution and Contributions of MSMEs

Since the early 1980s, MSMEs have been central to China's leap in GDP, urbanization, and employment. By 2024, MSMEs accounted for over 60% of GDP, roughly 50% of tax revenues, and 80% of urban employment (MIIT, 2024; World Bank, 2023). The sector's role in absorbing surplus rural labor has been especially important, facilitating the migration of more than 250 million rural workers to urban areas since 1980, most finding their first jobs in MSMEs (ILO, 2022; Wang et al., 2023). Through the provision of entry-level jobs and entrepreneurial opportunities, MSMEs have helped lift millions out of poverty, particularly in central and western provinces. Between 2014 and 2021, MSMEs accounted for 70% of job creation in poverty alleviation relocation zones (UNCTAD, 2024).

MSMEs are responsible for approximately 70% of China's technological innovation and 65% of patent applications (UNCTAD, 2024). Their agility enables them to adapt rapidly to technological and market changes and to pioneer new business models, especially in digital commerce, fintech, and renewable energy (IFC, 2024; Zheng et al., 2021). The contribution of MSMEs to innovation also reflects in their role as partners in China's innovation clusters and technology parks (MIIT, 2024). MSMEs have played a pivotal role in regional development, particularly in less-developed inland provinces (ILO, 2022; Zhou & Liu, 2021). In 2023, MSMEs accounted for more than 60% of new business registrations in the western provinces, compared to 40% a decade prior (MIIT, 2024).

China's MSMEs have embraced digital transformation at a fast pace. The "Internet Plus" strategy, launched in 2015, catalyzed the integration of digital technologies into traditional industries, including manufacturing, retail, and logistics (MIIT, 2024). The COVID-19 pandemic further accelerated this trend, as MSMEs turned to e-commerce, cloud computing, and AI-driven tools to maintain operations and reach consumers (IFC, 2024). The Digital Silk Road initiative, part of the Belt and Road framework, supports MSMEs' internationalization through investments in digital infrastructure, cross-border e-commerce, and online payment systems (UNCTAD, 2024). According to Zheng et al. (2021).

MSMEs and Economic Development

A substantial body of empirical research confirms the positive correlation between MSME activity and economic growth, job creation, and poverty reduction (World Bank, 2023; OECD, 2022). MSMEs are especially effective in absorbing surplus labor, fostering entrepreneurship, and promoting regional balance. However, the magnitude of these

effects depends on the quality of the enabling environment, including access to finance, market infrastructure, and policy stability (Wang et al., 2023).

Capacity Building and Knowledge Networks

Capacity building, through training, business development services, and access to technology, is a key determinant of MSME competitiveness. Strategic alliances, industry clusters, and knowledge networks enable MSMEs to access resources, share best practices, and foster innovation (European Commission, 2023; MIIT, 2024).

Employment Generation and Social Inclusion

MSMEs are the primary engines of job creation for youth, women, and marginalized populations, thus advancing social inclusion and regional equity (ILO, 2022; Zhou & Liu, 2021). Their decentralized structure and low entry barriers make them particularly effective in integrating vulnerable groups into the formal economy.

Technology, Innovation, and Digitalisation

Adoption of digital technologies is a key enabler of MSMEs' productivity, market access, and global competitiveness (UNCTAD, 2024; IFC, 2024). Digital transformation, including the use of e-commerce platforms, cloud services, and AI, allows MSMEs to overcome scale disadvantages, reach new customers, and adapt to shifting market conditions. MSMEs that adopt digital tools are more likely to export, innovate, and survive external shocks (Zheng et al., 2021).

Persistent Challenges Facing MSMEs

Despite extensive policy efforts, access to affordable finance remains the single greatest challenge for MSMEs. Only 25% of MSMEs secure formal credit, with the annual financing gap exceeding \$2 trillion (World Bank, 2023; IFC, 2024). The rapid rise of fintech-enabled lending platforms has expanded credit access for some MSMEs but has also introduced new regulatory and risk management challenges (IFC, 2024). Costly licensing, taxation, and compliance procedures are compounded by frequent policy changes and inconsistent local implementation (OECD, 2022; Zhou & Liu, 2021). For example, in 2022, 42% of surveyed MSMEs reported delays in business registration or renewal due to unclear regulatory requirements (MIIT, 2024). Recruiting and retaining skilled labor is a major constraint, particularly for high-tech MSMEs and those in inland provinces (ILO, 2022; Li & Huang, 2022). MSMEs are more vulnerable to supply chain disruptions, demand shocks, and price fluctuations, as starkly demonstrated during the COVID-19 pandemic (UNCTAD, 2024; Wang et al., 2023). Nearly 60% of MSMEs surveyed by the MIIT in 2021 reported revenue declines of more than 20% during the height of the pandemic (MIIT, 2024).

Recent years have seen a proliferation of policy initiatives, including credit guarantee schemes, tax incentives, digitalization grants, and entrepreneurship education programs (MIIT, 2024; OECD, 2022). The effectiveness of these programs is mixed: while some regions have seen rapid MSME growth and innovation, others continue to lag due to a lack of local capacity, uneven implementation, or limited access to support services (World Bank, 2023). Recent academic and policy research has deepened understanding of MSMEs' role in China's growth. Zheng et al. (2021) found that digital adoption among MSMEs significantly improves productivity and export performance, while Wang et al. (2023) highlighted the uneven regional impacts of COVID-19 on MSME survival rates. The IFC (2024) document highlights the rapid growth of fintech-enabled lending platforms, increasing credit access while introducing new regulatory challenges. Li and Huang (2022) demonstrate the positive impact of entrepreneurship education on start-up success rates, especially in less-developed provinces. Zhou and Liu (2021) emphasize the influence of local governance and institutional environment on MSME growth.

STATEMENT OF THE PROBLEM

Despite their pivotal role, MSMEs in China face persistent, multi-dimensional barriers to growth and sustainability. Access to formal, affordable finance remains the single most significant challenge, with many MSMEs denied credit due to bank risk aversion, insufficient collateral, and weak financial literacy (World Bank, 2023; IFC, 2024).

According to the World Bank (2023), the annual MSME financing gap in China is estimated at over \$2T, with micro and start-up firms especially disadvantaged due to lack of credit history and informal status. Regulatory burdens, including complex licensing, high compliance costs, and frequent policy changes, impose significant operational risks, particularly for micro and small firms. Inconsistent regulatory implementation across provinces further undermines business confidence, leading to uncertainty in planning and investment (OECD, 2022; Zhou & Liu, 2021). A 2022 MIIT survey found that more than 35% of MSMEs spend more than 20% of their annual revenue on compliance-related activities.

Talent shortages and difficulties in recruiting and retaining skilled workers further undermine MSME competitiveness, especially in high-value sectors such as ICT, advanced manufacturing, and green technology (ILO, 2022; Li & Huang, 2022). Market volatility and external shocks, most notably the COVID-19 pandemic, have amplified these vulnerabilities, leading to business closures, job losses, and supply chain disruptions (UNCTAD, 2024; Wang et al., 2023). These challenges threaten not only the sustainability of MSMEs but also China's broader ambitions for high-quality, inclusive growth and technological self-reliance. Addressing these barriers is essential for unlocking the full potential of the MSME sector and ensuring that economic gains are broadly shared.

OBJECTIVES OF THE STUDY

This study aims to achieve the following objectives:

- To synthesize the recent academic, policy, and empirical literature on the role of MSMEs in China's economic growth, innovation, and social development.
- To analyze contemporary challenges and opportunities for MSMEs in fostering both economic and social transformation, with attention to digitalization, regional development, and green growth.
- To assess the impact of digital transformation on MSMEs' competitiveness, innovation, and resilience, especially in the context of external shocks such as the COVID-19 pandemic.
- To provide actionable, evidence-based policy recommendations for enhancing MSME growth, sustainability, and adaptability, including reforms in finance, regulation, skills, and ecosystem development.
- To identify knowledge gaps and propose future research directions in the field of MSME development, especially regarding informal enterprises, ESG, and longitudinal impacts of policy interventions.

THEORETICAL FRAMEWORK

The theoretical framework for this study integrates multiple perspectives to comprehensively analyze the determinants and impacts of MSME development in China.

RESOURCE-BASED VIEW (RBV)

The RBV posits that sustainable competitive advantage arises from the unique combinations of internal resources and capabilities, such as human capital, technology, and organizational culture, within firms (Teece, 2021). In the context of MSMEs, investing in human capital, building technological assets, and developing flexible management structures are critical for performance and resilience. Research shows that MSMEs with strong internal capabilities are better able to innovate, respond to market changes, and seize growth opportunities (Li & Huang, 2022; Zheng et al., 2021).

DYNAMIC CAPABILITIES THEORY

Dynamic capabilities theory extends the RBV by emphasizing a firm's ability to integrate, build, and reconfigure internal and external competencies in response to rapidly changing environments (Teece, 2021). For MSMEs, dynamic capabilities, such as agility, learning, and innovation, are especially important in navigating technological disruption, market volatility, and policy shifts. Firms that develop these capabilities are more likely to survive and thrive in China's fast-evolving economic landscape (Zheng et al., 2021).

INSTITUTIONAL THEORY

Institutional theory highlights the role of regulatory, cultural, and normative structures in shaping firm behavior and performance (OECD, 2022; UNCTAD, 2024). In China, strong government intervention, formal institutions, local governance, and informal business networks all profoundly influence MSMEs' opportunities and constraints (Zhou & Liu, 2021).

INTEGRATION OF THEORIES

These theoretical perspectives are complementary. RBV and dynamic capabilities explain firm-level heterogeneity and performance, while institutional theory situates MSME development within the broader policy and social context. The interplay between internal capabilities and institutional support determines MSME outcomes in terms of growth, resilience, and social impact.

METHODOLOGY

This study employs a qualitative, systematic literature review methodology, synthesizing recent peer-reviewed journal articles, policy reports, and empirical studies published between 2018 and 2025. This approach enables a comprehensive, up-to-date understanding of the evolving landscape and the multiple determinants of MSME performance in China.

DATA SOURCES

The review draws on a wide range of sources, including:

- Academic databases: Scopus, Web of Science, ScienceDirect.
- Official government reports: MIIT, National Bureau of Statistics (NBS), local government publications.
- International organizations: OECD, World Bank, IFC, ILO, UNCTAD, European Commission.
- Industry and trade association reports.
- Leading Chinese-language policy and business journals (where available in English translation).

THEMATIC ANALYSIS

Thematic analysis was used to identify recurring patterns, relationships, and debates regarding MSMEs' contributions, challenges, and policy responses. Key themes include MSME economic impact, finance and regulatory barriers, digital transformation, regional development, and resilience to shocks.

CONTENT ANALYSIS

Content analysis was applied to policy documents, case studies, and empirical reports to extract qualitative insights. This includes a review of government program evaluations, expert commentary, and case studies of exemplary MSME clusters and digitalization initiatives.

CASE STUDY APPROACH

To provide context-rich examples, the study incorporates several illustrative case studies, including:

- **Fintech Lending in Guangdong:** The rise of fintech providers such as We Bank and Ant Microloan has enabled thousands of MSMEs to access credit, but regulatory frameworks are still evolving (IFC, 2024).
- **Women-Led MSMEs in Sichuan:** Targeted training programs and microfinance have increased the share of women entrepreneurs by 18% since 2020 (ILO, 2022).
- **Export-Oriented MSMEs in Jiangsu:** Integration into global value chains has boosted productivity but also exposed MSMEs to international market volatility (UNCTAD, 2024).

- **Green MSMEs in Shandong:** Adoption of green technologies and ESG practices has enabled some MSMEs to access new markets and financing, but uptake remains limited outside the most advanced provinces (UNCTAD, 2024).

LIMITATIONS

This study is based on secondary data and literature; no primary fieldwork was conducted. While this enables broad coverage and integration of diverse sources, it limits the ability to capture the most recent micro-level dynamics or informal sector developments except as reflected in published studies. The study also acknowledges potential publication and reporting biases in official sources.

DATA TRIANGULATION

Data triangulation is employed to enhance reliability and validity by corroborating evidence across multiple sources. Contradictory findings are noted and, where possible, reconciled through cross-referencing and critical analysis.

ETHICS CLEARANCE WAIVER

This research is based solely on secondary sources and a systematic review of the published literature. No primary data was collected, and no direct engagement with human participants occurred. Consequently, no ethical clearance was required for this study. All sources are properly cited and referenced.

AI TOOLS STATEMENT

The author confirms that AI tools were not used in this paper.

RESULTS AND DISCUSSION

Capacity Building and Human Capital Development

Investing in human capital is a core determinant of MSME success. According to Teece (2021), internal capabilities, especially skilled human resources and learning orientation, are crucial for innovation, adaptability, and growth. MSMEs with robust training programs, strong leadership, and a culture of continuous improvement consistently outperform those without (Li & Huang, 2022).

Government Initiatives

China's "Mass Entrepreneurship and Innovation" campaign has provided extensive support to MSMEs, including training, business incubators, and funding, particularly targeting youth, women, and rural entrepreneurs (MIIT, 2024). The "Entrepreneurship Training for All" program in Jiangsu Province has trained more than 500,000 MSME founders and staff since 2020, improving business survival rates by 12% (MIIT, 2024).

Skills and Talent Gaps

Despite these efforts, talent shortages persist. MSMEs often struggle to attract and retain skilled employees due to limited resources to offer competitive salaries and benefits. According to ILO (2022), 48% of MSMEs cite difficulty in hiring as a major growth barrier. This gap is especially acute in high-tech industries and inland provinces, exacerbating regional disparities in innovation and productivity.

Role of Knowledge Networks

Strategic alliances, business clusters, and knowledge-sharing networks are increasingly important for capacity building. These structures allow MSMEs to access shared resources, benefit from peer learning, and participate in collective innovation projects (European Commission, 2023). In Hangzhou, MSME participation in local digital clusters has been linked to higher R&D intensity and faster product development cycles (MIIT, 2024).

EMPLOYMENT GENERATION AND POVERTY REDUCTION

MSMEs account for more than 80% of urban employment and approximately 70% of new job creation annually (ILO, 2022; World Bank, 2023). A 2023 World Bank report found that 40% of new urban jobs in the western provinces can be attributed to MSMEs, up from just 22% in 2010. In 2022, women accounted for 37% of MSME founders, a 9% increase over five years (ILO, 2022). Targeted programs, such as microfinance and business training for women-led MSMEs in Sichuan, have increased the share of women entrepreneurs by 18% since 2020 (ILO, 2022).

PROMOTING COMPETITIVE MARKETS AND INNOVATION

The expansion of MSMEs has intensified market competition, driving innovation, lower prices, and improved consumer welfare. MSMEs are particularly dynamic in sectors such as e-commerce, advanced manufacturing, creative industries, and green technology (European Commission, 2023; OECD, 2022). They have challenged the dominance of established giants such as Alibaba and JD.com by leveraging digital platforms, social media marketing, and innovative logistics solutions (IFC, 2024). MSMEs account for 65% of patent applications and nearly 70% of new product launches in China (UNCTAD, 2024). Provincial data from Zhejiang and Guangdong show that MSMEs' R&D investment intensity has increased by 8% annually since 2020 (MIIT, 2024).

TECHNOLOGY, DIGITAL TRANSFORMATION, AND GLOBAL INTEGRATION

Digitalization has emerged as a critical enabler of MSME growth and resilience. MSMEs that adopt digital tools such as cloud computing, e-commerce, and artificial intelligence report higher productivity, broader market reach, and greater innovation capacity (UNCTAD, 2024; IFC, 2024; Zheng et al., 2021). The "Internet Plus" and Digital Silk Road initiatives have provided incentives for digital adoption, including subsidies for e-commerce platforms, digital skills training, and infrastructure investments (MIIT, 2024). As a result, the digitalization rate of MSMEs has more than doubled since 2017, with over 60% of MSMEs now using online sales channels (IFC, 2024). Despite progress, a digital divide persists between urban and rural MSMEs, and between large and small firms. Rural MSMEs often lack access to affordable broadband, digital skills, and online marketplaces. In 2023, only 28% of rural MSMEs reported using digital platforms compared to 64% in urban areas (MIIT, 2024). Zhejiang province's "Smart MSME" initiative has supported over 100,000 MSMEs in digitalizing operations, resulting in a 20% average increase in productivity and a 15% rise in export volumes (MIIT, 2024).

REGIONAL DEVELOPMENT AND SOCIAL INCLUSION

MSMEs are critical for balanced regional development and the reduction of urban-rural divides. Government policies promoting industrial clusters, economic zones, and business incubators have helped nurture MSME ecosystems in less-developed provinces (OECD, 2022; Chongqing Municipal Government, 2023). The Chongqing MSME Cluster, established in 2020, has attracted more than 5 000 MSMEs, creating 80,000 jobs and boosting regional GDP by 2.5%. The cluster model is now being replicated in other inland regions to encourage local entrepreneurship and innovation (Chongqing Municipal Government, 2023). MSMEs have promoted the economic integration of women, young people, and migrant workers, contributing to social stability and cohesion (ILO, 2022; UNCTAD, 2024).

IMPACT OF COVID-19

The COVID-19 pandemic exposed the vulnerability of MSMEs to external shocks. A nationwide survey by MIIT (2021) found that 60% of MSMEs experienced revenue declines of more than 20% in 2020, with micro and informal enterprises hardest hit. Sectors such as hospitality, tourism, and retail were particularly affected. The government responded with a package of support measures, including tax relief, credit guarantees, rent reductions, and digitalization grants (MIIT, 2024). Digital “service platforms” and fintech solutions have enabled some MSMEs to pivot to online sales and remote operations (IFC, 2024). Urban and tech-oriented MSMEs recovered faster than rural and traditional firms (Wang et al., 2023). In Shenzhen, rapid deployment of digital tools and targeted subsidies enabled 75% of MSMEs to restore pre-pandemic output by mid-2021 (Shenzhen SME Bureau, 2022).

PERSISTENT CHALLENGES

Despite progress, most MSMEs still struggle to obtain affordable finance. Only 25% have access to formal credit; high collateral requirements and limited risk-sharing mechanisms are key obstacles (World Bank, 2023; IFC, 2024). The rise of fintech lending platforms has expanded access, but regulatory oversight and financial literacy remain challenges (IFC, 2024). Licensing, compliance, taxation, and reporting requirements remain burdensome, especially for micro and start-up firms (OECD, 2022). MSMEs face acute difficulties in attracting and retaining skilled labor, particularly in IT, engineering, and management. Limited resources for salaries and training constrain competitiveness (ILO, 2022). MSMEs are disproportionately affected by demand shocks, price fluctuations, and supply chain disruptions, emphasizing the need for diversification and risk management (UNCTAD, 2024).

CONCLUSIONS

The evidence assembled in this study unequivocally demonstrates that MSMEs are indispensable to China’s economic growth, innovation, and employment. Their contributions extend well beyond quantitative metrics, encompassing social inclusion, regional development, and the democratization of entrepreneurship. MSMEs are the primary engines of employment, technological innovation, and poverty alleviation, and they play a vital role in the integration of vulnerable groups into the formal economy. However, persistent barriers, access to finance, regulatory complexity, talent shortages, and heightened vulnerability to market shocks continue to impede the sector’s full potential. The COVID-19 pandemic has exacerbated these challenges, highlighting the fragility of MSMEs in the face of external disruptions and underscoring the need for more robust, adaptive, and inclusive policy support.

The findings highlight the essential role of government intervention in creating an enabling ecosystem for MSMEs. Effective support must go beyond financial incentives to include regulatory streamlining, talent development, digital infrastructure, and targeted support for vulnerable groups and regions. The acceleration of digital transformation and the rise of ESG and green finance provide new opportunities for MSMEs to drive high-quality, inclusive growth. Building a resilient and innovative MSME sector is not only central to China’s domestic ambitions for common prosperity and technological self-reliance, but also to its global competitiveness in an increasingly volatile and interconnected world. The lessons from China’s experience are highly relevant for other emerging and developing economies seeking to harness the transformative power of MSMEs.

POLICY RECOMMENDATIONS

- **Establish Dedicated MSME Support Agencies:** Create specialized institutions at national and provincial levels to provide integrated financial, technical, and advisory services tailored to MSMEs (OECD, 2022; MIIT, 2024). These agencies should offer “one-stop” services, including business registration, licensing, information, and market access support.
- **Streamline Regulatory Processes:** Simplify licensing, compliance, and reporting requirements to reduce administrative burdens, particularly for micro and start-up firms. Adopt one-stop digital service platforms, automate compliance processes, and harmonize standards across provinces (MIIT, 2024; Zhou & Liu, 2021).
- **Promote Digital Transformation:** Offer targeted incentives, digital skills training, and infrastructure investments to bridge the digital divide, especially in rural and inland regions. Expand subsidies for e-

commerce adoption, cloud services, and AI tools. Encourage MSMEs to participate in digital clusters and knowledge-sharing networks (UNCTAD, 2024; IFC, 2024).

- **Enhance Access to Finance:** Develop innovative financial products, expand credit guarantee schemes, promote alternative finance (e.g. fintech, crowdfunding), and leverage data-driven risk assessment models (World Bank, 2023; IFC, 2024). Encourage banks to use alternative data for credit scoring and increase the availability of unsecured loans for high-growth MSMEs.
- **Strengthen Entrepreneurship Education:** Integrate entrepreneurship, digital skills, and business management into vocational and higher education curricula, and foster university-industry collaboration (Li & Huang, 2022). Expand access to business training, mentorship, and peer learning opportunities, especially for women, youth, and rural entrepreneurs.
- **Foster Public-Private Partnerships:** Encourage collaboration between government, academia, and the private sector to facilitate technology transfer, market access, and innovation diffusion (European Commission, 2023). Support the development of industry clusters, innovation hubs, and business incubators.
- **Promote Regional Development:** Target support for MSMEs in less-developed provinces through fiscal incentives, industry clusters, and capacity-building programs (OECD, 2022). Invest in regional infrastructure and connectivity to level the playing field for inland MSMEs.
- **Advance ESG and Green Finance Integration:** Encourage MSMEs to adopt environmentally sustainable practices and integrate ESG principles into their business operations. Provide technical assistance, regulatory incentives, and access to green finance for MSMEs investing in clean technologies or sustainable supply chains (UNCTAD, 2024).
- **Monitor and Evaluate Policy Outcomes:** Establish robust monitoring and evaluation systems to assess the effectiveness of MSME support interventions and ensure continuous improvement (World Bank, 2023). Collect disaggregated data on MSME performance by region, sector, gender, and firm size to inform targeted policy design.
- **Support Informal MSMEs:** Design pathways for informal enterprises to formalize, including simplified registration, tax incentives, and tailored microfinance products. Recognize the unique challenges of informal MSMEs and incorporate them into national development strategies (UNCTAD, 2024).

CONTRIBUTIONS OF THE STUDY

This manuscript advances the literature by providing one of the most comprehensive and up-to-date syntheses of MSMEs' role in China's economic growth, drawing on the latest empirical evidence, policy developments, and theoretical perspectives (2018–2025). Its integrated approach covers economic, social, and technological dimensions, and highlights best practices and persistent gaps in current MSME support mechanisms. The study's incorporation of digital transformation, regional development, and resilience to shocks adds critical new dimensions to the discourse on MSME development. Its attention to the role of ESG principles and green finance in the context of China's carbon neutrality goals is especially timely. By situating MSME development within both national and international contexts, the findings offer actionable insights for policymakers, practitioners, and researchers in China and other emerging economies. The study also identifies important directions for future research, including the integration of informal MSMEs, longitudinal impact assessment, and comparative analysis across countries and sectors.

IMPLICATIONS

- **For MSME Owners and Managers:** Prioritize investment in human capital, innovation, and digital transformation to enhance competitiveness and resilience. Engage with business clusters, digital platforms, and public support programs to access resources and networks.
- **For Policymakers:** Recognize the strategic importance of MSMEs and design holistic, evidence-based support frameworks that address the sector's evolving needs. Focus on regulatory streamlining, targeted finance, and digital infrastructure, with special attention to vulnerable regions and groups.
- **For Educators and Trainers:** Adapt curricula to emphasize entrepreneurship, digital literacy, and business management, and strengthen ties with industry. Provide flexible, modular training programs and support lifelong learning for MSME employees.

- **For Financial Institutions:** Develop risk assessment models and financial products better aligned with MSME realities, including unsecured lending, fintech solutions, and alternative data analytics. Collaborate with government and fintech providers to expand credit access.
- **For Researchers:** Pursue longitudinal and mixed-methods studies to deepen understanding of MSME dynamics, policy impacts, and sectoral variations. Study the impact of ESG and green finance on MSME growth.
- **For Development Agencies:** Draw on China's experience to inform MSME strategies in other emerging and developing economies, emphasizing capacity building, digital innovation, and inclusive growth.

FUTURE RESEARCH DIRECTIONS

- **Mixed Methods Approaches:** Combine qualitative and quantitative research to provide nuanced insights into MSME impact across sectors and regions. Surveys, interviews, and case studies should be integrated with big data analytics to capture both macro and micro trends.
- **Longitudinal Studies:** Assess the long-term effects of policy interventions, digital transformation, and external shocks on MSME performance. Such studies can reveal lagged impacts, path dependencies, and the sustainability of policy outcomes.
- **Comparative Analyses:** Examine similarities and differences between China and other emerging economies to identify best practices and policy innovations. Comparative research can clarify the role of institutional context, market structure, and cultural factors in MSME development.
- **Informal MSMEs:** Explore the unique challenges and contributions of informal enterprises, which constitute a significant share of economic activity but are often overlooked in policy design (UNCTAD, 2024). Research should address barriers to formalization, access to finance, and social protection.
- **Sectoral and Regional Variation:** Investigate differences in MSME development by sector (e.g., services, manufacturing, high-tech) and region (coastal vs. inland, urban vs. rural) to inform more targeted, context-sensitive policy interventions.
- **Impact of ESG and Green Finance:** With China's carbon neutrality and sustainable development goals, research on MSME engagement in green innovation, ESG compliance, and sustainable finance will be increasingly important (UNCTAD, 2024; World Bank, 2023).

ORIGINALITY / VALUE

This study is among the most up-to-date and integrated reviews of China's MSME sector. Its focus on digitalization, regional equity, and resilience in the post-pandemic era provides new theoretical and practical value. The findings are relevant for China and internationally, offering a roadmap for leveraging MSMEs as engines of sustainable, inclusive growth.

REFERENCES

Chongqing Municipal Government. (2023). *Annual Report on MSME Development in Chongqing*.

European Commission. (2023). *Annual Report on European SMEs 2022/2023*. <https://ec.europa.eu/growth/smes>

International Finance Corporation (IFC). (2024). *SME Finance Forum: Global SME Finance Data*. <https://www.smeфинanceforum.org>

International Labour Organization (ILO). (2022). *Small Matters: Global evidence on the contribution to employment by the self-employed, micro-enterprises and SMEs*. <https://www.ilo.org>

Li, Y., & Huang, J. (2022). "Entrepreneurship Education and Start-Up Success in Rural China." *Asia Pacific Education Review*, 23(2), 197-213.

Ministry of Industry and Information Technology (MIIT). (2022, 2024). *China SME Development Report*. <http://www.miit.gov.cn>

Organisation for Economic Co-operation and Development (OECD). (2022). *Financing SMEs and Entrepreneurs 2022: An OECD Scoreboard*. <https://www.oecd.org/industry/smes/>

Shenzhen SME Bureau. (2022). *Post-Pandemic MSME Recovery Report*.

Teece, D. J. (2021). *Dynamic Capabilities and Strategic Management: Organizing for Innovation and Growth* (2nd ed.). Oxford University Press.

United Nations Conference on Trade and Development (UNCTAD). (2024). *World Investment Report 2024: Investing in Sustainable Value Chains*. <https://unctad.org>

Wang, L., Zhou, M., & Xu, H. (2023). “COVID-19 and MSME Survival in China: Evidence from a National Survey”. *China Economic Review*, 78, 102-119.

World Bank. (2023). *Small and Medium Enterprises (SMEs) Finance: Improving SMEs’ Access to Finance and Finding Innovative Solutions to Unlock Sources of Capital*. <https://www.worldbank.org/en/topic/sme/finance>

Zhou, Y., & Liu, Z. (2021). “Institutional Environment and MSME Growth in China: The Role of Local Governance.” *Journal of Asian Public Policy*, 14(1), 44-62.

Zheng, P., Sun, X., & Chen, L. (2021). “Digital Technology Adoption and MSME Export Performance in China.” *Technological Forecasting and Social Change*, 172, 121-137.

HOW ENVIRONMENTAL FACTORS INFLUENCE THE ENTREPRENEURIAL ORIENTATION AND GROWTH OF RURAL SMEs IN KZN, SA

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ABSTRACT

Environmental factors that impact survival, growth, and internationalisation of rural small and medium-sized enterprises (SMEs) in KwaZulu-Natal (KZN), South Africa (SA) are identified in this quantitative study, emphasising the role entrepreneurial orientation (EO) and resource constraints play. SMEs located in rural areas of the KZN province, formally registered with the Department of Trade, Industry and Competition (DTIC) of the SA government at the time of the study, made up the target population. The study used a closed-ended, structured questionnaire as a measuring tool to ensure results were valid and dependable, in line with the study content and predictability. The questionnaire was created from the literature study, which was the main information source, to measure the variables among selected rural KZN SMEs. Data was collected from 309 rural SME owners-managers. Statistical analysis (SPSS v27) confirmed reliability (Cronbach's $\alpha > 0.70$) and significance at $p < .001$. Findings indicate EO positively impacts performance, and this effect is strengthened by favourable environmental conditions such as access to raw materials, domestic demand, taxation policies, and equipment quality, as well as family labour, and practical technology use. The results highlight the unique challenges faced by rural SMEs, demonstrating that stronger environmental conditions amplify EO performance returns.

Keywords: entrepreneurship, SMEs.

INTRODUCTION

EO is considered to be crucial for SME performance, characterised by proactivity, innovativeness, risk-taking, and strategic decision-making, particularly vital for rural SMEs facing resource limitations. In addition, EO is found to enhance SME performance and competitive advantage (Correia et al., 2023). The various EO dimensions include autonomy, innovativeness, risk-taking, and proactiveness, as well as competitive aggressiveness; this supports findings by Chandra et al. (2025). Furthermore, innovation and risk-taking behaviours are linked to market expansion and profit generation. Nevertheless, it was determined SMEs tend to adopt indirect, guerilla-like strategies due to resource constraints, corroborating findings by Arfaei et al. (2025), while strong EO correlates with better market entry and international performance.

Environmental conditions significantly influence EO and SME growth, with internal factors such as resource endowments and external factors that include raw material access, demand, and policies shaping business success.

- Internal factors include resource quality, family labour, skills, and equipment.
- External factors comprise raw material supply, domestic demand, taxation, and infrastructure.

Although favourable conditions amplify the positive EO impact on performance, resource scarcity and poor infrastructure hinder growth (Xiao et al., 2025). Therefore, environmental support, including policies, is vital for rural SME development.

THEORETICAL FRAMEWORKS

In this study, theories supporting SME growth are the Resource-Based View (RBV) and Contingency Theory; these explain how SMEs leverage resources and adapt strategies to environmental changes for survival and growth. RBV,

on the one hand, emphasises unique, valuable, and inimitable resources, where these resources include tangible and intangible assets such as EO, managerial skills, and innovation (Ipsmiller, Dikova, & Brouthers, 2022). On the other hand, Contingency Theory advocates for strategy adaptation based on internal and external environments (Hentati et al., 2026). Both frameworks highlight the importance of resource deployment and flexibility in rural SMEs.

Environmental dynamism, defined as the rate of change and volatility, affects SME survival and growth, requiring owners-managers to be cognisant of environmental shifts (Huang et al., 2023). High dynamism, for example, increases uncertainty and reduces predictability. In addition, SMEs must monitor environmental volatility to adapt strategies. According to the International Labor Organization (ILO) (2024), Internal factors such as family labour and equipment quality, and external factors such as demand and transportation influence performance. Furthermore, dynamic interactions between internal and external environments govern SME activities. The external environment significantly impacts SME survival and expansion.

CHALLENGES AND POLICY IMPLICATIONS FOR RURAL SMEs

Rural SMEs face unique challenges such as resource scarcity, infrastructure deficits, and policy gaps, which require supportive institutional frameworks and development policies. Resource limitations hinder expansion and contribution to economic growth, while policy support and institutional frameworks are crucial for SME development. Furthermore, poor management capacity and fluctuating policies complicate operations. International and regional policies, for example, EU rural development, aim to foster rural SME growth. Nonetheless, lack of entrepreneurial attitudes and awareness in rural communities' limits business initiation. This comprehensive analysis underscores the importance of environmental factors, resource management, and strategic flexibility in enhancing SME survival and growth in rural KZN, with EO playing a pivotal role amid resource constraints and dynamic environments.

Challenges Rural SMEs face in KZN

Rural SMEs in KwaZulu-Natal (KZN) face numerous internal and external obstacles impacting their growth and sustainability. Internal factors include poor management focus on strategic concerns, reliance on owner-managers, inadequate HR practices, and limited managerial skills. External factors involve poor access to market information, restrictive regulations, high taxes, and infrastructure deficits, along with limited government support. Most SMEs depend heavily on the owner-manager, with little delegation or hiring of skilled staff. Further to this, marketing is the primary link between products/services and customers, but small market size and community dependence hinder growth.

Financial issues are critical, with 70% rural citizens living in poverty, limiting local demand. In addition, lack of finance, poor financial controls, and difficulty in obtaining external funding threaten survival. Many SMEs also lack formal strategic planning and suffer from operational inefficiencies. Further contributing aspects include that education and managerial training are vital for SME success; however, most owners have limited formal management skills. Inadequate access to information technology and poor infrastructure further restrict growth opportunities. External environmental factors impact SME performance, significantly influencing their decision-making, growth, and internationalisation prospects. Political instability and unrest form part of these factors, affecting market conditions and consumer behaviour, as does the lack of supportive government policies and complex regulations that hinder SME operations.

No specific rural SME strategy exists in SA, and bureaucratic red tape complicates business processes. There is also high taxation (74%), with costly licensing and registration procedures deemed major drawbacks. In addition, infrastructure deficits, such as inadequate transportation and utilities, also impede expansion, while late payments from government and community members negatively impact cash flow and growth. Sociodemographic factors, including social values and community support, are further found to influence entrepreneurial decisions. Additionally, technology adoption is crucial; however, rural SMEs

face challenges in information and communication technology (ICT) access and utilisation. SMEs are further expected to consider competition from multinational firms and that trade barriers reduce market competitiveness, while considering that economic variables such as manufacturing costs, product pricing, and borrowing costs affect profitability. Where internationalisation is concerned, it is found to be impacted by market dynamism, including shifts in industry and consumer preferences.

INTERNAL ENVIRONMENT AND MANAGEMENT CHALLENGES

Internal factors within SMEs directly affect their ability to grow and adapt. Where poor management focuses on strategic issues, Human Resource Management (HRM) specifically hampers performance. Furthermore, owner-managers often resist outside assistance, limiting capacity building, even though dependence on the owner-manager limits not only skilled workers being hired but also the delegation of duties.

Insufficient business monitoring and labour skills are also determined to negatively influence success, with equipment quality and operational oversight often found to be subpar. However, most SMEs do not engage in formal strategic planning, leading to resource underutilisation, where limited access to technology and poor financial controls threaten operational efficiency. Further to this, education, experience, and managerial training are crucial to improving SME resilience. Internal challenges are, nonetheless, compounded by external pressures, reducing growth potential.

INFLUENCE OF EXTERNAL ENVIRONMENT ON EO

External environmental dynamism and resource access shape SME EO and growth, whereas environmental dynamism, including industry and consumer shifts, positively impacts EO. Therefore, entrepreneurs with better resource access identify opportunities earlier. This requires understanding environmental characteristics to enhance opportunity recognition and profitability, since external factors moderate the relationship between EO and business performance. SMEs should thus proactively respond to external changes through innovation and strategic decision-making. As example, external challenges such as late payments and high taxes influence EO and strategic responses.

When considering the business environment impact on SME internationalisation, external factors are recognised to influence the ability of SMEs to expand into international markets. In this regard, environmental dynamism is found to affect the internationalisation capacity of firms. The main success elements, therefore, include management knowledge, customer understanding, business practices, and financial strategies. SMEs with strong EO and resource awareness are better positioned for international growth, while competition and trade barriers challenge their global competitiveness. Moreover, technology and innovation access are found to be critical for international market entry. This shows that external environment factors determine the timing and success of internationalisation efforts.

ROLE OF GOVERNMENT AND POLICY IN SME DEVELOPMENT

Government policies and regulations significantly affect SME growth and sustainability, where the lack of specific SME policies in rural SA hampers development. Added to this, regulations, high taxes, and red tape are deemed major barriers. However, the increase in the VAT registration threshold from R1 to R2.3 million aims to reduce administrative burdens. Bureaucratic procedures and costly licensing are also shown to hinder expansion, where limited government support and infrastructure investments restrict SME opportunities. This requires policy reforms to facilitate easier access to resources and reduce operational costs.

CRITICAL ROLE OF EDUCATION AND SKILLS DEVELOPMENT

Education and managerial skills are vital for SME survival and growth. Further to this, higher education and training are considered to improve innate drive, innovation, and risk management, while experience and prior management knowledge correlate with better performance. In view of the limited SME access to training and technology shown to hamper their competitiveness, it is important to note education enhances strategic decision-making and operational efficiency, where skills development programmes are deemed essential to address technical and managerial gaps.

There are, however, technological adoption and innovation challenges, even though technology and innovation are key drivers of SME competitiveness. In rural KZN SMEs face slow adoption of new technologies, impacting operational cycles. In addition, limited technical skills, age, and training opportunities are found to hinder ICT utilisation. This is problematic, as ICT adoption is considered crucial for SME market expansion and efficiency. Moreover, lack of technological advancement reduces competitiveness against multinationals, indicating that, to sustain growth, SMEs need to develop capabilities in digital tools and innovation strategies.

Recommendations for SME growth and sustainability:

- Strategies to support rural SME development include policy reforms, education, and collaboration.
- Review and improve rural revitalisation policies and legal frameworks.
- Incentivise financiers to relax policies supporting SME funding.
- Incorporate entrepreneurship into basic education curricula.
- Simplify registration, licensing, and compliance procedures.
- Improve infrastructure, transportation, and ICT access.
- Foster strategic alliances with universities, government agencies, and IT firms.
- Establish regional business groups and support networks.
- Promote technology adoption, innovation, and entrepreneurial leadership.
- Conduct workshops and training to enhance business skills and sustainability practices.

OVERVIEW OF SME AND BUSINESS PERFORMANCE RESEARCH

The literature review encompasses various aspects of SMEs, including their resource management, innovation, internationalisation, and challenges, as well as strategies, and sustainability, with a focus on SA, emerging markets, and global contexts. Theoretical frameworks for understanding firm performance and growth used in the study include the Resource-Based View (RBV) and Dynamic Capabilities in Firms. In this regard, Kero and Bogale (2023) conducted a systematic review, emphasizing the importance of internal resources and capabilities for sustainable competitive advantage. They highlight future research avenues in leveraging resources and capabilities for firm growth, in addition to discussing how firms can employ dynamic capabilities in adapting to changing environments. Challenges for SMEs in SA have elicited resilient survival strategies, as Khanyile et al. (2025) found in their study of SMEs in Durban's legal sector, while Malau and Motloung (2025) examined government support for township SMEs, finding support may be insufficient. Other studies, such as Maphanga (2025), evaluated government policies supporting emerging entrepreneurs in Mfolozi Municipality, with Nkoe and Ramasimu (2025) identifying challenges and government support issues in the Sol Plaatje Municipality. Obstacles SMEs face were found to include limited access to finance, market access, and policy support.

Innovation and Digitalisation

The roles of innovation, digital transformation, and technology adoption have been extensively studied. Examples include Mchunu et al. (2025), who reviewed how SA SMEs achieve competitive advantage via innovation and digitalization, as well as Lekhanya et al. (2023), who discussed African SMEs' innovation challenges, while Onngam and Charoensukmongkol

(2024) highlighted the agility of social media and its impact on SME performance. Other research comprises digital proficiency and tech literacy, which are shown as critical for SME success (Wulandari et al., 2025). In addition, innovation is driven by EO, knowledge sharing, and environmental dynamism.

Internationalisation and Global Market Strategies

Factors influencing SME international expansion and performance have been investigated by scholars such as Miura (2025), whose study investigated the internationalisation speed of SMEs. Furthermore, Wulandari et al. (2025) examined gender-based factors affecting SME internationalisation, with Satyanarayana et al. (2022) researching Indian software firms' internationalisation driven by EO, and Zahra et al. (2024) conceptualising new international ventures as an entrepreneurship and international business nexus. Strategies include expanding into global markets, leveraging networks, and managing risks.

EO and Firm Performance

Entrepreneurial traits impact business success in several ways. Morgan and Anokhin (2023) found EO mediates customer participation and new product success. Added to this, Wales et al. (2020, 2023) accentuated the multilevel EO nature and its role in value creation, with Rafiq et al. (2026) highlighting operational efficiency as context reliant. Moreover, entrepreneurial characteristics such as risk-taking, innovativeness, and proactiveness are linked to performance.

Social Media and Marketing Strategies

Research regarding social media digitalization for SME growth shows Mpungose et al. (2025a, b) developed models for social media utilization during COVID-19. These studies indicate leveraging social media enhances rural SMME survival and growth in rural SMMEs, as social media marketing is a key tool for reaching customers and sustaining operations.

Environmental Sustainability and Green Innovation

The role SMEs play in sustainable development and green practices was investigated by Okere et al. (2023), who linked environmental sustainability with SME finance in Africa. In addition, Zhuang et al. (2025) connected EO with environmental innovation, while Tsikada et al. (2025) discussed the green supply chain management impact on sustainability. Green marketing and eco-infrastructure investments are found to be critical for sustainable growth.

International Business and Competitive Advantage

Where global competition and international strategies are concerned, Porter (2023) analysed changing patterns of international competition, while Weilbach (2025) discussed support agencies' perspectives on business sustainability, Rasmussen (2024) provided insights on born global firms and rapid internationalisation. Further to this, Ogundare and van der Merwe (2024) examined competitor orientation and proactiveness for competitive advantage.

Policy, Support, and Institutional Factors

The roles of government policies and institutional support are reported in studies such as the Organization for Economic Development (OECD) (2025), which noted the limited competitiveness of rural SMEs, and the SA Revenue Services (SARS) (2026) in its discussion regarding VAT thresholds affecting SME growth. Added to this, Van Wyk and Venter (2023) studied strategic decision-making in SA SMEs. Policy support is found to be vital but often insufficient for SME development.

Innovation, Knowledge Management, and Organisational Capabilities

Research on internal factors influencing SME success by, for example, Stamper and Chinyamurindi (2025), links

innovation and knowledge management to financial performance, with Otache (2024) connecting innovation capability and strategic flexibility to performance. Capabilities such as absorptive capacity and organisational life cycle were found to influence growth, while knowledge sharing and innovation are determined as key SME success drivers.

Challenges in Rural and Emerging Markets

SMEs in rural and emerging economies face specific issues. Rasimphi et al. (2025) reviewed success and failure factors of rural cooperatives and SMEs, whereas Neupane et al. (2025) highlighted innovation and growth drivers in hospitality SMEs. Challenges include limited access to finance, infrastructure, and market opportunities, with proposed strategies that involve leveraging social media, policy support, and innovation.

LITERATURE REVIEW CONCLUSION

The literature underscores the multifaceted nature of SME performance, emphasising resource management, innovation, internationalisation, and sustainability, along with supportive policies as critical factors for growth and resilience across diverse contexts.

REFERENCES

- Arfaei, A., Hasani, S. R., Namamian, F., & Ghanizadeh, A. (2025). Providing a guerilla marketing model based on the meta-synthesis and fuzzy Delphi methods. *International Journal of Nonlinear Analysis and Applications*, 16(5), 87-105.
- Chandra, Y., Clarke, J., Holt, R., Kincaid, P. A., Short, J. C., & Wolfe, M. T. (2025). *Aesthetic appeal: How images inform emerging entrepreneurial themes*, (pp. e00552). Elsevier.
- Correia, R. J., Dias, J. G., Teixeira, M. S., & Campos, S. (2023). Building competitive advantages and business success: the role of learning orientation, reward systems and entrepreneurial orientation. *European Business Review*, 35(1), 92-119.
- Hentati, H., Jardak, M. K., & Boulila, N. (2026). The impact of contingency factors on the degree of digitization and the operational performance in accounting firms. *Journal of Accounting & Organizational Change*, 22(1), 64-88.
- Huang, Y.-F., Lin, H.-C., & Lee, H.-M. (2023). Innovation in manufacturing SMEs during the COVID-19 pandemic: How does environmental dynamism reinforce employee proactive behavior? *Technological Forecasting and Social Change*, 187, 122247.
- International Labor Organization (ILO). (2024). Evaluating the policy, legal, and regulatory environment of SMEs.
- Ipsmiller, E., Dikova, D., & Brouthers, K. D. (2022). Digital internationalization of traditional firms: Virtual presence and entrepreneurial orientation. *Journal of International Management*, 28(4), 100940.
- Kero, C. A., & Bogale, A. T. (2023). A Systematic Review of Resource-Based View and Dynamic Capabilities of Firms and Future Research Avenues. *International Journal of Sustainable Development & Planning*, 18(10).
- Khanyile, N. S., Kanyangale, M., & Mthombeni, A. (2025). Resilience and Survival Strategies for Small and Medium Enterprises (SMEs) Within the Legal Sector of Durban, South Africa. *iRASD Journal of Management*, 7(2), 01-13.

- Lekhanya, L. M., Ngibe, M., & Dorasamy, N. (2023). African SMEs Innovation Challenges. *Current Topics on Business, Economics and Finance*, 7, 19-37.
- Malau, E. M., & Motloung, O. M. (2025). e-kasi Economy in South Africa: Is the Support Provided by the Government enough for Small Businesses in the Townships to Thrive? *African Journal of Innovation and Entrepreneurship (AJIE)*, 4(2), 81.
- Maphanga, M. (2025). Evaluating the Role of Government Policies in Supporting Emerging Entrepreneurs: A Case Study of Mfolozi Municipality in King Cetshwayo District, South Africa. *African Journal of Innovation and Entrepreneurship (AJIE)*, 4(2), 409.
- Mehunu, N., Maphumulo, J. R., & Nyide, C. J. (2025). Achieving competitive advantage through business innovation and digitalization by South African small and medium-sized enterprises: A systematic literature review. *International Journal of Business Ecosystem & Strategy* (2687-2293), 7(3), 222-232.
- Miura, Y. (2025). Exploratory research on the internationalization speed of small and medium-sized enterprises. *Journal of the International Council for Small Business*, 6(2), 256-268.
- Morgan, T., & Anokhin, S. (2023). Entrepreneurial orientation and new product performance in SMEs: The mediating role of customer participation. *Journal of Business Research*, 164, 113921.
- Mpungose, S., Lekhanya, L. M., & Anwana, E. O. (2025a). Critical Factors Influencing Social Media Utilisation for the Survival and Growth of Rural SMMEs During the Covid-19 Crisis in KwaZulu- Natal: Toward a Conceptual Model. *International Journal of Advanced Business Studies*, 4(4), 151-177.
- Mpungose, S., Lekhanya, L. M., & Anwana, E. O. (2025b). Social media marketing and survival strategies for rural SMMEs' growth during and beyond the COVID-19 crisis in KwaZulu-Natal. *International Journal of Advanced Business Studies*, 4(4), 178-209. Neupane et al. 2025
- Nkoe, D. B., & Ramasimu, N. F. (2025). The challenges and government support for SMEs at Sol Plaatje Municipality in the Northern Cape Province of South Africa. *International Journal of Research in Business & Social Science*, 14(5).
- Organization for Economic Development (OECD). (2025). Rural SMEs are typically not particularly successful in competitiveness.
- Ogundare, J. A., & van der Merwe, S. (2024). The role of competitor orientation and proactiveness in competitive advantage for small-and medium-sized enterprises performance. *The Southern African Journal of Entrepreneurship and Small Business Management*, 16(1), 786.
- Okere, K. I., Ibe, G. I., Muoneke, O. B., & Nwaeze, N. C. (2023). Environmental sustainability, small and medium enterprises, and finance in Africa: a triplicate relationship. *Environmental Science and Pollution Research*, 30(14), 41359-41378.
- Onngam, W. & Charoensukmongkol, P. (2024). Effect of social media agility on performance of small and medium enterprises: Moderating roles of firm size and environmental dynamism. *Journal of Entrepreneurship in Emerging Economies*, 16(6), 1611–1633.
- Otache, I. (2024). Innovation capability, strategic flexibility and SME performance: the roles of competitive advantage and competitive intensity. *African Journal of Economic and Management Studies*, 15(2), 248-262. Porter 2023.
- Rafiq, M., Yang, J., & Bashar, S. (2026). Operational efficiency as a contingent, not universal mechanism: evidence from Pakistani SME supply chains. *Supply Chain Management: An International Journal*, 1-17.
- Rasimphi, T. E., Tinarwo, D., & Mulaudzi, T. (2025). Success And Failure Factors of Rural Cooperatives and SMMEs In Limpopo Province, South Africa: A Scoping Review. South Africa: A Scoping Review.
- Rasmussen, E. S. (2024). *Cases on born globals*. Edward Elgar Publishing.

SA Revenue Service (SARS). (2026). South Africa's Value Added Tax (VAT) Threshold.

Satyanarayana, K., Chandrashekar, D., Sukumar, A., & Jafari-Sadeghi, V. (2022). How does international entrepreneurial orientation influence firms' internationalization? An exploration with Indian software product top management teams. *International Journal of Entrepreneurial Behavior & Research*, 28(7), 1702-1731.

Stamper, S., & Chinyamurindi, W. T. (2025). Innovation and knowledge management capabilities as determinants of financial performance in technology-based small businesses in South Africa. *South African Journal of Information Management*, 27(1), 2016.

Tsikada, C., Chasaya, W., & Ayandibu, A. O. (2025). The adoption of green supply chain management in entrepreneurship and its impact on business sustainability: Lessons for South African SMEs. *Future Business Journal*, 11(1), 198.

Wales, W. J., Covin, J. G., & Monsen, E. (2020). Entrepreneurial orientation: The necessity of a multilevel conceptualization. *Strategic Entrepreneurship Journal*, 14(4), 639-660.

Wales, W. J., Covin, J. G., Schüller, J., & Baum, M. (2023). Entrepreneurial orientation as a theory of new value creation. *The Journal of Technology Transfer*, 48(5), 1752-1772.

Weilbach, N. (2025). Business Sustainability: Support Agencies' Perspectives on the Limitations SMMEs Face in the Northern Cape. *International Journal of Economics, Business and Management Research*, 9(8).

Wulandari, S. S., Diah, M. L. B. M., & Asari, A. (2025). Digital proficiency and entrepreneurial mindset for sme success through market savvy and tech literacy. *Aptisi Transactions on Technopreneurship (ATT)*, 7(1), 26–36-26–36.

van Wyk, I., & Venter, P. (2023). Factors influencing strategic decision-making in South African small businesses. *Acta Commercii-Independent Research Journal in the Management Sciences*, 23(1), 1070. Zahra, S. A., Criaco, G., Petricevic, O., & Hashai, N. (2024). Conceptualizing international new ventures as the nexus of entrepreneurship and international business. *Journal of International Business Studies*, 55(8), 1048-1056.

Xiao, S., Roh, T., & Park, B. I. (2025). Entrepreneurial orientation, environmental dynamism, and disruptive sustainability in emerging markets: Evidence from MNE subsidiaries in China. *Business Strategy and the Environment*, 34(8), 10012-10032.

Zhuang, Y., Lee, Y., & Cortes, A. F. (2025). From Risk to Reward: Entrepreneurial Orientation as a Driver for Environmental Innovation and Performance. *Sustainable Development*, 33(6), 8203-8212.

LESSONS FROM A DECADE OF DELIVERING SHORT LEARNING PROGRAMMES FOR WOMEN ENTREPRENEURS: INSIGHTS FROM A SOUTH AFRICAN UNIVERSITY

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ABSTRACT

In South Africa, women entrepreneurs occupy a paradoxical position: they are economically active in significant numbers yet remain systematically underserved by formal entrepreneurship education structures. Although short learning programmes (SLPs) offer a potentially powerful response to this gap, they are largely under-theorised and under-reported in the scholarly literature. This paper examines the evolution, pedagogical design, and systemic impact of the North-West University's (NWU) SLP for Business Start-ups, with a particular focus on the Enterprising Women Programme (EWP), from its inception in 2013 to its current digital, stackable micro-credentials modality. Drawing on a reflective case study design, the paper triangulates evidence across programme records and facilitator reflections, an independent Master of Business Administration (MBA) evaluation, a doctoral study producing a framework for entrepreneurship education and an institutional case document. Effective SLPs for female entrepreneurs, as evidenced by the paper, must be participant-centred, architecturally adaptable, with strong institutional commitment to iterative development. A proof of concept for inclusive, gender-responsive entrepreneurship education in line with the United Nations Sustainable Development Goals is provided by the EWP's outcomes, which include over 650 beneficiaries, with a 60 percent business formation rate among programme alumni, in a context where between 60 and 80 percent of SMMEs reportedly fail within their first two years of operation, and documented identity-level personal transformation. The paper enhances theoretical discourse by drawing on transformative learning theory, andragogical principles, communities of practice, effectuation theory, and the capability approach, with the construct of entrepreneurial identity formation serving as the pivotal integrative element. Additionally, it informs practical applications by delineating three design principles for SLPs aimed at supporting marginalised women, while advancing the proposition that stackable micro-credentials constitute a substantial instrument for promoting equity in entrepreneurship education within the Global South.

Keywords: women entrepreneurship, short learning programmes, micro-credentials, entrepreneurial identity.

INTRODUCTION

Although scholars have shown an increasing interest in entrepreneurship education (EE) over the last two decades, the focus has remained largely on degree-bearing programmes delivered to formally enrolled students in well-resourced institutional settings (Nabi et al., 2017; Passarelli & Bongiorno, 2025). This orientation systematically excludes a population that arguably stands to benefit most from structured entrepreneurial development: women who are balancing entrepreneurial aspirations with the demands of household and caregiving responsibilities, operating in communities where a university campus may be hours away and where a semester-length commitment is simply not feasible. Short learning programmes (SLPs), offering flexible, accessible, non-degree interventions that can be designed around the realities of participants' lives, represent the most plausible vehicle for reaching this population at scale. Yet they occupy a marginal position in the scholarly literature, their design principles are under-theorised, and their outcomes are rarely tracked beyond a single cohort.

This paper addresses that gap through the case of the North-West University's (NWU) Enterprising Women Programme (EWP). Piloted in 2013 in the Vaal Triangle region of South Africa, a post-industrial area characterised

by high unemployment and a racially and economically diverse population, the EWP was designed to provide structured entrepreneurship education to women at the early stages of business development, who were poorly served by existing entrepreneurship education through programmes that were typically generic in design, inflexible, and inattentive to the specific challenges women face in starting and sustaining a business. What ensued was an evolving intervention, reshaped by participant feedback, independent scholarly evaluation, and the disruptions of a global pandemic, to the point where it reached its current form as a digital, stackable micro-credentials model reaching participants across South Africa and the broader African continent.

A reflective case study design (Yin, 2018) is adopted, positioning the paper's author (the programme's principal architect since 2013) as a practitioner-scholar engaged in retrospective programme analysis (Schön, 2016). Given the author's long-standing involvement in the design and delivery of the EWP, the analysis is approached as a reflective practitioner case rather than as an external programme evaluation. The emphasis is therefore on identifying design lessons and theoretically informed insights emerging from sustained engagement with the programme, while recognising that the findings should be interpreted within the context of a single institutional case. Evidence is triangulated across programme records and facilitator reflections, a mixed-method MBA evaluation (Steenkamp, 2016), a doctoral study (Landsberg, 2022), and an institutional case document (Greyling et al., 2024). The paper argues that entrepreneurial identity formation constitutes a critical mechanism through which SLPs can contribute to sustained entrepreneurial action among women and explores how programme design can support this process over time.

THEORETICAL FRAMEWORK

This paper leads with a deceptively simple question: what impact does an entrepreneurial short learning programme really have on an individual? The obvious answer is business skills and knowledge, but the evidence offered by a decade of the EWP suggests that the most consequential impact is less easily measured: programme completers saw themselves differently. They described thinking like entrepreneurs, dreaming bigger, and acting with a confidence they had not previously felt entitled to. This shift in self-concept, referred to as entrepreneurial identity formation (Radu-Lefebvre et al., 2021) in the scholarly literature, best explains the programme's sustained impact and serves as the organising lens for this paper.

Looking beyond content delivery is required to understand how a programme produces this shift. An explanation is offered by Mezirow's (2000) transformative learning theory: meaningful adult learning is effective not by adding information, but by disrupting the assumptions through which people interpret themselves and their possibilities. The EWP functions as an unsettling and ultimately liberating experience for women who have received limited affirmation that entrepreneurship is for them. Knowles' (1984) principle of adult learning, postulating that adults learn best when content is immediately relevant, self-directed, and respectful of prior experience, helps explain why the programme's practical, participant-centred design amplifies this effect. Additionally, Wenger's (1998) insight that learning is fundamentally social and that identity is shaped as much by the community one belongs to as by the content one encounters, helps make sense of the peer networks that participants consistently describe as among the programme's most enduring outcomes. The capability approach (Sen, 1999; Nussbaum, 2011) provides the evaluative vocabulary. If entrepreneurial identity formation is the mechanism, expanded human agency is the outcome of what participants became able to do, to aspire to, and to pursue, rather than just whether participants started businesses. This framing is important for a programme serving women whose startup conditions may be impeded by constrained choices and limited social support to act entrepreneurially.

Taken together, these perspectives suggest a developmental pathway in which transformative learning challenges existing assumptions, andragogical principles support meaningful adult engagement, communities of practice reinforce learning through social interaction, and expanded capabilities enable entrepreneurial action. Entrepreneurial identity formation serves as the integrating construct linking these processes and outcomes, providing a lens through which the longer-term impact of entrepreneurship education can be understood.

While business registration is a measure of success, it does not tell the whole story. The fuller picture is a woman who leaves the programme thinking of herself differently: as someone capable of building something, of holding herself and others accountable, of asking for help and offering it in return. It is this shift, sustained long after the programme concludes, that a decade of evidence from EWP consistently reveals.

THE ENTERPRISING WOMEN PROGRAMME: CONTEXT, DESIGN, AND A DECADE OF EVOLUTION

The South African Context

The National Development Plan 2030 recognises entrepreneurship as central to addressing South Africa's 32.7 percent unemployment rate (South African Government, 2026). Yet, the country's macroeconomic conditions are characterised by unequal access to finance, digital infrastructure and formal business networks, with necessity-driven entrepreneurship predominating and a gender gap that widens as businesses mature (Global Entrepreneurship Monitor, 2024; Radebe & Smith, 2023). Women entrepreneurs, particularly those from non-metropolitan areas, face structural disadvantages that generic entrepreneurship support fail to address (Brush et al., 2020). As a direct response to these conditions, the NWU's EWP, established in 2013, was designed from the outset to support women that existing entrepreneurship education was failing to reach. The programme's multi-dimensional design - simultaneously addressing education, gender equity, economic participation, and community development - aligns directly with the United Nations Sustainable Development Goals (SDGs), particularly SDGs 4, 5, 8, and 10 (United Nations, 2015).

Programme Design

The EWP is an accredited short learning programme (SLP), initially offered as a fully face-to-face programme for female entrepreneurs in a single location. The SLP has subsequently evolved into a comprehensive digital model, structured as ten stackable micro-credentials that contribute to a full SLP. This stackable architecture enables partial completion to be recognised and valued, accommodates time constraints faced by women managing multiple responsibilities, and allows experienced entrepreneurs to select only the modules addressing their specific knowledge gaps (Varadarajan et al., 2023). Inclusion design features include flexible pacing, multiple learning formats, diverse assessment modalities, and a deliberate culture of safe and respectful communication.

Participant selection reflects a deliberate philosophy: entrepreneurial potential is prioritised over business idea quality, on the premise that a capable, adaptable person will find and develop a viable opportunity, while even a strong idea will stagnate without the right person conceptualising and implementing it. This aligns with Sarasvathy's (2001) effectuation theory, which distinguishes between entrepreneurs who begin with a fixed goal in mind and work backwards, and those who begin with who they are and what they know, and develop from there. Applicants submit a two-minute business pitch video detailing the customer problem, value proposition, unique selling proposition, and programme expectations.

An instructive early adaptation was the introduction of a commitment fee after the first cohort, when it was observed that participation without financial investment correlated with lower commitment and higher attrition. A nominal fee of approximately 5 percent of the programme's total value was subsequently introduced as a commitment mechanism, consistent with psychological ownership theory (Pierce et al., 2001).

A Decade of Evolution

The EWP's most significant contribution may be its capacity for institutional learning across its three distinct phases. Phase 1 (2013-2016) established the face-to-face EWP model. Steenkamp's (2016) mixed-method MBA evaluation, incorporating qualitative interviews with 21 participants and questionnaires with 22 participants, spanning the 2013-2015 cohorts, highlighted meaningful gains in business management skills, entrepreneurial attitudes, and self-confidence, while identifying persistent gaps in financial management content, mentorship, networking, and post-programme support that directly shaped subsequent programme development. Phase 2 (2017-2019) deepened financial content, introduced key speakers and role models and refined the facilitation model toward a teacher-as-coach orientation. Landsberg's (2022) doctoral study, a systematic literature review of international entrepreneurship education (EE) best practices combined with qualitative interviews with EWP participants, found that participants consistently valued creativity training, learning-by-doing approaches, and peer interaction, while identifying financial depth, soft skills, mentorship, and networking as ongoing gaps. His resulting EE framework, incorporating hybrid learning, effectuation, entrepreneurial competencies, financial management, mentorship, networking, reflection,

digital tools, and personalised education, map directly to the current ten micro-credential units. Phase 3 (2020-2024) was precipitated by COVID-19. The forced shift to digital delivery revealed both opportunity and challenge, as participants appreciated the flexibility and geographic accessibility, while digital access inequalities created stumbling blocks for others. This led to the most consequential design decision in the programme's history: rather than reverting to face-to-face delivery, the SLP was restructured into the current stackable micro-credentials model.

Impact and Outcomes

The headline statistics are substantive: more than 650 participants have benefited from the EWP, with 314 completing the full SLP, of which 80 percent are women. Approximately 60 percent of these women went on to establish businesses, translating to more than 100 new female-owned businesses contributing to the South African economy, as determined through post-programme participant tracking and programme records (Greyling et al., 2024). While longitudinal tracking beyond the early post-programme period remains a priority for future research, this business formation rate is particularly noteworthy when considered against the national context, in which reported estimates suggest that between 60 and 80 percent of South African SMMEs fail within the first two years of operation (Mhlongo & Daya, 2023) - the critical early stage at which most EWP participants were operating at the time of enrolment. Steenkamp's (2016) longitudinal dimension adds an important nuance: the 2013 cohort showed the highest self-employment rate, suggesting that business formation takes time and that immediate post-programme measurement systematically understates impact.

The most significant evidence of impact lies in participants' description of what happened to them as individuals. Applying the capability approach (Nussbaum, 2011; Sen, 1999), the paper attests not only to business registration rates but also to human agency - what participants become able to do, to be, and to aspire to. Landsberg's (2022) qualitative interviews document reconstructed self-concepts and identity shifts enacted in business practice: one participant described how she realised, through the customer discovery process, that she had been targeting the wrong customer segment, changing her website accordingly, and observing a substantial increase in engagement. Another described the programme as equipping her to train and evaluate her own agents with a more discerning eye. Participant voice data from programme records corroborates this pattern. One participant reflected: "This programme is amazing. I see like an entrepreneur already. The eyes of my understanding had been enlightened." Another observed: "I can't sleep. I'm having business ideas. Lots of them. Our minds are exercising, our territories are enlarged" (Greyling et al., 2024). Steenkamp (2016) similarly documented self-confidence, belief in oneself, and courage to act as consequential shifts. Cohort relationships, with networks of women who called one another for advice, referred clients, and held one another accountable long after formal programme completion, were consistently described as one of the EWP's most enduring outcomes (Wenger-Trayner & Wenger-Trayner, 2020).

From a practitioner viewpoint, attrition remains the programme's most persistent structural challenge. The commitment fee reduced - but did not eliminate - early withdrawal, while the self-paced micro-credentials model introduces completion risks for participants who lack self-regulatory capacity in asynchronous learning environments. Access to finance remains the most consistent post-programme barrier: the EWP equips women with the knowledge and identity to pursue their ventures but cannot resolve the structural finance gap that constrains growth. These limitations do not diminish what the evidence shows; they define the boundaries within which it should be interpreted, and the directions in which the programme continues to develop.

DISCUSSION

A decade of delivering the EWP has taught lessons that go beyond what any single cohort evaluation could reveal, with three practical realities emerging as being the most consequential.

The first concerns the starting assumption. What changed was not the content of the programme as much as its foundational premise. Like most entrepreneurship programmes, early iterations of the EWP were developed around what participants were assumed to need, namely a curriculum of business knowledge designed to compensate for a perceived lack of competence. What the evidence consistently showed, however, was something different: women already had contextual knowledge, lived experiences, and entrepreneurial instincts waiting to be activated. So, rather than building a curriculum around what women were presumed to lack, the programme began designing for what participants already had. Treating the women as capable agents rather than recipients of knowledge produced a

measurable difference. Participants demonstrated increased self-confidence, reconstructed self-concepts and the courage to act on previously deferred business decisions, as documented by both Steenkamp (2016) and Landsberg (2022). These findings, which are consistent with Radu-Lefebvre et al's (2021) systematic review of entrepreneurial identity research, suggest that identity-affirming learning environments that recognise and build on participants' existing knowledge and experience are more likely to produce durable entrepreneurial self-concepts than those focused primarily on what participants lack, rather than what they bring.

The second lesson relates to the form of the intervention. The EWP challenged the assumption that meaningful entrepreneurial education requires extended engagement of a semester, a year, or a degree. The women who benefited most found exactly what they needed to take the next step in their entrepreneurial journey through a structured, time-bounded, practically oriented learning experience. What mattered was not the length of the programme, but its relevance, rigour, and respect for participants' lived realities. Restructuring the programme as a stackable micro-credentials model was the logical conclusion of this insight - if each unit of learning is self-contained, immediately applicable, and independently credentialled, then a participant who completes two modules and pauses is not a failure, she is a credentialled learner who may return, and who has already gained something of real value (Msweli et al., 2022; Varadarajan et al., 2023). Reframing this partial completion is one of the most practically significant shifts made by the EWP. These findings extend emerging work on micro-credentials as equity instruments in the Global South (Msweli et al., 2022; Varadarajan et al., 2023), suggesting that the impact of stackable credentials lie in its accessibility, as well as its capacity to sustain motivation and recognise progress among learners whose engagement is necessarily non-linear.

The third lesson is perhaps the most important and the least transferable without genuine institutional commitment: programmes evolve and improve when they are designed to learn. The EWP did not emerge from a planning process that anticipated every challenge, but from a decade of paying attention: the commitment fee was introduced after observing the implications when participation was free, the financial content was deepened after observing participant responses and noting Steenkamp's (2016) findings, while the micro-credentials architecture was introduced in response to the lessons of COVID-19 and a willingness to restructure rather than simply aiming to recover, with the revised implementation model supported by Landsberg's (2022) findings. None of these adaptations would have been possible without an institutional environment that treated evidence as a resource for improvement rather than a verdict on performance, and without a time horizon long enough for iterative development to amalgamate into something genuinely different from what began. This iterative, evidence-responsive approach reflects what Passarelli and Bongiorno (2025) identify as a critical, but underexplored, dimension of entrepreneurship education: the capacity of programmes to evolve in response to participant outcomes, rather than remaining fixed around initial design assumptions.

For universities considering similar programmes, this may be the most honest and challenging message the EWP's experience offers: the results documented were not the product of good design alone, but of good design sustained and improved across a decade.

CONCLUSION

The EWP had its origins in a modest ambition: to provide access for women to structured, practical entrepreneurship education to fill a gap in existing offerings. A decade later, the EWP delivered more than 100 new female-owned businesses with a 60 percent business formation rate among programme completers and, possibly most significantly, produced a body of evidence documenting the kind of identity-level transformations that statistics alone cannot capture: women who entered the programme uncertain of their agency as entrepreneurs left it thinking and acting differently. This shift, more than any certificate or business plan, is the programme's most enduring contribution.

Less visibly but equally importantly, institutional learning resulted from a decade of offering the EWP. The current model emerged from listening to participants, an evaluator who documented what was working and what required adaptation, mapping of the programme against international best practice, and a pandemic that fast-tracked planned digital transformation. The stackable micro-credentials model is an architectural response to a decade of evidence about what women entrepreneurs actually need, and what their lives actually allow.

Three propositions emerge from this experience for those designing SLPs for women in similar contexts: begin with potential, not deficit; design for real life, not the ideal student; and pledge institutional commitment for the long term, because the outcomes documented were not the product of good design alone, but of good design sustained and improved across a decade.

Although developed within South Africa, the EWP addresses challenges that are common across many emerging economies, where women entrepreneurs frequently encounter barriers related to access, affordability, geographic distance, and competing household responsibilities. The programme's experience suggests that flexible, stackable entrepreneurship education models may provide a practical mechanism for expanding participation and entrepreneurial capability among underserved populations across the Global South, while also offering insights for institutions in developed economies seeking more inclusive and accessible approaches to entrepreneurship education.

The EWP is offered not as a replicable blueprint but as a proof of concept: evidence that inclusive, transformative entrepreneurship education for women is achievable within a short learning format, and that the tools to understand, evaluate, and improve such programmes are available to practitioners willing to use them.

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REFERENCES

- Brush, C. G., Greene, P. G., & Welter, F. (2020). The Diana Project: A legacy for research on gender in entrepreneurship. *International Journal of Gender and Entrepreneurship*, 12(1), 7-25. <https://doi.org/10.1108/IJGE-04-2019-0083>
- Global Entrepreneurship Monitor. (2024). *Global Entrepreneurship Monitor 2023/24 Women's Entrepreneurship Report: Reshaping Economies and Communities*. L. B. S. Global Entrepreneurship Research Association.
- Greyling, L., Landsberg, J. L., & Van der Merwe, H. (2024). *Short Learning Programme for Business Start-ups: A North-West University Case Study*.
- Knowles, M. S. (1984). *Andragogy in action: Applying modern principles of adult learning* (1st ed.). Jossey-Bass.
- Landsberg, J. D. (2022). *Creating a framework to enhance entrepreneurial education at the bhive Enterprise Development Centre of the North-West University* [Thesis, North-West University]. Potchefstroom, South Africa.
- Mezirow, J. (2000). *Learning as transformation : Critical perspectives on a theory in progress*. Jossey-Bass.
- Mhlongo, T., & Daya, P. (2023). Challenges faced by small, medium and micro enterprises in Gauteng: A case for entrepreneurial leadership as an essential tool for success *Southern African Journal of Entrepreneurship and Small Business Management*, 15(1). <https://doi.org/10.4102/sajesbm.v15i1.591>
- Msweli, N., Twinomurinzi, H., & Ismail, M. (2022). The International Case for Micro-Credentials for Life-Wide And Life-Long Learning: A Systematic Literature Review. *Journal of Information, Knowledge, and Management*, 17, 151-183. <https://doi.org/10.28945/4988>
- Nabi, G., Liñán, F., Fayolle, A., Krueger, N., & Walmsley, A. (2017). The impact of entrepreneurship education in higher education: A systematic review and research agenda. *Academy of Management Learning & Education*, 16(2), 277-299. <https://doi.org/10.5465/amle.2015.0026>
- Nussbaum, M. C. (2011). *Creating Capabilities : The Human Development Approach*. Harvard University Press. <https://doi.org/10.4159/harvard.9780674061200>

- Passarelli, M., & Bongiorno, G. (2025). Is it the time to reshape entrepreneurship education? State-of-the-art and further perspectives. *International Entrepreneurship and Management Journal*, 21(61). <https://doi.org/10.1007/s11365-025-01071-y>
- Pierce, J. L., Kostova, T., & Dirks, K. T. (2001). Toward a theory of psychological ownership in organizations. *Academy of Management Review*, 26(2), 298-310. <https://doi.org/10.5465/amr.2001.4378028>
- Radebe, T. N., & Smith, M. (2023). *The current state of women's entrepreneurship in South Africa*. In A. Bosch (Ed.), *Women's Report 2023: Women Entrepreneurs*. <https://www.womensreport.africa/wr2023-paper-one/>
- Radu-Lefebvre, M., Lefebvre, V., Crosina, E., & Hytti, U. (2021). Entrepreneurial Identity: A Review and Research Agenda. *Entrepreneurship Theory and Practice*, 45(6), 1550-1590.
- Sarasvathy, S. D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, 26(2), 243-263. <https://doi.org/10.5465/amr.2001.4378020>
- Schön, D. A. (2016). *The reflective practitioner: How professionals think in action*. Routledge. <https://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=1480239>
- Sen, A. (1999). *Development as freedom*. Oxford University Press.
- South African Government. (2026). *Employment and Labour on Stats SA Q1 of 2026 quarterly labour force survey*. Retrieved 05 18 2026 from <https://www.gov.za/news/media-statements/employment-and-labour-stats-sa-q1-2026-quarterly-labour-force-survey-13-may>
- Steenkamp, A. (2016). *An assessment of a women entrepreneurship programme at a business incubator: A case study approach* [Mini dissertation, North-West University].
- United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. <https://sdgs.un.org/2030agenda>
- Varadarajan, S., Koh, J. H. L., & Daniel, B. K. (2023). A systematic review of the opportunities and challenges of micro-credentials for multiple stakeholders: learners, employers, higher education institutions and government. *International Journal of Educational Technology in Higher Education*, 20(1). <https://doi.org/10.1186/s41239-023-00381-x>
- Wenger-Trayner, E., & Wenger-Trayner, B. (2020). *Learning to make a difference: Value-creation in social learning spaces*. Cambridge University Press. <https://doi.org/10.1017/9781108677431>
- Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511803932>
- Yin, R. K. (2018). *Case study research: Design and methods* (6th ed.). Sage Publications.

EXPLORING POST-PROGRAMME ENTREPRENEURIAL PERCEPTIONS AMONG STEP PARTICIPANTS: INSIGHTS FOR ENTREPRENEURIAL EDUCATION

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ABSTRACT

Entrepreneurship education is increasingly recognised as a means of addressing graduate unemployment and enhancing economic participation in emerging economies such as South Africa. Higher education institutions (HEIs) have therefore introduced entrepreneurship development initiatives aimed at equipping students with entrepreneurial knowledge, competencies and orientations. The Student Training for Entrepreneurial Promotion (STEP) programme represents one such experiential entrepreneurship education initiative designed to enhance students' entrepreneurial capabilities through applied learning. This study explores participants' post-programme entrepreneurial perceptions and selected relationships among variables to generate insights for entrepreneurship education. A quantitative, cross-sectional research design was employed. Survey data were collected from 40 South African participants using a self-administered questionnaire. Data analysis included descriptive statistics, reliability testing and correlation analysis to identify patterns and associations among variables. The findings indicate statistically significant positive correlations among entrepreneurial intention, entrepreneurial identity and entrepreneurial journey, while entrepreneurial growth orientation emerged as a conceptually independent dimension, showing no significant associations with the remaining constructs. The results further highlight the potential value of experiential learning strategies, reflective learning activities and developmental support mechanisms in strengthening students' entrepreneurial orientation. The study contributes to entrepreneurship education literature by providing context-specific insight into post-programme entrepreneurial perceptions within a South African higher education setting. Rather than asserting causal programme effects, the study emphasises patterns of association that may inform the design and enhancement of entrepreneurship education initiatives. The study is limited by its cross-sectional design and relatively small sample size, which restricts generalisability and precludes causal inference. Future research using longitudinal and mixed-method approaches with larger samples is recommended to deepen the understanding of students' entrepreneurial development over time.

Keywords: entrepreneurial education, entrepreneurial perceptions, entrepreneurial intention, entrepreneurial identity, entrepreneurial journey, entrepreneurial growth orientation, STEP programme.

INTRODUCTION

The importance of entrepreneurship education as a strategy to minimise graduate unemployment and promote economic participation has been increasingly recognised, especially in emerging economies such as South Africa (Ajani, 2024). Thus, in addition to disciplinary knowledge, Higher Education Institutions (HEIs) are increasingly expected to equip students with entrepreneurial competencies, attitudes and orientations (Pedroza & Salayandia, 2025) that may support entrepreneurial activity and self-employment (Creso *et al.*, 2024). In response, many institutions have introduced entrepreneurship development initiatives to promote entrepreneurial education through experiential and applied approaches (Nor *et al.*, 2025). Among these approaches, experiential entrepreneurship education has gained significant attention for its emphasis on active participation and reflection on experience (Rajapakse & Vidanalage, 2023).

Experiential entrepreneurship education initiatives such as the Student Training for Entrepreneurial Promotion (STEP) programme provide students with exposure to practical entrepreneurial activities aimed at enhancing entrepreneurial competencies and self-awareness (Step training, 2023; Frese *et al.*, 2016). In addition, entrepreneurship education research increasingly highlights the importance of exploring entrepreneurial intention (Karikari & Ocansey, 2025), entrepreneurial identity (Koropogui *et al.*, 2026) and entrepreneurial orientation (Vijayan & Suryawanshi, 2025) as key outcomes of experiential entrepreneurship education, with growing attention also given to entrepreneurial trajectories (Denosta *et al.*, 2025). Insights into participants' perceptions of these outcomes post-programme may shed light on how experiential entrepreneurship education initiatives contribute to students' entrepreneurial development in higher education contexts (González & Padilla, 2024; Frese *et al.*, 2016; Kolb, 1984).

Therefore, the aim of this study is to explore the post-programme entrepreneurial perceptions of STEP participants in the context of South African higher education. Specifically, the study examines selected relationships among entrepreneurial intention, entrepreneurial identity, entrepreneurial journey and growth orientation, to generate insight that may contribute to the enhancement of entrepreneurship education initiatives.

LITERATURE REVIEW

Entrepreneurial Education and Experiential Learning

Worldwide, entrepreneurship education has been acknowledged as a mechanism to develop individuals to perceive opportunities, generate value and act entrepreneurially (Phiri & Chasaya, 2023). Onalo and Ogwuche (2025) argue that entrepreneurship education extends beyond traditional business start-up training and focuses on developing entrepreneurial behaviour, creativity, innovation and problem-solving capabilities. Entrepreneurship education is widely regarded as a structured and intentional process aimed at equipping individuals with the knowledge, skills and attitudes required to identify opportunities, manage uncertainty and create value in dynamic environments (Ncube *et al.*, 2024). To address these objectives, experiential learning has emerged as a dominant pedagogy in entrepreneurship education (Koape & Mamabolo, 2024).

According to Kolb (1984) experiential learning is a cyclical process in which knowledge emerges through concrete experience, reflective observation, abstract conceptualisation and active experimentation. In entrepreneurship education, experiential learning enables students to engage directly in entrepreneurial activities, thereby bridging the gap between theoretical knowledge and practical application and subsequently enhancing entrepreneurial intention (Motta & Galina, 2023). Consequently, structured experiential entrepreneurship education initiatives such as the STEP programme have emerged (Udeozor *et al.*, 2025). Developed by Frese *et al.* (2016), STEP enhances students' entrepreneurial competencies through structured experiential activities, including opportunity identification, business creation exercises, teamwork and problem-solving tasks. Although Kolb, (1984) experiential learning model and initiatives such as STEP have broad applicability, the value of such structured experiential approaches is especially evident in emerging economies where graduate unemployment places heightened demands on higher education.

Within the South African context, entrepreneurship education is increasingly viewed as a strategic response to persistent graduate unemployment. The country continues to experience significant unemployment challenges, with an overall unemployment rate of 32.7 percent (Trading Economics, 2026) and youth unemployment reaching 45.8 percent (Statistics South Africa, 2026) in the first quarter of 2026. These conditions place considerable pressure on HEIs to develop graduates who are not only employable but also capable of creating their own economic opportunities through entrepreneurial activity (Matabane *et al.*, 2024). In response, experiential entrepreneurship education approaches have gained increasing relevance, as they provide students with practical exposure to entrepreneurial processes within structured learning environments that encourage active participation, reflection and capability development (Rajakpake & Vidanalage, 2023; Kumari & Sudha, 2026). Initiatives such as the STEP programme have consequently been introduced to equip students with entrepreneurial competencies and applied business skills, contributing not only to knowledge and capability development, but also to broader psychological and developmental entrepreneurial outcomes among students (Obschonka & Zarea, 2023; Frese *et al.*, 2016).

Entrepreneurship Outcomes of Experiential Entrepreneurship Education

Experiential entrepreneurship education is increasingly linked to entrepreneurial outcomes that extend beyond simply acquiring knowledge and competencies (Arntzen-Nordqvist & Emilsen, 2026). From the literature it is evident that researchers have increasingly focused on entrepreneurial outcomes that capture psychological and developmental outcomes, such as entrepreneurial intention (Karikari & Ocansey, 2025; Hamilton, 2023), entrepreneurial identity (Koropogui *et al.*, 2026; Greyling, 2023), entrepreneurial orientation (Vijayan & Suryawanshi, 2025) and entrepreneurial trajectories (Denosta *et al.*, 2025). In the context of this study, particular attention is given to entrepreneurial intention, entrepreneurial identity, entrepreneurial journey and entrepreneurial growth orientation. These four constructs were selected as they collectively reflect the motivational, psychological, developmental and growth-related dimensions of entrepreneurial development, and are increasingly recognised in the literature as key outcomes of experiential entrepreneurship education initiatives designed to foster holistic entrepreneurial capability beyond knowledge acquisition alone (Frese *et al.*, 2016; Arntzen-Nordqvist & Emilsen, 2026; Denosta *et al.*, 2025).

Intention is defined as a psychological tendency to carry out a specific action or actions in future (Simamora, 2022). According to Brookes (2026), intention refers to the willingness of an individual to perform a specific behaviour. The definition is well rooted in the work of Ajzen, (1991), where intention is described as the strongest predictor of planned behaviour and influenced by various variables, such as attitude, subjective norms and perceived behavioural control. Entrepreneurial intention is described as an individual's conscious state of mind and willingness to start a new business or engage in entrepreneurial activity (Hamilton, 2023). Within entrepreneurship education research, entrepreneurial intention is often used as an indicator of individuals' entrepreneurial readiness and willingness to pursue entrepreneurial activity (Campaner, 2026). Experiential entrepreneurship education initiatives - such as STEP - may influence entrepreneurial intention by exposing participants to practical entrepreneurial activities that support opportunity identification and perceived entrepreneurial capability (Bahaw *et al.*, 2024).

Identity is described as a process of gathering characteristics, beliefs, personality traits and expressions that define an individual or a group (Stets & Burke, 2025). In addition, identity consists of two levels, namely individual personality (the unique combination of traits and experiences that define an individual) and social identity (an individual's sense of belonging to a larger cultural, demographic or social group) (OECD, 2024). Koropogui (2026) categorised entrepreneurial identity as the way in which individuals perceive themselves as entrepreneurs. Entrepreneurial identity can be conceptually linked to Place's (1956) identity theory in that it assumes identity is grounded in underlying states; however, entrepreneurial identity development is more directly explained through social interactionist perspectives that emphasise role-based self-concepts formed through interaction with the environment. This suggests that entrepreneurial identity is not stagnant but rather develops over time as individuals engage in entrepreneurial experiences, reflect on these experiences and begin to internalise the role of "entrepreneur" within their self-concept (Mathias, 2023). Within entrepreneurship education, entrepreneurial identity is increasingly recognised as an important developmental outcome, particularly in experiential learning environments where students actively participate in entrepreneurial activities (Karikari & Ocansey, 2025). Exposure to entrepreneurial activities may contribute to students' entrepreneurial self-awareness and strengthen their identification with entrepreneurship to consider self-employed rather than pursuing traditional employment (Malebane & Mahlaole, 2023).

Grigore (2023) classifies journey as the process of moving from one place to another. Entrepreneurial journey refers to the developmental process through which individuals engage with entrepreneurial learning, experiences and entrepreneurial self-development over time (Manzi-Puertas *et al.*, 2024). The concept acknowledges that entrepreneurship is not a single event, but rather a dynamic and developmental progression shaped by experiences, learning and personal growth (Amahi *et al.*, 2025). Within entrepreneurship education, students' entrepreneurial journeys may be shaped through practical entrepreneurial engagement, reflective learning and the interaction with entrepreneurial challenges and opportunities. In experiential programmes, individuals are exposed to applied entrepreneurial experiences that may shape their entrepreneurial development pathways (Manzi-Puertas *et al.*, 2024).

The term growth originates in both psychological and economic literature, where it is defined differently, ranging from individual developmental processes in psychology to increases in output and productivity in economics (Bundala, 2022). Within entrepreneurship literature, the term "growth" broadens economic and psychological definitions to include a growth orientation, which portrays an individual's tendency to actively pursue personal, professional and entrepreneurial development through learning and seeking opportunities (Kangerski *et al.*, 2025). In

the field of entrepreneurship, growth-orientated individuals are characterised as people who are willing to learn, adapt and innovate (Ibrahim & Adeniyi, 2024). Within entrepreneurship education, growth orientation may be fostered through experiential learning activities where individuals are encouraged to engage, solve problems and reflect on entrepreneurial experiences (EDHE, 2025). Programmes such as STEP may accordingly contribute to the development of growth-orientated mindsets among participants (Kangerski *et al.*, 2025).

Taken together, the literature highlights that experiential entrepreneurship education has the potential to foster holistic entrepreneurial development that extends beyond knowledge and competency acquisition to encompass the psychological and developmental dimensions of entrepreneurial becoming (Arntzen-Nordqvist & Emilsen, 2026; Denosta *et al.*, 2025). The next section outlines the methodology used to explore post-programme entrepreneurial perceptions of these outcomes within the STEP experiential entrepreneurship education programme.

METHODOLOGY

Research Design and Sample

A quantitative, cross-sectional design was employed. Survey data were collected from 40 STEP programme participants at a South African higher education institution, using a self-administered structured questionnaire. Convenience sampling was used, given the bounded and accessible nature of the programme cohort (Etikan *et al.*, 2016). The study does not seek to evaluate programme efficacy or establish causal relationships; rather, it explores post-programme entrepreneurial perceptions and selected associations among constructs to generate insights for entrepreneurship education.

Table 1 presents the demographic profile of the sample. Notably, all participants identified as African, the majority were male (57.5%), with third-year undergraduates constituting the largest group (57.5%). Participants were drawn from six faculties, with the largest representation from Economics and Management Sciences (35.0%), Natural and Agricultural Sciences (25.0%), and Education (15.0%), confirming that engagement with the STEP programme extended well beyond business-related disciplines.

Table 1: Demographic profile of STEP participants (n=40).

Variable	n	%	Variable	n	%
Gender			Ethnic Group		
Male	23	57.5	African	40	100
Female	16	40.0			
Not reported	1	2.5			
Faculty			Year of study		
Economics & Management Sciences	14	35.0	3 rd year	23	57.5
Natural & Agricultural Sciences	10	25.0	2 nd year	6	15.0
Education	6	15.0	Postgraduate	5	12.5
Humanities	5	12.5	4 th year	3	7.5
Engineering	1	2.5	1 st year	2	5.0
Law	1	2.5	Not reported	1	2.5
Not reported	3	7.5			

Measuring Instrument

Data were collected using a self-administered, structured questionnaire designed to measure participants' post-programme entrepreneurial perceptions. The instrument comprised four theoretically distinct but related constructs that, together, captured the intentional, identity-based, journey-related and growth-orientation dimensions of entrepreneurial development. All items were measured on a six-point Likert-type scale, ranging from 1 = strongly

disagree to 6 = strongly agree. The use of an even-numbered scale deliberately excluded a neutral midpoint and required respondents to indicate either agreement or disagreement. The four constructs measured in the study are:

- Entrepreneurial intention consisted of eight items and assessed participants' intention to pursue entrepreneurship, reflecting their attitudinal orientation, personal desirability, and motivational commitment to becoming an entrepreneur. The construct was adapted from Ajzen (1991).
- Entrepreneurial identity consisted of eight items and measured participants' broader self-concept and identity orientation toward entrepreneurship, including the influence of social networks, peer belonging, and occupational self-concept. The construct was adapted from Greyling (2023).
- Entrepreneurial growth orientation consisted of five items and assessed the extent to which participants self-identified growth ambitions for their envisaged ventures, spanning a spectrum from localised lifestyle aspirations to expansionist goals. The construct was adapted from Greyling (2023).
- Entrepreneurial journey consisted of four items and measured participants' perceived engagement with and progression along an entrepreneurial path, including practical readiness and venture-creation competence. The construct was adapted from Greyling (2023).

The three constructs adapted from Greyling (2023) were selected in preference to internationally developed alternatives on the basis of their contextual relevance to the South African entrepreneurial environment, noting that their application in the present study extends their use into a higher education setting.

Data Analysis

Data were analysed using IBM SPSS Statistics. Descriptive statistics (means, standard deviations, skewness, kurtosis) characterised construct distributions. Internal consistency reliability was assessed via Cronbach's alpha (α), with $\alpha \geq 0.70$ as the preferred threshold and $\alpha \geq 0.60$ accepted for exploratory research with small samples (Nunnally & Bernstein, 1994; Hair *et al.*, 2019). Pearson product-moment correlations examined associations among constructs, with significance evaluated at $p < 0.01$ (two-tailed).

RESULTS AND DISCUSSION

Descriptive Statistics

The descriptive statistics were examined to determine the central tendency, dispersion, and distributional characteristics of the four entrepreneurial constructs. This analysis provides an initial indication of how strongly participants responded to each dimension and whether responses were concentrated or varied across the sample.

Table 2: Descriptive statistics.

Construct	Valid N	Mean	Std Deviation	Skewness	Kurtosis
Entrepreneurial intention	40	5.557	0.475	-0.886	-0.265
Entrepreneurial identity	40	4.893	0.570	-0.337	-0.722
Entrepreneurial growth orientation	40	3.590	0.986	-0.378	4.435
Entrepreneurial journey	40	5.131	0.774	-0.740	-0.440

The results in Table 2 show that entrepreneurial intention recorded the highest mean score ($M = 5.557$, $SD = 0.475$). This suggests that participants reported strong intentions to pursue entrepreneurial activity. The relatively low standard deviation indicates limited variation in responses, suggesting a high degree of agreement among participants regarding their entrepreneurial intentions. The negative skewness of -0.886 indicates that responses were concentrated toward the higher end of the scale, while the kurtosis of -0.265 suggests a relatively normal distribution with little excess kurtosis.

Entrepreneurial journey recorded the second-highest mean score ($M = 5.131$, $SD = 0.774$). This indicates that participants generally perceived themselves as progressing positively along the entrepreneurial pathway, particularly in relation to practical readiness and venture-creation confidence. The larger standard deviation relative to entrepreneurial intention suggests greater variation in participants' perceived entrepreneurial readiness. The negative

skewness value of -0.740 again indicates a tendency toward higher response scores, while the kurtosis value of -0.440 suggests a relatively flat but acceptable distribution. Entrepreneurial identity produced a moderately high mean score ($M = 4.893$, $SD = 0.570$). This suggests that participants generally associated entrepreneurship with their self-concept, although this construct was slightly less strongly endorsed than entrepreneurial intention and entrepreneurial journey. The standard deviation indicates moderate consistency in responses. The skewness value of -0.337 suggests a mild tendency toward higher scores, while the kurtosis value of -0.722 indicates a relatively flat distribution, reflecting some variation in the extent to which participants had internalised an entrepreneurial identity. Entrepreneurial growth orientation recorded the lowest mean score ($M = 3.590$, $SD = 0.986$). This suggests that participants were less strongly oriented toward growth-focused or expansionist entrepreneurial ambitions than toward entrepreneurial intention, identity, or practical readiness in their entrepreneurial journeys. The relatively high standard deviation indicates greater variability in participants' growth aspirations. The skewness value of -0.378 suggests a slight tendency toward higher scores, though it is weak. The kurtosis value of 4.435 indicates a sharply peaked distribution, compared to the other constructs, suggesting that responses were less evenly distributed and may have clustered around specific response points.

Reliability Analysis

Internal consistency reliability was assessed using Cronbach's alpha to determine whether the items within each construct measured a coherent underlying dimension. This step was necessary because the study used multi-item scales to measure entrepreneurial intention, entrepreneurial identity, entrepreneurial growth orientation, and entrepreneurial journey.

Table 3: Internal consistency reliability.

Construct	Cronbach's alpha (α)
Entrepreneurial intention	0.788
Entrepreneurial identity	0.600
Entrepreneurial growth orientation	0.673
Entrepreneurial journey	0.723

As reported in Table 3, entrepreneurial intention demonstrated good reliability ($\alpha = 0.788$). Entrepreneurial journey demonstrated acceptable reliability ($\alpha = 0.723$), while entrepreneurial growth orientation showed marginally acceptable reliability ($\alpha = 0.673$), which is defensible given the exploratory nature of the study and its small sample. Entrepreneurial identity returned the lowest coefficient ($\alpha = 0.600$). This should be interpreted cautiously, although it remains defensible for exploratory research given the conceptual breadth of the construct (Hair *et al.*, 2019; DeVellis, 2017).

Correlation Analysis

Pearson product-moment correlation analysis was conducted to examine the associations among the four entrepreneurial constructs. The purpose of this analysis was not to establish causality, but to identify whether entrepreneurial intention, entrepreneurial identity, entrepreneurial growth orientation, and entrepreneurial journey were statistically associated within the sample.

Table 4: Correlation matrix.

Construct pair	r	P
Entrepreneurial intention – Entrepreneurial journey	0.713	<0.01
Entrepreneurial identity – Entrepreneurial journey	0.566	<0.01
Entrepreneurial intention – Entrepreneurial identity	0.494	<0.01
Entrepreneurial growth orientation – all constructs	-0.161 to 0.299	-

The strongest association emerged between entrepreneurial intention and entrepreneurial journey ($r = 0.713$, $p < 0.01$). This large positive correlation indicates that participants who reported a strong motivational commitment

to pursuing entrepreneurship also perceived themselves as practically ready and competent to initiate a venture. The convergence of these two constructs suggests that, within this sample, entrepreneurial intent and perceived practical competence were closely aligned, reinforcing the well-established link between self-efficacy and intentionality in the entrepreneurship literature (Bandura, 1997; Krueger *et al.*, 2000).

A moderate significant correlation was found between entrepreneurial identity and entrepreneurial journey ($r = 0.566$, $p < 0.01$). Participants who reported a stronger sense of entrepreneurial self-concept, shaped by social belonging, peer networks, and occupational orientation, also tended to perceive themselves as further along an entrepreneurial path in terms of practical readiness and venture-creation competence. Although the cross-sectional design does not allow directional conclusions to be drawn, this association nonetheless has direct implications for how the STEP programme structures its peer interaction and mentorship components. Specifically, it suggests that peer networks and social validation may be meaningfully associated with entrepreneurial confidence and perceived practical readiness, pointing to the value of intentionally designed social learning opportunities within experiential entrepreneurship education programmes. A moderate significant correlation was also observed between entrepreneurial intention and entrepreneurial identity ($r = 0.494$, $p < 0.01$). The co-occurrence of a consolidated entrepreneurial self-concept with strong entrepreneurial intentions is consistent with identity-based models of intentional behaviour, which posit that those who internalise an entrepreneurial role identity are more likely to act in ways aligned with that identity (Fauchart & Gruber, 2011). By contrast, entrepreneurial growth orientation did not correlate significantly with any of the remaining constructs ($r = -0.161$ to 0.299). The absence of significant associations with intention, identity, or journey indicates that growth ambition operates as a conceptually independent dimension: a participant may be deeply intentional, self-identified as an entrepreneur, and practically ready to start a venture, yet remain undecided or conservative regarding the desired scale of that venture. This decoupling is consistent with the literature that distinguishes lifestyle entrepreneurship from high-growth venturing (Hessels *et al.*, 2008) and points to the need for explicit growth-orientation development as a distinct component within entrepreneurship education curricula.

CONCLUSION

This study explored the post-programme entrepreneurial perceptions of STEP participants within a South African higher education context, focusing on the associations among entrepreneurial intention, entrepreneurial identity, entrepreneurial journey and entrepreneurial growth orientation. Rather than evaluating programme efficacy or establishing causal relationships, the study sought to identify patterns of association that may inform the design and enhancement of experiential entrepreneurship education initiatives.

The descriptive findings indicate that participants reported strongly positive perceptions across three of the four constructs, with entrepreneurial intention recording the highest mean score, followed by entrepreneurial journey and entrepreneurial identity. These results suggest that, following participation in the STEP programme, students generally demonstrated strong motivational commitment to entrepreneurship, perceived themselves as practically ready to pursue entrepreneurial activity, and had begun to internalise an entrepreneurial self-concept. Collectively, these findings are consistent with the theoretical expectations of experiential learning (Kolb, 1984) and support the view that structured entrepreneurship education initiatives of this nature may contribute to meaningful psychological and developmental entrepreneurial outcomes among students (Frese *et al.*, 2016; Arntzen-Nordqvist & Emilsen, 2026).

The correlation analysis revealed three statistically significant associations. The strongest relationship emerged between entrepreneurial intention and entrepreneurial journey, suggesting that motivational commitment to entrepreneurship and perceived practical readiness are closely aligned within the sample. This convergence reinforces the well-established link between self-efficacy and intentionality in the entrepreneurship literature (Bandura, 1997; Krueger *et al.*, 2000) and points to the potential value of experiential learning activities that simultaneously develop both motivational and practical entrepreneurial capabilities. Moderate significant associations were also observed between entrepreneurial identity and entrepreneurial journey, and between entrepreneurial intention and entrepreneurial identity, suggesting that the development of an entrepreneurial self-concept may be meaningfully linked to both practical readiness and motivational commitment. These findings highlight the potential role of peer interaction, social belonging and reflective learning activities in supporting entrepreneurial identity development within experiential programme contexts (Cardon *et al.*, 2009).

By contrast, entrepreneurial growth orientation did not correlate significantly with any of the remaining constructs, indicating that it operates as a conceptually independent dimension within the sample. A participant may demonstrate strong entrepreneurial intention, a consolidated entrepreneurial identity and perceived practical readiness, yet remain undecided or conservative regarding the desired scale of their envisaged venture. This decoupling is consistent with the distinction between lifestyle entrepreneurship and high-growth venturing in the literature (Hessels *et al.*, 2008) and represents a noteworthy finding in the South African context, where the development of growth-oriented entrepreneurs is particularly relevant to addressing graduate unemployment and stimulating broader economic participation. The findings therefore suggest that growth orientation may require explicit and targeted attention as a distinct developmental component within entrepreneurship education curricula, rather than being assumed to emerge naturally alongside other entrepreneurial outcomes.

The study contributes to entrepreneurship education literature by providing context-specific insight into post-programme entrepreneurial perceptions within a South African higher education setting, and by extending the application of Greyling's (2023) constructs into a higher education environment. Beyond its scholarly contribution, the findings carry several practical implications for managers, programme administrators and public policymakers involved in the design and support of entrepreneurship education initiatives. For programme managers and administrators at HEIs, the strong alignment between entrepreneurial intention and entrepreneurial journey suggests that experiential programmes are most effective when they develop motivational commitment and practical readiness in tandem, rather than treating these as separate outcomes. The significant association between entrepreneurial identity and entrepreneurial journey further suggests that programme design should incorporate structured peer interaction, mentorship opportunities and reflective learning activities, as these elements may be instrumental in supporting students' entrepreneurial self-concept development and, by extension, their perceived practical readiness. The finding that growth orientation operates independently of the other constructs carries a direct design implication: programmes such as STEP should consider incorporating explicit growth orientation development components, such as exposure to scalable business models, growth-focused mentorship and venture scaling workshops, rather than assuming that ambition for scale will emerge organically alongside entrepreneurial intention and identity. For public policymakers, particularly in the South African context where graduate unemployment remains a pressing national challenge, the findings suggest that investment in experiential entrepreneurship education initiatives at HEIs may contribute meaningfully to the development of entrepreneurially oriented graduates. However, the isolation of growth orientation as an independent construct cautions against assuming that experiential programmes alone will produce the high-growth entrepreneurs needed to drive broader economic participation and job creation. Policymakers could therefore consider complementary interventions, such as post-programme incubation support, access to growth financing and entrepreneurial networking platforms, which extend the developmental impact of experiential programmes beyond the higher education environment and explicitly target growth ambition among promising graduates.

Whilst the study is grounded in the South African higher education context, its findings and implications carry broader international relevance. Graduate unemployment and the pressure on HEIs to produce entrepreneurially capable graduates are challenges shared across many emerging and developing economies globally (Ajani, 2024; Ncube *et al.*, 2024). The pattern of associations identified in this study - particularly the decoupling of growth orientation from other entrepreneurial outcomes - will likely resonate in comparable contexts where experiential entrepreneurship education is being introduced or expanded. Furthermore, the STEP programme itself is an internationally developed initiative (Frese *et al.*, 2016), and the insights generated by this study may therefore inform its application and refinement across diverse higher education settings beyond South Africa. Researchers and practitioners in other emerging economy contexts are encouraged to examine whether similar patterns of association emerge among their own programme participants, which would contribute to a more internationally grounded understanding of the outcomes of experiential entrepreneurship education.

The study is not without limitations. The cross-sectional design captures perceptions at a single point in time and precludes conclusions about entrepreneurial development over the duration of the programme or beyond. The relatively small sample size and use of convenience sampling at a single institution further restrict the generalisability of the findings. Additionally, the absence of a pre-programme baseline means that observed perceptions cannot be directly attributed to programme participation. Future research using longitudinal and mixed-method approaches with larger, more diverse samples across multiple institutions is recommended to deepen understanding of students' entrepreneurial development over time and to explore the conditions under which growth orientation may be more effectively cultivated through experiential entrepreneurship education.

REFERENCES

- Ajani, O.A. (2024). Entrepreneurship Education in South Africa's Higher Education Institutions: In Pursuit of Promoting Self-Reliance. *International Journal of Management, Knowledge and Learning*, 13(1), 29-41. <https://doi.org/10.53615/2232-5697.13.29-41>
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Amahi, F.U. & Chukwuku, E.J. (2025). The Strategic Role of Entrepreneurial Mindset and Culture on Business Performance. *World Journal of Innovation and Modern Technology*, 9(8): 112 – 132. <https://doi.org/10.56201/wjim.v9.no8.2025>.
- Arntzen-Nordqvist, M. & Emilsen, A.S. (2026). Implementing entrepreneurship education across disciplines: train-the-trainer to enhance students' entrepreneurial skills and mindset. *Edward Elgar Publishing*, 94 – 113. <https://doi.org/10.4337/9781035345274.00014>.
- Bahaw, P., Baboolal, A., Mack, A. & Carter-Rogers, K. (2024). Exposure to entrepreneurship education interventions reveal improvement to vocational entrepreneurial intent: a two-wave longitudinal study. *Discover Education*, 3(1), 1-18. <https://doi.org/10.1007/s44217-024-00241-4>.
- Bandura, A. (1997). Self-efficacy: The exercise of control. W. H. Freeman.
- Brookes, E. (2026). Theory of planned behavior. *Simply Psychology*. <https://www.simplypsychology.org/theory-of-planned-behavior.html>
- Bundala, N. (2022). Psychological Determinants of Economic Growth. *International Journal of Advanced Economics*, 4(6), 116 – 130. <https://doi.org/10.51594/ijae.v4i6.351>.
- Campaner, J. (2026). Entrepreneurship Education Influencing Entrepreneurial Intentions of Business Students. *Journal of Information Systems Engineering & Management*, 10(29), 87 – 98. <https://doi.org/10.52783/jisem.v10i29s.4454>.
- Cardon, M. S., Wincent, J., Singh, J., & Drnovsek, M. (2009). The nature and experience of entrepreneurial passion. *Academy of Management Review*, 34(3), 511–532. <https://doi.org/10.5465/AMR.2009.40633190>
- Creso, S., Coweley, S. & Husain, A. (2024). Entrepreneurship education participation and job creation. *Springer Nature Singapore, Entrepreneurial Education*, 1 -18. <https://doi.org/10.1007/s41959-024-00122-9>
- Denosta, H., Magno, J.V.D., Tabasa, S.C. & Bansag, R. (2025). Exploring the entrepreneurial trajectories of BS Entrepreneurship graduates from the classroom to startup. *International Journal of Research Studies in Education*, 14(12), 221 – 227.
- DeVellis, R. F. (2017). Scale development: Theory and applications (4th ed.). Sage.
- Entrepreneurship Development in Higher Education (EDHE). (2025). Impact report 2025. Universities South Africa. https://edhe.co.za/wp-content/uploads/EDHE_ENTREPRENEURSHIP-DEVELOPMENT-LANDSCAPE.
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1–4. <https://doi.org/10.11648/j.ajtas.20160501.11>
- Fauchart, E., & Gruber, M. (2011). Darwinians, communitarians, and missionaries: The role of founder identity in entrepreneurship. *Academy of Management Journal*, 54(5), 935–957. <https://doi.org/10.5465/amj.2009.0211>
- Frese, M., Gielnik, M.M. & Mensmann, M. (2016). Psychological Training for Entrepreneurs to Take Action. Contributing to Poverty Reduction in Developing Countries. *Sage, Association for Psychological Science*, 25(3), 196 – 202. <https://doi.org/10.1177/0963721416636957>.
- González, G.G.M. & Padilla, A.A.J. (2024). Active learning strategies in entrepreneurship. Perceptions and experiences of students at a Mexican University. *Salud, Ciencia Tecnologia – Serie de Conferencias*, 3(701), 1 – 14.

- Greyling, L. (2023). Guiding framework for female entrepreneurial identity development in South Africa (Doctoral thesis, North-West University, South Africa).
- Grigore, R. (2023). Introduction: Journey & Quests. *Theory in Action*, 16(4), 1. <https://doi.org/10.3798/tia.1937-0237.2319>.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). Multivariate data analysis (8th ed.). Cengage Learning.
- Hamilton, L. 2023. South African youth entrepreneurial intention: Mediating role of attitude. *24th Global Business and Technology Association Conference (GBATA)*, Prague, Czech Republic, 233 – 240.
- Hessels, J., van Gelderen, M. W., & Thurik, A. R. (2008). Entrepreneurial aspirations, motivations, and their drivers. *Small Business Economics*, 31(3), 323–339. <https://doi.org/10.1007/s11187-008-9134-x>
- Ibrahim, I.D. & Adeniyi, A. (2024). Cultivating an Entrepreneurial Mindset to Address Unemployment through Innovation, Adaptability and Interdisciplinary Research. *African Journal of Inter/Multidisciplinary Studies*, 6(1), 1-11. <https://doi.org/10.51415/ajims.v6i1.1386>.
- Kangerski, F. de A., Machado, A. de B., & Dandolini, G. A. (2025). Framework for entrepreneurial education: Integrating experiential and transformative learning in vocational institutions. In *The Barcelona Conference on Education 2024: Official Conference Proceedings*, 983–997.
- Karikari, A.F. & Ocansey, E.O.N.D. (2025). Influence of entrepreneurial education on the development of entrepreneurial mindset and intention. *International Journal of Entrepreneurship and Business Innovation*, 8(4), 47 – 66. <https://doi.org/10.52589/IJEBIXMKHOY36>.
- Koape, M. & Mamabolo, A. (2024). The effect of experiential learning on entrepreneurial competencies and business performance. *Journal of Development Entrepreneurship*, 29(2), 1 – 26. <https://doi.org/10.1142/S1084946724500109>
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.
- Koropogui, S.T., St-Jean, E. & Chouchane, R. (2026). Developing entrepreneurial identity through entrepreneurship education: A configurational analysis. *The International Journal of Management Education*, 24, 1 – 16.
- Krueger, N. F., Jr., Reilly, M. D., & Carsrud, A. L. (2000). Competing models of entrepreneurial intentions. *Journal of Business Venturing*, 15(5–6), 411–432. [https://doi.org/10.1016/S0883-9026\(98\)00033-0](https://doi.org/10.1016/S0883-9026(98)00033-0)
- Kumari, S. & Sudha, S. (2026). Entrepreneurship education for management students: A framework-based review. *The International Journal of Management Education*, 24(1), 101311. <https://doi.org/10.1016/j.ijme.2025.101311>.
- Malebane, M.J. & Mahlaole, S.T. (2023). Prior entrepreneurship exposure and work experience as determinants of entrepreneurial intentions among South African university of technology students. *Frontiers in Psychology*, 14, 1 – 14. <https://doi.org/10.3389/fpsyg.2023.1176065>.
- Manzi-Puertas, M.A., Agirre-Aramburu, I. & López-Pérez, S. (2024). Navigating the student entrepreneurial journey: Dynamics and interplay of resourceful and innovative behavior. *Journal of Business Research*, 174, 1-16. <https://doi.org/10.1016/j.jbusres.2024.114524>.
- Mathias, B. (2023). Entrepreneurial identity. *Oxford Research Encyclopedia of Business and Management*, 1 – 17. <https://doi.org/10.1093/acrefore/9780190224851.013.381>.
- Matabane, M.J., Lodewyk-Raliphada, R., & Graupner, L.I. (2024). Preparing graduates for the job market: A strength-based skill development approach. *SA Journal of Human Resource Management*, 22, 1-10. <https://doi.org/10.4102/sajhrm.v22i0.2692>
- Motta, V.F. & Galina, S.V. (2023). Experiential learning in entrepreneurship education: A systematic literature review. *Teaching and Teacher Education*, 121(2), 1 – 12. <https://doi.org/10.1016/j.tate.2022.103919>.

- Ncube, T.R. (2024). Assessing the Impact and Challenges of Entrepreneurship Education in a University of Technology in South Africa. *African Journal of Inter/Multidisciplinary Studies*, 7(2), 1 – 11. <https://doi.org/10.51415/ajims.v7i2.1564>.
- Nor, A.I., Mohamed, F.S., Barre, M.M. & Hussein, M.A. (2025). The role of higher education institutions in promoting entrepreneurship development. *Taylor & Francis, Cogent Business & Management*, 12(1), 1 -18. <https://doi.org/10.1080/23311975.2025.2523417>
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.
- Obschonka, M., Zarea, F. & Vankov, D. (2023). Development of Entrepreneurial Skills in Adolescence and Impact on Economic Transformation: A Systematic Review. *United Nations Industrial Development Organization, Vienna*, 1-134.
- Onalo, S.M. & Ogwuche, L.A. (2025). The Role of Entrepreneurial Education in Fostering Innovation and Job Creation among Youth in Developing Economies. *International Journal of Academic Management Science Research*, 9(10), 140 – 152.
- Organisation for Economic Co-operation and Development (OECD). (2024). Identity definition. OECD. <https://www.oecd.org/content/dam/oecd/en/topics/policy-issues/future-of-education-and-skills/learning-compass-constructs/Identity>.
- Pedroza, J.D. & Salayandia, K.V. (2025). Entrepreneurial competencies in higher education: a literature review. *Review article*, 5(5), 1-14. <https://doi.org/10.21803/ingecana.5.5.923>
- Phiri, M.A. & Chasaya, W. (2023). Entrepreneurship education as a driver of entrepreneurial intentions amongst university students. *Corporate Governance and Organizational Behavior Review*, 7(4), 161 – 170. <https://doi.org/10.22495/cgobrv7i4p14>.
- Place, U. T. (1956). Is consciousness a brain process? *British Journal of Psychology*, 47(1), 44–50. <https://doi.org/10.1111/j.2044-8295.1956.tb00560>.
- Rajapakse, V. & Vidanalage, A.K.T. (2023). The Role of Experiential Learning in Shaping Entrepreneurship Intentions. *Annual International Conference on Business Innovation (IOBI)*, 181 – 190.
- Simamora, B. (2022). Decision, choice, intention, expectation, and willingness: Critics and comments. *Journal Ekonomi Perusahaan*, 29(1), 1-17. https://doi.org/10.46806/j_evpv29i1.834.
- Statistics South Africa. (2026). Quarterly Labour Force Survey (QLFS), Quarter 1: 2026. Statistics South Africa.
- STEP Training. (2023). Student Training for Entrepreneurial Promotion (STEP) programme. *Leuphana University of Lüneburg*. <https://step-training.com/>
- Stets, J. & Burke, P.J. (2025). An overview of identity theory. *Handbook of Social Psychology*, 25 – 41. <https://doi.org/10.4337/9781035306596.00009>.
- Trading Economics. (2026). South Africa unemployment rate. <https://tradingeconomics.com/south-africa/unemployment-rate>
- Udeozor, V., Hughes, M., Ogundana, O. M., & Umoru, U. (2025). Enhancing entrepreneurial outcomes: The role of experiential pedagogy in compulsory entrepreneurship education in developing economies. *Journal of the International Council for Small Business*, 7(2), 332–346. <https://doi.org/10.1080/26437015.2025.2497250>.
- Vijayan, K., Suryawanshi, P.D., Ajotiker, M.V. & Suresh, A.P. (2025). Entrepreneurial orientation of experiential learning programme (ELP) students. *International Journal of Agriculture Extension and Social Development*, 8(8), 261 – 264. <https://doi.org/10.33545/26180723.2025.v8.i8d.2274>.

AUTOMATION vs THE HUMAN TOUCH: STRATEGIC TRADE-OFFS IN SERVICE QUALITY IN HOSPITALITY

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ABSTRACT

The hospitality sector's execution of services is rapidly evolving due to the integration of automation and artificial intelligence (AI) technologies, which are also changing established concepts about employment, guest experience, and service quality. This study critically evaluates the strategic trade-offs between operational effectiveness and human interaction in the hospitality industry within the broader context of Industry 4.0. The paper examines how automation improves consistency, speed, and dependability while also undermining the relational and emotional aspects that support effective service interactions, drawing on recent research. The findings suggest that while automation enhances basic service features, it frequently reduces cultural nuance, empathy, and personalisation, all of which are crucial to guest happiness, especially in upscale hospitality environments. This study also emphasises the dual effect on employment, where automation leads to the creation of new, skill-intensive jobs requiring emotional intelligence and technological proficiency in addition to job loss. In the study's findings, issues of trust, data privacy, system dependability and age disparities are important variables affecting guest's acceptance of automated services. The study declares that the most effective course of action is a hybrid service model, which combines automated systems with human involvement. These approaches allow organisations to redefine employment roles and service design while striking a balance between efficiency and experiential value. The lack of thorough frameworks to direct this integration; however, continues to be a major gap in the research. The study concludes by proposing the need for more empirically grounded and context-sensitive research to support the development of sustainable, human-centric automation strategies in hospitality.

Keywords: automation, hospitality, Artificial Intelligence, robotics, guest experience, human-centered.

INTRODUCTION

The rapid increase and use of automation and artificial intelligence (AI) technologies is causing a significant shift globally in the hospitality industry (Jabeen, Al Zaidi, and Al Dhaheri, 2022). In view of Singh and Sharma (2026) some of the AI services range from self-service check-in kiosks and mobile concierge applications to robotic in room dining service staff and AI-powered chatbots. The design, delivery, and experience of hospitality services are changing because of these technology advancements.

According to Mohanty and Munir (2024) post-COVID-19 pandemic, there has been an increase in the implementation of contactless technologies in the hospitality industry, due to growing concerns about hygiene, safety, and health. Guests have become accustomed to digital payments and mobile check-ins. Hence, automation is being embraced to reduce operational costs while simultaneously improving service responsiveness, consistency, and efficiency. The hospitality industry is renowned for being essentially a human-centered profession built on emotional employment, interpersonal contact, and the ability to give guests a meaningful and memorable experience through empathy, comprehension, and cultural awareness. Mandić, Panić, and Šain (2023) expresses that automation reduces the interpersonal, personal touch that portrays service excellence in hospitality, even while it can expedite procedures and increase accuracy. The warmth, spontaneity, and awareness that human personnel offer to guest engagements and satisfaction may be absent from service experiences mediated by robots. By critically examining the strategic trade-offs between automation and the human touch in contemporary hospitality, this paper aims to close these gaps. The objectives for this research are to: investigate how automation technologies affect service quality and guest experience; Analyse the effects of automation on job opportunities, skills transformation, and employment practices; and suggest

hybrid service models that combine technological efficiency with the relational and experiential aspects of the hospitality industry. The study will employ a systematic literature review process.

LITERATURE REVIEW

In Hospitality

As part of overall Industry 4.0 advancements, the hospitality industry is continually embracing technology that encourages efficiency, scalability, and data-driven decision-making, according to Abdou and Shehata (2026). According to Maier and Edwards (2020), automation technologies have advanced quickly in the hospitality industry, Utilising this technology has proven to shorten the waiting times of guests and increased accuracy. Notwithstanding these benefits, Parker and Grote (2022) highlight that the literature advises against considering automation as a solution that works for everyone. The Adoption of automation technology should be viewed as a revolution of the service ecosystem with intricate organisational and experience ramifications rather than just a technological improvement.

Automation and Service Quality

Within the hospitality industry, service quality has traditionally been assessed using the SERVQUAL model of reliability, responsiveness, assurance, empathy, and tangibles, all of which remain essential contributing factors of guest satisfaction (Ali et al., 2021). However, the rapid advancement of automation technologies has transformed how these dimensions are delivered in the hospitality industry. Sakyi et al. (2024) argues that although automation has the potential to improve certain aspects of service quality, it may at the same time weaken others. For example, automated technologies can significantly improve reliability and responsiveness by reducing human error, increasing operational efficiency, and providing a more speedy and more consistent service delivery. Despite these advantages, automation has limitations in delivering the emotional and interpersonal elements of hospitality. Setiono and Hidayat (2022) assert that automated systems often lack the emotional intelligence and appropriate awareness necessary for meaningful human interactions. Similarly, Prete (2021) argues that guests may understand automated service encounters as impersonal, particularly in situations that require empathy, complex problem-solving, or sensitivity to cultural distinctions. These limitations are especially significant within the luxury hospitality sector, where guests are expecting to receive personalised service and emotional engagement.

Employment and Labour Implications

Koo, Curtis and Ryan (2021) speculate how automation may affect jobs in the hospitality industry, which reflects larger concerns about the nature of work in the era of artificial intelligence. Hospitality is generally a labour-intensive industry. With the introduction of automation, which could change the nature of work, the skills needed, and the demand for labour. Estlund (2021) highlights the possibility of losing one's work, especially for repetitive, low-skilled jobs namely, in room dining service, housekeeping coordination, and front desk operations. Repetitive job tasks may be replaced by robots, which could result in a smaller workforce and more job instability. Contrariwise Tanoy (2025) emphasises the potential for job transformation instead of unemployment. Automation may change the nature of work towards a more complex, creative, and relational tasks that require human judgement and emotional intelligence. New roles may possibly emerge in areas such as technology management, data analysis, and service design, requiring reskilling and upskilling of the workforce. However, this transition is not without challenges, as it requires investment in training and education, as well as organisational support to ensure inclusive access to new opportunities. Houlne (2024) justifies how emotional labour becomes more intense in automated environments. Employees are expected to concentrate on high-value interactions that need more emotional engagement and interpersonal skills since routine jobs are increasingly being performed by machines. Employees may feel more pressure to perform emotional tasks as a result, which could have an impact on their wellbeing and job satisfaction. Therefore, it is important to consider both quantitative changes (number of jobs) and qualitative changes (kind of work) when analysing how automation will affect employment.

Guest Experience in Automated Hospitality Environments

The concept of a "guest experience" has numerous aspects and includes reactions to service interactions on a rational emotional, and sensory level (Ashton 2021). This experience is given fresh perspectives by the integration of automation technologies, which transforms the way guests engage with hospitality services. Das (2023) highlights that on the positive side, automation can improve perceived control, speed, and convenience by enabling guests to customise their experiences and access services as needed. Tomczyk, Mascia, Gierszewski and Walker (2023) contend that the older generation express concerns about the loss of human interaction and ignorance on how to use the new technology. Whilst the younger, tech-savvy generation might be more open to automation. Furthermore, trust turns out to be a crucial element in determining how well guests embrace automation. Guests must have confidence in the reliability, security, and fairness of AI systems. Concerns about data privacy, algorithmic bias, and system failures can negatively impact the guest experience. Therefore, the successful integration of automation requires not only technological functionality but also careful consideration of ethical and relational dimensions.

Figure 1: A summary diagram of a Guest Experience in an Automated Hospitality Environments.



Source: Researcher's own work.

The diagram visualises how technology shapes each stage of the guest journey while maintaining comfort and personalisation.

At the center is "Automated Hospitality Experience", surrounded by six key dimensions:

- Easy Self-service Check-In: it is a quick, contactless arrival via a mobile app.
- Smart Rooms: IoT (Internet of things) enables controls for lighting, temperature, and entertainment.
- Virtual Concierge: having a 24/7 AI assistance for queries and recommendations on dining, travel, and entertainment.
- Automated Dining: robotic in room dining service and digital ordering systems.
- Efficient Services: robotic housekeeping and rapid response systems.

This diagram demonstrates how automation can improve guest satisfaction when balanced with thoughtful design and emotional intelligence.

Towards Hybrid Service Models

Hybrid service models, which combine the advantages of automation with the essential significance of human interaction, are being promoted by an increasing amount of literature. Scholars Alrahamneh, Murshed, and Alhalalmeh, (2026) argue for the integration of automation and human service within a socio-technical framework rather than seeing them as mutually exclusive. This strategy is consistent with the concepts of joint efficiency, in which humans and technical systems are intended to enhance one another. Huzooree, Yadav and Dewasiri (2025) express, hybrid models preserve complicated, interpersonal, and emotionally nuanced interactions for employees while assigning basic, routine responsibilities to automated technologies. This maintains the experience and emotional aspects of service while simultaneously improving operational efficiency. Crucially, to guarantee compatibility with organisational objectives and guest expectations, such models necessitate intentional service design, precise job boundaries, and regular evaluation. The research shows that there aren't many comprehensive frameworks that guide the implementation of hybrid techniques, despite their potential. The need for more integrated and theoretically grounded models is highlighted by the fact that many investigations are still descriptive or exploratory. This gap highlights the contribution of the current study, which aims to create a conceptual framework for "augmented hospitality" that strikes a balance between human-centered service and automation.

IDENTIFIED GAPS IN THE LITERATURE

There are still a significant number of gaps in the current research, even though it offers insightful information about the adoption and consequences of automation in the hospitality industry. Firstly, it is common to look at employment, guest experience, and service quality separately rather than as interrelated aspects of a larger service ecosystem. Secondly, the ethical and developmental consequences of automation have received less consideration, especially when it comes to inclusive growth and fair employment. Thirdly, there aren't many practical frameworks that help practitioners create and execute plans for balanced automation.

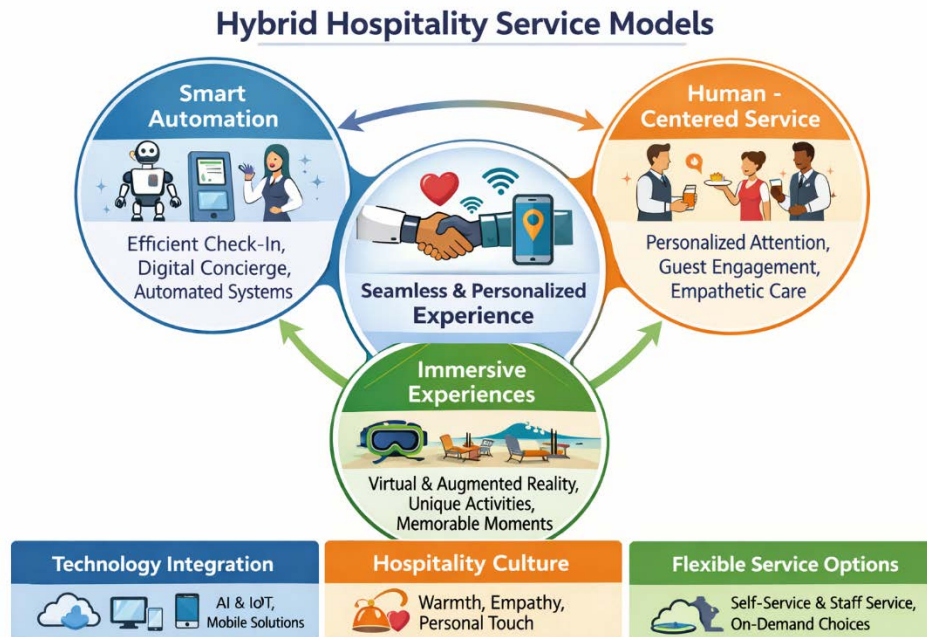
CONCLUSION OF THE LITERATURE REVIEW

According to the research, automation in the hospitality industry offers both advantages and disadvantages, increasing productivity while possibly decreasing the human elements that distinguish excellent service. Automation and hospitality outcomes have a complicated, context-dependent link that is mediated by several circumstances. Methods of integration that incorporate the similarities between technology and human services and go beyond binary thinking are therefore clearly needed. To address this demand, this study suggests a hybrid, human-centered framework for comprehending and controlling technology in the hospitality industry. According to the literature, automation in the hospitality industry is a revolutionary change in the service environment rather than just a technological improvement.

Findings

Automation greatly increases the delivery of service, speed, accuracy, and efficiency noted by Maier and Edwards, (2020), improving responsiveness and reliability. But it frequently reduces empathy, emotional involvement, and personalised service, all of which are still essential to creating value in the hospitality industry. As opposed to being replaced, the traditional criteria of service quality, responsiveness, assurance, empathy, tangibles, and reliability are being redefined. Automation improves functional aspects but reduces from relational aspects, especially in high-touch settings like upscale hospitality. Routine employment duties carry a genuine danger of job loss (Estlund, 2021). Higher-order abilities including emotional intelligence, problem-solving, and technology literacy are necessary for emerging occupations. Employees are increasingly in charge of intricate, emotionally draining interactions when regular jobs are automated, which may raise stress levels and have an adverse effect on wellness. The younger generation are generally more receptive to automation, while older guests exhibit resistance due to unfamiliarity. The most sustainable approach identified is the hybrid (augmented hospitality) model, where automation and human service complement each other. However, there is a lack of strong conceptual frameworks guiding implementation.

Figure 2: This diagram illustrates how efficiency and human touch can coexist, creating a balanced model for modern hospitality.



Source: Researcher's own work.

Limitations of the Study

The reviewed literature presents several limitations:

- A significant percentage of the research, especially in the actual hospitality industry, lacks empirical validity.
- Several studies focus on industrialised economies, with less attention paid to developing countries like South Africa, where employment dynamics are very different.
- Employee well-being and lived experiences in automated environments are less investigated than guest experience.
- Because AI and automation are developing at a rapid pace, conclusions may soon become outdated, limiting their long-term relevance.

Recommendations

- Hybrid service design – allocate repetitive tasks to automation and assign emotionally changeling tasks to human employees.
- Workforce skilling and upskilling – provide training opportunities for employees.
- Human – centered service philosophy – maintain that human touch.
- Service roles and boundaries – prevent service gaps and confusion.

Future Research

To address these gaps, future studies should consider:

- Development of an “Augmented Hospitality” Framework
There is a clear need for a theoretically grounded, empirically tested models that integrate:
 - Technology
 - Human interaction

- o Service quality
 - o Employment challenges
- Context-Specific Studies in Developing Economies
Research should focus on regions like South Africa to explore:
 - o Employment implications
 - o Socio-economic trade-offs
 - o Skills development challenges
- Longitudinal Studies on Workforce Transformation
Examine how automation affects:
 - o Career pathways
 - o Job satisfaction
- Guest Experience Across Sectors
Comparative studies on:
 - o Generational differences
 - o Cultural expectations of hospitality
 - o Luxury vs budget
- Ethics and Trust in AI-Driven Hospitality
Further investigation into:
 - o Algorithmic bias
 - o Data governance
 - o Trust-building mechanisms

Declaration of the Use of AI: I, Seshini Gunpath, declare that I did use Copilot to create my pictures, I also used it for some sentence constructions.

REFERENCES

- Abdou, A. H., & Shehata, H. S. (2026). Digital synergy for hospitality sustainability: a moderated mediation model of IoT, data-driven decision-making, AI, and hotel sustainable performance. *Frontiers in Sustainability*, 6, 1727952.
- Ali, B. J., Gardi, B., Othman, B. J., Ahmed, S. A., Ismael, N. B., Hamza, P. A., ... & Anwar, G. (2021). Hotel service quality: The impact of service quality on customer satisfaction in hospitality. *International Journal of Engineering, Business and Management*, 5(3), 14-28.
- Alrahamneh, A., Murshed, A. A., & Alhalalmeh, A. H. (2026). Socio-Technical Systems in Social Security: Balancing Automation and Human Interaction for Beneficiary Services. In *Business Resilience and Business Innovation for Sustainability: The Double-Edged Role of Artificial Intelligence and Other Disruptive Technologies* (pp. 2369-2382). Cham: Springer Nature Switzerland.
- Ashton, M. T. (2021). *Robotics, artificial intelligence and service automation in hotel service process design: can customer dominant logic provide improved value?* (Doctoral dissertation, Bournemouth University).
- Das, M. P. (2023). Technology and Guest experience: Innovations reshaping hotel management. *International Journal for Multidimensional Research Perspectives*, 1(3), 76-95.
- Del Prete, M. (2021). Emotional artificial intelligence: detecting and managing customer emotions in automated customer service.
- Estlund, C. (2021). *Automation anxiety: Why and how to save work*. Oxford University Press.
- Houlne, T. (2024). *The Intelligent Workforce: How Humans & Machines Will Co-Create a Better Future*. Simon and Schuster.

- Huzooree, G., Yadav, M., & Dewasiri, N. J. (2025). AI and Emotional Intelligence in Project Management: managing hybrid teams in a tech-driven environment. In *Global Work Arrangements and Outsourcing in the Age of AI* (pp. 111-130). IGI Global Scientific Publishing.
- Jabeen, F., Al Zaidi, S., & Al Dhaheri, M. H. (2022). Automation and artificial intelligence in hospitality and tourism. *Tourism Review*, 77(4), 1043-1061.
- Koo, B., Curtis, C., & Ryan, B. (2021). Examining the impact of artificial intelligence on hotel employees through job insecurity perspectives. *International Journal of Hospitality Management*, 95, 102763.
- Maier, T., & Edwards, K. (2020). Service system design and automation in the hospitality sector. *Journal of Hospitality*, 2(1-2), 1-14.
- Mandić, D., Panić, A., & Šain, M. Č. (2023, December). Automated service delivery in hotels: Balancing efficiency and human interaction for optimal guest satisfaction. In *International Scientific Conference on Economics, Management and Information Technologies* (Vol. 1, No. 1, pp. 167-174).
- Mohanty, P. P., & Munir, A. (2024). Contactless service in postcovid-19: An insight from the hospitality industry. In *Post-COVID tourism and hospitality dynamics* (pp. 381-399). Apple Academic Press.
- Parker, S. K., & Grote, G. (2022). Automation, algorithms, and beyond: Why work design matters more than ever in a digital world. *Applied psychology*, 71(4), 1171-1204.
- Sakyi, J. K., Nnabueze, S. B., Filani, O. M., Okojie, J. S., & Babatope, O. M. (2024). Digital Transformation in Service Delivery Leveraging Automation and Risk Reduction for Long-Term Commercial Efficiency.
- Setiono, B. A., & Hidayat, S. (2022). Influence of service quality with the dimensions of reliability, responsiveness, assurance, empathy and tangibles on customer satisfaction. *International Journal of Economics, Business and Management Research*, 6(09), 330-341.
- Singh, G., & Sharma, R. (2026). Robotics in Luxury Hospitality: Transforming Service Experience in Five-Star Hotel Restaurants. In *Robotics in Hotel Services: Housekeeping, Reception, and Concierge Services* (pp. 181-216). IGI Global Scientific Publishing.
- Tanoy, M. D. (2025). Artificial Intelligence and the Future of Work: A Critical Examination of Labor Market Transformation in the Era of Cognitive Automation. *Available at SSRN 5974495*.
- Tomczyk, L., Mascia, M. L., Gierszewski, D., & Walker, C. (2023). Barriers to digital inclusion among older people: a intergenerational reflection on the need to develop digital competences for the group with the highest level of digital exclusion. *Innoeduca. International Journal of Technology and Educational Innovation*, 9(1), 5-26.

UNDERSTANDING GROWTH FACTORS IN WOMEN-OWNED BUSINESSES: EVIDENCE FROM A SYSTEMATIC REVIEW IN LIMPOPO PROVINCE

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ABSTRACT

Women-owned businesses are key to economic development, poverty reduction, job creation and community transformation, especially in rural economies. Despite structural inequalities, financial constraints and socio-cultural barriers, women entrepreneurs in rural areas of South Africa still play an important role in local economic activities. However, few studies systematically explored the growth factors of women-owned businesses in rural areas through the lens of the Theory, Context, Characteristics and Methodology (TCCM) framework. This paper synthesises evidence on the factors that enable or constrain the growth of women-owned businesses in rural Limpopo Province. Using the TCCM framework and the SPAR-4-SLR protocol, the review screened literature published between 2010 and 2025 from Scopus, Web of Science, Google Scholar and relevant dissertations. From an initial pool of 127 records, 15 studies met the inclusion criteria after duplicate removal, eligibility screening and quality appraisal using the Mixed Methods Appraisal Tool. The synthesis shows that growth is shaped by the interaction of financial inclusion, entrepreneurial education, social capital, government support, digital access, market access and infrastructure. Theoretically, the study contributes to integrating the fragmented literature through the TCCM framework. In practice, the study provides insights for policymakers, development agencies and entrepreneurship support institutions. The paper argues that high-impact support for women-owned businesses in Limpopo must shift from isolated interventions to integrated rural entrepreneurship ecosystems that combine resources, capabilities, markets and institutional accountability.

Keywords: women's entrepreneurship, business growth, Limpopo province, rural, systematic review, TCCM framework.

INTRODUCTION

Entrepreneurship is generally recognised as a driver of economic development, employment generation and poverty reduction, especially in developing economies (Mahadea et al., 2022). Women entrepreneurship has been growing as an important driver of economic growth, household income generation, and community development worldwide (Beriso, 2021). Women-owned businesses play an important role in rural communities' livelihoods in agriculture, retail, tourism, and informal trading (Donga & Chimucheka, 2024; Neumann, 2020; Welter, 2011). Women entrepreneurs are an important part of the small business sector in South Africa, especially in predominantly rural provinces such as Limpopo, where unemployment, poverty and inequality remain high (Statistics South Africa, 2022). Although women-owned businesses contribute to local economies, they still face many challenges that hinder business growth and sustainability. Studies show that women entrepreneurs face barriers such as limited access to finance, poor infrastructure, weak technological adoption, low educational attainment, and socio-cultural constraints (Brush et al., 2019; World Bank, 2022; Netshikhudini, 2023). In Limpopo Province, many women start businesses as a survival strategy due to a lack of formal employment; however, these businesses struggle because of insufficient institutional support, infrastructural deficits, and limited entrepreneurial skills (OECD, 2021; Mahlomaholo et al., 2023).

Although there have been several studies on women entrepreneurship in South Africa, limited research has systematically reviewed growth factors influencing women-owned businesses in rural Limpopo Province using the TCCM framework. The TCCM framework provides a structured research approach (Paul & Rosado-Serrano, 2019).

The study, therefore, aims to systematically review literature on factors influencing the growth of women-owned businesses in rural Limpopo Province using the TCCM framework. The objectives are to:

1. Identify theories used to explain growth factors in women-owned businesses.
2. Examine the factors influencing the growth of women-owned businesses in rural areas of Limpopo Province.
3. Provide recommendations for future research based on study findings.

The study seeks to address the following research questions:

1. What theories have been used to explain growth factors in women-owned businesses?
2. What factors influence the growth of women-owned businesses in rural areas of Limpopo Province?
3. What recommendations can be proposed for future research based on study findings?

CONCEPTUALISING WOMEN’S ENTREPRENEURSHIP IN LIMPOPO PROVINCE USING TCCM FRAMEWORK

Theoretical Framework

The literature reviewed in this study shows that several theories have been used to explain women's entrepreneurship and business growth. Human capital theory suggests that education, training and entrepreneurial skills are important for improving business performance (Ebewo et al., 2025). This view is supported by Majola (2025), who argues that women entrepreneurs with better skills and knowledge are likely to grow their businesses. However, the theory is criticised for focusing on individual capabilities and ignoring structural barriers such as poverty and gender inequality. Social capital theory emphasises networks, relationships, and social support systems that enable entrepreneurial activities (Ogundana et al., 2023). Ogujiuba et al. (2025) contend that, unlike the human capital theory that focuses on individual skills, social capital theory underscores the importance of external relationships in gaining access to finance, information and markets. Critics say rural women entrepreneurs often are excluded from influential business networks. Feminist theory theorises how gender inequalities and patriarchal norms inhibit women’s entrepreneurial opportunities (Ebewo et al., 2025), whereas the institutional theory theorises how formal and informal institutions such as policies, culture and regulations influence entrepreneurial behaviour (Henry et al., 2021). The Resource-Based View (RBV) theory states that access to resources such as finance, skills and social capital is vital for the growth of businesses (Brush et al., 2019). Collectively, these theories suggest that female entrepreneurship is affected by individual, social, institutional and resource-related factors.

Context

A review of existing literature in this study indicates that most studies on women entrepreneurship in South Africa are focused on urban areas, and rural contexts are underexplored (Donga & Chimucheka, 2024; Welter, 2011). Mahadea et al. (2022) found that financial institutions and entrepreneurship support services are concentrated in urban centres, and rural women entrepreneurs are dependent on informal credit systems. This highlights the gap between entrepreneurial opportunities in urban and rural areas. The Limpopo Province is marked by high unemployment, poverty, poor infrastructure and dependence on informal economic activities (Statistics South Africa, 2023). For example, Ebewo et al. (2022) state that poor roads, erratic electricity and weak digital connectivity, among others, hinder business growth. Infrastructural challenges notwithstanding, women’s access to resources and business opportunities is still limited by patriarchal cultural systems. Most female rural entrepreneurs in Limpopo operate micro- and small-scale enterprises in sectors such as agriculture, retail, catering, and tourism (OECD, 2021). Sithole (2019) found that patriarchal attitudes limit women’s autonomy and entrepreneurial participation. Consequently, the literature shows that the rural context significantly shapes the opportunities and challenges faced by women-owned businesses.

Characteristics

The literature reviewed in this study shows that women-owned businesses in rural areas are commonly characterised by small-scale operations, informal structures, limited capital investment, and low technological adoption (Storey, 2016). These findings are consistent across studies; however, some scholars argue that informality can provide flexibility for survival in resource-constrained environments, while others see it as a constraint to growth because of

limited access to finance and formal markets (Sithole, 2019; Ebewo et al., 2025). Kerr et al. (2018) suggest that, despite these limitations, women entrepreneurs with a growth orientation often demonstrate resilience, innovation, adaptability, and strong community engagement. On the other hand, less successful enterprises are often characterised by a low risk-taking capacity and limited exposure to business development support (Ebewo et al., 2025). This implies that entrepreneurial outcomes differ greatly even in similar rural contexts, depending on individual and environmental factors. In terms of innovation, Moyo and Gumbo (2023) argue that women entrepreneurs in rural Limpopo primarily practice incremental innovation, such as small process improvements or product diversification, rather than radical innovation. This differs from studies in more developed contexts where higher levels of technological innovation are more common. The literature indicates that business characteristics are shaped by both resource constraints and contextual conditions in rural areas.

Methodology

Research on women's entrepreneurship in Limpopo Province commonly employs qualitative, quantitative, and mixed-methods approaches. Quantitative surveys are used to identify patterns and relationships (Creswell & Creswell, 2018), while qualitative case studies provide deeper contextual insight (Mahlomaholo et al., 2023). The different approaches have different emphases, with quantitative studies aiming at generalisation and qualitative studies aiming at depth. According to Moyo and Gumbo (2023), mixed methods are used because they combine both approaches to gain a more complete understanding of women's entrepreneurship. However, many studies still use single-method designs, hindering the ability to fully capture the complexity of rural entrepreneurship. Methods of data collection include surveys, interviews, focus groups, case studies, and secondary data analysis (Mahlomaholo et al., 2023). However, longitudinal and comparative studies are underused in the literature, which limits understanding of long-term business growth. Therefore, this study aims to systematically review the current literature and identify research gaps using the TCCM framework (Paul & Rosado-Serrano, 2019).

FACTORS INFLUENCING THE GROWTH OF WOMEN-OWNED BUSINESSES

Access to Finance

According to the World Bank (2022), access to finance is one of the key determinants of women-owned business growth. However, studies also highlight persistent barriers, such as a lack of collateral, low financial literacy, and discriminatory lending practices, that hinder rural women's access to formal (OECD, 2021; Donga & Chimucheka). Neumann (2020) notes that access has improved for some women entrepreneurs through microfinance and government funding programmes, although coverage remains limited. In contrast, Netshikhudini, (2023) argues that financial access enables business expansion, technology adoption and job creation, but its impact is constrained without inclusive financial systems. This means that financial inclusion is important for growth, but its effectiveness depends on equitable and accessible financial support structures.

Education and Entrepreneurial Training

The literature reviewed in this study shows that education and entrepreneurial training are important for the growth of women-owned businesses. Majola (2025) argues that education improves skills and decision-making, while Storey (2016) notes that education alone may be insufficient without practical experience, especially in rural contexts. According to Netshikhudini (2023), women entrepreneurs with training are better able to manage finances, marketing, and operations, but many still lack access to quality education opportunities. Fielden and Davidson (2010) add that government and NGO training programmes improve entrepreneurial skills, although their impact depends on accessibility and relevance. The literature suggests that education and training support business, but are most effective when combined with practical, accessible support systems.

Social Capital and Networking

Social capital and networking are critical to the growth of women-owned businesses. Donga & Chimucheka (2024) suggest that social relationships offer access to information and opportunities; access is often unequal, especially for rural women. Brush et al. (2019) found that participation in business associations improves performance and confidence, but limited access to formal networks can limit growth opportunities. Welter (2011) further adds that family and peer support strengthen resilience and sustainability. Therefore, the literature indicates that networking contributes to business growth. However, the extent of this effect depends on access to strong and inclusive social networks.

Government Support and Policy Environment

Government support and policy frameworks play an important role in promoting women entrepreneurship. The South African Government (2023) argues that funding schemes, training programmes, tax incentives, and market access initiatives are designed to support women-owned businesses. In contrast, OECD (2021) highlights that despite these interventions, many rural women entrepreneurs still struggle to access such support due to weak implementation and limited outreach. While policy support is intended to enhance business growth, its effectiveness is often reduced by bureaucratic procedures and low awareness among rural women entrepreneurs (Netshikhudini, 2023). This suggests a gap between policy design and actual implementation in rural contexts. Overall, the literature indicates that government support is important, but its impact depends on effective delivery and accessibility.

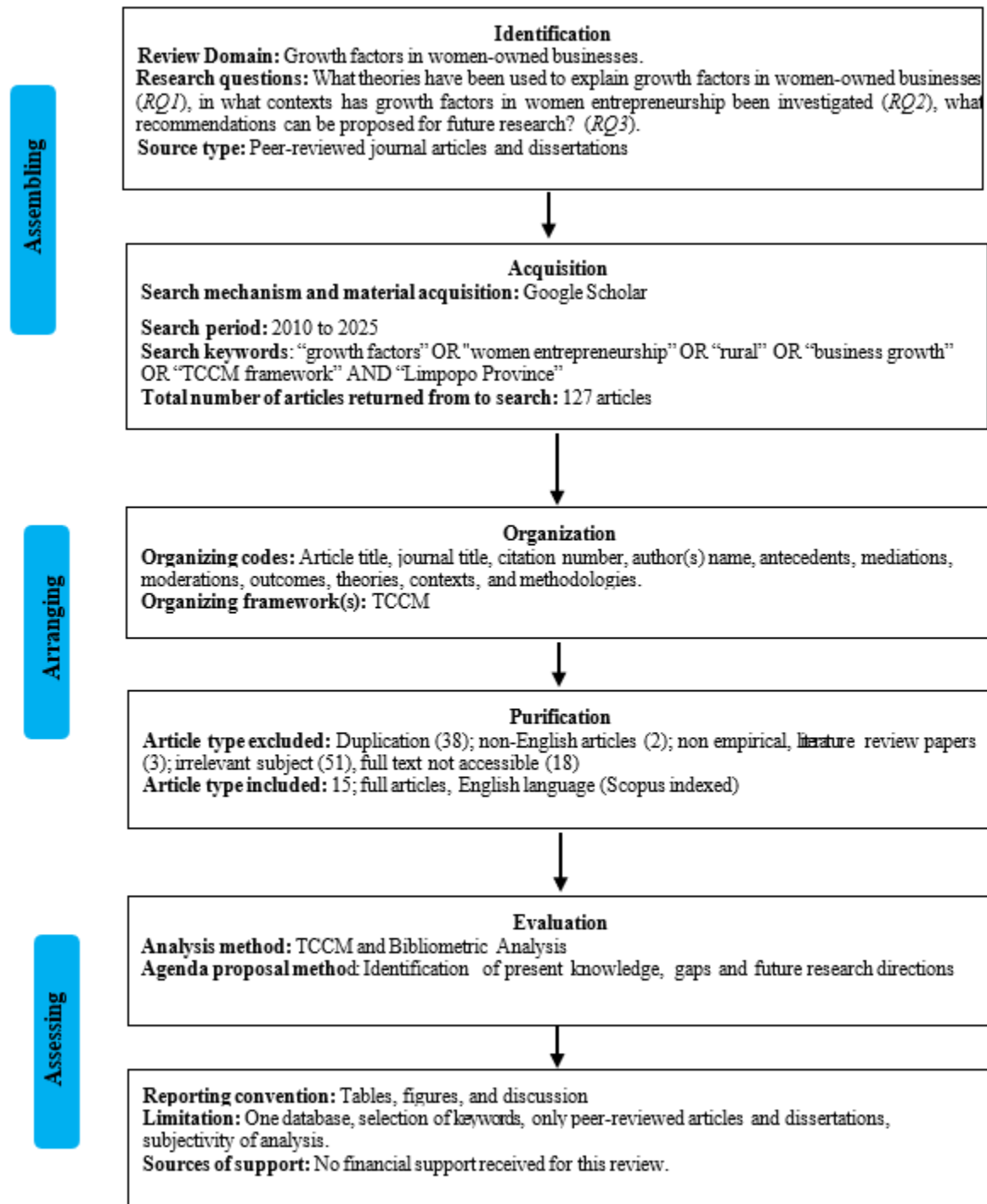
Technological Adoption and Digital Inclusion

The literature reviewed in this study shows that digital technologies are increasingly important for the growth of women-owned businesses. The World Bank (2022) argues that digital tools enable market expansion, online marketing, financial transactions, and customer engagement. In contrast, Statistics South Africa (2022) highlights that many rural women remain digitally excluded due to weak infrastructure and limited access to devices, limiting their ability to benefit from these opportunities. While digital adoption is widely viewed as a growth enabler, the literature shows a clear gap between urban and rural access to technology (Lethoko & Netshikhudini, 2023; Mahlomaholo et al., 2023). This suggests that technological benefits are unevenly distributed, with rural women entrepreneurs facing greater constraints. Consequently, the literature indicates that improving digital literacy and infrastructure is essential to enhancing the competitiveness and business growth of rural women entrepreneurs.

RESEARCH METHODOLOGY

This study systematically reviewed literature on growth factors for women-owned businesses in rural Limpopo Province using the SPAR-4-SLR protocol (Paul et al., 2021). The review had three stages: 1. Assembling relevant studies (2010–2025), 2. Arranging them through screening and eligibility checks, and 3. Assessing the final studies using the TCCM framework (Paul & Rosado-Serrano, 2019). This provided a systematic and transparent summary of the evidence on growth factors for women's entrepreneurship. Data were collected from Scopus, Web of Science and Google Scholar to capture both peer-reviewed and relevant grey literature. The search was conducted using keywords such as “women-owned businesses”, “growth factors”, “rural entrepreneurship”, and “Limpopo Province”, combined with Boolean operators. The search only included studies published between 2010 and 2025. The Mixed Methods Appraisal Tool (MMAT) was used to assess quality (Pluye & Hong, 2014). Included studies were empirical peer-reviewed articles, dissertations, and conference papers focusing on growth factors in women-owned businesses in rural South Africa, with emphasis on Limpopo Province (2010–2025). Excluded were urban-focused studies, non-empirical papers, non-English publications, and studies outside the time frame. The initial search yielded 127 records; duplicates were identified and removed manually. The remaining records underwent a screening process. This process resulted in 15 studies included in the final synthesis. Thematic analysis guided by the TCCM framework was used to synthesise findings into key themes such as financial, social, institutional, and technological growth factors, enabling identification of patterns and research gaps in rural women entrepreneurship.

Figure 1: Review procedure using the SPAR-4-SLR protocol.



Source: (Paul et al., 2022).

FINDINGS

Table 1: Emerging themes from the illustrative studies from 2010-2025.

No.	Empirical Theme	Key Findings	Source
1	Access to Finance	Women entrepreneurs in rural areas face challenges accessing loans due to a lack of collateral, low financial literacy, and restrictive lending systems. Financial support improves business sustainability and growth.	Khosa (2019); Makola (2022)
2	Entrepreneurial Education and Training	Entrepreneurial education and skills development improve innovation, management capacity, and business survival among women-owned enterprises.	Fielden & Davidson (2010); Lekhanya (2015); Kaka (2021)
3	Social Capital and Networking	Networking and mentorship improve rural women entrepreneurs' access to information, markets, and entrepreneurial opportunities.	Welter (2011); Khosa (2019)
4	Government Support and Policy Environment	Government interventions, entrepreneurship programmes, and empowerment policies positively influence women-owned business growth, although implementation remains inconsistent in rural areas.	Herrington et al. (2017); Mashamaite (2022)
5	Technological Adoption and Digital Inclusion	Digital technologies support business competitiveness, marketing, and customer engagement; however, rural women continue to experience digital exclusion.	Mbuyisa & Leonard (2017); Kamutuezu et al. (2021)
6	Family and Community Support	Emotional and operational family support contributes positively to entrepreneurial resilience and business sustainability among women entrepreneurs.	Fielden & Davidson (2010); Welter (2011); Seshibedi (2021)
7	Socio-cultural Barriers	Patriarchal norms, gender discrimination, and traditional cultural expectations continue to constrain women's entrepreneurship in rural communities.	Duflo (2012); Lethoko & Netshikundini (2024)
8	Infrastructure Constraints	Poor road networks, inadequate electricity, limited internet access, and weak rural infrastructure negatively affect women-owned business growth.	Khosa (2019); Makola (2022)
9	Work–Family Balance	Women entrepreneurs struggle to balance family responsibilities with business activities, affecting business performance and expansion.	Jennings & Brush (2013); Roomi & Harrison (2010); Seshibedi (2021); Lethoko & Netshikundini (2024)
10	Market Access and Business Expansion	Limited market access, transportation barriers, and a lack of formal business networks constrain business expansion opportunities.	Storey (2016); Ngomane (2023)
11	Innovation and Entrepreneurial Orientation	Entrepreneurial orientation, innovation, and adaptability improve business competitiveness and long-term sustainability.	Zahra & Wright (2011); Urban & Naidoo (2012); Harpa et al. (2015)
12	Institutional and Structural Challenges	Bureaucratic systems, weak institutional support, and poor implementation of entrepreneurship policies hinder women-owned business growth in rural areas.	Welter (2011); Makola (2022); Mashamaite (2022)

13	Human Capital Development	Education, entrepreneurial experience, and management competencies significantly influence business performance and growth sustainability.	Storey (2016); Kaka (2021)
14	Entrepreneurial Ecosystems	Supportive entrepreneurial ecosystems that integrate finance, mentorship, infrastructure, education, and policy support enhance women's entrepreneurship outcomes.	Stam (2015); Isenberg (2011); Neumann (2020); Mashamaite (2022)
15	Rural Contextual Realities	Rural women entrepreneurs largely operate informal and micro-enterprises influenced by poverty, unemployment, and limited economic opportunities.	Welter (2011); Seshibedi (2021); Khosa (2019)

Table 2: Synthesis of results.

TCCM dimension	Main pattern	Implication for a high-impact paper
Theory	RBV, institutional, social capital, human capital and feminist lenses dominate, but are often used separately.	Integrate theories to explain how resources, capabilities, gender and institutions interact.
Context	Rural Limpopo is shaped by poverty, dispersed settlements, infrastructure deficits and patriarchal norms.	Separate Limpopo-specific evidence from broader South African claims.
Characteristics	Businesses are often micro, informal, low-capital and incrementally innovative.	Avoid deficit-only framing; show adaptive capabilities and growth pathways.
Methodology	Most studies are cross-sectional, qualitative, survey-based or mixed-method. Longitudinal evidence is limited.	Prioritise longitudinal, comparative and intervention-based research.
Growth factors	Finance, education, networks, policy support, digital access and market access reinforce one another.	Frame growth as an ecosystem outcome rather than a single-factor problem.

DISCUSSION

The review advances three arguments. First, women-owned business growth in rural Limpopo is best understood as the conversion of constrained resources into capabilities. Finance, training, networks and digital access matter because they expand what entrepreneurs are able to do. Second, the rural context changes how growth factors work. A training programme that is effective in an urban setting may have limited value where transport is costly, internet connectivity is weak, and markets are thin. Third, gendered institutions shape both opportunity and constraint. Patriarchal norms, unpaid care work and unequal access to property and collateral influence whether women can convert support into growth.

The TCCM framework shows that the literature has made useful progress but remains uneven. Theoretically, studies identify relevant lenses but seldom integrate them into a coherent explanation of rural women-owned business growth. Contextually, Limpopo is often treated as a location rather than as a set of spatial, institutional and cultural conditions that actively shape entrepreneurship. In terms of characteristics, many studies describe informality and smallness as weaknesses, but fewer examine how informality can also provide flexibility, speed and local embeddedness. Methodologically, cross-sectional designs dominate, limiting understanding of growth trajectories over time.

A stronger research agenda should therefore move from listing barriers to explaining mechanisms. For example, instead of asking only whether finance matters, future studies should ask which financial products work for which types of rural women-owned businesses, under what institutional conditions, and with what complementary

support. Instead of asking only whether training matters, research should evaluate the design, duration, delivery mode and post-training outcomes of entrepreneurship programmes. This mechanism-oriented approach can produce evidence that is more useful for policymakers, funders and development practitioners.

CONCLUSION AND MANAGERIAL IMPLICATIONS

The findings point to five practical implications. First, financial institutions and development agencies should design gender-responsive rural finance that combines credit, savings, financial literacy and aftercare. Second, municipalities and provincial agencies should create local entrepreneurship support desks that help women entrepreneurs with registration, compliance, applications and market information. Third, universities and TVET colleges should support community-based training and mentorship programmes linked to real business problems. Fourth, digital inclusion should be treated as a business-growth priority, with practical support for mobile payments, social-media marketing, e-commerce readiness and cybersecurity awareness. Fifth, procurement and market-access initiatives should create pathways for rural women-owned businesses to supply schools, hospitals, municipalities, tourism operators and local retailers.

Future research should prioritise longitudinal studies that follow women-owned businesses over time and identify the conditions under which businesses move from survival to growth. Comparative studies across Limpopo districts would help explain how infrastructure, markets and local institutions produce different outcomes. Sector-specific research is also needed because growth factors may differ between agriculture, retail, tourism, services and manufacturing. Finally, intervention studies should evaluate whether finance-plus-training, mentorship, digital inclusion and procurement programmes produce measurable improvements in revenue, employment, resilience and formalisation.

Women-owned businesses in rural Limpopo are essential to inclusive development, but their growth is constrained by interlocking financial, institutional, infrastructural, digital and gendered barriers. The evidence shows that no single intervention is sufficient. High-impact support must build entrepreneurship ecosystems that connect finance, capability development, networks, markets, infrastructure and institutional accountability. By applying the TCCM framework, this paper clarifies the theories, contexts, business characteristics and methodological gaps that shape the field. The central contribution is a shift from a barrier-listing narrative to a capability and ecosystem perspective on rural women-owned business growth.

REFERENCES

- Beriso, B. S. (2021). Determinants of economic achievement for women entrepreneurs in Ethiopia. *Journal of Innovation and Entrepreneurship*, 10(5), 1–17. <https://doi.org/10.1186/s13731-020-00141-5>
- Brush, C. G., de Bruin, A., & Welter, F. (2019). A gender-aware framework for women's entrepreneurship. *Entrepreneurship Theory and Practice*, 43(1), 7-26.
- Creswell, J. W. & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE.
- Donga, G. & Chimucheka, T., (2024). Rural women entrepreneurship in South Africa: Issues and challenges. *African Journal of Inter/Multidisciplinary Studies*, 6(1), pp.1–12. Available at: *African Journal of Inter/Multidisciplinary Studies* [Accessed 16 May 2026].
- Ebewo, P. E., Schultz, C., & Mmako, M. M. (2025). Towards inclusive entrepreneurship: Addressing constraining and contributing factors for women entrepreneurs in South Africa. *Administrative Sciences*, 15(1), 14. <https://doi.org/10.3390/admsci15010014>
- Fielden, S., & Davidson, M. (2010). *International Research Handbook on Successful Women Entrepreneurs*. Edward Elgar Publishing.

- Henry, C., Coleman, S., Foss, L., Orser, B., & Brush, C. G. (2021). Richness in diversity: Towards more contemporary research conceptualisations of women's entrepreneurship. *International Small Business Journal*, 39(7), 601–613. <https://doi.org/10.1177/02662426211020608>
- Kerr, S. P., Kerr, W. R., & Xu, T. (2018). Personality traits of entrepreneurs: A review of recent literature. *Foundations and Trends in Entrepreneurship*, 14(3), 279–356.
- Lethoko, M., & Netshikundini, M. (2024). The Challenges of Rural Women Small-Business Owners in Limpopo Province: A Case of Makhado Local Municipality, South Africa.
- Mahadea, D., Kaseeram, I., & Pillay, K. (2022). Women entrepreneurship in South Africa: Constraints and opportunities in rural areas. *African Journal of Economic and Management Studies*, 13(1), 74–90. <https://doi.org/10.1108/AJEMS-01-2021-0032>
- Mahlomaholo, S. M., Shai, K. B., & Kgatla, S. T. (2023). Barriers to growth of women-owned enterprises in rural Limpopo. *Journal of African Business*, 24(1), 134–150. <https://doi.org/10.1080/15228916.2022.2080557>
- Majola, R., (2025). *Analysis of women entrepreneurship in township and rural areas in South Africa*. *Journal of the International Council for Small Business*, 6(3), pp.383–391. Available at: Taylor & Francis Online [Accessed 16 May 2026].
- Majola, R., (2025). *Analysis of women entrepreneurship in township and rural areas in South Africa*. *Journal of the International Council for Small Business*, 6(3), pp.383–391. Available at: Taylor & Francis Online [Accessed 16 May 2026].
- Moyo, S., & Gumbo, T. (2023). Methodological trends in gender and entrepreneurship research in Southern Africa. *Journal of Development Studies*, 59(2), 220–235. <https://doi.org/10.1080/00220388.2022.2137820>
- Netshikundini, M. (2023). An investigation of the challenges faced by women-owned small-medium enterprises in the Makhado Local Municipality, Limpopo Province (Master's dissertation). University of Limpopo.
- Neumann, T. (2020). The impact of entrepreneurship on economic, social and environmental welfare. *Management Decision*, 59(3), 820–840.
- OECD. (2021). *The Missing Entrepreneurs Report*. Paris: OECD Publishing.
- Ogujiuba, K., Eggink, M., Ogujiuba, C., & Boshoff, E. (2025). *Effect of contextual factors on the entrepreneurial ecosystem in South Africa*. *World*, 6(3), 91. <https://doi.org/10.3390/world6030091>.
- Ogundana, O. M., Igwe, P. A., Simba, A., & Umoru, U. (2023). Entrepreneurial networks and women entrepreneurship: A social feminist perspective of social capital. *International Review of Entrepreneurship*, 21(1), 1–23.
- Paul, J., & Rosado-Serrano, A. (2019). Gradual internationalisation vs born-global/international new venture models. *International Marketing Review*, 36(6), 830–858.
- Sithole, M. (2019). Barriers to Women-Owned Businesses in Rural Limpopo. *African Journal of Economic Review*, 7(1), 112–128.
- South African Government. (2023). *National Strategy on Gender Equality and Women Empowerment*. Pretoria.
- Statistics South Africa. (2022). *Quarterly Labour Force Survey*. Pretoria.
- Statistics South Africa. (2025). *District Population Estimates-Limpopo*.
- Storey, D. J. (2016). *Understanding the Small Business Sector*. Routledge.

Welter, F. (2011). Contextualising entrepreneurship—Conceptual challenges and ways forward. *Entrepreneurship Theory and Practice*, 35(1), 165–184.

World Bank. (2022). *Women, Business and the Law Report*. Washington DC: World Bank.

UNETHICAL FOOD AND BEVERAGE ADVERTISING, SUPPLIER EXPLOITATION, AND NON-COMMUNICABLE DISEASES: THE ROLE OF CONSUMER PROTECTION

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ABSTRACT

This paper explores the unethical advertising practices in the food and beverage industry and their impact on health, specifically focusing on South Africa. It highlights aggressive marketing of high sugar, salt, and fatty (HFSS) foods through pricing, advertising, and availability, particularly targeting disadvantaged consumers, contributes to rising obesity rates. Corporations often mislead consumers with false nutritional claims, exacerbating public health concerns related to non-communicable diseases (NCDs), such as cardiovascular issues and diabetes, which account for 71% of global deaths annually. Hence, the study aims to investigate the injustices faced by disadvantaged consumers in KwaZulu-Natal with respect to the advertising of unhealthy food products and the role of legislation in addressing them. The study is underpinned by the Social Justice Theory. A quantitative research approach was adopted to collect data from 379 adult consumers. The findings underscore the necessity for stronger regulations to protect consumers' health against the pervasive promotion of unhealthy food products.

Keywords: unethical advertising, unhealthy food products, health challenges, Consumer Protection Act.

INTRODUCTION AND BACKGROUND TO THE PROBLEM

In today's fast-paced consumer landscape, the food and beverage industry is characterized by fierce competition and innovative marketing strategies (5WPR, 2022). However, the aggressive tactics employed by food and beverage companies (Reddy, 2018), often blurring the lines of ethical advertising, leading to significant health challenges for consumers. Such unethical food and beverage advertising encompasses a range of practices that mislead consumers and end up exploiting vulnerable populations (Mupangavanhu & Kerchhoff, 2023), which in turn contributes to the rising prevalence of non-communicable diseases (NCDs). At the heart of these issues lies the manipulation of consumer perceptions. Moreover, the targeting of vulnerable populations such as children, low-income families, and individuals with limited access to education (UNCTAD, 2018; Budreviciute *et al.*, 2020), raises ethical concerns about the responsibility of advertisers to protect those most susceptible to harmful advertising. With the pervasive influence of modern advertising, these practices have intensified, as platforms provide companies with powerful tools to reach and engage consumers in ways that traditional advertising could not (Lisun *et al.*, 2024).

Aggressive advertising of high sugar, salt, and fat (HFSS) foods particularly targets youth and minorities, contributing to obesity rates in South Africa (Reddy, 2018). The consumption of ultra-processed foods (UPFs) is linked to an increased risk of NCDs, such as cardiovascular disease and diabetes, which account for 71% of global deaths annually, as per the World Health Organization (Budreviciute *et al.*, 2020). However, South Africa is quickly catching up with high-income countries by making the 'Western' diet more accessible to all segments of society (Spires *et al.*, 2016).

The aim of this paper is to investigate the injustices faced by adult consumers in the disadvantaged areas of the Midlands, KwaZulu-Natal, with respect to businesses engaging in unethical/socially irresponsible advertising practices.

The main underpinning theory for the study is the Social Justice Theory. Social justice demands equitable access via regulation, preventing excessive wealth and property concentrations (Rawls, 2001). It reconstructs society on equity, acknowledgement, and inclusion (Adams *et al.*, 2023). Redistributing advantages and resources to impoverished groups in order to support their legal claims to social and economic equality (Brown & Young, 2021).

A lack of social justice in the marketplaces has a negative impact on “consumer justice” due to the fact that citizens are left voiceless and helpless (McGregor, 2017). As disadvantaged individuals and children fall into vulnerable groups, the inequality relating to the challenges arising from food advertising to such consumers need to be addressed. Consequently, there is a need to explore the unhealthy food and beverage advertising, supplier exploitation, and NCDs, as well as the role of consumer protection.

LITERATURE REVIEW

This article examines how unethical food and beverage advertising, supplier exploitation, and consumer vulnerability contribute to the growing burden of NCDs. It further evaluates the effectiveness of the Consumer Protection Act 68 of 2008 in addressing misleading marketing practices and protecting vulnerable consumers, while highlighting the need for stronger regulatory measures in KwaZulu-Natal (KZN).

Non-Communicable Diseases

Globally, NCDs are on the rise and are the leading cause of death (Stoeva, 2020; Karim, 2022; Spires *et al.*, 2016; Lago-Peñas *et al.*, 2021), and South Africa is no exception (Discovery, 2021). Chronic illnesses that are not contagious are referred to as NCDs. However, they are silent killers who rob people of their lives without causing any pain. Hence, NCDs are silent killers (Khanal, 2025; World Health Organization, 2025). As a result, the rise of NCDs is a slow-motion calamity, as they frequently evolve (Tempels, 2019). According to the World Health Organization's 2019 Global Health Estimates, NCDs make up seven of the top ten causes of death worldwide (Discovery, 2021; United Nations, 2025). There is a possibility that by 2030, NCDs will have overtaken communicable, maternal, neonatal, and nutritional (CMNN) disorders as the major cause of death in Sub-Saharan Africa (Bigna & Noubiap, 2019; Mutyambizi *et al.*, 2019).

Globally, the top four leading types of NCDs are cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes (WHO, 2023). Cardiovascular diseases (17.9 million deaths per year), cancers (9.0 million), respiratory illnesses (3.9 million), and diabetes (1.6 million) are the leading causes of death among NCDs (Budreviciute *et al.*, 2020; Belayneh *et al.*, 2024). Furthermore, research indicates that South Africans have a 51.9% chance of dying from chronic illnesses like diabetes, heart disease, stroke, lung cancer, and obstructive pulmonary disorders like asthma, according to the NCD Countdown 2030. These disorders can begin in infancy and continue throughout childhood, youth, and old age (Budreviciute *et al.*, 2020). Such diseases are commonly associated with older age groups, yet research indicates that 17 million NCD deaths occur before the age of 70. Of these early deaths, 86% are expected to occur in LIMCs (WHO, 2023).

Contributing Factors to Non-Communicable Diseases

Firstly, consumers choose processed and convenience foods because of their widespread availability, affordability, palatability, and convenience (Knipe, Omoruyi, & Durojaye 2022; Frank *et al.* 2024). Thus, it is clear that the availability of unhealthy food products has contributed to an increase in obesity and overweight rates (Afoakwah, Mahunu, & Osei-Kwarteng, 2024) and contributed to increased consumption of harmful products (Knipe, Omoruyi, & Durojaye, 2022).

Secondly, socio-economic status has been identified as a significant determinant in the development of NCDs worldwide, including in South Africa (Samodien *et al.*, 2021). Despite being classed as an upper-middle-income country, South Africa has one of the world's worst income disparities, with 55% of the population living in poverty (Frank *et al.*, 2024). A study by Stewart & Yap (2020), is also in agreement with the previous studies that these low-literate consumers have been identified as misinterpreting labels, wrongly using products, and purchasing inappropriate items, resulting in overwhelming effects as they continue to make poor decisions due to illiteracy.

The third contributing factor to NCDs is change in diets. According to Omotoso (2022), eating habits are shifting all around the world. With the rising wealth and faster globalisation, low- and middle-income nations are embracing more Westernised diets high in sugar and processed foods, South Africa is no exception. A significant number of South African youth engage in poor lifestyle choices that can lead to the development of NCDs over time (Godbharle, Kesa, & Jeyakumar, 2024). Thus, food systems shape consumer tastes, attitudes, and cultures, influencing food choices (Ziga & Karriem, 2022).

According to studies, UPFs, such as sugary drinks and fast meals, are meant to be enticing and addictive (Gupta & Sachdev, 2022). This addiction to these foods promotes over-eating, leading to weight gain. As the present food supply contains high levels of HFSS, which are related to numerous chronic illnesses (Popkin *et al.*, 2024). Thus, the consumption of HFSS foods is a primary cause of NCDs (Reddy, 2018; Nneli, Dogbe, & Revoredo-Giha, 2023).

Unhealthy Food and Beverage Advertising

UNICEF (2023) adds that the food industry employs various creative techniques to capture consumers' attention, money, and body. According to Farzand *et al.* (2025), alternative options that were not as common in the past are now offered to consumers by fast food restaurants, frozen goods, and prepared meals in supermarkets. As a result, UPF consumption is driven by large-scale marketing techniques that emphasise affordability, flavour, convenience, and availability (Frank *et al.*, 2024). Furthermore, the aggressive marketing of energy drinks, often targeting young adults and students, mirrors past issues with Coca-Cola. These drinks contain high levels of caffeine and other stimulants (Pavlovic *et al.*, 2023), but there are no regulations restricting their sale to minors in South Africa (Higgins & Ortiz, 2014; Pavlovic *et al.*, 2023). They are sold freely to everyone, regardless of age. Therefore, advertisers must be aware of how consumers are affected and their reaction to advertising (Glucksman, 2017).

Hecht *et al.* (2020) found that harmful food and beverage marketing is more prevalent and successful in increasing sales than marketing of healthier options. These HFSS and UPFs are not only highly appealing but also addictive, much like nicotine, making them particularly harmful (Gupta & Sachdev, 2022). This shows that marketing plays a role in influencing how people think about food (Willis, 2022).

Targeting Disadvantaged Consumers and Consumer Vulnerability

Another ethical issue in the food and beverage marketing is the targeting of vulnerable and disadvantaged consumers. In determining consumer vulnerability, the UNCTAD (2018) definitions and policies for vulnerable and disadvantaged consumers, include children, the elderly, rural consumers, disabled, or illiterate consumers, and those whose social and economic status is a factor. Simultaneously, many South Africans, particularly in rural and low-income areas, face poverty, unemployment, and restricted access to nutritious food (Mthethwa & Wale, 2020).

Consumer vulnerability refers to a temporary and fluid state of powerlessness, with specific populations at higher risk. It is characterised by a lack of control and imbalance during marketplace interactions or consumption of marketing messages and products (Dunnett, Hamilton, & Piacentini, 2016; Echeverri & Salomonson, 2019). Consumer vulnerability can be caused by a variety of factors, including consumers with limited access to information due to geography or limited resources, and consumers with low confidence in seeking justice due to fear and a lack of language proficiency (Hill & Sharma, 2020). The KZN province, being one of South Africa's poorest, has the highest number of economically disadvantaged households (Statistics South Africa, 2025). Therefore, this indicates that KZN has a high proportion of vulnerable consumers and requires protection with regard to the food and beverage industry.

According to de Stadler (2016), vulnerability can also be caused by consumers' low socio-economic status and unequal bargaining power with corporations. However, some features can be used to identify this group. The reality is that South African consumers from disadvantaged communities face a lack of formal education as a result of poor literacy rates (Reddy, 2012) and are more likely to make unhealthy food choices that negatively impact their health (Reddy, 2018; Muwanga & Korsten, 2024). The following studies also affirm that consumers frequently struggle to read labels; this lack of knowledge and support is exploited by the suppliers and manufacturers in the food business (Pisa, Vorster, & Nishida, 2011; Reddy, 2018; Muwanga & Korsten 2024: 648). As a result, consumers are vulnerable to deceptive marketing and fraud due to misleading techniques, insufficient understanding, and a lack of self-control (Hill & Sharma, 2020). Therefore, Brewer (2011) emphasises that vulnerable consumers require

additional protection. Hence, disadvantaged consumers need to be protected as they are more vulnerable to being affected by vulnerability.

Supplier Exploitation

According to Kenton (2020), unfair business practices involve using deceptive, dishonest, or unethical techniques to obtain business, such as misrepresentation and non-compliance with norms and laws. Food companies have become highly skilled at exploiting and manipulating nutritional information to align with their business objectives, often shifting their strategies to fit evolving public health guidelines (Clapp & Scrinis, 2017). The food and beverage industry is frequently held accountable in public health discussions for the rising incidence of NCDs (Tempels, Blok, & Verweij, 2020). For instance, South African manufacturers have used misleading information on food labels, such as claiming a product is "95% fat-free" when a 5% fat content is not considered low fat (Ferly, Apriyanto, & Katjong, 2024). This leads consumers to believing that they are making healthier choices when that may not be the case.

Suppliers may also avoid liability for defective or unhealthy products by using complex language that consumers cannot easily understand, leading to the unintentional consumption of unhealthy foods and beverages (Koen, Blaauw, & Wentzel-Viljoen, 2016). As a result, consumers may consume unhealthy products without knowing it. Jamshidi-Naeini *et al.* (2021) state that meals, particularly processed foods, frequently contain hidden ingredients such as sugar, salt, and fats. The term "hidden ingredients" refers to raw materials or additives that are not clearly listed on product labels. This includes food additives, processing aids, materials that come into contact with the product during production, and packaging materials that may leach into the food (Riaz & Riaz, 2023). Stewart & Yap (2020) reveal that these low-literate consumers have been identified as misinterpreting labels, wrongly using products, and purchasing inappropriate items, resulting in overwhelming effects as they continue to make poor decisions due to illiteracy.

Furthermore, Charebois *et al.* (2016) mention that food fraud is intentionally modifying, misrepresenting, mislabelling, replacing, or interfering with food products at any step in the supply chain. Food fraud harms the food sector and undermines consumer confidence; some research has examined changes in purchasing habits. Food fraud deceives consumers about product quality and can pose serious health risks (Mphaga, Moyo, & Rathebe, 2024). Recent food fraud cases have been linked to mislabelling practices (Moreira *et al.*, 2021).

Pisa, Vorsters, & Nishida (2011), point out that consumer's lack of awareness and support prohibits them from adopting healthier dietary practices. As a result, food manufacturers and suppliers take advantage of this lack of knowledge by marketing and promoting food products in ways that are detrimental to proper nutrition. Consequently, these marketing methods can be hazardous since they are frequently dishonest in informing consumers, particularly young consumers, about what is actually in the food they eat (Hecht *et al.*, 2020; UNICEF, 2023). Hence, some of these business techniques exploit power imbalances and are therefore deemed unfair to the consumer (Wood *et al.*, 2021). The literature above indicates that unethical food business practices contribute to the increase of NCDs, particularly in underprivileged communities.

Consumer Legislation and its Effectiveness

The main objective of the Consumer Protection Act 68 of 2008 (CPA) is to promote fair business practices and create a legal framework for a fair consumer market. The Act aims to prioritise addressing disadvantages faced by vulnerable groups such as low-income individuals, minors, seniors, illiterates, those living in isolated or remote areas, and those in low-density population areas (CPA, South Africa 2008: Section 3; Muwanga & Korsten, 2024). The Act prohibits and controls unfair corporate activities but does not specify which practices are unfair (Woker, 2010).

The CPA regulates relationships between suppliers and consumers before, during, and after transactions involving goods and services (Reddy, 2012; Haupt, 2015). In the context of unethical food and beverage advertising, supplier exploitation and NCDs, the CPA plays an important role in protecting consumers from unfair marketing, misleading labelling, and unsafe food practices that may harm public health (CPA, South Africa 2008: Section 5(2)).

Section 9 of the CPA affords the consumer the right to be treated fairly and ethically. This is applicable to advertisements of food products to disadvantaged communities to ensure that they are not misled by unscrupulous

advertising tactics. Section 10 gives the consumer the right to choose, which would include the right to freely choose the food products in the marketplace and not be coerced into buying unhealthy food products. Section 11 relates to the right to privacy and aims to address the concern of unsolicited marketing. This right can be significant in protecting disadvantaged consumers from aggressive or unsolicited marketing of unhealthy food products.

As indicated above, one of the challenges faced by disadvantaged consumers is that their low levels of literacy may be exploited by food product suppliers. Section 22 of the Act sets out the right to information in plain and understandable language. This is applicable to food labelling and food advertisement claims. These should not mislead consumers. Reddy & Singh (2022) emphasize that product labelling and trade descriptions should not be vague or misleading. Care should be taken with the use of “technical terms,” which a person with “average literacy skills” might not understand. This requirement applies to various documents, including those related to food labelling and product information. In addition, Section 24 of the CPA prohibits misleading trade statements on food labels (CPA, South Africa 2008: Section 24).

The CPA also affords consumers the right to fair and responsible marketing (Kerchhoff, 2020). Although the Act does not specifically mention unhealthy food and beverage products, Section 29 emphasises the significance of fair and responsible marketing practices, specifically prohibiting marketing that is false, misleading, fraudulent, or deceptive in any material way (CPA, South Africa 2008: Section 29; Omoruyi & Durojaye, 2025). This would include false or misleading claims about health and nutrition, as well as food products or their benefits. The case of *Tryzon Frontier (Pty) Ltd v Batchelor N.O. & Others* (2018) is relevant to the application of this Section CPA, which addresses the issue of misrepresentation of the nature or qualities of goods and is specifically linked to Section 29.

Section 40 prohibits unconscionable conduct which prohibits suppliers from exploiting consumers, especially disadvantaged ones, who are “unable to protect themselves” or those that have limited knowledge through, for instance, illiteracy. This is applicable in situations where advertisers could take advantage of disadvantaged consumers with regard to unhealthy food products. In addition, Section 41 prevents suppliers from misleading consumers through exaggeration, ambiguity, innuendo, or deception regarding material facts (CPA, South Africa 2008: Section 41). Sections 40-42 of the CPA emphasise the right to fair and honest dealing, preventing deception through false, misleading, or fraudulent representations. Moreover, under Section 48 of the Act, providers are prohibited from offering products or services with unreasonable or unjust costs or conditions (CPA, South Africa 2008: Section 48; Reddy, 2012). This ensures that student loans are not subject to unreasonable conditions that may disadvantage students.

Consumer protection and knowledge are critical for achieving social justice in an unequal society (Govender, 2017). Suppliers should treat consumers fairly and honestly, and consumers should not be subjected to deceptive, unfair, or unethical commercial practices. Furthermore, providers should ensure transparency and disclosure, and customers should have access to adequate, accessible, and just complaint resolution methods based on the rule of law (Larsen & Lawson, 2013). Additionally, Wardah (2023) also emphasises the importance of legal protection for consumers in the 21st century, as more food and beverage products enter the domestic market from both domestic and international sources. Hence, an urgent need is evident, requiring the transformation of the food and beverage sector into creating legislation that would address the issue by removing the power imbalance between the supplier and consumer, by affording everyone equality. To eliminate the inequalities created by the suppliers, change is needed to take place.

This paper, therefore, seeks to fill in a critical knowledge gap by evaluating unethical food and beverage advertising and supplier exploitation, all contributing to NCD development. The underlying premise is that consumer protection will be improved. By examining this relationship, the study aims to investigate the injustices faced by adult consumers in the disadvantaged areas of the Midlands, KwaZulu-Natal with respect to businesses engaging in unethical/socially irresponsible advertising practices.

METHODOLOGY

This paper adopted a descriptive research design, collecting quantitative data through surveys to analyze adult consumers health challenges, caused by unethical food and beverage advertising and supplier exploitation in the Midlands area, KZN, South Africa. Quantitative data were collected using a structured questionnaire administered to

the respondents. This paper seeks to provide policy-relevant insights to improve consumer protection in disadvantaged areas.

Quantitative research measures variables and tests relationships to prove, disprove, or support theories, to revealing patterns (Oranga, Matere, & Njurai, 2025). Its objective is testing and not developing theory through data analysis (Creswell, 2013), while collecting facts on human behaviour to confirm theories, identify causes, and predict outcomes (Ghanad, 2023). This study adopted a quantitative design for its ease of implementation, numerical emphasis, respondent anonymity, and the researcher have full control, ensuring data integrity (Ghanad, 2023). Quantitative data on the unethical food and beverage advertising and supplier exploitation leading to the rise of NCDs were gathered from adult consumers using survey questionnaires. The target population for the study consisted of adult consumers in uMngeni Municipality in the Midlands, KZN, South Africa. Three townships, viz. Mpophomeni, Emashingeni, and Mevana, in the Midlands, KZN were used for data collection. According to the statistics of the 2011 Census, the uMngeni Municipality has approximately 92 710 people (Statistics South Africa, 2011). Since no recent statistics are available, the study relies on statistics from 2011. The sample size for this study is 379 respondents from the Midlands, as recommended by Bougie & Sekaran (2020) for a population between 30,000 and 40,000. All administered questionnaires were returned, resulting in a 100% response rate. Combining convenience sampling with purposive sampling broadens reach, reduces sampling bias, and enhances representativeness. A structured questionnaire was developed as the instrument for data collection. The tool was divided into the following six sections, which measured various themes as illustrated below:

Table 1: Themes in the questionnaire.

Section	Theme
A	Biographical data of respondents
B	Health challenges and awareness of unhealthy food and NCDs
C	Consumer food choices, marketing and labelling practices
D	Consumer rights and legal awareness under the CPA
E	Evaluation of existing food safety and consumer protection legislation
F	Accountability and recommendations

To meet the empirical objectives, the researcher analysed and presented results from a questionnaire primarily using quantitative methods. The survey featured mostly closed-ended questions, including Likert scale items, alongside a few open-ended questions. The questionnaire was administered in English, with isiZulu translations available upon request. This study targets adult consumers in three disadvantaged Midlands townships of KZN: Mpophomeni, eMevana, and Emashingeni.

To ensure validity, a questionnaire was pre-tested with 15 respondents to evaluate its clarity and relevance, identifying any errors and establishing validity and reliability. Cronbach's Alpha was also used to measure internal consistency, with a coefficient of 0.7 or higher deemed acceptable (Hair *et al.*, 2019). All sections of the questionnaire exceeded this value, indicating very good reliability. The data was collected through voluntary, confidential, self-administered electronic questionnaires. Respondents were allowed to withdraw at any time. SPSS software, specifically version 29.0, was used for analysing the quantitative data.

In addition, ethics guide the conduct of ethical research, emphasizing voluntary participation (Edmonds & Kennedy, 2017). Key principles include anonymity, which protects participant identity, and confidentiality, ensuring data confidentiality (Christensen, Johnson, & Turner, 2014). This study received approval from the Durban University of Technology's Research Ethics Committee (Ref. No. IREC 090/24). The respondents were informed via a consent form, retained anonymity, and had the right to withdraw at any time, ensuring no personal harm was inflicted. The validity of the findings depends on participant honesty.

FINDINGS AND DISCUSSION

The quantitative study entailed a survey using a questionnaire that was sent to 379 adult consumers within the Midlands area, with a 100% response rate. All the respondents were disadvantaged consumers residing in the Midlands area. The findings were categorised into sub-themes that are pertinent to this article.

Biographical Profile of Respondents

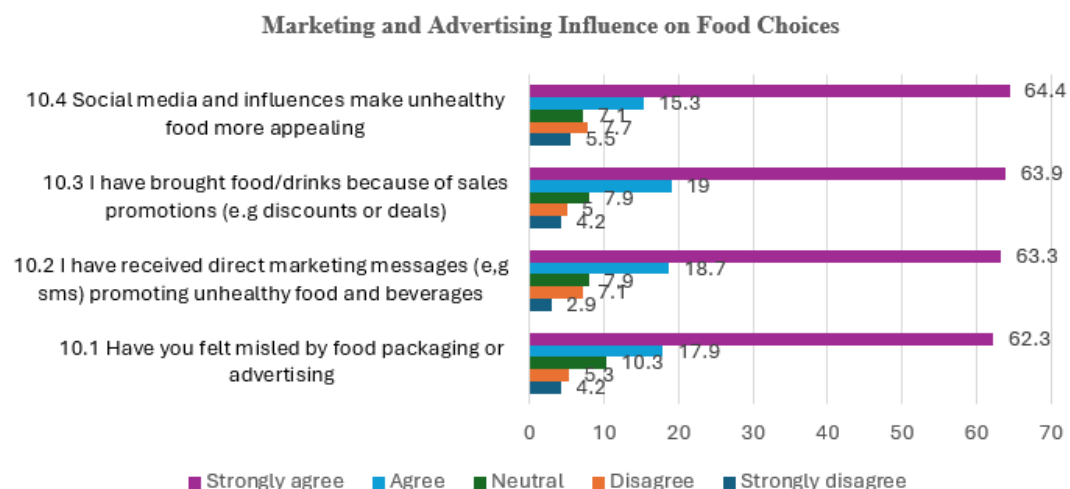
The sample was predominantly female (n=227; 59.9%) compared to male (n=96; 25.3%), with 56 respondents (14.8%) preferring not to disclose. The largest age group was 31–40 years (n=126; 33.2%), and 79.7% were aged 31 or older, indicating established adult dietary patterns. Regarding education, 32.2% had completed only primary school, and 12.9% had no formal education. Thus, the findings that directly explain the low food label literacy are documented later in Figure 4. The majority were unemployed (n=163; 43.0%), and 77.8% of respondents fell within the two lowest household income brackets (below R5 500 per month). Therefore, the socio-economic profile underscores the structural food-choice constraints examined throughout the study and confirms the appropriateness of targeting this population for a consumer justice investigation.

Marketing and Advertising Influence on Food Choices

A single clear pattern emerges in this section, namely, strong agreement that promotional and marketing practices influence consumer food choices and make unhealthy foods more attractive. A combined 80.2% of respondents agreed or strongly agreed that they had felt misled by food packaging or advertising, while only 9.5% disagreed or strongly disagreed. This shows a strong perception that food marketing can be deceptive or confusing. A similar pattern appeared in which, collectively, 82.0% agreed or strongly agreed that they had received direct marketing messages promoting unhealthy food and beverages, compared to 10.0% who disagreed or strongly disagreed. This indicates that a direct promotional exposure was widely experienced by respondents. Furthermore, a combined 82.9% agreed or strongly agreed that they had bought food or drinks because of a sales promotion such as discounts or deals, while only 9.2% disagreed or strongly disagreed. This suggests that promotional pricing and special offers were highly influential in shaping purchasing behaviour.

Lastly, the strongest agreement in the section was observed, in which collectively 79.7% agreed or strongly agreed that social media and influencers make unhealthy food more appealing, compared to 13.2% who disagreed or strongly disagreed. This indicates that newer digital forms of promotion also played an important role in shaping perceptions and food choices. Overall, the findings show a consistent trend of strong agreement across all four items, with agreement levels ranging from 79.7% to 82.9%, and disagreement remaining low at between 9.2% and 13.2%.

Figure 1: Marketing and Advertising Influence on Food Choices.



The findings from Figure 1 above confirm the literature on marketing and advertising influences on food choices. South African manufacturers have used misleading information on food labels, such as claiming a product is "95% fat-free" when a 5% fat content is not considered low fat (Ferly, Apriyanto, & Katjong, 2024). As a result, consumers are vulnerable to deceptive marketing and fraud due to misleading techniques, insufficient understanding, and lack of self-control (Hill & Sharma, 2020). Therefore, this indicates that respondents widely perceived marketing, promotions, direct advertising, and social media influence as important drivers of unhealthy food appeal and purchasing behaviour.

Food Label Literacy

The findings reflect the low food label reading ability. Collectively, only 19.0% of respondents agreed or strongly agreed that they knew how to read and understand nutrition labels, while 72.9% disagreed or strongly disagreed. A similar finding appeared where a combined 13.7% agreed or strongly agreed that they checked labels for sugar, salt and fat content before buying, whereas 77.0% disagreed or strongly disagreed. This shows that most respondents did not feel confident in reading or using nutrition labels when making food choices.

Another finding reflects the strong concern about the quality and trustworthiness of food labels. Mutually, 80.5% agreed or strongly agreed that there is too much information on food labels, while only 11.3% disagreed or strongly disagreed. While collectively 79.9% agreed or strongly agreed that some ingredients are hidden or not clearly indicated, compared to 11.1% who disagreed or strongly disagreed. Lastly a combined 77.8% agreed or strongly agreed that some food labels are misleading or make false health claims, while 13.7% disagreed or strongly disagreed. These results show a strong direction towards dissatisfaction with how food label information is presented.

However, showed a more divided pattern than the other items. Although 46.1% agreed or strongly agreed that food labels use confusing terminology, a similar 45.6% disagreed or strongly disagreed, with 8.2% neutral. This suggests that the use of confusing terminology was experienced less uniformly than the other label-related problems.

Table 2: Food label literacy.

		Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Chi Square p-value
		Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	
C11.1	I know how to read and understand nutrition labels on food packaging.	17	57.3%	59	15.6%	31	8.2%	51	13.5%	21	5.5%	< 0.001
C11.2	I check food labels for ingredients such as sugar, salt and fat content before buying.	29	60.4%	63	16.6%	35	9.2%	34	9.0%	18	4.7%	< 0.001
C11.3	Food labels use confusing terminology.	43	37.7%	30	7.9%	31	8.2%	60	15.8%	115	30.3%	< 0.001
C11.4	There is too much information on the food labels.	9	5.0%	24	6.3%	31	8.2%	62	16.4%	243	64.1%	< 0.001
C11.5	Some ingredients are hidden or not clearly indicated on the food product.	4	3.7%	28	7.4%	34	9.0%	63	16.6%	240	63.3%	< 0.001
C11.6	I believe that some food labels are misleading or make false health claims.	4	3.7%	38	10.0%	32	8.4%	60	15.8%	235	62.0%	< 0.001

The findings from Table 2 above indicate the food label literacy. Consumer unawareness and lack of support hinder the adoption of healthier dietary practices, leading food manufacturers and suppliers to exploit this ignorance by marketing products harmful to proper nutrition (Pisa, Vorsters, & Nishida, 2011). Consumers may struggle with nutrition labels because of small text sizes and unfamiliar terminology in ingredient lists (Muwanga & Korsten, 2024).

As a result, low-literate consumers often misinterpret labels, misuse products, and make inappropriate purchases, leading to significant negative outcomes from their illiteracy (Stewart & Yap, 2020).

Hence, the overall findings show that respondents generally lacked confidence in their own ability to read and use food labels, while at the same time expressing strong concern that labels contain too much information, hide ingredients, and may be misleading. In simple terms, the pattern shows both low label literacy and high distrust of label content.

CONCLUSION AND RECOMMENDATIONS

The paper concludes that unethical food and beverage advertising practices significantly influence unhealthy consumer choices, particularly among disadvantaged populations in KwaZulu-Natal, leading to increased NCDs. It identifies aggressive marketing tactics and the prevalence of HFSS foods as key influencers of unhealthy purchasing behaviours. Vulnerabilities are exacerbated by socio-economic inequalities and low food label literacy, with consumers reporting that processed foods are often more affordable and accessible than nutritious options.

The paper advocates for stronger regulations on unhealthy food advertising, particularly targeting vulnerable consumers. Food and beverage companies need to emphasize clarity in their marketing messages to establish trust. This entails precise labelling, thorough ingredient listings, and concise justifications of sourcing procedures. It emphasizes the need for regulatory oversight of social media marketing and calls for improved consumer education on food-related risks. Public awareness campaigns will help keep consumers educated as they will know which food products are linked to NCDs. Thus, it is evident that education is an important aspect as the more informed consumers are they will be able to make informed decisions.

The reinforcement of consumer mechanisms mean that we can cultivate a marketplace that not only respects consumers rights but also prioritizes the health of consumers. Doing this will pave the way for future ethical practices. The recommendations include clearer food labelling, increased access to healthy foods, enhanced enforcement of consumer protection laws, and promotion of corporate social responsibility within the food industry. Further research is suggested to evaluate food advertising's long-term effects on consumer behaviour and the efficacy of protection measures against unethical practices.

REFERENCES

- 5WPR. (2022). *The ethics of food and beverage marketing: Striking a balance*. <https://5wpr.net/the-ethics-of-food-and-beverage-marketing-striking-a-balance/>
- Adams, M., Bell, L. A., Goodman, D. J., Shlasko, D., Briggs, R., & Pacheco, R. (2023). *Teaching for diversity and social justice* (4th ed.). Routledge.
- Afoakwah, N. A., Mahunu, G. K., & Osei-Kwarteng, M. (2024). *Safe food and non-communicable diseases in the Global South*. In *Food safety and quality in the Global South*. Springer Nature Singapore.
- Aniol, D. (2015). *The inequality of bargaining power in consumer contracts* [LLM thesis, University of Pretoria].
- Becher, S. I. (2018). Unintended consequences and the design of consumer protection legislation. *Tulane Law Review*, 93, 105–146.
- Belayneh, A., Chelkeba, L., Amare, F., Fisseha, H., Abdissa, S. G., Kaba, M., Patel, S. A., & Ali, M. K. (2024). Investigation of non-communicable diseases prevalence, patterns, and patient outcomes in hospitalized populations: A prospective observational study in three tertiary hospitals. *Journal of Health, Population and Nutrition*, 43(1), 1–11.
- Bigna, J. J., & Noubiap, J. J. (2019). The rising burden of non-communicable diseases in sub-Saharan Africa. *The Lancet Global Health*, 7(10), 1295–1296.
- Bougie, R., & Sekaran, U. (2020). *Research methods for business: A skill-building approach* (8th ed.). Wiley.

- Brewer, C. (2011). *Impact of the Consumer Protection Act on your email marketing*. TouchBase Pro. <http://www.touchbasepro.com/Consumer-Protection-Act-Email-Marketing-2011>
- Brown, D. S., & Young, S. (2021). (Un) just acts: Shakespeare and social justice in contemporary performance. *Shakespeare Bulletin*, 39(4), 529–535.
- Budreviciute, A., Damiaty, S., Sabir, D. K., Onder, K., Schuller-Goetzburg, P., Plakys, G., Katileviciute, A., Khoja, S., & Kodzius, R. (2020). Management and prevention strategies for non-communicable diseases (NCDs) and their risk factors. *Frontiers in Public Health*, 8, 1–11.
- Charlebois, S., Schwab, A., Henn, R., & Huck, C. W. (2016). Food fraud: An exploratory study for measuring consumer perception towards mislabeled food products and influence on self-authentication intentions. *Trends in Food Science & Technology*, 50, 211–218.
- Christensen, L. B., Johnson, R. B., & Turner, L. A. (2014). *Research methods, design, and analysis* (12th ed.). Pearson.
- Clapp, J., & Scrinis, G. (2017). Big food, nutritionism, and corporate power. *Globalizations*, 14(4), 578–595.
- Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed method approaches* (4th ed.). SAGE Publications.
- De Stadler, E. B. (2016). *The scope of the application of the Consumer Protection Act 68 of 2008 in the context of the sale of defective goods in comparative perspective*.
- Dunnett, S., Hamilton, K., & Piacentini, M. (2016). Consumer vulnerability. *Journal of Marketing Management*, 32(3–4), 207–210.
- Echeverri, P., & Salomonson, N. (2019). Consumer vulnerability during mobility service interactions: Causes, forms and coping. *Journal of Marketing Management*, 35(3–4), 364–389.
- Edmonds, W. A., & Kennedy, T. D. (2017). *An applied guide to research designs: Quantitative, qualitative, and mixed methods* (2nd ed.). SAGE Publications.
- Farzand, A., Rohin, M. A. K., Awan, S. J., Hussain, A., Faizan, M., & Ahmad, A. M. R. (2025). Obesity and food marketing: A narrative review of consumer influence, regulatory gaps, and ethical implications. *Frontiers in Nutrition*, 12, 1–23.
- Ferly, B., Apriyanto, A., & Katjong, R. (2024). The effectiveness of consumer protection law in overcoming misleading marketing in the food and beverage industry. *IPSO JURE*, 1(7), 24–37.
- Frank, T., Ng, S. W., Lowery, C. M., Thow, A. M., & Swart, E. C. (2024). Dietary intake of low-income adults in South Africa: Ultra-processed food consumption a cause for concern. *Public Health Nutrition*, 27(1), 1–13.
- Ghanad, A. (2023). An overview of quantitative research methods. *International Journal of Multidisciplinary Research and Analysis*, 6(8), 3794–3803.
- Glucksman, M. (2017). The rise of social media influencer marketing on lifestyle branding: A case study of Lucie Fink. *Elon Journal of Undergraduate Research in Communications*, 8(2), 77–88.
- Godbharle, S., Kesa, H., & Jeyakumar, A. (2024). Processed food consumption and risk of non-communicable diseases (NCDs) in South Africa: Evidence from Demographic and Health Survey (DHS) VII. *Journal of Nutritional Science*, 13, 1–9.
- Govender, V. (2017). *Consumer protection and service delivery by retail industry in the greater Durban area: The legal implications of the Consumer Protection Act 68 of 2008* [Master's thesis, Durban University of Technology].
- Gupta, P., & Sachdev, H. S. (2022). The escalating health threats from ultra-processed and high fat, salt, and sugar foods: Urgent need for tailoring policy. *Indian Pediatrics*, 59(3), 193–197.

- Hair, J. F., Sarstedt, M., & Ringle, C. M. (2019). Rethinking some of the rethinking of partial least squares. *European Journal of Marketing*, 53(4), 566–584.
- Hecht, A. A., Perez, C. L., Polascek, M., Thorndike, A. N., Franckle, R. L., & Moran, A. J. (2020). Influence of food and beverage companies on retailer marketing strategies and consumer behaviour. *International Journal of Environmental Research and Public Health*, 17(20), 1–34.
- Higgins, J. P., & Ortiz, B. L. (2014). Energy drink ingredients and their effect on endothelial function: A review. *International Journal of Clinical Cardiology*, 1(1), 1–6.
- Hill, R. P., & Sharma, E. (2020). Consumer vulnerability. *Journal of Consumer Psychology*, 30(3), 551–570.
- Ishihara, M., Kwon, M., & Mizuno, M. (2023). An empirical study of scarcity marketing strategies: Limited-time products with umbrella branding in the beer market. *Journal of the Academy of Marketing Science*, 51(6), 1327–1350.
- Jamshidi-Naeini, Y., Moyo, G., Napier, C., & Oldewage-Theron, W. (2021). Food and beverages undermining elderly health: Three food-based dietary guidelines to avoid or delay chronic diseases of lifestyle among the elderly in South Africa. *South African Journal of Clinical Nutrition*, 34(1), 27–40.
- Karim, S. A. (2022). *Developing and applying a constitutional rights-based approach to the regulation of the modifiable risk factors for noncommunicable diseases in South Africa* [Doctoral thesis, University of KwaZulu-Natal].
- Kenton, W. (2020). *Unfair trade practice: Definition, deceptive methods and examples*. Investopedia. <https://www.investopedia.com/terms/u/unfair-trade-practice.asp>
- Kerchhoff, D. (2020). *False advertising and consumer protection in South Africa* [LLM thesis, University of the Western Cape].
- Khanal, D. P. (2025). Non-communicable diseases: A global public health threat. *Journal of Manmohan Memorial Institute of Health Sciences*, 10(1), 1.
- Knipe, P., Omoruyi, A. J., & Durojaye, E. (2022). The National Strategic Plan for the Prevention and Control of NCDs 2022–2027: Assessing policy priorities to address unhealthy diets. *ESR Review: Economic and Social Rights in South Africa*, 23(4), 29–35.
- Koen, N., Blaauw, R., & Wentzel-Viljoen, E. (2016). Food and nutrition labelling: The past, present and the way forward. *South African Journal of Clinical Nutrition*, 29(1), 13–21.
- Lago-Peñas, S., Rivera, B., Cantarero, D., Casal, B., Pascual, M., Blázquez-Fernández, C., & Reyes, F. (2021). The impact of socioeconomic position on non-communicable diseases: What do we know about it? *Perspectives in Public Health*, 141(3), 158–176.
- Larsen, G., & Lawson, R. (2013). Consumer rights: A co-optation of the contemporary consumer movement. *Journal of Historical Research in Marketing*, 5(1), 97–114.
- Lisun, Y., Semenova, L., Kudyrko, O., Kovalchuk, S., & Semchuk, D. (2024). The role of social networks in shaping consumer trends and developing the advertising industry. *Economic Affairs*, 69, 1–10.
- McGregor, S. L. T. (2017). *Conceptualizing consumer justice* [McGregor monograph series]. McGregor Consulting Group.
- Moreira, M. J., García-Díez, J., de Almeida, J. M., & Saraiva, C. (2021). Consumer knowledge about food labeling and fraud. *Foods*, 10(5), 1–12.
- Mphaga, K. V., Moyo, D., & Rathebe, P. C. (2024). Unlocking food safety: A comprehensive review of South Africa's food control and safety landscape from an environmental health perspective. *BMC Public Health*, 24(1), 1–14.

- Mthethwa, S., & Wale, E. (2020). Household vulnerability to food insecurity in rural South Africa: Evidence from a nationally representative survey data. *International Journal of Environmental Research and Public Health*, 18(4), 1–17.
- Mupangavanhu, Y., & Kerchhoff, D. (2023). Online deceptive advertising and consumer protection in South Africa—The law and its shortcomings? *De Jure Law Journal*, 56(1), 86–106.
- Mutyambizi, C., Booysen, F., Stokes, A., Pavlova, M., & Groot, W. (2019). Lifestyle and socio-economic inequalities in diabetes prevalence in South Africa: A decomposition analysis. *PLOS ONE*, 14(1), 1–21.
- Muwanga, T. S., & Korsten, L. (2024). The right to food in South Africa: A consumer protection perspective. *African Human Rights Law Journal*, 24(2), 632–658.
- Nneli, A., Revoredo-Giha, C., & Dogbe, W. (2023). Could taxes on foods high in fat, sugar and salt (HFSS) improve climate health and nutrition in Scotland? *Journal of Cleaner Production*, 421, 1–11.
- Oranga, J., Matere, A., & Njurai, E. (2025). The mixed methods research approach: An overview. *Postmodernism Problems*, 15(1), 84–99.
- Pavlovic, N., Miskulin, I., Jokic, S., Kovacevic, J., & Miskulin, M. (2023). Consumption of energy drinks among university students in Eastern Croatia. *Applied Sciences*, 13(2), 1–15.
- Pisa, P. T., Vorster, H. H., & Nishida, C. (2011). Cardiovascular disease and nutrition: The use of food-based dietary guidelines for prevention in Africa: Nutrition and cardiovascular disease. *SA Heart*, 8(1), 38–47.
- Popkin, B. M., Miles, D. R., Taillie, L. S., & Dunford, E. K. (2024). A policy approach to identifying food and beverage products that are ultra-processed and high in added salt, sugar and saturated fat in the United States: A cross-sectional analysis of packaged foods. *The Lancet Regional Health–Americas*, 32, 1–9.
- Rawls, J. (2001). *Justice as fairness: A restatement*. Harvard University Press.
- Reddy, K. (2012). Students as consumers: The implications of the Consumer Protection Act for higher education institutions in South Africa. *South African Journal of Higher Education*, 26(3), 586–605.
- Reddy, K. (2018). Food products and non-communicable diseases: Implications of the Consumer Protection Act 68 of 2008. *Journal of South African Law/Tydskrif vir die Suid-Afrikaanse Reg*, 2018(3), 569–586.
- Reddy, K., & Rampersad, R. (2012). Ethical business practices: The Consumer Protection Act and socio-economic transformation in South Africa. *African Journal of Business Management*, 6(25), 7403–7413.
- Reddy, K., & Singh, S. (2022). Regulation of nanotechnology and nano-enabled products: The implications of the Consumer Protection Act 68 of 2008 in South Africa. *African Journal of Inter/Multidisciplinary Studies*, 4(1), 325–337.
- Riaz, M. N., & Riaz, N. M. (2023). Hidden haram ingredients in foods. *Journal of Halal Quality and Certification*, 1(2), 118–124.
- Samodien, E., Abrahams, Y., Muller, C., Louw, J., & Chellan, N. (2021). Non-communicable diseases—A catastrophe for South Africa. *South African Journal of Science*, 117(5–6), 1–6.
- South Africa, Department of Trade and Industry. (2008). *Consumer Protection Act 68 of 2008*. Government Printer.
- Spires, M., Delobelle, P., Sanders, D., Puoane, T., Hoelzel, P., & Swart, R. (2016). Diet-related non-communicable diseases in South Africa: Determinants and policy responses. *South African Health Review*, (1), 35–42. <https://journals.co.za>
- Statistics South Africa. (2011). *Census*. <https://www.statssa.gov.za/?page>

- Statistics South Africa. (2025). *Poverty trends: An examination of abuse of absolute poverty between 2006 and 2023*. Stats SA. <https://www.statssa.gov.za/?p=19078>
- Stewart, C. R., & Yap, S. F. (2020). Low literacy, policy and consumer vulnerability: Are we really doing enough? *International Journal of Consumer Studies*, 44(4), 343–352. <https://doi.org/10.1111/ijcs.12569>
- Stoeva, P. (2020). International norm development and change: Can international law play a meaningful role in curbing the lifestyle disease pandemic? *BMC International Health and Human Rights*, 23(20), 1–13.
- Tempels, T. (2019). *A Janus-faced food industry? Ethical reflections on corporate responsibility for health* [Doctoral dissertation, Wageningen University].
- Tempels, T., Blok, V., & Verweij, M. (2020). Food vendor beware! On ordinary morality and unhealthy marketing. *Food Ethics*, 5(3), 1–21.
- Tryzon Frontier (Pty) Ltd v Batchelor N.O. & Others 2018 (3535/2013) ZAECPEHC 56.
- UNCTAD. (2018). *Working group on vulnerable and disadvantaged consumers: Notes for the 3rd meeting*. https://unctad.org/system/files/information-document/ccpb_Notes_WG_Vulnerable_Disadvantaged_Consumers_en.pdf
- UNICEF. (2023). *Aggressive marketing tactics by the food industry can have an impact on your health: What you need to know about marketing strategies used to advertise unhealthy foods*. <https://www.unicef.org/southafrica/blog/aggressive-marketing-tactics-food-industry-can-have-impact-your-health>
- United Nations. (2025). *General Assembly: Progress on the prevention and control of non-communicable diseases and the promotion of mental health and well-being*. <https://docs.un.org/en/A/79/702>
- Wardah, A. T. S. (2023). Legal protection for consumers food and drink poisoning. *Scientia*, 2(1), 144–146.
- Willis, S. (2022). Food marketing and its influence on peoples' perception of health. *Open Journal of Social Sciences*, 10(11), 537–549.
- Woker, T. (2010). Why the need for consumer protection legislation? A look at some of the reasons behind the promulgation of the National Credit Act and the Consumer Protection Act. *Obiter*, 31(2), 217–231.
- Wood, B., Williams, O., Nagarajan, V., & Sacks, G. (2021). Market strategies used by processed food manufacturers to increase and consolidate their power: A systematic review and document analysis. *Globalization and Health*, 17, 1–23.
- World Health Organisation. (2023). *Chronic obstructive pulmonary disease*. [https://www.who.int/news-room/fact-sheets/detail/chronic-obstructive-pulmonary-disease-\(copd\)](https://www.who.int/news-room/fact-sheets/detail/chronic-obstructive-pulmonary-disease-(copd))
- World Health Organisation. (2023). *Noncommunicable diseases*. <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>
- World Health Organization. (2025). *NCDs: The silent killers*. <https://www.who.int/news-room/spotlight/the-silentkillers>
- Ziga, M., & Karriem, A. (2022). NCD prevention through an equitable food system in South Africa: Opportunities and challenges. *ESR Review: Economic and Social Rights in South Africa*, 23(4), 7–12.

ENHANCING DIGITALLY EMPOWERED WORKPLACES: THE RELATIONSHIP BETWEEN DIGITAL ORGANISATIONAL CULTURE, DIGITAL COMPETENCY, AND EMPLOYEE ATTITUDES

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ABSTRACT

Digital initiatives have become a strategic priority in organisations. Using Dynamic Capabilities Theory and the Digital Maturity Model, the current research explores the structural links between digital or. Theational culture, digital transformation commitment and job satisfaction with digital competency as a moderator. This study adopted a quantitative, cross-sectional approach through a survey of 129 employees at a South African consumer goods firm. Structural equation modelling using Partial Least Squares (PLS) was used to test the hypotheses. The results of the structural model show that digital organisational culture has a significant positive influence on commitment to digital transformation and job satisfaction, revealing strong explanatory ability at the individual level. The study highlights that it may be more important to build a supportive digital organisational culture than individual digital competency to nurture commitment and satisfaction of employees in the midst of digital transformation.

Keywords: digital organisational culture, commitment to digital transformation, job satisfaction, digital competency.

INTRODUCTION

Consumer goods firms in South Africa operate in highly regulated and process-driven settings driven by compliance considerations, competition and the need for profitability and organisational sustainability. To adapt, companies in this industry have increasingly embraced digital technologies and automation to improve operational efficiency, minimise transaction costs, and increase agility within the retail value chain (Trofimov et al., 2023). Consequently, digital transformation has become a technology imperative with far-reaching organisational, process and job impacts. Therefore, this research seeks to answer the following question: How does digital competency shape the links between digital organisational culture, commitment to digital transformation and job satisfaction in a digitally focused consumer goods organisation? Through a Dynamic Capabilities microfoundational lens, the study aims to contribute to organisational behaviour research and to provide insights for the management of employee-centred digital transformation in South African consumer goods organisations.

LITERATURE REVIEW

Digital organisational culture is a key driver in employees' response to digital transformation through enabling flexibility, learning and change. Existing studies show that firms that institutionalise digital values and norms are more likely to improve employee engagement with digitalisation and mitigate resistance through ongoing training (Karakuş & Yalçın, 2024). In the retail and consumer goods industry, building a culture of experimentation, innovation and proactive future thinking has become crucial, especially with the growing adoption of new technologies like artificial intelligence, the Internet of Things and data analytics, which are transforming operational and customer-centric

processes (Sagar, 2024). Therefore, a digital-friendly culture facilitates employees' commitment to organisational change, promoting proactiveness and flexibility.

Commitment to Digital Transformation and Digital Organisational Culture

Digital organisational culture and commitment to digital transformation are interconnected. A digital culture is one that supports and reinforces shared values, norms and behaviours that legitimise and foster acceptance by employees of technological change (Hasan et al., 2025). Existing literature suggests that digital transformation efforts cannot be successful without employees being ready for change, which requires change management and support programs for employee development (Musaffer & Chihan, 2024). While interest in these issues is growing, there is a lack of empirical research exploring these relationships in different industries and emerging market economies (Tuukkanen et al., 2022). To remedy this, the current study hypothesises:

H1: Digital organisational culture is positively related to digital transformation.

Digital Organisational Culture and Job Satisfaction

Digital organisational culture is an essential predictor of employee work attitudes and experience. Existing research shows that supportive cultures and leadership practices are positively related to employee job satisfaction, organisational commitment and organisational citizenship behaviour (Rahman & Jantan, 2020; Dubey et al., 2023). Studies conducted in Industry 4.0 settings suggest that digital transformation increases job satisfaction when digital technologies decrease manual labour and enable flexibility; but research remains limited and geographically and sector-specific (Gebczyńska, 2022). As such, this research hypothesises:

H2: Digital organisational culture is positively related to job satisfaction

Digital Competency, Digital Organisational Culture, and Digital Transformation Commitment

Digital competency is a pivotal microfoundation of digital transformation that shapes employees' perceptions and acceptance of digital change. Studies have shown that leadership commitment, training and learning opportunities all positively impact employee behaviours during digital transformation (Alieva & Powell, 2022). However, the moderating impact of digital competency within a digitally focused organisational culture is overlooked. As such, this research suggests:

H3: Digital competency moderates the link between digital organisational culture and commitment to digital transformation

Digital Competency, Digital Organisational Culture and Job Satisfaction

Digital competency also plays an important role in employee work attitudes in digital contexts. For example, positive attitudes towards digital technologies and training support help employees adapt to flexible work arrangements and improve job satisfaction (Saygılı & Öztıraş, 2024; Machingambi et al., 2024). But research on the competency-satisfaction relationship is mixed (Hidayat et al., 2023; Wulandari et al., 2025). These mixed findings suggest that we need to consider digital competency as a moderating factor, rather than a predictor. Therefore, the last hypothesis is proposed:

H4: Digital competency moderates the link between digital organisational culture and job satisfaction.

METHODOLOGY

Research Design and Sample

This research used a positivist, deductive approach and a quantitative, cross-sectional correlational design to test the hypotheses. Employees from a South African consumer goods company were surveyed using a questionnaire. Convenience sampling was adopted, and a sample of 129 (a satisfactory sample size for a PLS-SEM model with a

high degree of complexity) was obtained. Prior ethical approval was obtained from North West University (NWU 00733 25 A4).

Measures and Analytical Procedure

The study used an online survey through Google Forms. The measures for the constructs were adapted from previous research. We used the scale developed by Gill and Van Boskirk (2016) ($\alpha = 0.92$) to measure digital organisational culture. Digital competency was assessed using the scale developed by Schmölz et al (2023) ($\alpha = 0.80$). Commitment to digital transformation was assessed using adapted items from well-known digital transformation literature (Gill & Van Boskirk, 2016; Alvarenga et al., 2020; Cavalcanti et al., 2022). The Job Satisfaction Scale (JSS) developed by Rothmann (2010) was used to assess job satisfaction ($\alpha = 0.84$). All items were assessed using Likert scales. The data were coded and initially analysed in SPSS version 27 and model estimation was conducted in SmartPLS version 3. A two-step PLS SEM approach was taken to analyse the measurement (reliability and validity) and structural (path coefficients and moderating effects) models. To assess significance, we conducted bootstrapping using a p-value of 0.05. This is in line with recommended practice for theory building and predictive studies.

RESULTS

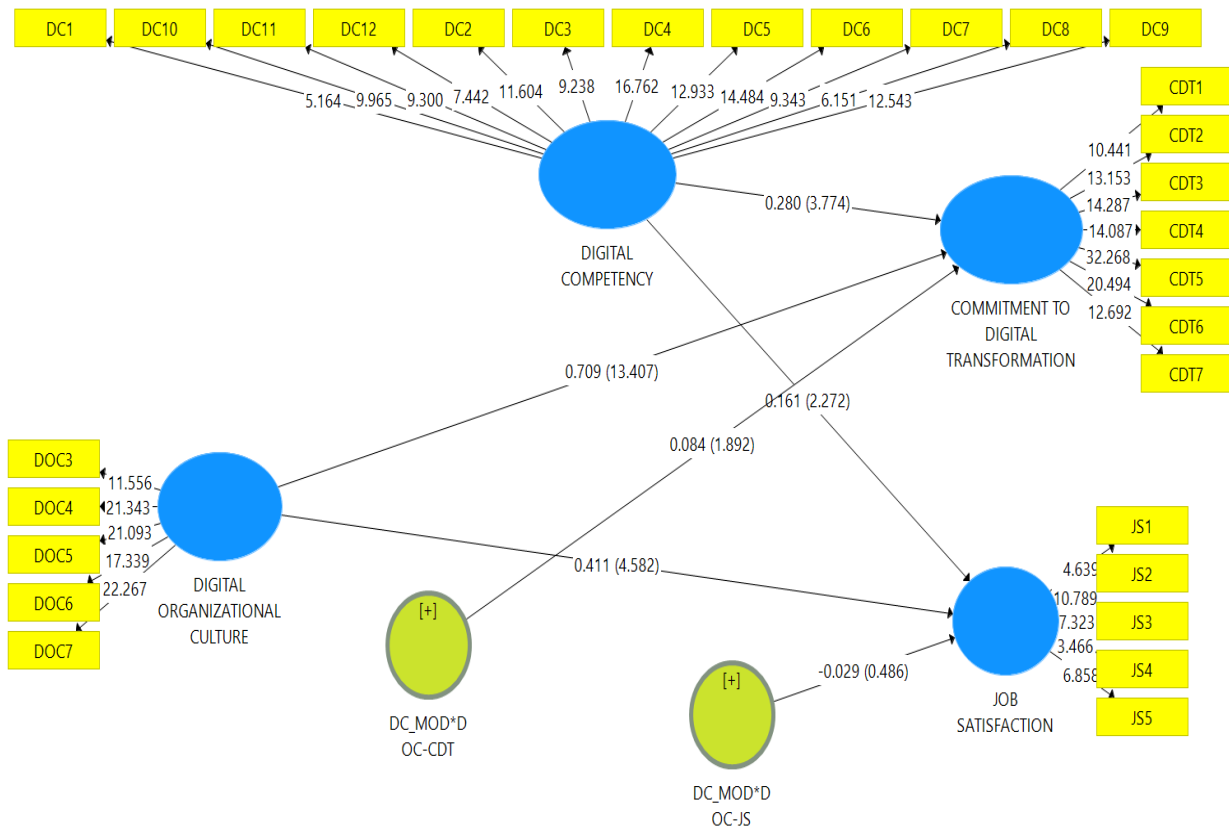
Descriptive Statistics and Data Screening

An initial data screening was undertaken to check the distributional characteristics and data quality. Skewness and kurtosis were used to detect outliers and extreme non normality. While PLS SEM does not demand normality, all indicators showed acceptable values of skewness of ± 3 and kurtosis of ± 3 , indicating that the data were suitable for further analysis. Methods, such as skewness and kurtosis, used by Hair Jr. (2010) and Tabachnick and Fidell (2013) are used for checking normality. Descriptive statistics revealed moderate to high means for the different constructs, reflecting generally favourable attitudes towards digital organisational culture, digital competency, commitment to digital transformation and job satisfaction. Cronbach's alpha (CA) and composite reliability (CR) were used to evaluate measurement reliability. All factors were above the acceptable threshold of 0.60, suggesting adequate internal consistency.

Structural Model and Hypotheses Testing

The structural model was assessed with bootstrapping (2 000 samples). The results show that digital organisational culture had a strong, positive and significant effect on commitment to digital transformation ($\beta = 0.709$, $p < 0.001$), explaining 62% of the variance, thus supporting H1. Digital organisational culture also positively influenced job satisfaction ($\beta = 0.411$, $p < 0.001$), supporting H2 and accounted for 24.2% of the variance in job satisfaction. The moderation results showed that digital competency did not moderate the path between digital organisational culture and commitment to digital transformation ($\beta = 0.084$, $p > 0.05$) or the path between digital organisational culture and job satisfaction ($\beta = -0.029$, $p > 0.05$). As such, H3 and H4 were rejected. Effect sizes analysis revealed a large effect for DOC—CDT, a moderate effect for DOC—JS and a small effect (bordering on trivial) for the interaction terms. The model is acceptably fit for purpose, and the findings support the integral role of digital organisational culture when explaining employee attitudes, while digital competency is an enabling, but not moderating, capability.

Figure 1: Path diagram (t-statistic inclusive).



GENERAL DISCUSSION

Drawing on Dynamic Capabilities Theory, this research explored the relationships between digital organisational culture, digital competency, digital transformation commitment and job satisfaction in the consumer goods industry. The results provide robust evidence of the role of digital organisational culture in driving employee commitment to digital transformation, supporting Hypothesis 1. This is consistent with previous studies that have found that organisations with a high degree of digital organisational culture are more likely to survive technological change due to their capacity to innovate, experiment and prepare employees (Veeraya et al., 2024). A digital mindset is therefore an important microfoundation that helps organisations sense and seize digital opportunities.

Hypothesis 2 was also supported, showing a positive association between digital organisational culture and job satisfaction. This finding extends the organisational behaviour literature, which emphasises the role of culture in organisational productivity, particularly in technology-oriented organisations (Shoaib, 2022). Digital organisational cultures that promote autonomy, learning and support seem to reduce uncertainty related to digital transformation, leading to higher job satisfaction. On the other hand, the interaction of digital competency and digital organisational culture on commitment to digital transformation (H3) and job satisfaction (H4) was not significant.

Theoretical Implications

This research contributes to Dynamic Capabilities Theory by empirically strengthening its microfoundational aspect, by showing how digital organisational culture acts as the enabler for individual-level adaptation, engagement and satisfaction. Through the lens of the Digital Maturity Model, the study highlights that digital maturity involves more than technology, it also requires cultural fit and employee engagement in transformation. The research adds to the

body of knowledge by establishing that digital competencies, although vital, does not directly enhance attitudinal measures without the influence of a digital culture.

Managerial Implications and Limitations

The findings highlight that digital transformation is a long term, skill-building process rather than technology centric. Managers should invest in building a digital culture that fosters learning, experimentation and psychological safety. This seems to be more important in gaining employee buy-in and satisfaction than competency. Finally, organisations should use reward, recognition and career development programs that keep employees motivated and reward digital behaviours, which in turn contribute to engagement and performance during digital transformation programs (Chaedir et al., 2024).

There are limitations to the study. First, the research was conducted in a single organization, and can't be generalised across the consumer goods industry. Second, the relatively small sample (N = 129) limits statistical power and could have affected moderation results. Third, organisational digital maturity was not explicitly measured, which may have enhanced contextual understanding. Finally, the low AVE for job satisfaction indicates a problem with convergent validity (despite satisfactory reliability indices).

Future Research Directions

Future studies should include leadership and change management to complement predictive factors and explain social aspects of digital change. Combinations of methods could offer deeper understanding of employees' sense-making during digital change. Wider samples across industries and nations would add to the generalisability, while longitudinal studies could address changes in digital culture and skills over time in dynamic capability development.

Conclusion

This research adds to the body of literature on digital transformation and organisational behaviour by showing that digital organisational culture is a key predictor of digital transformation commitment and employee satisfaction but that digital competency acts in a supporting rather than moderating role. Guided by the Digital Maturity Model and Dynamic Capabilities Theory, the study emphasises the importance of culture fit in driving digital adaptation.

REFERENCES

- Alieva, J. & Powell, D. J. (2022). The significance of employee behaviours and soft management practices to avoid digital waste during a digital transformation. *International Journal of Lean Six Sigma*, 14(1), 1-32.
- Alvarenga, A., Florinda, M., Radu, G., & Jo.O.M. (2020). Digital Transformation and Knowledge Management in the Public Sector. *Sustainability* 12: 5824. (crossref)
- Cavalcanti, D., Rodrigues, T.O., & Fernando.O.S. (2022). Drivers of digital transformation adoption: A weight and meta-analysis. *Heliyon* 8: e08911. (crossref)
- Chaedir, C., M Anwar, S., Pajariantio, H., & Tahier, I. (2024). The Influence of Digital Competence, Motivation and Work Discipline on Employee Performance. *International Journal of Entrepreneurship and Management Practices (IJEMP)*, 7(27): 370–385.
- Dubey, P., Pathak, A. K., & Sahu, K. K. (2023). Assessing the influence of effective leadership on job satisfaction and organisational citizenship behaviour. *Rajagiri Management Journal*, 17(3), 221-237.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1): 39-50.

Gill, M. & Van Boskirk, S. (2016). The Digital Maturity Model 4.0. Benchmarks: *Digital Transformation Playbook*. Available online: <https://www.forrester.com/report/the-digital-maturity-model-40/RES131801>. (crossref)

Hair, J., Black, W. C., Babin, B. J. & Anderson, R. E. (2010) Multivariate data analysis (7th ed.). Upper Saddle River, New Jersey: Pearson Educational International.

Hasan, E. F., Alzuod, M. A., Al Jasimee, K. H., Alshdaifat, S. M., Hijazin, A. F., & Khrais, L. T. (2025). The role of organizational culture in digital transformation and modern accounting practices among Jordanian SMEs. *Journal of Risk and Financial Management*, 18(3), 147. <https://doi.org/10.3390/jrfm18030147>.

Karakuş, M., & Yalçın, C. (2024). Digital Transformation and Organizational Change Management: Theoretical Models and Case Studies.

Machingambi, R., Sigauke, N., & Kappo-Abidemi, C. (2024). The impact of technological changes on employee performance: a case of selected retail outlets in Mbombela, South Africa. *Prizren Social Sciences Journal*, 1(8): 21–34.

Malgas, B., Khatle, T., & Mason, R. B. (2017). Job creation in the South African retail sector. *The Retail and Marketing Review*, 13(1), 1-13.

Olaleye, B.R., Lekunze, J.N., Sekhampu, T.J., Khumalo, N. & Ayeni, A.A.W. (2024). Leveraging Innovation Capability and Organizational Resilience for Business Sustainability Among Small and Medium Enterprises: A PLS-SEM Approach. *Sustainability*, 16, 9201. <https://doi.org/10.3390/su16219201>

Sagar, S. (2024). The impact of digital transformation on retail management and consumer behavior. *Journal of Business and Management*, 26(1), 06-14.

Schmölz, A., Schwarz, S., Bieg, T., Svecnik, E., Geppert, C., & Gerdenitsch, C. (2024). Digital competence scale (DCS) a short self-assessment instrument for measuring digital competences. *Nordic Journal of Digital Literacy*, (3), 126-143.(crossref).

Shoaib, H. M. (2022). Digital transformation as a mediating variable in the relationship between organizational culture and job satisfaction. *EuroMid Journal of Business and Tech-Innovation*, 1(3):16–50.

Tabachnick, B. G., & Fidell, L. S. (2013). Using Multivariate Statistics (6th ed., pp. 1–983). New Jersey: Pearson Education Inc.

Trofimov, I., Artykhov, A., Gostilovich, A., & Chizhov, S. (2023). Automation and digitalization of processes in the management of service organizations. *Revista Gestão & Tecnologia*, 23, 112-125.

Tuukkanen, V., Wolgsjö, E., & Rusu, L. (2022). Cultural values in digital transformation in a small company. *Procedia Computer Science*, 196, 3-12.

Veeraya, S., Raman, M., Gopinathan, S., & Singh, J. B. (2024). Digital Business Transformation of Malaysian Small and Medium-Sized Enterprises: A Review on Digital Leadership and Digital Culture. *International Journal of Organizational Leadership*, 13(4).

Wulandari, F. A., Hamid, R. S., & Ikbal, M. (2025). Role Of Digital Competence, Digital Culture, Individual Experience, in Increasing Job Satisfaction and Employee Performance at Bumh Banks In Palopo City. *Business, Management, & Accounting Journal*, 6(1), 627-642.

LEVERAGING ODOR INTENSITY TO ENHANCE FOOD RETAILING AND SERVICE EXPERIENCES

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ABSTRACT

Existing research often overlooks the impact of odor intensity, which varies naturally in retail environments like bakeries and coffee shops. Differences in odor strength can lead to distinct perceptual and behavioral responses, influencing decision-making. Prolonged exposure to strong scents may also result in sensory adaptation, altering neural signals linked to digestion and consumption. The study aims to investigate how varying food scent intensities affect consumer behavior through controlled experiments, contributing to a deeper understanding of olfactory influence in food marketing.

Keywords: smell intensity, food marketing, food perception, food consumption, mental imagery.

INTRODUCTION

Existing research on olfactory influence typically employs experimental settings that compare consumer responses to odorous versus non-odorous environments or pleasant versus neutral scents. While this approach effectively demonstrates the impact of odor diffusion in otherwise neutral surroundings, it fails to account for variations in odor intensity and their differential effects on consumer behavior. Odor intensity, defined as the perceived strength of an olfactory stimulus, is quantified based on its concentration in the air (Coffey and Toohey, 2006). In many retail settings, particularly in food establishments, the intensity of scent naturally fluctuates throughout the day. For instance, in bakeries, the aroma of freshly baked bread is most potent when emerging directly from the oven. Similar variations occur in coffee breweries, restaurants, cheese shops, and food counters within larger retail environments, creating dynamic sensory experiences that may uniquely influence consumer decision-making.

Findings on olfactory cognitive processing further support the saliency of studying the effects of different odor intensities. As with other sensory modalities, varying intensities of odor stimulate different neural structures, leading to distinct perceptual and behavioral responses (Baccarani et al. 2021; Sirotin, Shusterman, and Rinberg, 2015). The specific neuronal activations associated with scent recognition undergo modifications following prolonged or heightened exposure, contributing to sensory adaptation and olfactory fatigue (Chaudhury et al., 2010). Such changes in neural processing may alter brain signals to other physiological systems, such as digestive organs, thereby modulating visceral responses and subsequent consumer behaviors. This study seeks to examine the effects of varying food scent intensities on consumer visceral responses and subsequent food consumption through controlled laboratory experiments, contributing to a more nuanced understanding of olfactory influence in food retail and services.

SMELL INTENSITIES AND FOOD MARKETING

Sensory marketers employ olfactory stimuli to influence consumer behavior, leveraging scents to evoke emotional and cognitive responses (Hassan, Lim, and Rahman, 2024; Krishna et al. 2014). Whether in shopping malls, airports, bakeries, or restaurants, consumers encounter a complex interplay of natural and artificial food aromas that can trigger visceral reactions. Exposure to food-related scents varies depending on proximity and environmental conditions. For

example, a customer inside a bakery perceives a much stronger scent than an individual standing outside. The effect of food-related aromas on consumer behavior is further influenced by their valence and the person's prior familiarity with the scent (Biswas and Zsocs, 2019), and by the mental imagery it evokes in the consumer's memory (Ghorbanzadeh et al. 2025). Regardless of these variables, an odor must reach a detectable threshold for olfactory receptors to perceive it. Conversely, excessive scent intensity may cause discomfort, manifesting as nausea, headaches, or an urge for fresh air (McGinley et al. 2000).

Recognizing the importance of scent intensity, food retailers such as Domino's Pizza, Subway, and Starbucks have implemented ventilation strategies to optimize olfactory experiences. Subway strategically positions bread ovens near store entrances to maximize scent exposure upon entry, while Starbucks regulates ventilation to ensure coffee aromas dominate over competing food scents. Similarly, Domino's Pizza has enhanced fan absorption capacity to mitigate excessive scent intensity during peak hours.

Despite the practical relevance of scent intensity management in retail and food environments, academic research has predominantly focused on binary comparisons, such as odorous versus non-odorous settings, pleasant versus neutral scents, and congruent versus incongruent olfactory stimuli. This narrow framing has limited the exploration of scent intensity as a variable, particularly in its effects on visceral consumer responses and food-related behaviors (Abe et al., 2023; Giacalone et al., 2021).

Emerging research in neurobiology and sensory marketing suggests that different odor intensities activate distinct neural pathways, influencing perception, emotional states, and decision-making. For instance, higher scent intensities have been shown to stimulate the amygdala and orbitofrontal cortex more robustly, potentially heightening emotional arousal and influencing consumption patterns (Oetzel and Luppold, 2024). Moreover, prolonged or heightened exposure to scents can lead to olfactory adaptation, a phenomenon where the brain reduces its responsiveness to continuous stimuli, thereby altering appetite regulation and digestive responses (Girard et al., 2019). Despite these insights, the specific impact of scent intensity on food consumption and purchasing behavior remains underexplored. Key questions persist: Do stronger scents elicit more pronounced visceral reactions than weaker ones? Is there a threshold beyond which scent intensity becomes counterproductive or leads to sensory fatigue and lower consumption? How do these variations influence consumer satisfaction, dwell time, and food product choice? To address these gaps, this study investigates the neurobiological mechanisms underlying olfactory perception and eating behavior, integrating recent findings from retail scent research and aromachology. By examining how varying food scent intensities affect emotional and physiological responses, the study aims to contribute to a more nuanced understanding of scent-driven consumer behavior, with implications for sensory marketing, food product placement, and in-store experience design.

Smell in Food Marketing Research

Research in food marketing has consistently demonstrated the impact of food-related scents on visceral responses such as hunger and thirst. Panksepp (1998) posited that fundamental visceral sensations including hunger, thirst, and even sexual desire, are influenced by sensory cues such as odors. Salivation, for instance, can be elicited through conditioned reflexes (Ployon et al. 2017; Spence, 2011), particularly in response to food aromas (Nederkoorn et al., 2000). Krishna, Morrin, and Sayin (2014) further established that exposure to ambient food scents enhances the desire to eat, particularly when individuals can vividly recall the associated odor. This heightened desire subsequently increases food consumption. Spence (2011) also noted that salivation occurs as a preparatory response to food-related olfactory cues, reinforcing the link between scent exposure and eating behavior. Similarly, Boesveldt and Graaf (2017) found that olfactory stimuli can trigger an overwhelming urge to eat or drink, often leading to impulsive consumption. Beyond direct appetitive responses, ambient olfactory stimuli influence taste anticipation and subjective expected pleasure (Alba and Williams, 2013). These sensations contribute to hunger perception (Zoon, De Graaf, and Boesveldt, 2016), with their intensity modulated by factors such as satiety levels (Shanahan and Kahnt, 2022). Increased salivation, in turn, strengthens the desire to eat, which is significantly correlated with food consumption (Muñoz-González et al. 2018). Proserpio et al. (2017) demonstrated that exposure to palatable food stimuli, such as food aromas, leads to salivation and subsequent eating behavior. Koubaa and Eleuch (2021) further confirmed that food-related olfactory stimulation induces significant increases in craving, desire to eat, and actual consumption. While some studies have reported no significant changes in salivation or food consumption following scent exposure (Crowder and Schab, 1995; Shannon, 1974), the prevailing evidence suggests that salivation serves as a reliable

physiological predictor of eating behavior and food consumption (Krishna *et al.* 2014). Koubaa and Awokoya (2025) attributed inconsistencies in findings to methodological limitations, such as small sample sizes or inappropriate physical and cognitive measurements. Another potential explanation is the failure to account for scent intensity variations.

The Role of Scent Intensity in Food Marketing

Despite its practical relevance, the impact of food scent intensity remains largely underexplored in marketing research. However, recent studies in food science and nutrition have begun to illuminate its role in shaping consumer experience and behavior. For example, Puleo *et al.* (2021) found that odor sensitivity, as a vector of odor intensity, plays a pivotal role in the perception and liking of real food products. Morrin and Tepper (2021) demonstrated that the length, type and strength of aroma exposure can impact food perception and consumption outcomes. Piqueras-Fiszman and Spence (2015) investigated subjective flavor release and expectation among home and restaurant diners. They concluded that home diners experience stronger flavor release due to higher scent intensities during cooking. Their recommendations included using cloches to preserve food aromas until serving or adopting semi-open kitchen designs to allow scents to reach diners more effectively. However, these studies relied heavily on subjective assessments and lacked precise scent intensity measurements.

These findings are consistent with findings from older research works. For instance, Dattatreya, Prakash, and Bhat (2004) found that individuals exhibit more favorable flavor judgments for strongly scented cumin compared to weaker-smelling variants, reinforcing a preference for intense aromas in cooking. Similarly, Martin (2004) observed that heightened food aroma intensity in restaurants enhances hunger and appetite, leading to prolonged stays and increased consumption. He recommended that chefs adjust recipes to enhance aroma concentration. Taylor and Linfoth (1998) addressed this limitation from a mathematical perspective by quantifying the relationship between food scent intensity and flavor release using atmospheric pressure ionization techniques. Their findings indicated that flavor release increases proportionally with scent intensity up to a threshold level, beyond which excessive scent exposure slows flavor perception. These results align with Apter's (2007) optimal arousal theory, which posits that both insufficient and excessive sensory stimulation can lead to discomfort. Low-intensity stimuli may hinder odor recognition, resulting in cognitive strain, while excessive stimuli can saturate olfactory receptors, prompting the brain to signal discomfort and a need for fresh air.

Recent systematic reviews and experimental studies support further these findings. For instance, Abe *et al.* (2023) emphasized the need to integrate scent intensity into consumer behavior models, noting that unnoticed or overly intense scents can disrupt emotional engagement and decision-making. Girona-Ruiz *et al.* (2021) highlighted the strong link between scent, emotion, and appetite modulation, calling for more precise measurement techniques in food-related aromachology. Li *et al.* (2025) synthesized evidence from 43 studies and found that while food odors generally enhance sensory-specific appetite and cravings, their effects on food choice and intake vary depending on individual traits and odor delivery methods. While existing research confirms that olfactory and gustatory systems respond differently to varying scent intensities, their implications for consumer behavior remain ambiguous. Given the established correlation between flavor release and salivation, a strong predictor of eating behavior and food consumption (Stevenson, 2009), similar effects can be anticipated in food marketing contexts. Research should prioritize objective scent intensity measurement and explore its role in shaping consumer engagement, appetite, and purchase behavior.

Hypotheses

Considering the responsiveness of olfactory cells to scent intensity variations and the findings reviewed, a research framework examining the effects of food scent intensity on consumer visceral responses and subsequent consumption behavior could address a critical gap in food retailing and marketing literature.

We will investigate the impact of varying food scent intensities on two key responses: (1) desire to eat, measured through salivation, and (2) food consumption, quantified by the amount of food consumed.

We propose the following hypotheses:

- **H1:** Different food scent intensities will elicit varying levels of desire to eat.
- **H2:** Different food scent intensities will result in different quantities of food consumed.

In line with Apter's (2007) arousal theory:

- **H3:** Moderate scent intensities (within the recognition and annoyance thresholds) will enhance desire to eat and food consumption.
- **H4:** Weak and excessive scent intensities will have the opposite effect, reducing desire to eat and food consumption.

EXPERIMENTS

Two independent experiments were conducted to obtain the required dataset. All participants consented to take part in the experiments without any obligation with individuals informed of their right to discontinue participation at any stage without consequence. To ensure confidentiality, only anonymized demographic data pertinent to the analysis were recorded.

All experimental sessions were carried out in air-controlled environments, where ambient air was pre-filtered to eliminate residual odors and maintain olfactory neutrality. To further minimize potential interference from external scents, participants were instructed to take a water-only shower prior to arrival, explicitly avoiding the use of scented products such as shampoo, body lotion, perfume, or cosmetics.

For the experimental stimuli, vanilla cookies were selected as the gustatory component, while a synthetic vanillin-based aroma served as the olfactory stimulus. All participants confirmed prior familiarity with both the flavor and aroma of vanilla cookies, ensuring consistent baseline recognition across the sample. All individuals were free from any medical conditions. They were instructed to consume their usual breakfast at 8 a.m. and refrain from eating until the time of the experiment, which took place at 11 a.m. Participants in Experiment 1 were distinct from those in Experiment 2. The primary aim of Experiment 1 was to establish appropriate odorant concentrations corresponding to a range of predefined odor intensity levels. In this study, odor intensity calibration was conducted in accordance with the protocol described by Jiang, Coffey, and Toohey (2006). An olfactometric system was used in conjunction with a panel of trained evaluators. Participants were exposed to systematically diluted odorant mixtures alongside an odor-free reference gas, delivered through designated sniffing ports. Each panelist was instructed to assess the perceived odor intensity using a standardized ordinal scale defined as follows: **0:** No odor; **1:** Detectable; **2:** Recognizable; **3:** Strong; **4:** Very strong; **5:** Annoying

Experiment 1 involved a cohort of 30 participants, each assigned to one of 30 sniffing ports designed for controlled odorant diffusion. The study was conducted in two distinct phases. In the initial phase, 15 ports dispensed odor-free reference gas, constituting the control condition, while the remaining 15 ports emitted an odorous gas with systematically increasing concentrations. Odor intensity assessments were performed in accordance with the European Standard EN 13725:2003 for olfactometric measurements. At baseline, the concentration of the odorous gas was calibrated to match that of the odor-free gas to ensure equivalence in flow and delivery parameters. Each participant was given a 15-second interval to inhale the sample from their assigned port and subsequently rate the perceived odor intensity. This procedure was repeated across seven discrete trials. To mitigate olfactory adaptation and maintain receptor sensitivity, participants were instructed to inhale the aroma of roasted coffee beans for 10 seconds between successive exposures. During the first four trials, the concentration of odorous gas was incrementally increased. On the fifth trial, an odor-free gas was introduced to evaluate potential cognitive habituation effects, as described by Kobayashi *et al.* (2007). The sixth and seventh trials involved odorant concentrations exceeding those used in the fourth trial to assess perceptual recovery and sensitivity thresholds. Throughout the experiment, the control group consistently received the odor-free gas across all seven trials and was required to evaluate its intensity using the same standardized protocol.

The scent intensities were structured as follows: **Sniff 1:** Odor-free gas; **Sniff 2:** Detection level intensity; **Sniff 3:** Recognition level intensity; **Sniff 4:** Intensity between recognition and annoyance level; **Sniff 5:** Odor-free gas; **Sniff 6:** Annoyance level intensity; **Sniff 7:** Intensity beyond annoyance level.

In the second phase of the experiment, the roles of the control and test groups were reversed, allowing each participant to experience both conditions. The procedure was replicated to ensure consistency and to broaden the dataset for comparative analysis. To determine the optimal odorant concentrations for Experiment 2, researchers evaluated the odor intensity ratings provided by participants across both group assignments. Particular attention was

given to the fifth sniff, during which an odor-free gas was administered, serving as a probe for potential olfactory habituation.

The data revealed that 80% of participants accurately recognized the absence of odor, while the remaining 20% reported a faint olfactory sensation. This distribution suggests a high level of perceptual accuracy and minimal cognitive bias. Importantly, the analysis did not indicate any statistically significant habituation effects, affirming the reliability of the participants' odor intensity assessments throughout the experimental sequence. Since human perception of odor follows the power law (Stevens, 1960), odor intensity increases as a power function of the odorant concentration rather than in a linear manner. This relationship is described by the equation:

[$I = k C^n$] where **I** represents perceived intensity, **C** denotes odorant mass concentration, and **k** and **n** are constants specific to each odorant (Stevens, 1962).

To validate the correspondence between administered odorant concentrations and the subjective intensity ratings provided by panelists, a quantitative modeling approach was employed. Effective concentrations were statistically regressed against the perceived odor intensities to establish a predictive relationship.

The resulting analysis yielded statistically significant factor loadings ($p < 0.00$), confirming the robustness of the model. This enabled the derivation of a functional equation describing the relationship between odorant concentration and perceived intensity, thereby ensuring that the experimental dosing accurately reflected human sensory perception. The equation has the following form: [$I = 2.50 + 0.617C$] where **I** represents perceived odor intensity and **C** corresponds to effective odor concentration. Consequently, odorant concentrations and intensity levels applied in Experiment 2 were adjusted in accordance with this equation.

Experiment 2 employed a between-subject design, with six groups of equivalent participants. Each group consisted of 30 individuals. The experimental conditions were structured as follows: **Group 1:** No scent condition (control group); **Group 2:** Scent condition with odor intensity at the detection threshold; **Group 3:** Scent condition with odor intensity at the recognition threshold; **Group 4:** Scent condition with odor intensity between the recognition and annoyance thresholds; **Group 5:** Scent condition with odor intensity at the annoyance threshold; **Group 6:** Scent condition with odor intensity exceeding the annoyance threshold.

All experimental procedures were carried out in climate-controlled chambers, where ambient parameters such as temperature and ventilation were precisely regulated to emulate the typical environmental conditions found in commercial bakery and confectionery retail settings. Odor intensity was quantified through olfactometric analysis, using calibrated odorant concentrations as the basis for measurement. To enhance ecological validity and ensure that sensory responses reflected real-world consumer experiences, the experimental protocol incorporated a simulated shopping environment, replicating the sensory context of a typical bakery or cookie shop.

Food consumption was operationalized as the total quantity of vanilla cookies ingested by participants during the experimental session. To evaluate appetite or desire to eat, salivary response was used as a physiological proxy. Salivation was measured at two distinct time points: (1) a baseline measurement obtained immediately prior to odor exposure, and (2) a post-exposure measurement collected following the presentation of the olfactory stimulus.

Salivary output was quantified using the Strongin-Hinsie-Peck dental roll method, a validated technique for assessing salivary flow (Krishna, Morrin, and Sayin, 2014; Gal, 2012; Wooley and Wooley, 1973). Each participant received three pre-weighed sterile cotton dental rolls, individually sealed in zippered plastic bags. Participants were instructed to place two rolls between the lower gums and cheeks, and one beneath the tongue. To ensure consistency and accuracy, correct placement was demonstrated by the experimenter prior to each measurement. Saliva was collected over a standardized three-minute interval for both baseline and post-stimulus phases. Upon completion, participants returned the saturated dental rolls to their respective bags for weighing. Salivary volume was determined by calculating the net weight gain of the dental rolls, measured to the nearest 0.1 gram, thereby providing an objective index of physiological response to the odor stimulus.

Following the initial collection of baseline salivary output, participants engaged in a 10-minute distractor task consisting of unrelated questionnaire items. This interval served to reduce anticipatory bias and maintain cognitive neutrality prior to odor exposure. Subsequently, participants were exposed to the olfactory stimulus for a standardized duration of three minutes. Immediately after exposure, the salivation measurement procedure was repeated to obtain post-stimulus data.

Following the second salivation assessment, each participant was provided with 150 grams of vanilla cookies, individually packaged in sealed plastic bags to prevent olfactory interference from the natural aroma of the cookies with the artificially administered odor stimulus. Participants were instructed to consume cookies ad libitum. To minimize external sensory influences, the cookies were presented on a table covered with white paper and positioned against a neutral, blank wall, in accordance with established protocols for reducing environmental distractions during food intake studies (Rinaldo *et al.* 2014).

After the consumption phase, participants rated the perceived odor intensity using a standardized odor intensity scale. The total duration of the experimental session was approximately 30 minutes. At the conclusion of the session, the remaining cookie portions were collected and weighed to the nearest 0.1 gram. The difference between the initial and final weights was used to calculate individual consumption levels. As a token of appreciation, participants received symbolic remuneration for their participation.

RESULTS

The experimental design enables a between-group comparison of salivation levels and food intake across varying degrees of scent intensity. Accordingly, the research framework incorporates two dependent variables, the quantity of saliva produced, and the quantity of cookies consumed, alongside one independent variable, which is food scent intensity. To validate the appropriateness of the intensity levels employed in Experiment 2, a comparative analysis was conducted between the applied odor intensities, adjusted according to European CEN norms and refined based on Experiment 1 findings, and participants perceived intensity levels. Results indicated no significant discrepancies between the applied and perceived intensities, confirming the accuracy of the scent intensity classifications used in Experiment 2.

The dependent variables in this study are continuous, while the independent variable consists of six distinct experimental conditions. With each group comprising 30 participants, the sample size was sufficient to capture interactions between the dependent variables. No multicollinearity was detected, and correlations between saliva production and food consumption were found to be non-significant. Additionally, data exhibited a quasi-normal distribution, with skewness values of 0.25 for saliva production and 0.51 for food consumption. Given these characteristics, a Multivariate Analysis of Variance (MANOVA) with post hoc tests was deemed an appropriate statistical approach to assess the impact of scent intensity on the desire to eat and cookies consumption.

MANOVA results revealed significant differences in the dependent variables, salivation levels and food consumption, based on the intensity of the food scent diffused: $F(5, 170) = 20.75, p < 0.005$; Wilk's $\Lambda = 0.39$, partial $\eta^2 = 0.38$ (see Table 1). These findings support hypotheses **H1** and **H2**, demonstrating that variations in food scent intensity elicit distinct levels of eating desire and consumption.

To further evaluate the independent effects of scent intensity on desire to eat and food consumption, separate between-subjects analyses were conducted. Results confirmed a significant influence of scent intensity on salivation levels ($F(5, 174) = 39, p < 0.005$; partial $\eta^2 = 0.53$) and food consumption ($F(5, 174) = 13.13, p < 0.005$; partial $\eta^2 = 0.27$). To get to the impact of each intensity level on the desire to eat sensations and food consumption, we applied Tukey's HSD Post Hoc tests. These tests allow for multiple paired comparisons between the effects of the six categories (the six intensity levels applied) of the independent variable on each of the two dependent variables. Results of Tukey's HSD Post Hoc tests are summarized in the following table:

Table 1: Results of Tukey's HSD Post Hoc tests.

Intensity intervals	Saliva production		Cookies consumption	
	MD	P	MD	P
Odor free-Detection	1,7000***	,001	-5,4000	,949
Odor free-Recognition	1,7333***	,001	-3,7000	,990
Odor free-Recognition/Annoyance	2,6667***	,000	18,2333**	,036
Odor free-Annoyance	4,5667***	,000	31,7000***	,000
Odor free-Beyond Annoyance	4,9667***	,000	22,1667***	,005

Detection-Recognition	,0333	1,000	1,7000	1,000
Detection-Recognition/Annoyance	,9667	,214	23,6333***	,002
Detection-Anno	2,8667***	,000	37,1000***	,000
Detection-Beyond Annoyance	3,2667***	,000	27,5667***	,000
Recognition-Recognition/ Annoyance	,9333	,249	21,9333***	,005
Recognition-Annoyance	2,8333***	,000	35,4000***	,000
Recognition-Beyond Annoyance	3,2333***	,000	25,8667***	,000
Recognition Annoyance-Annoyance	1,9000***	,000	13,4667	,235
Recognition/ Annoyance-Beyond Annoyance	2,3000***	,000	3,9333	,987
Annoyance-Beyond Annoyance	,4000	,936	-9,5333	,619

***: significant at $p < 0.01$ / **: significant at $p < 0.05$

Desire to Eat

Exposure to food scent, regardless of intensity level, significantly enhances the desire to eat compared to the non-scent condition. Higher scent intensity correlates with increased salivation, as observed in the first five rows of column 1 in the table. When comparing individual groups, salivation increases only when scent intensity rises by a substantial margin. Differences between consecutive intensity levels are generally non-significant, except for the recognition-annoyance and annoyance-level pairs. Significant differences were identified between detection and annoyance levels, detection and beyond-annoyance levels, recognition and annoyance levels, recognition and beyond-annoyance levels, and the recognition-annoyance and beyond-annoyance levels. Notably, for each significant pair, one intensity level was consistently skipped. In all significant comparisons, higher scent intensity led to greater saliva production, reinforcing the relationship between scent strength and heightened desire to eat.

Food Consumption

When compared to the control group, only scent intensities beyond the recognition threshold significantly impacted food consumption, with the strongest effect observed between the detection and annoyance levels.

Comparing food consumption across groups revealed that consumption increased only when scent intensity rose substantially. Successive intensity levels exhibited non-significant differences, except in the recognition/recognition-annoyance pair. Significant differences were found between detection and recognition-annoyance levels, detection and annoyance levels, detection and beyond-annoyance levels, recognition and recognition-annoyance levels, recognition and annoyance levels, and recognition and beyond-annoyance levels. Again, one intensity level was consistently omitted in each significant pair. Notably, in all cases of significant difference, increased scent intensity corresponded with greater cookie consumption. Overall:

- If the consumer has been exposed to a weak scent (below recognition level), exposure to a higher intensity increases the desire to eat only when the intensity reaches or exceeds the annoyance level and enhances food consumption only beyond the recognition threshold. The desire to eat increases with scent intensity, whereas food consumption rises between the recognition-annoyance and annoyance levels but declines beyond the annoyance threshold.
- If the consumer has already recognized the scent, desire to eat increases only when exposed to intensities at or above the annoyance level, while food consumption is significantly affected by intensities beyond recognition.
- When scent intensity falls between recognition and annoyance levels, increased intensity enhances salivation but does not impact food consumption.
- If the scent intensity has already reached an annoyance level, further increases do not affect either desire to eat or food consumption.

The most pronounced effect on desire to eat occurred between the null intensity and the beyond-annoyance intensity, while the strongest impact on food consumption was observed between the detection and annoyance levels. Based on these findings, H3 is confirmed, while H4 is rejected. Tolerable scent intensities effectively increased salivation and food consumption, yet weak and excessive intensities also demonstrated notable effects, despite instances of non-significant results.

DISCUSSION

Food odor intensity affects the desire to eat and food consumption at different rates, with the significance and strength of these effects depending on an individual's olfactory sensitivity. Compared to a non-scented environment, any detectable food scent significantly enhances the desire to eat, whereas food consumption is significantly influenced only by scent intensities that exceed the recognition threshold. This pattern aligns with evidence that odors trigger non-conscious reflexes more rapidly and intensely than conscious behavioral responses, reinforcing salivation as a reliable precursor to food consumption.

However, eating can occur without a notable increase in salivation when scent intensity rises after the odor has already been recognized. Beyond recognition, the desire to eat intensifies only with substantial increases in scent intensity, whereas food consumption is influenced even by marginal increases. This may be attributed to the cognitive association between recognized food scents and vivid mental imagery of the food itself (Meggiato, 2015). Because participants had access to the food stimulus, their certainty in fulfilling their desire to eat accelerated consumption while salivation remained stable.

These findings offer a potential explanation for conflicting results in sensory marketing research regarding the impact of food scent on eating behavior. The significance and magnitude of scent effects on salivation and food consumption depend on variations in scent intensity. When the scent is unfamiliar, any detectable intensity level increases the desire to eat, whereas only recognizable strong intensities drive consumption. Future research should therefore consider the moderating role of scent intensity in the relationship between olfactory exposure, salivation, and eating behavior.

Optimal scent intensities for enhancing the desire to eat are those that exceed the recognition threshold, as saliva production consistently increases with higher intensities. However, food consumption is most effectively stimulated by scent intensities situated between recognition and annoyance levels. Excessive intensities may still promote consumption, but at a diminishing rate.

From a psychological perspective, these findings reconfirm the pivotal role of mental imagery in shaping the perception of sensory signals and guiding behavioral responses. The connection between odor intensity and olfactory mental imagery is rooted in the brain's ability to simulate sensory experiences. Research suggests that individuals who perceive odors as more intense often have stronger olfactory imagery, meaning they can vividly imagine smells even in their absence (Koubaa and Eleuch, 2021). This relationship is thought to involve overlapping neural pathways in the olfactory cortex, where actual odor perception and imagined smells activate similar brain regions (Djordjevic et al., 2005). Prior exposure to strong odors further enhances one's ability to mentally recreate scents, highlighting the role of memory and familiarity in olfactory imagery. For example, perfumers, chefs, or individuals frequently exposed to pungent odors, such as vinegar or freshly ground coffee, often find it easier to recall and imagine these smells due to their intensity (Tempere et al., 2014). This relationship underscores how exposure to intense smells strengthens both perception and mental simulation of odors by increasing imagery vividness, reinforcing the role of memory in olfactory imagery and calling for greater consideration of odor intensity in ambient and imagined olfactory stimulation. Understanding this relationship deepens our comprehension of how odor intensity influences the desire to eat and food consumption, and how it should be mobilized as a marketing vector in restaurants, food shops, and food product advertising.

Controlling scent intensity constitutes a powerful tool for food businesses. Recent research highlights that ambient scent intensity affects emotional states, dwell time, and purchase decisions, but its effectiveness depends on precise delivery and integration with other sensory cues. In bakeries, cafés, and patisseries, scent intensity peaks when bread is freshly baked or coffee is brewed. However, excessive scent exposure can suppress appetite, as observed with overpowering pizza or alcohol aromas in enclosed spaces (Proserpio et al., 2017). A study by Berčík et al. (2022)

found that aromatization in food retail stores increases customer engagement and turnover, but only when scent levels are carefully managed to avoid overstimulation. Food retailers are already applying these insights. Cinnabon franchises place ovens near store entrances and bake cinnamon rolls every 30 minutes to maintain optimal scent levels. Similarly, Singapore's Tiong Bahru Bakery uses semi-open kitchens to allow aromas to drift naturally into seating areas, enhancing appetite without overwhelming customers.

Recent reviews by Abe et al. (2023) and Giacalone et al. (2021) emphasize that scent intensity must reach the recognition threshold to trigger consumption, and that combining scent with visuals, music, and lighting increases effectiveness. For instance, food packaging that releases aroma upon opening, such as those used by Baemin Kitchen in South Korea, enhances the customer experience and increases beverage sales. Strong scents stimulate salivation, but prolonged exposure reduces saliva flow and induces thirst, which can be leveraged to upsell drinks (Proserpio et al., 2017). Restaurants can further optimize scent exposure by diffusing subtle aromas before seating and increasing intensity before ordering.

Another key consideration in food olfactory marketing is location strategy during lease negotiations. Indoor venues that retain food aromas, such as enclosed shopping malls or transit hubs, are more effective than openair spaces where scents dissipate quickly. In high-traffic environments such as malls and airports, food vendors benefit from securing ground-floor units near escalators or stairwells, allowing aromas to disperse across multiple levels and attract foot traffic from afar. In food outlets and vending machines, intermittent scent diffusion at controlled intensities can significantly enhance consumer engagement. The most effective scent levels fall between detection and annoyance thresholds, where olfactory cues stimulate appetite without overwhelming the senses. Periodic diffusion prevents olfactory habituation, and proper air filtration ensures that scent profiles remain pleasant and distinct, which is particularly important in mixed-use spaces where competing food odors may clash.

Food packaging is another emerging frontier in olfactory marketing. Kraft Foods has pioneered touch-activated scented packaging that releases food aromas, enhancing sensory engagement and influencing purchase intent. High-end establishments may also consider scent-neutrality policies. For instance, some Michelin-starred restaurants prohibit staff from wearing perfumes to preserve the integrity of food aromas (Spence, 2015).

Scent intensity can also be strategically used to promote specific dietary offerings. Stronger food aromas may compensate for reduced taste in salt-free, sugar-free, or low-calorie meals, which is particularly relevant in health-conscious markets where health considerations take precedence over eating pleasure. Research in psychology and marketing suggests that the brain compensates for sensory deficits by amplifying other inputs (Koubaa and Eleuch, 2021). Enhancing the aroma of grilled vegetables or sugar-free desserts may therefore help consumers maintain enjoyment while adhering to dietary restrictions.

REFERENCES

- Abe, S., Kawamata, H., Moriguchi, T., & Takemura, K. (2023). A review of research on the effects of scent on consumer behavior. *Advances in Consumer Studies*, 30(1), 1–36.
- Apter, M. J. (2007). *Reversal theory: The dynamics of motivation, emotion, and personality* (2nd ed.). Oneworld Publications.
- ASTM International. (1991). ASTM E679-91: Standard practice for determination of odor and taste thresholds by a forced-choice ascending concentration series method of limits. American Society for Testing and Materials.
- Baccarani, A., Brand, G., Dacremont, C., Valentin, D., & Brochard, R. (2021). The influence of stimulus concentration and odor intensity on relaxing and stimulating perceived properties of odors. *Food Quality and Preference*, 87, 104030.
- Biswas, D., & Szocs, C. (2019). The smell of healthy choices: Cross-modal sensory compensation effects of ambient scent on food purchases. *Journal of Marketing Research*, 56(1), 123–141.
- Boesveldt, S., & de Graaf, K. (2017). The differential role of smell and taste for eating behavior. *Perception*, 46(3–4), 307–319.

- Coffey, P., & Toohey, B. (2006). Improvement of odor intensity measurement using dynamic olfactometry. *Journal of the Air & Waste Management Association*, 56, 67–83.
- Crowder, R. G., & Schab, F. R. (1995). Imagery for odors. In F. R. Schab & R. G. Crowder (Eds.), *Memory for odors* (pp. 93–107). Erlbaum.
- Gilbert, A. (2008). *What the nose knows: The science of scent in everyday life*. Crown Publishers.
- Girard, A., et al. (2019). Field experiment on scenting trains and passenger satisfaction. *German Railway Study*.
- Hultén, B., Broweus, N., & van Dijk, M. (2009). *Sensory marketing*. Palgrave Macmillan.
- Kobayashi, T., Sakai, N., Kobayakawa, T., Akiyama, S., Toda, H., & Saito, S. (2008). Effects of cognitive factors on perceived odor intensity in adaptation/habituation processes: From two different odor presentation methods. *Chemical Senses*, 33(2), 163–171.
- Koubaa, Y., & Eleuch, A. (2020). Gender effects on odor-induced taste enhancement and subsequent food consumption. *Journal of Consumer Marketing*, 37(5), 511–519.
- Koubaa, Y., & Eleuch, A. (2021). Multimodal perceptual processing of cues in food ads: Do you smell what you see? Visual-induced olfactory imagery and its effects on taste perception and food consumption. *Journal of Advertising Research*, 61(1), 78–94.
- Krishna, A., Morrin, M., & Sayin, E. (2014). Smellizing cookies and salivating: A focus on olfactory imagery. *Journal of Consumer Research*, 41, 18–34.
- Lowe, M. R., & Butryn, M. L. (2007). Hedonic hunger: A new dimension of appetite? *Physiology and Behavior*, 91, 432–439.
- Martin, G. N. (2004). A neuroanatomy of flavor. *Petits Propos Culinaires*, 76, 58–82.
- Mattes, R. D. (2010). Hunger and thirst: Issues in measurement and prediction of eating and drinking. *Physiology and Behavior*, 100(1), 22–32.
- McGinley, C. M., Mahin, T. D., & Pope, R. J. (2000). Elements of successful odor/odour laws. WEF Odor/VOC 2000 Specialty Conference, Cincinnati, OH, April 16–19.
- McGinley, D. L., & McGinley, C. M. (1997). Odor school curriculum development for training odor investigators. AWMA 90th Meeting and Exhibition, Toronto, Canada.
- Melis, M., Barbarossa, I. T., & Sollai, G. (2023). The implications of taste and olfaction in nutrition and health. *Nutrients*, 15(15), 3412.
- Mogg, K., Bradely, B. P., Hyare, H., & Lee, S. (1998). Selective attention to food-related stimuli in hunger: Are attitudinal biases specific to emotional and psychopathological states, or are they also found in normal drive states? *Behaviour Research and Therapy*, 36, 227–237.
- Morrin, M., & Tepper, B. J. (2021). Multisensory marketing: Effects of environmental aroma cues on perception, appetite, and consumption of foods and drinks. *Current Opinion in Food Science*, 40, 204–210.
- Muñoz-González, C., Feron, G., & Canon, F. (2018). Main effects of human saliva on flavour perception and the potential contribution to food consumption. *Proceedings of the Nutrition Society*, 77(4), 423–431.
- Nederkoorn, C., Fren, S., & Anita, J. (2000). Cephalic phase responses, craving, and food intake in normal subjects. *Appetite*, 35(1), 45–55.
- Nibbe, N., & Orth, U. R. (2017). Odor in marketing. In P. Schieberle & A. Buettner (Eds.), *Springer Handbook of Odor* (pp. 141–142). Springer.

- Oetzel, S., & Luppold, A. (2024). How are we influenced by scents? Olfactory stimuli. In 33 *Phenomena of Purchasing Decisions* (pp. 117–121). Springer.
- Overbosch, P., van den Enden, J. C., & Keur, B. M. (1986). An improved method for measuring perceived intensity/time relationships in human taste and smell. *Chemical Senses*, 11(3), 331–338.
- Panksepp, J. (1998). *Affective neuroscience: The foundations of human and animal emotions*. Oxford University Press.
- Paquet, C., Dubé, L., & Le Bel, J. L. (2005). Are visceral factors sensitive to attentional focus manipulation? The case of hunger. *Advances in Consumer Research*, 32.
- Piqueras-Fiszman, B., & Spence, C. (2015). Sensory expectations based on product-extrinsic food cues: An interdisciplinary review of the empirical evidence and theoretical accounts. *Food Quality and Preference*, 40, 165–179.
- Proserpio, C., de Graaf, C., Laureati, M., Pagliarini, E., & Boesveldt, S. (2017). Impact of ambient odors on food intake, saliva production, and appetite ratings. *Physiology and Behavior*, 174, 35–41.
- Proserpio, C., Laureati, M., Bertoli, S., & Battezzati, A. (2017). Impact of olfactory stimuli on food intake and salivation. *Appetite*, 113, 62–69.
- Rinaldo, S. B., Duhan, D. F., Trela, B., Dodd, T., & Velikova, N. (2014). Evaluating tastes and aromas of wine: A peek inside the 'black box'. *International Journal of Wine Business Research*, 26(3), 208–223.
- Shanahan, L., & Kahnt, T. (2022). Satiety modulates neural responses to food odors. *NeuroImage*, 247, 118823.
- Shanahan, L. K., & Kahnt, T. (2022). On the state-dependent nature of odor perception. *Frontiers in Neuroscience*, 16, 964742.
- Sirotin, Y. B., Shusterman, R., & Rinberg, D. (2015). Neural coding of perceived odor intensity. *ENeuro*, 2(6).
- Sorensen, L. B., Moller, P., Flint, A., Martens, M., & Raben, A. (2003). Effect of sensory perception of foods on appetite and food intake: A review of studies on humans. *International Journal of Obesity Related Metabolism Disorder*, 27(10), 1152–1166.
- Spence, C. (2011). Mouthwatering: The influence of environmental and cognitive factors on salivation and gustatory/flavor perception. *Journal of Texture Studies*, 42(2), 157–171.
- Spence, C. (2015). Leading the consumer by the nose: On the commercialization of olfactory design for the food and beverage sector. *Flavour*, 4, 1–15.
- Stevens, S. S. (1960). The psychophysics of sensory function. *American Scientist*, 48, 226–253.
- Stevenson, T. (2009). *The psychology of flavor*. Oxford University Press.
- Taylor, A. J., & Linforth, R. S. T. (1998). Flavor perception: Measuring flavor release in real time. *Trends in Food Science and Technology*, 9(7), 285–289.
- Ueno, H., Amano, S., Merecka, B., & Kosmider, J. (2009). Difference in the odor concentrations measured by the triangle odor bag method and dynamic olfactory. *Water Science and Technology*, 59, 1339–1342.
- Zhang, T., & Spence, C. (2023). Orthonasal olfactory influences on consumer food behaviour. *Appetite*, 190, 107023.
- Zoon, H. F., de Graaf, C., & Boesveldt, S. (2016). Food odors direct specific appetite. *Foods*, 5(1), 12.

CRITICAL AND STRATEGIC PERSPECTIVES: CORPORATE GOVERNANCE AND THE TECHNOLOGICAL FUTURE OF HIGHER EDUCATION INSTITUTIONS (HEIs)

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ABSTRACT

This article analyzes the strategic importance of Corporate Governance in Higher Education Institutions (HEIs) from a global perspective. The study investigates how the adoption of good governance practices, combined with technological and digital acceleration, shapes the sustainability of institutions in the post-pandemic scenario. The problem focuses on identifying how governance can mitigate operational and reputational risks in an educational business environment that is increasingly volatile and dependent on emerging technologies. The methodology adopted is qualitative, based on the authors' experience as HEI managers, bibliographic and documentary research, as well as observations gathered in pedagogical meetings. The results indicate that the professionalization of management, transparency, and the integration of technological intelligence are indispensable pillars for the survival of HEIs. It is concluded that governance must transcend legal compliance, becoming an intrinsic part of the organizational culture to ensure academic excellence and economic viability in the future of global business.

Keywords: corporate governance, Higher Education Institutions (HEIs), global technology, strategic management.

INTRODUCTION

Contemporary organizations operate in environments of constant change and transformation, which directly influence their image, actions, and results before global society. In the educational sector, Higher Education Institutions (HEIs) face the challenge of maintaining their academic relevance while adapting to a highly competitive and technologically disruptive educational business market. However, a significant gap remains in the literature regarding the practical integration between traditional governance models and the agility required by these disruptive technologies.

Critical and strategic perspectives are fundamental to shaping the future where business and technology merge. In this scenario, Corporate Governance emerges as an essential system that allows HEIs to monitor the business environment, seeking organizational excellence and risk reduction. As highlighted in classic management literature, governance is not just a set of rules, but a direction mechanism that must be adapted to the particularities of each sector. The COVID-19 pandemic acted as a catalyst for this need, imposing a forced reinvention and establishing new management standards to ensure the continuity of teaching through virtual ecosystems. The objective of this study is to analyze this strategic importance and propose policy recommendations that ensure the sustainability of HEIs in the global business landscape.

THEORETICAL FRAMEWORK

Evolution of Corporate Governance in a Global Context

Historically, the concept of governance evolved from financial control mechanisms to complex systems of stakeholder management. According to the Cadbury Report (1992), corporate governance is the system by which companies are directed and controlled. Within HEIs, this concept expands to include the management of academic

quality and social responsibility. Internationally, the agency theory of Jensen and Meckling (1976) provides the basis for understanding conflicts of interest between owners (or maintainers) and managers. In HEIs, where objectives may vary between profit (private) and social impact (public), governance acts to align these interests, ensuring that the institution fulfills its pedagogical mission without compromising its financial health.

Data Governance and Digital Compliance

Recent studies expand the traditional view of governance to include "Data Governance". In this context, algorithmic transparency and the ethical use of Artificial Intelligence (AI) become critical pillars of digital compliance. The integration of emerging technologies must be accompanied by control mechanisms that ensure equity in digital access, preventing technological dependence from creating new institutional vulnerabilities.

Pillars and Principles of Corporate Governance

For governance to be effective, it must be based on four main pillars, widely discussed by the Brazilian Institute of Corporate Governance (IBGC) and the Securities and Exchange Commission (CVM):

- **Transparency:** Consists of the desire to inform, going beyond legal obligations. According to IBGC (2022), transparency results in a climate of trust, both internally and externally.
- **Equity:** Characterized by the fair treatment of all interest groups. In HEIs, this translates into equal access to technological resources for teachers and students.
- **Accountability:** Governance agents must account for their actions in a clear, concise, and understandable way, fully assuming the consequences of their acts and omissions.
- **Corporate Responsibility:** Ensuring the economic and financial viability of organizations, reducing the negative externalities of their businesses and increasing the positive ones.

The Future of Business and Global Technology

The future of business, as proposed by GBATA, is intrinsically linked to the capacity for technological integration. For HEIs, this means adopting Artificial Intelligence (AI) for personalizing learning, using Big Data for student retention management, and implementing data security systems in compliance with global data protection laws. As pointed out by Crepaldi (2013), management accounting and technology must walk together to offer support for strategic decisions.

METHODOLOGY

The present research adopts a qualitative in-depth approach, essential for understanding complex management phenomena. Unlike purely quantitative studies, this methodology seeks the essence of organizational practices. This choice is justified by the complexity of the phenomenon, allowing for a deep analysis that purely quantitative methods might omit. The methodological structure was designed based on the convergence of three main sources:

1. **Experience of the Authors (Managers):** The research uses the autoethnography method and experience reporting, based on the direct experience of the authors in coordination and management positions in Higher Education Institutions. This perspective allows identifying nuances of governance that are often invisible in official reports.
2. **Bibliographic and Documentary Research:** An exhaustive review of works by authors such as Almeida (2006), Bardin (2011), and Vergara (2005) was conducted, in addition to normative documents from educational regulatory bodies and boards of directors.
3. **Impressions from Pedagogical Meetings:** During the 2024-2026 cycle, perceptions were collected in planning meetings with other managers, teachers, and students. These impressions served as primary data to understand cultural resistance to technology and the challenges of implementing compliance standards. According to Bardin (2011), content analysis allows fragments of speeches collected in these meetings to be organized into thematic categories, providing a consistent view of the institutional reality.

STRATEGIC CHALLENGES AND RESULTS

Governance and Technological Transition

The transition to hybrid and remote teaching was not just a change of platform, but a paradigm shift in governance. HEIs needed to invest in IT infrastructure, cybersecurity, and training. According to discussions in pedagogical meetings, one of the greatest risks identified was the "digital blackout" of faculty members who, despite academic excellence, lacked technological fluency. Corporate governance acts here through preventive internal controls, which aim to mitigate future impacts resulting from the lack of training. Data reveal that this investment must be accompanied by preventive audits to ensure institutional resilience. As Almeida (2006) teaches, internal control must be a dynamic system that adapts to new operational threats.

Critical Perspectives: The Public and the Private

When characterizing HEIs generically, it is observed that private institutions, driven by the need for market efficiency, tend to adopt more agile governance models. In contrast, many public HEIs, although holding high intellectual capital, suffer from bureaucratic rigidity and a lack of professionalization in middle management. The management experience reported in this article shows that, regardless of the legal nature, the lack of a clear technical and functional organizational chart generates overlapping functions and inefficiency. The adoption of meritocracy and transparency criteria in resource allocation is a global challenge for the future of universities.

Case Study: Governance and Technological Adaptation in a Private HEI

A large private Higher Education Institution (HEI) with multiple campuses faced the challenge of transitioning its face-to-face operation to a fully digital model in less than a week. From a corporate governance perspective, the presidency and the board of directors established a crisis committee guided by transparency and accountability. The strategy consisted of centralizing financial decisions to ensure the maintenance of the payroll, while pedagogical management was decentralized to allow course coordinators to adapt teaching methodologies to available videoconferencing tools. Preventive internal control was triggered through rapid audits of IT systems, aiming to mitigate data security risks for students. The institution invested in international software licenses and synchronous training for its faculty, using Key Performance Indicators (KPIs) to monitor student dropout in real-time. This agile governance model allowed not only operational survival but a restructuring of the business model for hybrid teaching, resulting in a 15% reduction in fixed building maintenance costs and an increase in stakeholder satisfaction due to clarity in accountability during the period of uncertainty.

Complementary Reflections on the Future of HEIs and Technology

Analysis of this case, combined with practical experience in pedagogical meetings and international literature review (OECD, 2023; Jensen & Meckling, 1976), allows for the following strategic reflections:

- **Technology as a Governance Asset:** The future of educational business no longer allows technology to be seen only as support. It must be a pillar of governance. Using Artificial Intelligence to predict delinquency or dropout is a form of exercising corporate responsibility and financial sustainability.
- **The Challenge of Digital Equity:** Reflecting critically, governance in HEIs must address the digital divide. While private institutions manage to implement cutting-edge solutions, the effectiveness of higher education as a whole depends on equity policies that ensure intellectual capital is not wasted for lack of technological infrastructure.
- **Professionalization versus Tradition:** Many HEIs still operate under excessively bureaucratic management models or those based on academic traditions that ignore global market agility. Modern corporate governance requires a transition to meritocracy and auditable processes, where pedagogical success is inseparable from administrative efficiency.
- **Organizational Culture and Ethics:** No technological tool replaces integrity. Governance is only effective when the pillars of transparency and ethics permeate from senior management to the classroom, influencing student formation not just as technicians, but as citizens conscious of global complexities.

Results and Discussion

Data collected through meeting impressions and documentary analysis reveal that Corporate Governance is perceived as a seal of quality. Institutions with active advisory boards and internal audit processes demonstrated greater resilience during financial crises. During pedagogical discussions with students, it was noted that the perceived value of the HEI is directly linked to transparency in communication. Students at institutions with weak governance reported insecurity regarding the future of their courses, while institutions with well-structured accountability maintained superior levels of engagement. According to the theory of Strauss and Corbin (1998), the integration of these data allows concluding that governance in HEIs must focus on the balance between financial sustainability (business) and graduate quality (technology and education). The future requires HEIs to act as innovation hubs, where technology is not just a tool, but the governance environment itself.

POLICY RECOMMENDATIONS AND LIMITATIONS

Policy Recommendations

Based on the findings, it is recommended that HEIs:

- **Create Digital Ethics Committees:** To monitor the use of AI and Big Data in academic management.
- **Establish Technology Reserve Funds:** Dedicated to continuous technological updates and faculty training.
- **Develop Transparency KPIs:** Indicators that measure administrative transparency per stakeholders.

Limitations and Future Research

This study is limited to the perception of managers in large private HEIs. Future research should focus on comparative studies between the public and private sectors, using quantitative samples to validate the impact of governance on operational cost reduction.

CONCLUSIONS

Corporate Governance in Higher Education Institutions is a strategic imperative to shape the future of global business. The analysis demonstrated that the integration between practical management experience and the theoretical foundations of governance allows for the creation of more robust and ethical institutions. The paradigm shift suggested in this study indicates that HEIs must abandon amateur or excessively centralized management. The use of technology to monitor Key Performance Indicators (KPIs), combined with a culture of accountability, will ensure that these organizations fulfill their social role of training professionals capable of dealing with the technological complexity of the 21st century. Ultimately, governance is what will allow HEIs not only to survive but to lead the digital transformation in the global scenario.

REFERENCES

- Almeida, Marcelo Cavalcanti. (2012). Auditoria: um curso moderno e completo. São Paulo: Atlas, 2006 / 8. ed. São Paulo: Atlas.
- Bardin, Laurence. (2015). Análise de Conteúdo. São Paulo: Edições 70, 2011 / São Paulo: Edições 70.
- Cadbury, Adrian. (1992). Report of the Committee on the Financial Aspects of Corporate Governance. London: Gee.
- Comissão de Valores Mobiliários (CVM). (2026). Ministério da Economia. Available at: <https://www.gov.br/cvm/pt-br>. Accessed on: Mar 26, 2026.
- Crepaldi, Silvio Aparecido. (2013). Contabilidade gerencial: Teoria e Prática. 9. ed. São Paulo: Atlas.
- Denzin, Norman K. & Lincoln, Yvonna S. (2006). O planejamento da pesquisa qualitativa. 2. ed. São Paulo: Artmed.

Instituto Brasileiro de Governança Corporativa (IBGC). (2022). Código das Melhores Práticas de Governança Corporativa. 6. ed. São Paulo: IBGC.

Jensen, Michael C. & Meckling, William H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, v. 3, n. 4, p. 305-360.

Lakatos, Eva Maria & Marconi, Marina Andrade. (2021). Metodologia do trabalho científico. 4. ed. São Paulo: Atlas, 2012 / 9. ed. São Paulo: Atlas.

OECD. (2023). G20/OECD Principles of Corporate Governance. Paris: OECD Publishing.

Strauss, Anselm & Corbin, Juliet. (1998). Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory. Thousand Oaks: Sage Publications.

Vergara, Sylvia Constant. (2005). Métodos de Pesquisa em Administração. São Paulo: Atlas, 2005.

SYSTEMATIC LITERATURE REVIEW: THE IMPACT OF PREDICTIVE INTELLIGENCE AND REAL-TIME DATA INSIGHTS ON CORPORATE FINANCIAL SUSTAINABILITY

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ABSTRACT

The transition of AI and ML from conceptual frameworks to essential instruments for business financial sustainability in recent volatile markets is examined in this review study. The study concludes that real-time analytic and predictive intelligence are dynamic organizational competences rather than merely programs enhancements by synthesizing studies from 2015 to 2025 utilizing the PRISMA framework for selection and a standard approach. By substituting proactive, forward-looking techniques for periodic, retrospective reporting, these technologies enable businesses to become "digitally mature," which allows them to outperform their competition. With a focus on the mechanics of financial supervision, this systematic review looks at 52 high-impact studies to evaluate how predictive intelligence changes risk management. The selected research paper's findings have been presented using the SWOT framework. The investigation was intended to study how "early-warning analytic and predictive intelligence through AI and ML" might prevent financial meltdowns by identifying indications of liquidity stress through real-time analytic and helps in the development of the early warning system that can predict and mitigate the financial risk for the corporate and financial institutions.

Keywords: predictive intelligence, SWOT framework, AI & ML, corporate financial sustainability, real-time analytics.

INTRODUCTION

The changing global financial landscape in recent years is the result of the introduction of advanced digitalized technologies, including artificial intelligence, machine learning, big data analysis, and advanced financial models. These have rapidly transformed from abstract ideas to useful instruments utilized in numerous financial applications. As the current financial market is volatile and complex, in such a situation, another question arose on the financial sustainability measurement and predictive analysis for the organization. AI and ML help corporations, financial institutions, and financial analysts to predict, streamline operations, manage risk, and enhance the accuracy of decisions. Financial choice-making heavily relies on predictive analytics, a subset of data analytics, particularly in highly risk-sensitive circumstances.

Today global businesses have shown very mixed reactions to the changing technological development; some countries decided to pursue globalization and increase the inter-connectivity with the global market, like China, India and South Korea. However, some countries chose to adopt the protectionism policy to protect their market and reduce the dependency on the other market for the supplies and trades; therefore, the traditional method of predictive analysis has shown limitations in its accuracy. Moreover, ongoing tariff war and changing geopolitical situation makes the business environment more challenging and unpredictable for corporate. Traditional financial risk management systems are based on the statistical models and judgment of financially trained experts, but AI and ML have reshaped the decision-making process by providing more accurate and early detection of risk, which provides enough time to take and make the corrective actions and execute them (Fahrezi, M., 2024).

Moreover, the financial sustainability in the corporation is another major topic of discussion that gained their relevance and took center stage. Investors, regulatory authorities, and stakeholders have significantly pushed the corporation to show transparency, sustainability, and ethical corporate practices (Hamzat, L., 2025), which improved the significance of the real data insight. In the traditional method of predictability, retrospective analysis and periodic reporting play a major role, but in the fast-paced volatile global business environment, real-time analytics enable organizations to move faster and proactively act on the changing dynamics of business/organization. It allows decision makers to anticipate potential challenges with finances, identify opportunities, and integrate operations with established corporate objectives (Popoola & Ibrahim, 2023).

In recent years, the scholarly bodies are working on predictive analytics and interconnection with AI and ML as well as their role in financial risk management and corporate financial sustainability. In this paper, a systematic literature review of predictive analytics by using AI and ML and the role of real data insights in corporate financial sustainability, which helps in enhancing the corporate risk management capacity, will be presented. The goals of the investigation are to compile current information, evaluate methodological and technological approaches, and offer insights into the positive aspects, challenges, and possibilities of such instruments in the corporation's financial landscapes. In doing so, this study provides value to business professionals and scholarly scholars who seek ways to navigate and take advantage of the revolutionary effects of AI and ML in contemporary financial risk assessments and real-time insight into the financial sustainability of corporations.

RESEARCH QUESTIONS AND HYPOTHESIS

The following section summarizes the fundamental questions that were addressed in this paper:

RQ: What is the role of predictive intelligence in advancing contemporary practices of financial risk management, investment analysis, and predictive forecasting - and through which analytical and technological mechanisms are these improvements achieved?

Nonetheless, the following sub questions are provided in order to establish the hypothesis:

RQ1: In what capacities does predictive intelligence enhance financial risk management, decisions regarding investments, and forecasting accuracy?

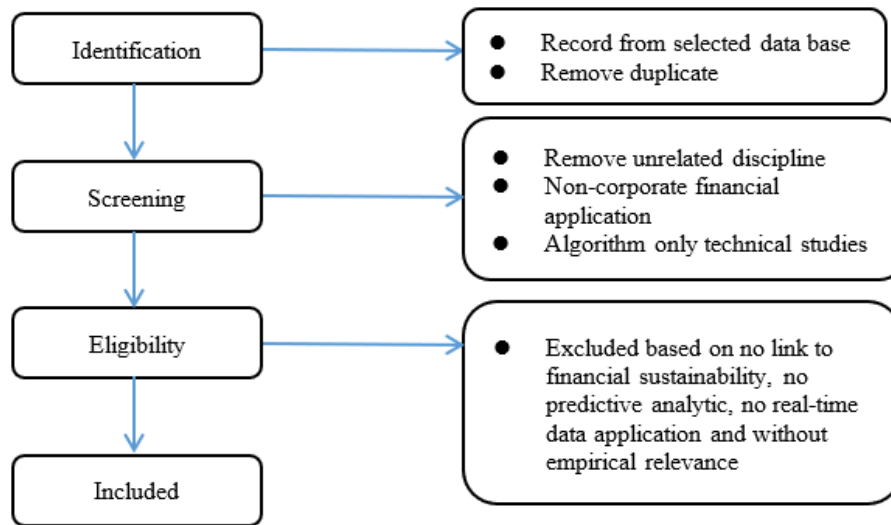
RQ2: To what extent do real-time analytics enhance transparency and the reliability of corporate financial reporting?

METHODOLOGY

This study applied a systematic literature review (SLR) approach to identify, analyze, and compile previous scholarly research on the implementation of predictive analytics by AI and ML and real-time insight on corporate financial sustainability and enhanced risk management capabilities. The study has been conducted by using the PRISMA guideline (Moher et al. 2010). The primary goal of the evidence-based PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) Statement and its extensions is to promote thorough and transparent reporting of systematic literature reviews.

A total of 813 articles were initially collected through the academic database of Science Direct, including Scopus, Google Scholar, and so on, by using the university account (HSE University). The search utilized the combination of keywords such as ("predictive intelligence" OR "artificial intelligence" OR "machine learning" OR "big data analytics") AND ("real-time data" OR "real-time analytics" OR "digital dashboards") AND ("corporate financial sustainability" OR "financial performance" OR "ESG performance"). To make certain that the most significant recent developments in the field were included, the review concentrated on peer-reviewed journal publications published between 2015 and 2025.

Figure 1: Systematic literature review process.



Merely English-language research articles from the corresponding journals indicated in the table have been selected for the identification process following the use of an advance search from 2015 to 2025, respectively. 813 research articles were chosen during the identification stage, and 742 articles were chosen for the screening procedure after duplicates were eliminated. The titles of all surviving studies were examined during the screening phase to assess their applicability to the research objective. Research articles were excluded 456 during the screening procedure, but they were screened by title of 742 research articles following the identification process. The remaining research studies showed potential applicability to decision-making in finance, business digitization, ESG reporting, and the implementation of predictive analytics. However, the eligibility test has been conducted in two stages, following abstract screening (152 research articles have been eliminated) and full text assessment (82 research articles have been eliminated) to evaluate each article's compliance with the specified inclusion criteria. Moreover, 16 research articles have been eliminated based on the lack of empirical or theoretical linkage to the pre-defined objectives. The assessment led to the final selection of the 52 research articles for the detailed analysis for the review.

Table 1: List of Journals selected for Investigation of Review.

Name of Journal	No. of Articles	Name of Journal	No. of Articles
Finance Research letter	166	International Journal of production Economics	24
International review of financial Analysis	128	Global Finance Journal	21
International Review of Economics & Finance	103	Meditari Accountancy Research	19
Research in International Business and Finance	74	Transportation Research part E: logistics and transportation review	18
Journal of Business research	71	Industrial Marketing Management	17
Economic Analysis and Policy	48	Technovation	17
Pacific - Basin Finance Journal	28	The British Accounting review	17
International Journal of Accounting Information System	16	Economic Modelling	15
International Journal of Productivity and Performance Management	12	The Quarterly Review of economics and Finance	10
Journal of International Financial Markets, Institutions and Money	09		

Inclusion and Exclusion Criteria

A predetermined set of inclusion and exclusion criteria guided the selection of research for this systematic review, enabling a targeted and comprehensive review of the relationship between keywords used for the analysis. The eligibility framework is described below in accordance with PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines.

To include the most recent development, the search has been limited in temporal scope to 2015-2025. Moreover, to assure the quality of the research articles, the Scopus database's peer-reviewed journal papers were the only ones taken into account. This guarantees that high-impact original research is included while keeping out non-referred reports, review articles, software publications, discussions, editorials, book chapters, conference proceedings, and gray literature. To maintain linguistic consistency, precious articles are published in English only. For thematic relevance, articles include predictive analytics, artificial intelligence (AI), big data, financial sustainability, corporate environments, or real-time insights that had to be clearly applied.

The research articles get excluded on the basis that they focus extensively on the technical algorithm development rather than demonstrating the significant connection with the corporate financial sustainability or decision-making. In order to preserve their relevancy to corporate finance and sustainability research, articles that addressed artificial intelligence or machine learning techniques in the fields of medicine, engineering, environmental modeling, robotics, or other non-business domains were also eliminated. Additionally excluded was research that did not specifically address risk management, business transparency, financial performance, ESG disclosure, or investment efficiency. Lastly, in order to provide a thorough assessment of study methodology, outcomes, and theoretical contributions, articles lacking accessible full-text versions were removed.

After adhering to PRISMA, the chosen research paper was analyzed using a qualitative approach to address the research question. The SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) will be used in this research paper to analyze the research topics and provide conclusions (Sabbaghi & Vaidyanathan, 2004; Helms & Nixon, 2010). SWOT analysis supports in the synthesis of research and makes it possible to evaluate contemporary advancements as well as prospective future study areas and gaps. SWOT framework can addresses the main research questions, and evaluate the performance metrics of selected research papers.

RESULTS AND DISCUSSION

In Table 2, the final selected list of the research articles published for the analysis for the pre-defined research questions in this systematic literature of review.

Table 2: Selected list of research articles.

Authors (full)	Year	Title	Key finding (concise)
Ray, Sougata; Pan, Aritra; Shukla, Ankur; Rastogi, Siddhartha Kumar	2026	Mapping and decoding green finance research: themes and topic interconnections using a multi-method approach	This study aims to systematically map, decode and interpret the evolving landscape of green finance research by identifying core themes, emerging trends and theoretical underpinnings.
Ghallabi, Fahmi; Souissi, Bilel; Du, Anna Min; Ali, Shoaib	2025	ESG stock markets and clean energy prices prediction: Insights from advanced machine learning	Results indicate that NGBoost outperforms other models, with a significant correlation between clean energy stock prices and ESG market variables.
Sariyer, Gorkem; Kumar Mangla, Sachin; Chowdhury, Soumyadeb; Erkan Sozen, Mert; Kazancoglu, Yigit	2024	Predictive and prescriptive analytics for ESG performance evaluation: A case of Fortune 500 companies	study proposes an AI-based multi-stage ESG performance prediction system consolidating clustering for identifying patterns within ESG data, relationships, deep learning for predictive accuracy, and prescriptive analytics for actionable insights.
Ignatov, Konstantin	2023	When ESG talks: ESG tone of 10-K reports and its significance to stock markets	The most recent research finds relevance of ESG-related corporate activities for formation of investors' opinion regarding companies' valuations and growth prospects.
Fahmy, Hany	2025	Empty pledges and powerless conventions: How transition climate risks are disrupting financial markets?	Find ineffectiveness of the U.S. carbon policy triggers flight to safety to the bond mutual fund market and disrupts the performance of green (but not brown) firms' stock prices.

Borkowski, Przemyslaw; Abdullazade, Zaur	2025	ESG indicators and sectoral volatility: GARCH vs. hybrid machine learning	Our findings indicate that ESG factors significantly affect sectoral volatility, with pronounced spillover effects in Financial and Industrial sectors.
Giantsidi, Sofia; Tarantola, Claudia	2025	Deep learning for financial forecasting: A review of recent trends	This paper presents a comprehensive review of 187 Scopus-indexed studies (2020–2024) on DL applications for financial forecasting.
Shi, Huiyi; Xia, Yufei; Cheng, Zihan; Zhang, Xinyu; Liu, Shutong	2025	Unleashing the effect of data asset information disclosure on corporate investment efficiency: Fresh evidence from double-debiased machine learning	This paper examines the influence of data asset information disclosure on corporate investment efficiency (CIE) utilizing the double-debiased machine learning methodology.
Giakoumelou, Anastasia; Salvi, Antonio; Bekiros, Stelios; Onorato, Grazia	2024	ESG and FinTech funding in the EU	We find that ESG reporting is positively related to the amount of capital raised, as investors weigh in physical and transition risks in information asymmetries.
Trotta, Annarita; Rania, Francesco; Strano, Eugenia	2024	Exploring the linkages between FinTech and ESG: A bibliometric perspective	Paper pursues these goals by exploring the evolution of the literature revolving around the linkages between FinTech innovations and ESG through a bibliometric perspective.
Ali, Hassnain; Zafar, Muhammad Bilal; Aysan, Ahmet Faruk	2025	Generative AI in finance: Replicability, methodological contingencies, and future research directions	This study provides a theory-informed synthesis of 84 peer-reviewed articles (2022–2025) using PRISMA-based screening, bibliometric analysis, and Structural Topic Modeling (STM).
Charles, Vincent; Emrouznejad, Ali; Kunz, Werner H.	2025	Advancements in Artificial Intelligence-based prescriptive and cognitive analytics for business performance: a special issue editorial	AI-based prescriptive and cognitive analytics offer significant potential to enhance decision-making, optimise performance, and create new avenues for value creation.
Fang, Jing; Li, Jingshuo; Bi, Pengfei	2025	Green paradox of Ai: short-term pain and long-term redemption—The two faces of Chinese enterprises’ sustainable development	Focusing on operational sustainability, environmental information disclosure, and carbon emissions performance, the results reveal a dual effect of AI that incurs short-term operational pressure of adoption costs and integration challenges, followed by substantial long-term gains in environmental transparency and emissions reduction.
Secinaro, Silvana; Lanzalonga, Federico; Oppioli, Michele; de Nuccio, Elbano	2025	The effects of disruptive technologies on accountability in fintech industry: Using bibliometric analysis to develop a research agenda	These advancements empower users to bypass traditional intermediaries, achieving cost reductions and fostering safer, more efficient information and verification processes.
Shi, Yu; Wu, Tong; Qin, Chuan; Liu, Bailu	2025	The value-creating potential of AI: A multi-dimensional analysis of effects and mechanisms	Drawing on a comprehensive dataset of Chinese listed companies spanning 2010–2022, this study investigates how AI adoption influences enterprise value through the mediating role of data assets and the moderating effect of managerial capability.
Taskin, Dilvin; Sariyer, Gökem; Acar, Ece; Cagli, Efe Caglar	2025	Do past ESG scores efficiently predict future ESG performance?	ESG scores are calculated using an enormous number of variables related to the sustainability practices of firms; thus, it is impractical for investors to come up with predictions of ESG performance.
Khan, Shaizy; Gupta, Seema	2024	Boosting the efficacy of green accounting for better firm performance: artificial intelligence and accounting quality as moderators	To achieve this, the paper explores the moderating effects of artificial intelligence (AI) and accounting education quality on the relationship between green accounting and firm performance.
Lodhia, Sumit; Farooq, Muhammad Bilal; Sharma, Umesh; Zaman, Rashid	2024	Digital technologies and sustainability accounting, reporting and assurance: framework and research opportunities	Design/methodology/approach This paper draws on academic literature to explore the role of digital technologies in sustainability accounting, reporting and assurance.
Song, Yang; Li, Runfei; Zhang, Zhipeng; Sahut, Jean-Michel	2024	ESG performance and financial distress prediction of energy enterprises	The empirical findings indicate that text words, topics and sentiments derived from ESG reports prove to be effective in forecasting financial distress in energy companies.
Bouyaddou, Youssef; Jebabli, Ikram	2025	Integration of investor behavioral perspective and climate change in reinforcement learning for portfolio optimization	However, there is a noticeable gap in research on integrating sustainability and low-carbon considerations into machine learning-based portfolio optimization.
Yang, Zhenyi; Lu, Rijing; Lu, Rui; Yan, Qi	2025	The green governance effect of retail investor attention: Evidence from China's investor interactive platforms	Based on account-level data from China's two investor interactive platforms, namely the “eHuDong” and “HuDongYi” of Shanghai and Shenzhen Stock Exchanges, we empirically find that retail investor attention can exert a significant green governance effect by curbing corporate greenwashing behavior.
Ferjančič et al.	2024	Textual analysis of corporate sustainability reporting and corporate ESG scores	Using BERTopic, an advanced topic modelling technique, we identify and subsequently cluster the most important ESG topics, providing significant insights into the reporting landscape.
Ren, Xiaohang; Zeng, Gudian; Sun, Xianming	2023	The peer effect of digital transformation and corporate environmental performance: Empirical evidence from listed companies in China	The extant research has explored the factors influencing environmental performance at the macroeconomic level.

Fan, Liyan; He, Jiarun; Su, Boyi; Wang, Chen	2025	Digital technology penetration and supply chain resilience improvement: Enterprise innovation strategies in the digital age	The results show that digitalization significantly improves supply chain resilience, primarily through enhanced information disclosure, dynamic capabilities, and supply chain efficiency.
Gao, Qian; Wang, Jing; Zhang, Rui	2025	Customer-driven supply chain sustainability in the digital economy: identifying the role of customer firms' digital transformation on supplier ESG performance in China	Findings Results show that (1) customer companies' digital transformation significantly enhances suppliers' ESG performance; (2) suppliers' innovation capability strengthens the positive relationship between customer digital transformation and ESG performance, while financial slack weakens this relationship and (3) analyst attention partially mediates the relationship between customer digital transformation and suppliers' ESG outcomes.
Lai, Xiaobing; Quan, Lei; Guo, Chong; Gao, Xing	2025	Exploring the digital era: Has digital technology innovation reshaped investment efficiency in Chinese enterprises?	Utilizing data from 2005 to 2021 for Chinese A-share listed companies, this study examines the impact of digital technology innovation on corporate investment efficiency.
Tian, Ye; Zhao, Mengyang	2025	Does managerial climate risk perception improve environmental, social and governance (ESG) performance? Evidence from China	These results remain robust after addressing endogeneity issues and in a series of robustness checks.
Zhou, Zhongsheng; Yuan, Zhichao; He, Chao	2025	Can digital transformation promote firms' sustainable development? Evidence based on ESG performance	The results show that digital transformation can strengthen firms' ESG performance and promote sustainable growth.
Zhou, Xiaoyong; Li, Gaochao; Wang, Qunwei; Li, Yangganxuan; Zhou, Dequn	2025	Artificial intelligence, corporate information governance and ESG performance: Quasi-experimental evidence from China	By applying a staggered difference-in-differences approach to panel data from 1418 A-share listed firms in China (2011–2022), we find that AI significantly improves ESG performance.
Chen, Hua; Wang, Zhuang	2025	Does ESG rating disagreement affect management tone manipulation?	Significant discrepancies exist among rating agencies' assessments of a company's ESG performance, making it challenging for the market to evaluate a firm's sustainable development capabilities accurately.
Doğan, Murat; Sayılır, Özlem; Komath, Muhammed Aslam Chelery; Çimen, Emre	2025	Prediction of market value of firms with corporate sustainability performance data using machine learning models	We analyze a comprehensive global dataset of 5,450 firms operating in 10 sectors.
Eslahi, Ethan; Creti, Anna; Sanin, Maria-Eugenia	2025	Signal received? Carbon price and financial–environmental performance prioritization in EU ETS firms	We propose a novel composite financial–environmental performance index that adjusts the emphasis on each dimension.
He, Feng; Duan, Lin; Lucey, Brian; Hao, Jing	2025	Biodiversity risk or climate risk? Which factor affects corporate ESG rating divergence	Analyzing dataset from 2015 to 2022, we provide novel empirical evidence that firm-level biodiversity risk exposure exerts a significant mitigating effect on corporate ESG rating divergence.
Shi, Xiuping; Liu, Hao	2025	How does digital supply chain transformation enhance sustainable performance of renewable energy enterprises?	The results show that digital transformation significantly enhances the sustainable performance of renewable energy enterprises by improving supply chain intelligence and coordination efficiency.
Siddique, Md Abubakar; Karim, Sitara	2025	Can ESG disclosure predict carbon risk? Evidence from machine and deep learning models	Results demonstrate that advanced AI models significantly outperform traditional regressions by capturing complex, non-linear relationships often overlooked by conventional methods.
Wu, Ke; Zhang, Yongfang; Chen, Ying; Li, Miao	2025	Impact of digital finance on corporate ESG	Using panel data of Chinese A-share listed companies from 2011 to 2021, we empirically examine the impact of digital finance on environmental, social, and corporate governance.
Lin, Sheng-Wei; Lu, Wen-Min	2024	Using inverse DEA and machine learning algorithms to evaluate and predict suppliers' performance in the apple supply chain	We introduce the application of IDEA to recalibrate operational benchmarks, focusing on substantial CO2 reduction, and couple this with advanced predictive algorithms to proactively steer supplier practices toward Apple's sustainability targets.
Nguyen, Quyen; Diaz-Rainey, Ivan; Kuruppuarachchi, Duminda; McCarten, Matthew; Tan, Eric K.M. Dev, Dhairya; Sharma, Gagan Deep; Gupta, Mansi; Tiwari, Aviral Kumar	2023	Climate transition risk in U.S. loan portfolios: Are all banks the same?	We observe that climate transition risk profile was stable over time, save for a temporary (in some cases) and permanent (in others), reduction in their fossil-fuel exposure after the Paris Agreement.
	2025	Sustainable finance in action: A comprehensive framework for policy and practice integration	Using an integrative literature review of 684 scholarly articles combining bibliometric analysis with manual review research identifies six critical themes and highlights barriers such regulatory ambiguity, lack of standardized metrics, and limited data availability.
Downing, Nicholas Joseph	2025	Missing value imputation in environmental, social, and governance data: an impact on emissions scores	These results show a potential missing data bias in ESG data that favors larger firms and the importance of imputing missing data with ML techniques to reach category scores that more closely capture actual sustainability performance.
Li, Junjun; Wu, Tong; Hu, Boqiang; Pan, Dongliang; Zhou, Yaqiong	2025	Artificial intelligence and corporate ESG performance	The findings indicate that AI capabilities significantly strengthen ESG performance.
Liu, Yangyan; Song, Jia; Zhou, Bingjun; Liu, Jiangui	2025	Artificial intelligence applications and corporate ESG performance	We find that AI adoption significantly improves overall ESG performance by boosting all three individual environmental, social, and governance pillars.
Tan, Weijie; Liu, Yiqian; Teng,	2025	When ESG news talks: How media	Using Baidu News reports spanning 2007–2022 on Chinese A-share

Mingming		sentiment shapes corporate financial behavior in China	listed companies as text data and machine learning and text analysis methods, this study measures environmental, social, and governance (ESG) news sentiment indices.
Wang, Changlong; Zhang, Yi; Miao, YuMeng	2025	Artificial intelligence and corporate ESG: Evidence from Chinese listed enterprises	Utilizing comprehensive data from Chinese A-share listed companies spanning 2008 to 2023, study analyzes AI's influence on corporate environmental, social, and governance (ESG) performance.
Wei, Rongrong; Yu, Zhaopeng; Zhen, Deyun	2025	The differentiated effect of China's new environmental protection law on corporate ESG performance	Results show that the NEPL has notably enhanced the ESG performance of heavy polluting enterprises, the conclusion remains valid after series of robustness tests, including identification assumption tests and Debiased Machine Learning(DML) method.
Wu, Bo; Liao, Suhong	2025	Can digital financial awareness enhance enterprises' business credit?	The analysis of comprehensive firm-level data, we demonstrate that increased awareness of digital financial tools enables businesses to foster the development of regional financial intermediaries.
Yu, Junli; Yuan, Guodong (Gordon); Liu, Shiqi; Zhang, Jingxia	2025	Green credit, supply chain concentration and corporate digital transformation: Evidence from China	Our findings reveal that green credit significantly accelerates digital transformation by reducing customer concentration (a key supply chain risk factor) and financing constraints.
Yu, HuiRu; Shu, Kedong; Ni, Zeqiang; Liu, Qing; Li, ShuaiHang	2025	Does big data promote firms' leverage ratios? Evidence from China's national comprehensive big data pilot zones	Utilizing a difference-in-differences approach, we find that the BDPZ policy plays a significantly positive role in promoting firms' leverage ratios, a result is robust across various tests.
Allahdadi, Mohammad R.; Fretheim, Torun; Vindedal, Kjetil Davoodi, Shayan; Fereydooni, Ali; Rastegar, Mohammad Ali	2024	Value of climate change news: A textual analysis	In the face of escalating climate change risks, investors are seeking strategies to safeguard their portfolios.
	2024	Can portfolio construction considering ESG still gain high profits?	Approach uses ML models and a Markov Switching Variance (MSV) model to predict returns and volatility, and a Multi Criteria Decision-Making (MCDM) model, named TODIM, to select superior stocks.
Huang, Yujun	2024	Do ESG ETFs provide downside risk protection during Covid-19? Evidence from forecast combination models	Introduce the Value-at-Risk (VaR) and modified Sharpe Ratio (mSR) based on such measurement as representative of tail risk protection.
Liu, Xukang; Ma, Chaoqun; Ren, Yi-Shuai	2024	How AI powers ESG performance in China's digital frontier?	The results indicate that AI enhances corporate R&D investment and the degree of digital transformation, therefore improving ESG performance.

SWOT Framework Results

Result obtained after the analysis of the collected and screened 52 research papers. This SWOT synthesizes findings across finance, econometrics, artificial intelligence, machine learning, and quantitative investment.

Table 3: SWOT framework results.

Strengths	Weaknesses
● Risk identification by early-warning analytic, enhance the early detection of credit default, stress signals of liquidity, and tail risk exposure ● By dynamically estimating projected returns, predictive models enhance allocation choices. It leads to greater diversification effectiveness and enhanced Sharpe indices. ● Nonlinear correlations overlooked by traditional models are captured via machine learning. It leads to more accurate derivative valuation and enhanced hedging techniques. ● Forward-looking capital adequacy modeling is made possible by predictive intelligence. ● Irrational trading behavior is identified sooner using predictive analytics ● Automation of routine risk assessment tasks	● Deep learning and other advanced AI models function as "black boxes," executing choices in regulated contexts that are challenging to defend ● Training datasets that address survivor ship bias, missing macro variables, noisy high-frequency signals, and regime instability are crucial for predictive intelligence. ● The necessary cloud computing infrastructure, quantitative researchers, data engineers, and model validators are needed for implementation. ● Complex models run with the potential of collecting noise rather than structure due to overfitting and erroneous signal production. ● Banks frequently use antiquated infrastructure. Can affect predictive risk instruments' slower deployment periods.
Opportunities	Threats
● Satellite imagery, ESG disclosures, consumer transaction statistics, shipping and logistics movements, and social emotion indices may all be used with predictive intelligence to provide unorthodox investing signals. ● AI-powered macroeconomic prediction ● Reinforcement learning-based automated portfolio	● Implementation flexibility is limited by regulatory uncertainties in AI-driven financial. Including impartiality restrictions, model audit trails, and justification criteria. ● Forecast dependability abruptly drops as a consequence of market alterations that undermine predictive stability,

management Adaptive portfolio systems continually modify exposures. Such as volatility targeting techniques, dynamic hedging, and robo-advisory optimization ● Transformation of predictive credit scoring. ● The accuracy of borrower evaluations is improved via machine learning. ● Predictive intelligence aids sustainability-conscious finance through ESG-integrated predictive risk modeling.	such as structural fractures that weaken historical linkages. ● Data-driven systems' cybersecurity flaws put institution-wide resilience at risk. ● Quantitative techniques that might indicate market decline are subject to crowding effects. ● Automating decision-making processes poses ethical and accountability problems. Unintentional prejudice in financing, insurance oversight, and credit approvals may be introduced by opaque models, which might result in legal and reputational liability.
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Effects of Predictive Intelligence and Real-Time Data Insights on Corporate Financial Sustainability

The systematic literature review's findings demonstrate that real-time data analytics and predictive intelligence tools significantly contribute to the organization's financial sustainability by enabling improved risk management capabilities, more effective investments, greater organizational resilience, and increased transparency.

Firstly, companies may anticipate financial meltdowns and be ready for unforeseen circumstances by utilizing artificial intelligence and machine learning algorithms. In order to minimize any negative repercussions, predictive models help firms identify unpredictability in climate-transition concerns and funding issues. Long-term financial stability is improved in organizations that use predictive intelligence techniques. Secondly, the capability to track all aspects of finances and operations at any moment is the subsequent significant advantage of real-time analytics. Real-time dashboards offer quicker managerial reaction than traditional reporting platforms that are operational on periodic schedules. Lastly, encouraging innovation focused on sustainability constitutes a single of the major contributions achieved by implementing the use of the examined research techniques. Better resource allocation for green technologies is made possible by predictive intelligence, which also contributes to strategic benefits and regulatory compliance.

The outcomes suggest that real-time analytics and predictive intelligence are not only technologies but also dynamic organizational competencies. Organizations that use analytics for decision-making assistance demonstrate exemplary resilience and effective investment decisions in terms of strategy. Therefore, it is accurate to claim, based on the notion of digital transformation, that the organization's analytics capability guarantees its flexibility in the appearance of unforeseen circumstances.

Role of Predictive Intelligence in Forecasting Accuracy, Investment Decisions, and Risk Management (RQ1)

From the research articles, the result has been obtained; through its beneficial effects on financial forecasting, investment efficiency, and financial risk management performance, this article emphasizes the importance of predictive intelligence.

First, by merging various structured and unstructured information sources, such as macroeconomic factors, statutory disclosures, and sentiments from the market, predictive models that incorporate artificial intelligence (AI) and machine learning (ML) improve the level of precision of financial estimations. Second, by resolving the issue of information asymmetry, the situation in which the corporation and its investors have equal access to financial information, predictive intelligence improves investment efficiency and enables managers to take advantage of investment potential. In the current global financial situation, disclosure of the financial and non-financial reports is attracting the investors' attention and building the trust to enhance the potential of the investment.

The idea that predictive intelligence supports future-oriented financial practices rather than retrospectively oriented practices is further supported by these conclusions. Technologies in analytics mitigate uncertainty in the development of business strategies by improving forecast and investment decision accuracy. This aligns with the

resource-based hypothesis, which acknowledges the importance of data analytics skills for gaining an edge over competitors.

Role of Real-Time Analytics in Transparency and Financial Reporting Reliability (RQ2)

Research conducted has shown that real-time analytics improves company disclosure and contributes to the dependability of financial reporting techniques. Corporations may constantly monitor their performance metrics with real-time reporting systems, which eliminates reporting period delays and facilitates immediate assessment. This ensures managerial responsibility and improves the accuracy of internal management decision-making. Furthermore, real-time analytics greatly improves the transparency of sustainability performance data. By continuously monitoring sustainability performance metrics, businesses may better inform stakeholders about their contribution to the environment, reducing information asymmetry in investment markets.

Additionally, real-time disclosure procedures improve analyst monitoring effectiveness and stock information accuracy. Increased access to information reduces exploitative executive conduct and boosts investor confidence. By reducing regulatory risks, real-time monitoring and reporting technologies can also assist businesses in meeting new sustainability-reporting regulations.

In the final analysis, this study emphasizes how important transparency is as a mediator between the use of analytics and long-term financial viability. In addition to improving disclosure accuracy, real-time reporting procedures help businesses and investors develop confidence. From a stakeholder standpoint, more transparency has a direct impact on financial sustainability and capital availability.

CONCLUSION

In conclusion, we can state that the systematic review demonstrates the positive impact of predictive intelligence and real-time insight on corporate financial sustainability by enhancing the risk management capability, providing more accuracy in the forecast, improving organizational resilience, and supporting the organizational decision-making process.

Through the process of more effective risk management, more cost-effective investments, increased flexibility, and innovations with a sustainability priority, predictive intelligence and real-time data insights significantly contribute to corporate financial sustainability. ML-based predictive solutions improve proactive risk management while minimizing uncertainty during financial forecasting by enabling businesses to identify early warning indicators linked to market volatility, credit risk, and global climate transformation vulnerability. Predictive intelligence-based decision-support methods, on the other hand, guarantee effect studies.

Research Gaps and Future Research

Although predictive intelligence enhances predicting and investment efficacy, internal attributes of an organization like digital maturity, governance quality, leadership competence, and IT infrastructure preparation have a major role in how successful analytic systems perform. The present investigation does not adequately investigate these moderating components. In order to determine whether organizational preparation influences analytic-driven financial sustainability results, further empirical research is required.

Integrated financial sustainability models are prominently missing from existing research papers. Future research could investigate deeper into the validity of ESG disclosures. Furthermore, as present approaches tend to favor larger enterprises over smaller ones, research should concentrate on using AI to identify green washing techniques and reconstitute missing information in ESG data.

Lastly, insufficient Studies on the Combined Impact of Real-Time Data Insights and Predictive Intelligence available. Instead of examining their combined influence on financial sustainability results, the majority of research

examine predictive analytics and real-time analytics independently. Therefore, in order to improve forecasting accuracy, transparency, and risk management performance, future investigations should establish integrated models which look at the interactions between predictive intelligence and real-time data.

REFERENCES

- Fahrezi, M. (2024). A Systematic Literature Review: The Use of Artificial Intelligence and Machine Learning in Financial Risk Management and Predictive Analytics. *International Journal of Research and Applied Technology (INJURATECH)*, 4(1), 211-223.
- Hamzat, L. (2025). Holistic enterprise risk and cost governance through real-time financial monitoring and predictive data intelligence.
- Popoola, A. D., & Ibrahim, A. K. (2023). Conceptual Model for Advancing Real-Time Analytics and Financial Transparency in Corporations. *International Journal of Advanced Multidisciplinary Research and Studies*, 3.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & Prisma Group. (2010). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *International journal of surgery*, 8(5), 336-341.
- Helms, M. M., & Nixon, J. (2010). Exploring SWOT analysis—where are we now? A review of academic research from the last decade. *Journal of strategy and management*, 3(3), 215-251.
- Sabbaghi, A., & Vaidyanathan, G. (2004). SWOT analysis and theory of constraint in information technology projects. *Information systems education journal*, 2(23), 1-19.

FROM COMMUNICATION TO IMPACT: STRATEGIC KNOWLEDGE TRANSFER & INNOVATION CAPACITY BUILDING IN EUROPEAN RESEARCH AND TECHNOLOGY ECOSYSTEMS

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ABSTRACT

This paper examines the role of strategic communication in facilitating knowledge transfer and innovation capacity building within European research and innovation ecosystems. Drawing on a qualitative multiple-case study approach, the study analyzes four European-funded initiatives: SMART4ALL, METACITIES, EUNICE European University, and InclusiveSpaces. Findings indicate that strategic communication functions as a key enabling capability supporting stakeholder engagement, knowledge exchange, ecosystem coordination, and capacity development. The study proposes a communication-centered conceptual framework linking communication, stakeholder engagement, knowledge transfer, and innovation impact. The findings contribute to innovation ecosystem literature and provide practical implications for universities, project coordinators, and policymakers.

Keywords: strategic communication, knowledge transfer, innovation ecosystems, Quadruple Helix Model.

INTRODUCTION

European research and innovation ecosystems have evolved significantly over the last decade through large-scale collaborative initiatives funded by Horizon 2020, Horizon Europe, and Erasmus+. These programmes have promoted cooperation among universities, industry, public authorities, and civil society organizations to accelerate innovation, strengthen competitiveness, and generate societal impact. Despite substantial investments in research and technological development, significant challenges remain regarding the translation of knowledge into innovation uptake, policy implementation, and real-world applications.

Traditionally, communication in research projects has been treated as a dissemination activity focused on increasing visibility and reporting results. However, emerging literature increasingly recognizes communication as a strategic capability that supports stakeholder engagement, knowledge transfer, trust building, and collaborative innovation (Luoma-aho & Halonen, 2010; Pegan & Lovec, 2025). This shift is particularly important in innovation ecosystems where technological solutions often need to be understood, adopted, and implemented by stakeholders with different levels of expertise, interests, and technological literacy.

The challenge is not only to generate innovation but also to communicate its value in ways that facilitate understanding, adoption, and practical application (Rogers, 2003). This becomes particularly relevant in areas such as smart cities, inclusive technologies, and higher education innovation, where successful implementation depends on effective interaction among multiple stakeholder groups.

Although previous studies have examined communication, stakeholder engagement, knowledge transfer, innovation ecosystems, and capacity building as separate domains, limited attention has been paid to understanding how these dimensions interact within European research and innovation ecosystems and how communication functions as a mechanism that enables innovation uptake and ecosystem development (Luoma-aho & Halonen, 2010; Pegan & Lovec, 2025).

Therefore, this paper investigates the evolving role of strategic communication as a fundamental enabler of knowledge transfer and innovation capacity building within European research and technology ecosystems. Drawing on evidence from four European-funded initiatives – SMART4ALL, METACITIES, EUNICE European University, and InclusiveSpaces – the study explores how communication strategies contribute to stakeholder engagement, knowledge exchange, innovation adoption, and ecosystem impact.

The study addresses the following research questions (RQ):

RQ1: How does strategic communication facilitate knowledge transfer within European research and innovation ecosystems?

RQ2: Which communication mechanisms contribute to stakeholder engagement and innovation capacity building among ecosystem actors?

RQ3: How can communication-driven approaches support innovation uptake and socio-economic impact in European-funded research initiatives?

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Strategic Communication, Knowledge Transfer and Innovation Ecosystems

Strategic communication has evolved from a message-oriented activity to an organizational capability that supports stakeholder engagement, knowledge exchange, and institutional transformation. Contemporary approaches emphasize that communication extends beyond information transmission and includes processes that facilitate collaboration, participation, transparency, and shared understanding among stakeholders (Cornelissen, 2020; Pegan & Lovec, 2025).

Knowledge transfer has similarly evolved from linear models of information transmission toward collaborative and participatory approaches. Roux et al. (2006) argue that effective knowledge exchange requires moving beyond unidirectional transfer towards knowledge interfacing and knowledge sharing, where multiple stakeholders contribute to the creation and application of knowledge. Communication therefore becomes a central mechanism through which knowledge is translated, interpreted, and transformed into innovation.

The literature on collaborative innovation further highlights the role of knowledge management in supporting community capacity building. Trust-building, communication synergies, and connectivity mechanisms enable collaborative innovation communities to develop sustainable innovation capabilities (Machado et al., 2019; Santos et al., 2024). Similarly, learning networks have been identified as important mechanisms for bridging knowledge divides across organizations, sectors, and geographical regions, facilitating continuous learning and innovation diffusion (McIntosh et al., 2023; Santos et al., 2024).

Innovation ecosystems are characterized by interactions among diverse actors who jointly contribute to innovation generation, diffusion, and adoption (Chesbrough, 2003). Within such ecosystems, stakeholder engagement plays a critical role because innovation outcomes depend not only on technical excellence but also on collaboration, trust, and knowledge exchange among participants (Missonier & Loufrani-Fedida, 2014).

The importance of stakeholder engagement is particularly evident in the Quadruple Helix model, which integrates academia, industry, government, and civil society into innovation processes. The Quadruple Helix approach has become a cornerstone of European innovation policy, emphasizing co-creation, participatory innovation, and societal engagement (Carayannis & Campbell, 2009; Carayannis et al., 2018). Consequently, strategic communication functions as a coordinating mechanism that facilitates interaction among ecosystem actors and supports innovation adoption.

Communication for Capacity Building and Ecosystem Orchestration

Capacity building refers to the development of competencies, skills, resources, and organizational capabilities that enable stakeholders to participate effectively in innovation processes and generate long-term value. Recent studies suggest that communication activities such as webinars, mentoring programmes, workshops, collaborative platforms,

and online learning environments contribute significantly to capacity development by supporting knowledge acquisition, professional learning, and stakeholder participation (Byrd, 2020; Santos et al., 2024).

The role of communication is particularly important within universities and research organizations, which increasingly function as orchestrators of innovation ecosystems. Universities no longer operate solely as providers of education and research but also serve as innovation system integrators that facilitate collaboration among academia, industry, government, and society (Etzkowitz & Leydesdorff, 2000; CESAER, 2018). Through digital infrastructures, collaborative platforms, stakeholder engagement activities, and knowledge-sharing mechanisms, they contribute to ecosystem development and innovation diffusion.

Given the interdisciplinary nature of this study, Table 1 presents the main analytical constructs and their definitions.

Table 1. Analytical Constructs and Operational Definitions Applied in the Cross-Case Analysis.

Construct	Definition	Key References
Strategic Communication Capability	The ability of an organization or ecosystem to design and implement communication processes that support stakeholder engagement, collaboration, knowledge exchange and impact generation	Luoma-aho & Halonen (2010); Pegan & Lovec (2025)
Stakeholder Engagement	The process of involving relevant actors in decision-making, co-creation and collaborative activities within an ecosystem	Missonier & Loufrani-Fedida (2014); Carayannis & Campbell (2009); Carayannis et al. (2018)
Knowledge Transfer Effectiveness	The extent to which knowledge is successfully shared, understood and applied by different stakeholder	Roux et al. (2006); Machado et al. (2019)
Innovation Capacity Building	The development of competencies, skills, organizational capabilities and collaborative mechanisms that enhance innovation performance	Byrd (2020); Santos et al. (2024)
Innovation Impact	Observable outcomes related to innovation adoption, ecosystem development, organizational transformation and societal benefits	CESAER (2018); McIntosh et al. (2023)

Research Gap and Conceptual Framework

Although previous studies have separately examined strategic communication, stakeholder engagement, knowledge transfer, innovation ecosystems, and capacity building, limited research has investigated how these dimensions interact within European research and innovation ecosystems.

To address this gap, this study proposes a conceptual framework in which Strategic Communication Capability functions as the primary enabling mechanism. Strategic communication enhances stakeholder engagement, facilitates knowledge transfer, supports innovation capacity building, and ultimately contributes to innovation uptake, ecosystem sustainability, and socio-economic impact.

The framework is explored through four European-funded initiatives representing different innovation ecosystem contexts: SMART4ALL, METACITIES, EUNICE European University, and InclusiveSpaces.

METHODOLOGY

This study adopts a qualitative multiple-case study approach (Yin, 2018) to investigate the role of strategic communication in facilitating knowledge transfer and innovation capacity building within European research and innovation ecosystems.

The analysis focuses on four European-funded initiatives: SMART4ALL, METACITIES, EUNICE European University, and InclusiveSpaces. These cases were selected because they represent different innovation ecosystem configurations while sharing a strong emphasis on communication, stakeholder engagement, and capacity-building activities.

Data were collected through document analysis and participant observation. Sources included project proposals, communication and dissemination plans, public deliverables, project reports, stakeholder engagement activities, training programmes, digital communication platforms, and impact assessment materials. The authors' active involvement in communication, dissemination, stakeholder engagement, and capacity-building activities across the examined projects provided additional insights into communication processes and ecosystem dynamics.

Participant observation is increasingly recognized as a valuable qualitative approach in innovation and organizational research because it enables researchers to capture contextual factors, interaction patterns, and tacit processes that may not be evident through documentary analysis alone (Yin, 2018).

The data were analysed through thematic analysis guided by the study's conceptual framework. Coding focused on five analytical constructs: Strategic Communication Capability, Stakeholder Engagement, Knowledge Transfer Effectiveness, Innovation Capacity Building, and Innovation Impact. Cross-case comparison enabled the identification of recurring patterns across the four initiatives while preserving the contextual characteristics of each ecosystem.

Although the findings cannot be generalized to all innovation ecosystems, the multiple-case study design provides valuable insights into how communication contributes to innovation adoption, stakeholder engagement, and ecosystem development across different European contexts.

The selected cases represent complementary innovation ecosystem configurations, including digital innovation and SME support (SMART4ALL), regional excellence hubs and smart city innovation (METACITIES), transnational higher education ecosystems (EUNICE), and inclusive urban innovation environments (InclusiveSpaces), allowing analytical rather than statistical generalization across diverse European innovation contexts

FINDINGS

The cross-case analysis revealed that strategic communication functioned not merely as a dissemination mechanism but as a core capability supporting knowledge translation, stakeholder engagement, innovation adoption, and ecosystem development. Across the four initiatives, communication emerged as a critical factor enabling diverse stakeholders to understand, evaluate, and adopt technological and organizational innovations. The analysis identified four recurring and interconnected themes across all examined cases: (i) communication as a knowledge translation mechanism, (ii) communication as an ecosystem coordination capability, (iii) communication-driven capacity building and innovation adoption, and (iv) communication for inclusion and societal impact. Although each project emphasized different aspects of communication, these four themes consistently appeared throughout the examined innovation ecosystems and collectively explain how communication contributes to ecosystem performance and sustainability.

Strategic Communication as a Knowledge Translation Mechanism

Across all cases, communication activities played a critical role in translating complex knowledge into accessible and actionable information for diverse stakeholder groups. Rather than focusing solely on the dissemination of project outputs, communication strategies facilitated continuous knowledge exchange through webinars, workshops, mentoring activities, digital platforms, training sessions, and collaborative events.

This role was particularly evident in SMART4ALL, where technological solutions developed in domains such as Digitized Agriculture, Transport and Environment had to be communicated to SMEs, startups, entrepreneurs, and end-users with varying levels of technological expertise. Communication activities, including targeted webinars, mentoring schemes (technological, business and ethical mentoring), open-call campaigns, success stories, and business-oriented outreach actions, helped bridge the gap between technology developers and potential adopters. Instead of emphasizing technical specifications, communication efforts focused on practical applications, business benefits, and real-world use cases.

For example, in the Digitized Agriculture domain, communication activities helped stakeholders better understand the value of digital technologies, IoT-enabled solutions, and data-driven decision-making tools by translating technical concepts into operational and economic benefits relevant to agricultural producers and agribusinesses. The findings suggest that communication acted as a translation layer between technological innovation and market adoption (Rogers, 2003).

The analysis further revealed that communication effectiveness depended not only on the content being communicated but also on the communication channels and engagement formats employed. Across the examined projects, webinars, mentoring programmes, stakeholder workshops, online communities, social media campaigns, newsletters, digital collaboration platforms, success stories, and demonstration events emerged as particularly effective tools for facilitating knowledge transfer and stakeholder engagement.

Interactive communication formats proved especially valuable because they enabled two-way knowledge exchange rather than one-directional dissemination. Mentoring sessions and workshops allowed technology providers to better understand user needs, while potential adopters could explore practical applications, implementation requirements, and business opportunities. This finding supports previous studies suggesting that communication is most effective when it facilitates dialogue, co-creation, and collaborative learning rather than simply transmitting information.

Similarly, EUNICE employed shared digital infrastructures, collaborative platforms, MOOCs, mobility opportunities, and joint educational activities to facilitate knowledge exchange among students, researchers, academic staff, and external stakeholders. The alliance's communication mechanisms supported transnational knowledge circulation and promoted participation in common educational and research activities, contributing to a more integrated European higher education ecosystem.

Strategic Communication as an Ecosystem Coordination Capability

The findings indicate that communication also served as an ecosystem coordination mechanism by facilitating alignment among heterogeneous stakeholder groups. This role was particularly evident in METACITIES and EUNICE, where multiple actors from academia, industry, government, and civil society collaborated within complex governance structures.

The SMART4ALL ecosystem provides a particularly illustrative example of how strategic communication supports cross-border and cross-sector collaboration. The initiative brought together universities, research centres, Digital Innovation Hubs, SMEs, startups, accelerators, and industrial stakeholders from multiple European countries with the objective of fostering knowledge exchange and technology transfer across regional innovation ecosystems. Communication mechanisms such as open-call campaigns, matchmaking events, mentoring activities, networking sessions, brokerage meetings, and success-story dissemination enabled stakeholders from different sectors and countries to identify collaboration opportunities and establish new partnerships.

Beyond facilitating networking, communication contributed directly to commercialization pathways (Chesbrough, 2003). By connecting technology developers with SMEs, entrepreneurs, investors, and end-users, communication activities supported the transformation of research outputs into market-oriented solutions reflecting open innovation principles based on knowledge exchange across organizational boundaries (Chesbrough, 2003). The findings suggest that strategic communication strengthens knowledge transfer not only by increasing awareness but also by creating the conditions necessary for collaboration, business growth, technology adoption, and innovation commercialization.

METACITIES adopted a Quadruple Helix approach involving universities, municipalities, innovation hubs, technology organizations, businesses, and public authorities from Southeastern Europe building upon broader Triple and Quadruple Helix innovation frameworks (Etzkowitz & Leydesdorff, 2000; Carayannis & Campbell, 2009). Within this context, communication activities supported coordination among partners, strengthened stakeholder engagement, and facilitated collaboration around Digital Twins and smart city solutions.

Importantly, communication was not limited to promoting technological developments. Municipal authorities and local decision-makers are rarely technology specialists and often evaluate innovation according to policy priorities, sustainability objectives, operational efficiency, and return on investment. Communication activities therefore focused on translating complex concepts such as Digital Twins and metaverse-enabled urban services into practical narratives demonstrating how these technologies could improve urban planning, public service delivery, sustainability, and citizen engagement.

Similarly, EUNICE developed shared governance structures, stakeholder councils, communication boards, digital collaboration environments, and working groups that facilitated institutional coordination across partner universities. Communication supported the alignment of diverse institutional priorities and strengthened collaboration among academic and non-academic stakeholders.

Communication-Driven Capacity Building and Innovation Adoption

A third recurring theme concerned the contribution of communication activities to capacity building and innovation adoption. Across all cases, communication-supported training, mentoring, experiential learning, and stakeholder engagement activities strengthened participants' skills, competencies, and innovation capabilities.

SMART4ALL provided mentoring and innovation support mechanisms for SMEs, startups, and research teams through open calls, coaching schemes, and networking activities. Communication played a central role in attracting participants, supporting engagement throughout the innovation process, and promoting opportunities for collaboration and business development.

The findings demonstrate that the effectiveness of capacity-building activities depended not only on the quality of the technical content delivered but also on the clarity, accessibility, and adaptability of communication. Even highly innovative technological solutions require effective communication to be understood, evaluated, trusted, and ultimately adopted by potential users, customers, investors, and policymakers (Rogers, 2003).

This pattern was also observed within EUNICE, where communication supported student research clubs, entrepreneurship laboratories, mobility activities, summer schools, hackathons, internships, and collaborative learning initiatives. Through digital platforms, targeted campaigns, and student ambassador networks, communication helped create communities of practice that encouraged participation, networking, and knowledge sharing.

An additional finding concerns the role of communication in innovation scouting and entrepreneurial capacity building. Within initiatives such as METACITIES and EUNICE, communication-supported activities increasingly focused on identifying promising innovators, researchers, and students and helping them develop entrepreneurial competencies. Innovation scouting activities, challenge-based events, hackathons, entrepreneurship programmes, and startup-oriented training sessions provided opportunities for participants to transform research ideas into innovation projects and potential business ventures.

Particular emphasis was placed on communication skills development, including pitching techniques, storytelling, presentation skills, and investor-oriented communication. Such competencies are increasingly recognized as essential components of innovation ecosystems because technological excellence alone is rarely sufficient to secure funding, attract partners, or convince potential customers and investors. The ability to communicate a value proposition clearly and persuasively therefore emerged as a critical factor supporting innovation adoption and entrepreneurial success.

The evidence suggests that communication functions as a complementary capability to innovation itself. While business models, technological excellence, and networking remain essential, their effectiveness is significantly enhanced when supported by communication strategies that translate innovation into understandable and relevant value propositions for specific audiences.

Communication for Inclusion and Societal Impact

The final theme concerned the role of communication in supporting inclusion, diversity, and broader societal impact. InclusiveSpaces demonstrated how participatory communication approaches can strengthen stakeholder involvement and empower underrepresented groups to contribute to innovation processes.

The project's Design-for-All philosophy highlighted the importance of communication when technological innovation targets user groups with limited technological literacy, including elderly citizens and persons with disabilities. In such contexts, communication activities focused on accessibility, usability, trust-building, and practical relevance. Participatory workshops, co-design sessions, and user-centred communication approaches enabled stakeholders to better understand and evaluate technological solutions designed for inclusive and climate-resilient urban environments.

A particularly illustrative example emerged from SMART4Women, an initiative developed within the SMART4ALL ecosystem to promote the participation of women and girls in digital technologies. Through targeted awareness campaigns, visibility actions, stakeholder engagement activities, role-model promotion, and dedicated community-building initiatives, SMART4Women sought to reduce barriers to participation in STEM and digital innovation ecosystems.

Rather than focusing exclusively on technical competencies, communication activities emphasized accessibility, inspiration, networking opportunities, and the visibility of female innovators and entrepreneurs. The initiative demonstrated how strategic communication can contribute to diversity and inclusion objectives while simultaneously strengthening the sustainability and resilience of innovation ecosystems.

Across the four cases, communication was consistently associated with increased stakeholder participation, stronger collaboration networks, improved visibility of innovation opportunities, and enhanced capacity for innovation uptake.

Cross-Case Synthesis

The cross-case analysis supports the proposed conceptual framework. Strategic communication emerged as the primary enabling capability linking stakeholder engagement, knowledge transfer, innovation capacity building, innovation adoption, and ecosystem impact.

Across all four initiatives, communication performed four interconnected functions. First, it translated complex knowledge into accessible and actionable information. Second, it coordinated interactions among diverse stakeholders within innovation ecosystems. Third, it facilitated capacity building and innovation adoption by creating opportunities for participation, learning, collaboration, and trust-building. Fourth, it supported inclusion and societal impact by engaging groups that are often underrepresented in innovation processes.

The findings therefore suggest that communication functions most effectively when embedded within ecosystem governance, stakeholder engagement, and innovation management processes rather than being treated as a standalone dissemination activity.

DISCUSSION

The findings reinforce recent literature suggesting that strategic communication should be understood as a core capability supporting knowledge exchange, stakeholder collaboration, and innovation ecosystem development rather than as a peripheral dissemination function (Luoma-aho & Halonen, 2010; Santos et al., 2024). Consistent with knowledge management research, communication emerged as a key mechanism facilitating the creation, sharing, interpretation, and application of knowledge across organizational and geographical boundaries (Machado et al., 2019).

More importantly, the findings indicate that communication acts as the missing link between knowledge generation and innovation uptake. While research projects frequently focus on technological development, successful

adoption depends on stakeholders' ability to understand, trust, evaluate and apply innovation within their own organizational or societal contexts (Rogers, 2003).

The results further extend existing innovation ecosystem literature by demonstrating that communication contributes not only to awareness raising but also to innovation adoption. Across the examined cases, communication enabled stakeholders to understand technological innovations in relation to their own needs, priorities, and operational contexts. This was particularly evident in the communication of digital agriculture solutions to SMEs and farmers, Digital Twin technologies to municipalities, and inclusive technologies to elderly citizens and persons with disabilities.

The findings also support the view that universities and research organizations increasingly function as ecosystem orchestrators, facilitating interactions among academia, industry, government, and society ((Etzkowitz & Leydesdorff, 2000; CESAER, 2018). In all four cases, communication was embedded within governance structures, stakeholder engagement processes, capacity-building activities, and innovation support mechanisms, highlighting its strategic rather than operational role.

An important implication emerging from the study is that communication should be viewed as a strategic investment rather than a support activity. In increasingly complex innovation ecosystems, the success of technological innovations depends not only on research excellence but also on the ability to communicate value propositions to different stakeholder groups. Farmers, municipalities, SMEs, investors, students, elderly citizens, and persons with disabilities interpret innovation through different lenses and require different communication approaches. Consequently, communication becomes a prerequisite for technology adoption, stakeholder alignment, and sustainable ecosystem development.

THEORETICAL CONTRIBUTIONS AND PRACTICAL IMPLICATIONS

This study contributes to the literature by proposing a communication-centred perspective on innovation ecosystems. While previous studies have examined communication, stakeholder engagement, knowledge transfer, innovation capacity building, and ecosystem development as separate domains, the present study demonstrates their interdependence within European research and innovation ecosystems.

The findings suggest that strategic communication functions as an enabling capability connecting stakeholder engagement, knowledge transfer, innovation capacity building, innovation adoption, and ecosystem impact. The proposed framework therefore extends knowledge transfer and innovation ecosystem literature by positioning communication as a central coordinating and translation mechanism that supports the movement of knowledge from research environments into practical applications.

From a practical perspective, the findings highlight the need for project coordinators, universities, innovation hubs, and policymakers to integrate communication activities into innovation strategies from the earliest stages of project design. Communication plans should move beyond visibility objectives and include stakeholder engagement, collaborative learning, community building, inclusion, and impact assessment mechanisms. Particular attention should be devoted to communicating technological innovations in ways that are understandable, relevant, and actionable for target audiences with different levels of technological literacy.

CONCLUSION

This paper examined the role of strategic communication in facilitating knowledge transfer and innovation capacity building within European research and innovation ecosystems. Drawing on evidence from SMART4ALL, METACITIES, EUNICE, and InclusiveSpaces, the study demonstrated that communication contributes to ecosystem development by supporting stakeholder engagement, knowledge exchange, innovation adoption, capacity building, and societal impact.

The findings indicate that strategic communication should be understood as a fundamental capability underpinning innovation ecosystem performance. Beyond dissemination, communication functions as a mechanism that translates knowledge, coordinates stakeholders, facilitates innovation adoption, and supports inclusive ecosystem

development. Future research could further investigate communication-related impact indicators and explore how communication capabilities influence long-term sustainability and innovation outcomes across different innovation ecosystem contexts.

REFERENCES

- Byrd, D. (2020). Tools for Success: An Assessment of Capacity Building in the Nonprofit Sector. Master of Nonprofit Administration Capstone Research Report, University of San Francisco.
- Carayannis, E. G., & Campbell, D. F. J. (2009). 'Mode 3' and 'Quadruple Helix': Toward a 21st Century Fractal Innovation Ecosystem. *International Journal of Technology Management*, 46(3/4), 201-234.
- Carayannis, E. G., Grigoroudis, E., Campbell, D. F. J., Meissner, D., & Stamati, D. (2018). The Ecosystem as Helix: An Exploratory Theory-Building Study of Regional Co-opetitive Entrepreneurial Ecosystems as Quadruple/Quintuple Helix Innovation Models. *R&D Management*, 48(1), 148-162.
- Chesbrough, H. (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston: Harvard Business School Press.
- Cornelissen, J. (2020). *Corporate Communication: A Guide to Theory and Practice*. Sage.
- Etzkowitz, H., & Leydesdorff, L. (2000). The Dynamics of Innovation: From National Systems and "Mode 2" to a Triple Helix of University–Industry–Government Relations. *Research Policy*, 29(2), 109-123.
- Luoma-aho, V., & Halonen, S. (2010). Intangibles and Innovation: The Role of Communication in the Innovation Ecosystem. *Innovation Journalism*, 7(2), 1-20.
- Machado, A. B., Souza, M. J., & Catapan, A. H. (2019). Systematic Review: Intersection between Communication and Knowledge. *Journal of Information Systems Engineering & Management*, 4(1), em0086.
- McIntosh, O. B., Burnett, A., Feldman, I., Lamphere, J. A., Reuter, T. A., & Vital, E. (2023). The Role of Sustainability Knowledge-Action Platforms in Advancing Multi-Stakeholder Engagement on Sustainability. *Data & Policy*, 5, e33.
- Missonier, S., & Loufrani-Fedida, S. (2014). Stakeholder Analysis and Engagement in Projects: From Stakeholder Relational Perspective to Stakeholder Relational Ontology. *International Journal of Project Management*, 32(7), 1108-1122.
- Pegan, Ž., & Lovec, M. (2025). Strategic Communication in Public Governance: Enhancing Stakeholder Participation and Policy Effectiveness. *Public Administration Review*, 85(2), 215-229.
- Rogers, E. M. (2003). *Diffusion of Innovations* (5th ed.). New York: Free Press.
- Roux, D. J., Rogers, K. H., Biggs, H. C., Ashton, P. J., & Sergeant, A. (2006). Bridging the Science-Management Divide: Moving from Unidirectional Knowledge Transfer to Knowledge Interfacing and Sharing. *Ecology and Society*, 11(1), 4.
- Santos, E., Carvalho, M., & Martins, S. (2024). Sustainable Enablers of Knowledge Management Strategies in a Higher Education Institution. *Sustainability*, 16(12), 5078.
- White Paper Task Force Innovation. (2018). *Role of Universities of Science and Technology in Innovation Ecosystems: Towards Mission 3.1*. Leuven: CESAER.
- Yin, R. K. (2018). *Case Study Research and Applications: Design and Methods* (6th ed.). Thousand Oaks, CA: Sage Publications.

Project websites:

- SMART4ALL: <https://smart4all.esdalab.ece.uop.gr/>
- METACITIES: <https://metacities-hub.com/>
- EUNICE: <https://eunice-university.eu/>
- InclusiveSpaces: <https://inclusivespaces-heproject.eu/>

EXPLORING THE INFLUENCE OF ENTERPRISE SOCIAL MEDIA (ESM) ON EMPLOYEE ENGAGEMENT (EE) IN THE WORKPLACE

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ABSTRACT

Enterprise Social Media (ESM) is increasingly embedded in organisational communication, yet its role in shaping Employee Engagement (EE) within the banking sector remains underexplored. This research explores how employees working in the banking sector make sense and experience engagement through everyday interactions on Enterprise Social Media platforms. Although much of existing literature highlights the functional benefits of ESM, far less attention has been given to employees lived experiences, the subtle dynamics that shape how they participate, or the conditions in banking sector that support or limit meaningful EE. Guided by Social Influence Theory (SIT), the study takes an interpretivist, qualitative approach to understand how processes such as compliance, identification, and internalisation play out in digital workplaces and influences how employees navigate communication, visibility, and communication on ESM. A multiple embedded case study, supported by semi-structured interviews will generate rich, contextualised insights into how EE is constructed in ESM-mediated workplaces. The study aims to contribute a sector-specific conceptual framework that deepens understanding of ESM's influence on engagement and offers relevant insights for designing digitally connected and socially sustainable work environments.

Keywords: Enterprise Social Media (ESM), Employee Engagement (EE), banking sector, Social Influence Theory (SIT), interpretivist.

INTRODUCTION

Organisations typically use two main types of social media. Firstly, the public social networks for external communication. Some examples are Facebook, Twitter, and LinkedIn. Secondly, private social networks or ESM platforms for internal collaboration and knowledge sharing. Some examples are Microsoft Viva Engage (formerly known as Yammer), Workplace from Meta, Slack, and Microsoft Teams (Leonardi, 2017; Treem et al., 2013 & Van et al., 2016). While public social media facilitates outward-facing branding and relationship-building, the ESM platforms enable employees to exchange information, coordinate work, and enhance knowledge sharing within the organisation (Saraf et al., 2022 & Ewing et al., 2019). The academic and industry research surrounding the use of social media in the corporate context has been extensive, particularly in terms of marketing, branding and customer relationship management. However, there has recently been a focus of interest on the use of ESM platform as a specific, emerging area of investigation because of the way that ESM platforms allow employees to communicate, collaborate and share knowledge using digital platforms that are provided to them by organizations. For example, Microsoft Teams, Yammer, Workplace by Meta, and custom-built intranet-based social systems have been adopted in many industries such as commercial banking where geographically dispersed teams need a reliable, secure, real-time means of communicating with one another (Leonardi et al., 2013; Kane et al., 2014).

In recent years, more organisations are using ESM tools as a significant part of operating their businesses with respect to how employees communicate, collaborate, and build relationships, hence enabling digital transformation in internal communication and collaboration, knowledge sharing and community formation (Pitafi, 2022; Leonardi, 2013). Presently, an increasing number of companies in the e-commerce, manufacturing, education and finance sectors have adopted ESM applications for various business purposes such as streamlined communication, efficient process direction, profitable marketing, society cultivation, secure data storage, and seamless online meetings (Lane et al., 2024; Kepler et al. 2023). The ESM platforms promise more than just efficiency because they offer the

potential to foster community, strengthen voices, and create a sense of belonging across hierarchical and geographical boundaries (Leonardi, 2013; Mohiya, 2025). Despite the popularity of ESM tools, EE lacks absolute clarity and are methodologically narrow. Empirical studies have shown that during periods of enforced physical distancing, ESMs helped mitigate feelings of workplace isolation and reinforced employee morale by providing continuous social support and informal check-ins (Zhang et al., 2024). The rise of ESM has intensified tensions as these platforms are becoming central to hybrid work; however, their development is not neutral. The banking sector offers a particularly distinctive setting for examining these dynamics. As Banking institutions operate within complex governance structures, strict compliance requirements, and deeply embedded risk-averse cultures (Basel Committee on Banking Supervision, 2015), they offer distinctive settings for exploring these dynamics thereby creating a unique backdrop for understanding how employees navigate engagement on ESM platforms. Although ESM is increasingly embedded in banking workflows, employees' experiences of visibility, participation, and interaction on these platforms remain underexplored. Understanding how EE is constructed within such environments requires moving beyond functional accounts of ESM to consider the social processes that influence behaviour, identity, and meaning-making.

This study aligns with the Global Business and Technology Association (GBATA) Conference 2026 theme - *Critical and Strategic Perspectives: Shaping the Future of Global Business and Technology*. As global businesses increasingly rely on digital platforms to coordinate work across dispersed teams, ESM plays a critical role and is widely recognised as a strategic driver of productivity, innovation, retention and organisational resilience. In global business workplaces where teams are distributed and culturally diverse (as modelled in the banking industry worldwide) maintaining EE is both challenging and more strategically important (Ruck, 2017). The research will analyse the opportunities and challenges of ESM in the banking sector and provide a neutral, objective view of how ESM is changing the future of work through technology. The research will investigate how commercial banks can use ESM to create a more connected, resilient and effective workplace in a changing global economy.

Research Gaps

The existing research gaps being identified by the study are:

ESM research remains conceptually narrow and technologically biased: Most existing studies focus on system features, usage metrics, or digital connectivity (Treem et al., 2013; Cao et al., 2016), while neglecting the subjective, interpretive, and culturally embedded nature of employee engagement. The social and discursive processes through which employee engagement is co-constructed through meaning-making, identity, digital language, and everyday interaction remain underexplored. Existing studies using interpretivist, qualitative research to capture employees lived experiences of engagement on ESM platforms in the workplace is limited. Quantitative approaches are dominantly utilised in exploring employee engagement as an individual psychological state or output metric; overlooking the emotional, relational, and contextual dimensions of engagement which includes disengagement, overload, exclusion, and performative participation. Qualitative inquiry could help understand how employees construct meaning around ESM; and other issues such as overload, exclusion, performative participation and employee disengagement (Cao et al., 2016; Chen et al. 2023; Zhou et al., 2024).

Insufficient study of social influence processes within ESM-mediated service environments: Existing studies seldom examine how compliance, identification, and internalisation operate in digital spaces, nor how artefacts such as emojis, tags, memes, visibility cues, and normative pressures shape employee engagement. This leaves a gap in understanding how power, representation, and sociocultural negotiation unfold in ESM-mediated communication (Mohiya, 2025). There is limited application of SET to explain how relational dynamics influence employees' willingness to engage on ESM platforms. Existing studies emphasize that employees participate more fully when they receive reciprocity, fairness, and organisational support in their interactions (Cropanzano et al., 2005). Yet few studies explore how ESM-based interactions such as receiving recognition, feedback, or support through digital channels, shape employee engagement in the workplace. Therefore, the limited attention to the relational and reciprocal dimensions of ESM restricts understanding of how digital communication environments foster or hinder meaningful employee engagement.

Insufficient representation of the banking sector in ESM research: Most empirical studies on ESM focus on technology firms, education, or general corporate environments, and barely the insufficient representation of the highly regulated, service-intensive sectors such as banking. This creates a gap in understanding how ESM operates within

complex, compliance-driven organisational structures where digital transformation is accelerating but unevenly implemented. Wang et al. (2022) highlighted that “it is equally important to critically explore power and representation are negotiated in digital spaces especially as leadership, employee feedback, cultural diversity are critical to sustaining EE and the attached risks (overload, exclusion, dissociation) of using ESM.

Research Aims and Objectives

Drawing on SIT, the proposed study aims to investigate how employees in the banking sector construct and interpret engagement at workplace through the use of ESM platforms, by critically examining existing scholarship and applying Social Influence Theory to explore how compliance, identification, and internalisation operate within everyday digital communication and are shaped by organisational norms, hierarchies, and communication practices in some banking institutions. This study is aimed at the following objectives:

1. To critically review existing literature on ESM and EE, with specific attention to how SIT has been applied in organisational communication research.
2. To explore how employees across multiple banking institutions experience and interpret their engagement when interacting on ESM platforms.
3. To examine how the social influence processes of compliance, identification, and internalisation emerge within everyday ESM-mediated communication.
4. To analyse how organisational norms, hierarchies, and digital communication practices enable or constrain the social influence dynamics that shape EE on ESM.

The study will be examined across the following research questions:

1. How do banking employees construct and interpret engagement through their use of ESM?
2. How do compliance, identification, and internalisation shape engagement on ESM?
3. How do organisational norms and digital practices influence social influence processes on ESM?

Rationale for the Study

Building on the works of Mohiya (2025) and Zhou et al. (2024) is a foundation for identifying above-mentioned gaps and addressing them in the present study. Both Mohiya (2025) and Zhou et al. (2024) emphasise behavioural or structural patterns, but neither examines how employees make sense of their engagement on ESM. The subjective, relational, and meaning-making dimensions remain underexplored. An interpretivist approach is therefore essential to illuminate these lived experiences. Dunk-West and Saxton (2024) call for more detailed, qualitative approaches to understand how ESM facilitates practices in organisations. Qualitative studies systematically and rigorously provide a way for researchers to further understand how social realities are developed, rather than conveyed through numeric data (Taylor et al., 2015). Neither study examines how compliance, identification, and internalisation influence EE in digital environments. However, these mechanisms are central to how employees navigate visibility, hierarchy, and organisational expectations on ESM. Applying SIT provides a theoretically grounded way to address this gap. While both studies synthesise general patterns across industries, neither addresses how ESM operates in highly regulated, hierarchical sectors. The banking sector’s compliance culture, risk sensitivity, and formal communication norms are likely to shape EE in distinctive ways. However, this remains unexamined.

The banking sector provides an important function by providing economic stability and facilitating a stronger and more inclusive economy requiring high levels of public confidence. Banks are required to demonstrate solid digital governance over internal communication, decision-making and employee support. The need for banks to implement effective digital workplace solutions has never been greater (Basel Committee on Banking Supervision, 2015). Banks need to consider how ESM can ensure that employees can participate in decision-making, designing policies on digital conduct, wellbeing, inclusion, and data governance. Banks can also use ESM to bridge the gap between the needs of employees and technological efficiencies when creating human resources and information technology policies. This study will provide a conceptual extension by applying SIT to the investigation, generate specific insights into digital communication in banking, offer a deepened understanding of digital communication in a rapidly evolving sector and identify implications for practice.

LITERATURE REVIEW

ESM has progressed from its early days as a set of basic internal communication tools to complex platforms shaping EE, reflecting broader shifts in digital work and workplace connectivity via its continuous development. Evolving from simple web-based applications such as wikis and blogs into feature-rich, mobile-enabled platforms such as intranets, forums and a few dominant suites offering chat, channels, reactions, tagging, and search, (thereby centralising communication, governance, and analytics inside proprietary ecosystems into advanced mobile-enabled platforms) ESM has become sophisticated digital platforms that plays a critical role in shaping how employees in organisations communicate, collaborate, and connect (Ewing et al., 2019). This change reflects a wider move to digitally connected, distributed, and fast-moving workplaces where constant connectivity is essential and not optional (Leonardi et al., 2013).

At the beginning of the 2000s, many groups were using internal systems to share files and information and manage communications with each other, but these systems offered basic functionality and did not allow for easy interdepartmental collaboration. In the 2010s, there was growth in the number of useful digital tools available to companies to help support teamwork, including tools for instant messaging, searchable archives of past messages, and tools for easily sharing files. As a result, communication among members of a team, department, or an entire organization became more fluid as barriers broke down between people or departments who work remotely and/or from different time zones. Existing literature offers several influential definitions of ESM, each emphasising different functional and social dimensions. Leonardi et al. (2013) describe ESM as organisational platforms that enable employees to send targeted or broadcast messages, share and modify content, and access the communication and files shared by others across the organisation. Other scholars emphasise the socio-organisational aspects by highlighting ESM as digital infrastructures that enable mass collaboration connecting employees across functional and geographical boundaries (Kane et al., 2014).

For the purposes of this study, ESM is defined as digital platforms provided within an organisation to support multidirectional communication, collaboration, and social interaction among employees, enabling both work-related and socio-emotional exchanges that contribute to organisational functioning. This definition recognises the relational and cultural dimensions that are central to understanding EE. Existing studies reveal that ESM is a prevalent area of examination in terms of knowledge sharing, collaboration, and learning in organisations (Leonardi, 2013; Schlagwein et al., 2017), but the academic community has yet to adequately examine the specific impact ESM has on EE, especially in sectors that are heavily regulated (e.g. commercial banking). The banking sector has very specific and rigid compliance standards, hierarchical structures and a risk-averse culture, which may affect employees' use and experience of ESM (Rana et al., 2019). Understanding the influence of ESM on EE requires focusing on the capabilities and limitations of the technical characteristics of ESM, as well as the organisational context within which it is implemented.

Zhou et al (2024) reported that the use of ESM has transformed business practices because it meets the needs of remote/hybrid working models, while Leonardi et al (2013) highlighted that ESM enables members of organizations to use digital tools that are not restricted to one-way communications (like email). As the new ESM tools are continuously being used in this manner, there will be development in a mode of communication that enables communication across departmental and hierarchical levels, including a collaborative, dynamic and integrated platform for the entire organisation to work on. New platforms are being introduced to ESM, such as threaded discussion groups, persistent archives and user tagging, which help to improve internal communication, collaboration and knowledge management. According to Liu et al. (2021) and Leonardi et al. (2013), ESM is still evolving so much that these authors believe ESM technology is shifting from being thought of as neutral tools to being recognised as being a part of the shaping of employees' work practices and information flows. Remote and hybrid working environments have increased the need for organisations to use ESM to connect with their employees and to keep them engaged, making the effects of ESM on EE to vary by employee (Pavithra et al., 2017). Due to the need for further exploration and critical reflection on the conditions that make ESM truly effective in banks, a significant investigation might unfold whether what appears as progress is truly compliance, and whether what is measured as EE may be concealing exhaustion, inequality, and exclusion.

Conceptualisation of EE

The concept of EE has gained popularity in management circles because it enables organizations to excel and gain a competitive advantage, and has gained substantial popularity and influence, attracting interest from both academic and business sectors. Despite its wide recognition, the term is inconsistently defined and frequently overlaps with other established psychological concepts. However, EE is conceptually ambiguous, with different scholars offering various interpretations and definitions. Some related concepts such as job satisfaction, job involvement, work involvement, organizational commitment, and organizational citizenship behaviour contribute to the complexity (Bailey et al., 2017). Some existing studies define EE as the emotional commitment and involvement that employees have toward their organisation and its goals while others view it as the emotional connection and commitment employees have to their work and organization, which is beyond employee satisfaction (Gallup, 2026). For the purposes of this study, EE is defined as a multidimensional psychological state reflecting employees' cognitive, emotional, and behavioural investment in their work and organisation. This definition appears appropriate for examining ESM because it captures the ways in which digital communication tools may influence employees' sense of connection, involvement, and participation in organisational life. Over the past decades, many scholars have closely analysed EE. Existing research has shown that high levels of EE sustain employees' jobs satisfaction, adaptability and creativity (Saks, 2006), leading to lower absenteeism and turnover. Organisations and employees are experiencing new work practices post Covid-19 pandemic (Wang et al., 2022) and drastic changes are occurring in managing EE (Liu et al., 2021; Ployhart et al., 2021), fueling distress, depression, and anxiety that influences EE (Pirzadeh et al., 2021).

However, other researchers have reported that there are some advantages employees gain from hybrid work settings emphasizing that extreme reductions in commuting times, and increased time for family and leisure activities help to re-ignite EE. Even with lots of progress, conceptual ambiguity remains, there is demand for sharper definitions and more in-depth qualitative work that can capture how EE feels and unfolds in real workplaces (Hu, 2020; Murmura et al. 2021; Pirzadeh et al, 2021). Tensions remain unsettled around EE being treated as a momentary state and sometimes as a stable trait which overlaps conceptually with constructs like commitment and job involvement; and engagement locus (whether individual, team, or organisational). As organisations increasingly adopt ESM platforms to support communication, collaboration, and social interaction, EE is no longer shaped solely by traditional managerial practices but also by employees' experiences of digital connectivity, visibility, and participation (Leonardi, 2013). This shift underscores the need for a conceptualisation of EE that is sensitive to the relational and communicative dynamics introduced by ESM. Therefore, this study identifies that there is need for a critical review, reconceptualizing EE as a socially constructed, context-dependent process, rather than a universal psychological state. Social constructionism adopts a subjectivist position as knowledge is created because of dialogue (between the participant and researcher) and does not reflect an objective or external reality (Ozuem et al. 2024).

Social Influence Theory (SIT)

SIT provides a conceptual framework to understand how people accept social influence through the process of compliance, identification, and internalisation. SIT was developed from Kelman's attempt to show the circumstances under which social influence leads to behavioural and attitudinal change (Davlembayeva et al., 2026). For instance, individuals comply to receive a reward or avoid the consequences of failing to act; identify with the people they are influenced by; and internalise when the influence aligns with one's own personal beliefs, values and morals. Although these differences are a good starting point for examining how people accept social influence, to an extent, they oversimplify the complex ways in which power dynamics, cultural systems and human agency intersect in modern day organisations (Davlembayeva et al. 2026). The application of SIT has encompassed all types of work environments including organisations, medical settings and socio-political frameworks, and it has demonstrated its flexibility. In socio political research, SIT has exposed how persuasion and identity work contribute to collective action and divergence (Watanabe et al., 2017; Azemi & Ozuem, 2026). Researchers have used SIT to study the ways people adopt and use technology in marketing strategies. Some have combined SIT with Elaboration Likelihood Model (ELM) to explore how users accept an Information System, while others have focused on communication between referent groups and its influence on consumer behaviour. In a digital setting, SIT has also been applied to both social media marketing and influencer marketing.

SIT's continued popularity is a result of its flexibility. However, this flexibility has the potential to diminish the explanatory power of the approach. Many contemporary applications of the SIT are treated as descriptive toolkits, rather than critical frameworks, and generally ignore how the influence of the SIT is mediated through hierarchy, digital infrastructure, and culture. For this study, SIT is mobilised to interrogate how ESM platforms reproduce or disrupt compliance, identification, and internalisation in ways that shape EE. As a result of extensive application of SIT across diverse domains, influence in ESM is contingent, which means outcomes may vary depending on who speaks, how visible and credible they are, which norms and incentives are active, and what semiotic tools (e.g. posts, emojis, tags, memes) mediate communication. To analyse the findings accurately, this study requires approaches that can trace moment-to-moment exchanges, connect talk to digital artefacts and governance structures, and acknowledge how researcher's interpretative presence shapes the production of influence. Overall, the study intends to critically examine SIT as a dynamic, socially constructed phenomenon central to understanding and analysing EE in digitally facilitated banking industry. Also, the theory provided a critical and strategic lens for understanding how digital technologies shape organisational behaviour, communication norms, EE, and the future of global business and technology, portraying ESM as a social system and not just tools.

METHODOLOGY

This study is utilizing a conceptual research framework developed from an analysis of previously published research on how ESM is used in the organizational context through the study of EE and digital communications. The review of the literature was conducted through a comprehensive search of appropriate peer-reviewed journals/databases containing quantitatively or qualitatively based studies assessing the use of ESM, workplace communication, and EE (Leonardi, 2017; Martin et al., 2015; Ruck et al, 2017). The review also incorporated studies that explore the relational and behavioural implications of social technologies in organisations. The findings will include both benefits from the implementation of social technologies such as increased voice and collaboration and disadvantages such as stress, distraction, and decreased interpersonal contact (Song et al., 2019). Documenting analytic process enhances both the value of the research and allows findings to be situated meaningfully within wider scholarly debates and applied contexts (Ozuem et al., 2025). Rather than generating primary empirical data, the study synthesises established theoretical perspectives of SIT to develop a conceptual understanding of how ESM shapes EE in view of objectivist approaches which assume that themes exist within the data and can be systematically uncovered (Saunders et al., 2019; Ozuem et al., 2025).

As the banking sector comprises of institutions sharing similar compliance requirements and digital governance structures, probably differing in their respective ESM adoption (Basel Committee on Banking Supervision, 2015); a multi-site qualitative approach will enable the study to explore patterns of meaning-making in multiple locations (Taylor et al., 2015). Each participating bank is a site of inquiry, rather than a bounded case in the traditional case-study sense (Yin, 2018). The focus of analysis is therefore not the organisation itself, but the interpretive processes through which employees understand, negotiate, and perform engagement on ESM platforms (Bailey et al., 2017; Leonardi, 2013). Recruitment will involve purposive sampling across multiple banking institutions, enabling variation in role, function, and digital practice (Collis et al., 2014). While the sites share sectoral characteristics, the multi-site approach may strengthen the credibility and transferability of findings and may ensure the study reflects the uniformity or diversity of digital communication practices within the bank sector. Semi-structured interviews will be complemented by observations of ESM artefacts (e.g., posts, threads, reactions) to connect employee narratives with actual ESM platform behaviours.

DISCUSSIONS

The role of ESM in modern organizations has become very important and has a strong influence on how people interact, work together, and create meaning in their jobs. ESM is different from other forms of communication because it provides real time access to the actions, thoughts, and contributions of coworkers. Research shows that employees often base their level of engagement on how their coworkers engage digitally, whether through posting updates, sharing information, or contributing to discussions. When employees see that their coworkers are using ESM to provide insights or participate in conversations about the organization, it can help build their sense of psychological safety and lead to similar forms of engagement, demonstrating some of the early forms of social influence that was originally discovered in previous organisational communication research (Leonardi, 2017). Likewise, if employees see their supervisor participate actively in ESM, they may begin to mirror that behaviour to identify with highly

regarded members of the organisation (Davlembayeva et al., 2026). Conversely, if multiple individuals within a work group exhibit positive attitudes toward ESM, including using it to provide recognition of accomplishments and sharing best practices, employees may feel pressured into contributing to maintaining their group's cohesion; and this is a form of compliance driven by perceived social norms. The importance of these dynamics is compounded in today's digital environment, due to the increased level of visibility and peer comparisons present (Davlembayeva et al., 2026).

Beyond surface-level participation, ESM can also facilitate deeper, value-driven EE when employees encounter content that resonates with their personal or professional values, such as posts highlighting collaboration, learning, or organisational purpose, they may internalise these values, leading to more sustained and meaningful engagement behaviours. This aligns with Kelman's internalisation process (Davlembayeva et al., 2025). This is supported by research showing that digital communication can reinforce shared values and strengthen organisational identification (Ruck et al., 2017; Men et al., 2020). In this way, ESMs function communication tools and mechanism through which employees interpret organisational culture and align their behaviours accordingly. Although ESM may appear to have a positive effect on EE, there are some cases where it has had a negative effect on EE globally. For example, studies show that too much visibility, information overload or ambiguous expectations of how one should participate digitally can lead to increased anxiety, decreased engagement or/and decreased performance (Yasir et al. 2017). This variety of outcomes illustrates how complex ESM is when influencing EE and illustrates the need for further research looking at how employees manage their social and emotional experiences in the daily business environment. To address research questions, open ended questions will allow the participants to provide responses, using words, terms, phrases and lived experiences on EE in banking institutions (Ozuem et al., 2024).

Conclusion and Limitations

The research findings can help organisations reflect more thoughtfully on how ESM shapes employees' everyday experiences, particularly around visibility, expectations, and communication culture. By understanding how employees interpret influence, identity, and engagement on these platforms, employers, leaders and communication teams can become more aware of the subtle pressures or unintended consequences that digital tools may create. The findings may not prescribe solutions but offer a basis for more informed, sensitive decision-making about digital communication practices, EE, and the wider banking institution environments.

With focus on employees within banking institutions, the research findings may reflect the specific culture, regulatory pressures, and communication norms of banking institutions and may not be easily transferable to other sectors or organisational settings. Adopting semi-structured interviews method of data collection means the insights will depend on what participants feel comfortable sharing, especially in workplaces where digital communication is closely monitored or highly formalised. Access to internal ESM data may also be limited, meaning the study will depend primarily on employees' interpretations rather than direct observation of platform activity. In majority of qualitative work, the researcher's own perspective and positionality may shape how the data is interpreted, even with careful reflexive practice (Collis & Hussey, 2014).

Future studies could build on this work by exploring how the use of ESM influences EE in other sectors in finance industry such as insurance, asset management or capital markets to explore whether the influence processes to be identified in banking sector manifest similarly or differently in other sectors within the same industry. Longitudinal research could also deepen understanding by examining how employees' interpretations and influence dynamics evolve as digital communication practices change over time. While this study focuses on SIT, future research could integrate complementary frameworks such as Social Identity Theory, Social Exchange Theory, Affordance Theory, or Organisational Communication Theories to broaden conceptual understanding of EE using ESM at workplace. Given that banking institutions operate globally, future studies could explore how cultural norms, regulatory environments, and communication expectations shape EE on ESM across different countries or regions.

REFERENCES

- Azemi, Y., Ozuem, W. (2026). *Paid search advertising across stages of the customer shopping journey: a shopping goal theory perspective*. *Information Technology & People*, 39(8), 32–49. doi: <https://doi.org/10.1108/ITP-03-2023-0223>.
- Bailey, C., Madden, A., Alfes, K., & Fletcher, L. (2017). The Meaning, Antecedents and Outcomes of Employee Engagement: A Narrative Synthesis. *International Journal of Management Reviews*, 19(1), 31–53.
- Basel Committee on Banking Supervision (2015). Corporate Governance Principles for Banks. *Banks for International Settlements*. Retrieved February 19, 2026, from <https://www.bis.org/bcbs/publ/d328.pdf>.
- Cao, X., Guo, X., Vogel, D., & Zhang, X. (2016). Exploring the Influence of Social Media on Employee Work Performance. *Internet Research*, 26(2), 529–545.
- Chen, J., Wang, Y., & Zhang, H. (2023). Enterprise Social Media Use and Employee Competencies: The Mediating Role of Knowledge Sharing. *Journal of Knowledge Management*, 27(3), 689–707.
- Collis, J., & Hussey, R. (2014). *Business Research: A Practical Guide for Undergraduate and Postgraduate Students (4th ed.)*. Palgrave Macmillan.
- Cropanzano, R., & Mitchell, M. S. (2005). Social Exchange Theory: An Interdisciplinary Review. *Journal of Management*, 31(6), 874–900.
- Davlembayeva, D., & Papagiannidis, S. (2026). *Social Influence Theory: A review*. In S. Papagiannidis (Ed.), *TheoryHub Book*. Newcastle University. <https://open.ncl.ac.uk> ISBN: 9781739604400
- Dunk-West, P., & Saxton, K. (2024). *Qualitative Social Research* (1st ed.). Routledge.
- Ewing, M., Men, L. R., & O’Neil, J. (2019). Using Social Media to Engage Employees: Insights from Internal Communication Leaders. *Public Relations Review*, 45(3), 1–9.
- Gallup. (2026). What is Employee Engagement, and How Do You Improve It? Retrieved February 18, 2026, from <https://www.gallup.com/workplace/285674/improve-employee-engagement-workplace.aspx>.
- Hu, R. (2020). COVID-19, Smart Work, and Collaborative Space: A Crisis-Opportunity Perspective. *Journal of Urban Management*, 9(3), 276–280.
- Kane, G. C., Alavi, M., Labianca, G., & Borgatti, S. P. (2014). What’s Different About Social Media Networks? A Framework and Research Agenda. *MIS Quarterly*, 38(1), 275–304.
- Keppler, S. M., & Leonardi, P. M. (2023). Building Relational Confidence in Remote and Hybrid Work Arrangements: Novel Ways to Use Digital Technologies to Foster Knowledge Sharing. *Journal of Computer-Mediated Communication*, 28(4).
- Lane, J. N., Leonardi, P. M., Contractor, N. S., & DeChurch, L. A. (2024). Teams in the Digital Workplace: Technology’s Role for Communication, Collaboration, and Performance. *Small Group Research*, 55(1), 139–183.
- Leonardi, P. M. (2013). When Does Technology Use Enable Network Change in Organizations? A Comparative Study of Feature Use and Shared Affordances. *MIS Quarterly*, 37(3), 749–775.
- Leonardi, P. M. (2017). The Social Media Revolution: Sharing and Learning in the Age of Leaky Knowledge. *Information and Organization*, 27(1), 47–59.

- Leonardi, P. M., Huysman, M., & Steinfield, C. (2013). Enterprise Social Media: Definition, History, and Prospects for the Study of Social Technologies in Organizations. *Journal of Computer-Mediated Communication*, 19(1), 1–19.
- Liu, D., Chen, Y., & Li, N. (2021). Tackling the negative impact of COVID-19 on work engagement and taking charge: A multi-study investigation of frontline health workers. *Journal of Applied Psychology*, 106(2), 185–198. doi:10.1037/apl0000851
- Martin, G., Parry, E., & Flowers, P. (2015). Do Social Media Enhance Employee Voice? *Human Resource Management Journal*, 25(4), 1–14.
- Men, L. R., O' Neil, J., & Ewing, M. (2020). Examining the Effects of Internal Social Media Usage on Employee Engagement. *Public Relations Review*, 46(2), 1–10.
- Mohiya, M. (2025). The Effect of Social Media on Employee Engagement: The Mediating Role of Job Satisfaction and Perceived Organizational Support. *Humanities & Social Sciences Communications*, 1.
- Murmura, F., & Bravi, L. (2021). Digitization and Sustainability: Smart Working as an ICT Tool to Improve the Sustainable Performance of Companies During the Covid-19 Pandemic. In *Digital Transformation in Industry* (pp. 97–108). Springer.
- Ozuem, W. (2025). *Digital marketing strategies for value co-creation: Models and approaches for online brand communities*. Cham, Switzerland: Palgrave Macmillan.
- Ozuem, W., Ranfagni, S., Willis, M., Salvietti, G., & Howell, K. (2024). Exploring the Relationship Between Chatbots, Service Failure Recovery and Customer Loyalty: A Frustration-Aggression Perspective. *Psychology & Marketing*, (10), 2253–2273.
- Ozuem, W., Willis, M., Ranfagni, S., & Omeish, F. (2025). Thematic Analysis in an Artificial Intelligence-Driven Context: A Stage-by-Stage Process. *International Journal of Qualitative Methods*, 24.
- Pavithra, V., Swapna, R., & Sushma, B. (2017). Exploring the Impact of Internal Social Media Usage on Employee Engagement. *SSRG International Journal of Humanities and Social Science*, 220–225.
- Pirzadeh, P., & Lingard, H. (2021). Working From Home During the COVID-19 Pandemic: Health and Well-Being of Project-Based Construction Workers. *Journal of Construction Engineering and Management*, (6).
- Pitafi, A. H. (2022). Enterprise Social Media as Enablers of Employees' Agility: The Impact of Work Stress and Enterprise Social Media Visibility. *Information Technology & Management*, 38(3), 1230–1253.
- Ployhart, R. E., Shepherd, W. J., & Strizver, S. D. (2021). The COVID-19 Pandemic and New Hire Engagement: Relationships with Unemployment Rates, State Restrictions, and Organizational Tenure. *Journal of Applied Psychology*, 106(4), 518–529.
- Rana, N. P., & Sharma, A. (2019). Adoption of Digital Technologies in Banking Sector: A Review. *International Journal of Information Management*, 45, 165–176.
- Ruck, K., Welch, M., & Menara, B. (2017). Employee Voice: An Antecedent to Organisational Engagement? *Public Relations Review*, 43(5), 904–914.
- Saks, A. M. (2006). Antecedents and Consequences of Employee Engagement. *Journal of Managerial Psychology*, 21(7), 600–619.
- Saraf, N., Bharati, P., & Ravichandran, T. (2022). Does Social Capital Arise from Enterprise or Public Social Media Use? A Model of Social Media Antecedents and Consequences. *Information Systems Frontiers*.

- Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research Methods for Business Students*. Pearson Education Limited.
- Schlagwein, D., & Hu, M. (2017). How and Why Organisations Use Social Media: Five Use Types and Their Relation to Absorptive Capacity. *Journal of Information Technology*, 32(2), 194–209.
- Song, S., Lee, J., Kim, Y., Sun, Y., Liu, Y., Zhang, Z., Hu, F. (2019). *IEEE international conference on communications (ICC)*.
- Taylor, S. J., Bogdan, R., & Devault, M. (2015). *Introduction to Qualitative Research Methods: A Guidebook and Resource*. John Wiley & Sons.
- Treem, J. W., & Leonardi, P. M. (2013). Social Media Use in Organizations: Exploring the Affordances of Visibility, Persistence, Editability, and Association. *Communication Yearbook*, 36, 143–189.
- Van Osch, W., & Steinfield, C. (2016). *Social Media in Strategic Management*. Emerald Group Publishing.
- Wang, Z., Hangeldiyeva, M., Ali, A., & Guo, M. (2022). *Effect of Enterprise Social Media on Employee Creativity: Social Exchange Theory Perspective*.
- Watanabe, C., Naveed, K., Neittaanmäki, P., & Fox, B. (2017). Consolidated Challenge to Social Demand for Resilient Platforms: Lessons from Uber's Global Expansion. *Technology in Society*, 48, 33–53.
- Yasir, M., Imran, M., & Irfan, M. (2017). Workplace Stress and Employee Outcomes: The Moderating Role of Social Media Usage. *Journal of Management Development*, 36(3), 1–12.
- Yin, R. K. (2018). *Case Study Research and Applications*. Design and Methods Sage.
- Zhang, X., Ma, L., Hao, F., Wang, G., & Zhang, G. (2024). Enterprise Social Media Use and Employee Creativity: Moderating Role of Innovative Culture. *International Journal of Human-Computer Interaction*, 40(24), 8447–8462.
- Zhou, Y., Chen, J., & Cheng, B. (2024). Platform Incentives, User Engagement and Knowledge Collaboration Performance in Online Knowledge Community: A Cross-Cultural Perspective. *Journal of Knowledge Management*, 28(10), 2940–2975.

DUAL AUTHORITY, DUAL IDENTITY: POWER NEGOTIATION AMONG BLACK WOMEN EXECUTIVES IN POST-APARTHEID SOUTH AFRICA

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ABSTRACT

Black women remain critically underrepresented in executive and top management positions in South Africa despite three decades of employment equity legislation, and organisations continue to bear a measurable performance cost for this gap. The aim of this paper is to explore the nuanced and often overlooked ways in which Black South African women executives navigate conflicting authority demands within both organisational and cultural contexts. It proposes a conceptual framework that illustrates this navigation process and highlights its implications for organisations. This inquiry is driven by both practical business considerations and scholarly interest. While much research on women in leadership focuses on barriers to reaching executive positions, there is a significant gap in understanding the structural pressures that Black women executives face once they attain these roles. This is especially relevant in environments where cultural kinship obligations sometimes clash with corporate governance expectations. Existing studies have investigated similar dynamics in other patriarchal societies but have acknowledged that their conclusions may not universally apply across different cultural settings. South Africa presents a unique landscape, characterised by its complex interplay of cultural obligations, employment equity legislation, King IV governance, and a growing Black digital media environment. In this context, the paper employs a conceptual research design that integrates various theoretical frameworks, such as role conflict theory, identity work, boundary theory, field-specific capital theory, social cognitive theory, and postcolonial leadership scholarship to develop an original analytical framework. Importantly, this study does not gather primary data; instead, it lays the groundwork for future empirical research to validate the proposed framework. The paper makes four contributions to management and communications scholarship. First, it extends power negotiation and identity frameworks to the South African cultural context, addressing a gap in existing literature. Second, it introduces the concept of authority domain conflict as a distinct organisational phenomenon with three specific conflict zones. Third, it positions high-reach digital media platforms as an undertheorised variable in organisational culture that actively reinforces the cultural scripts Black women executives must navigate. Fourth, it proposes actionable implications for human resource management, corporate governance, and organisational communications strategy.

Keywords: digital media, executive leadership, power negotiation, cultural authority, gender.

INTRODUCTION

South Africa has made significant strides in promoting gender equity through the Employment Equity Act 55 of 1998 and the King IV Report on Corporate Governance (Institute of Directors in Southern Africa, 2016). Yet women hold only 25.3% of top management positions in the private sector, and the representation of Black women is lower still (Commission for Employment Equity, 2024). JustShare (2023) found women in only 15% of CEO roles across JSE Top 40 companies. The business cost is real: top-quartile gender diversity at executive level is associated with a 27% greater likelihood of outperforming industry peers on economic profit (Hunt et al., 2018). Most scholarship on women in leadership addresses the barriers to reaching executive roles. Far less attention has been paid to what happens structurally once a Black South African woman has broken through. She does not enter a single, stable authority environment. She simultaneously occupies at least two: an organisational authority domain, where title, hierarchy, and fiduciary duty determine how power flows, and a cultural authority domain, where gender scripts, kinship obligation, and communal ritual operate on entirely different terms. These two domains are not complementary. They are

sometimes structurally incompatible, and navigating between them is not a matter of personal adjustment. It is a daily structural condition.

Poltera and Schreiner (2019) caution that the very terms 'women', 'leadership', and 'the African context' are contested and conceptually ambiguous, and that feminist theorists must resist their flattening. This paper takes that caution seriously: it does not treat Black South African women executives as a homogeneous category or African culture as a monolith. What it identifies is a structural problem produced at a specific intersection, the coexistence of two legally recognised authority systems in post-apartheid South Africa that were not designed to coexist. The Recognition of Customary Marriages Act 120 of 1998 gives full legal recognition to marriages concluded under African customary law, including lobola and kinship governance obligations. A woman who holds executive authority in a corporate environment is simultaneously, under this framework, a person whose household membership and social standing are partly constituted through cultural obligations that persist alongside, and sometimes directly conflict with, her corporate role. Digital media intensifies this structural problem. Lewis, Hussen, and Van Vuuren (2013), writing in *Feminist Africa*, demonstrate that digital and media platforms actively constitute the gendered identity scripts available to South African women: they are not neutral channels but spaces in which authority, womanhood, and belonging are continuously negotiated. In the current media environment, platforms such as Mzansi Magic circulate narratives that frame women executives as figures whose corporate authority is contested in domestic spaces, shaping the expectations that employees and stakeholders bring to their evaluation of women leaders in real organisations (MultiChoice Group, 2024). For communication management scholarship, this is not a peripheral observation. It is the mechanism that connects the organisational problem to the communication management intervention. This paper proposes the Dual Authority Navigation Framework (DANF). Three questions guide the inquiry: How do Black women executives in post-apartheid South Africa navigate competing authority demands? What conceptual framework best captures these authority conflicts? And what strategic implications does this hold for human resource management, governance, and organisational communications practice? The paper makes four original contributions to management, communication, and international business scholarship. First, it extends power negotiation and identity frameworks to the South African cross-cultural context, addressing a gap with direct relevance for multinational organisations operating across dual authority environments. Second, it introduces authority domain conflict as a distinct organisational phenomenon with three specific conflict zones. Third, it positions high-reach digital media as an undertheorised variable in organisational culture. Fourth, it proposes actionable implications for human resource management, governance, and communication strategy, grounded in six empirically testable research propositions.

THEORETICAL BACKGROUND

The DANF is built on four complementary theoretical pillars. This section explains each pillar's contribution and considers two additional perspectives that grounds the analysis without displacing the core architecture.

Role Conflict Theory and the Authority Incompatibility Problem

Katz and Kahn (1978) established that role conflict emerges when the expectations attached to different roles a person occupies are incompatible. Subsequent scholarship developed this primarily as a time-allocation problem between work and family. What has received far less theoretical development is role conflict arising where the incompatibility is not about time but about the very basis of authority. Role conflict theory provides the DANF's foundational logic, but requires extension: it must account for legally co-existing authority systems, not merely competing expectations within a single normative order. The Recognition of Customary Marriages Act (Republic of South Africa, 1998b) means cultural authority carries statutory weight that can interact directly with corporate governance decisions. This is a structural conflict.

Identity Work, Boundary Theory, and the Authority Legitimacy Boundary

Ibarra (1999) describes identity work as largely sequential: professionals consolidate a stable professional identity over time. The Black South African woman executive's experience suggests a different pattern, not a transition to stability, but a permanent condition of context-switching. Eagly and Carli (2007) extend this with the labyrinth metaphor; the DANF extends it further: the labyrinth walls reach well beyond the corporate environment. Ashforth,

Kreiner, and Fugate (2000) treat the home-work boundary primarily as temporal and spatial. The DANF reframes this as an authority legitimacy boundary, a line marking where one basis for holding power ends and another begins. Crossing it requires no change of location. It can happen across a dinner table or during a telephone call. Together, identity work and boundary theory explain how women manage continuous domain-switching and why the cognitive costs compound over time, a dynamic that African feminist scholars have consistently linked to the particular double burden experienced by Black professional women in post-apartheid institutions (Poltera and Schreiner, 2019).

Field-Specific Capital and Capital Discontinuity

Bourdieu (1986) argues that authority, prestige, and legitimacy are field-specific: what counts as powerful capital in one field may carry no weight, or negative weight, in another. An executive title is substantial capital in the corporate field. In a cultural field that distributes authority according to gender, age, and kinship position, the same title may be received as irrelevant. Kandiyoti (1988) captures the strategic dimension in her concept of patriarchal bargains. The DANF introduces capital discontinuity: the structural gap between the authority capital an executive holds in the organisational field and the different currency required in the cultural field. This mechanism explains why the executive's professional standing does not protect her from cultural challenge, and why organisations that do not account for this dynamic misread what is driving exit and governance risk.

Postcolonial Leadership, Ubuntu, and the Dual Obligation

Nkomo (2011) argues that African leadership experiences require frameworks that move beyond Western assumptions. Nkomo and Ngambi (2009) identify prevailing leadership theories as insufficiently attentive to the African cultural context. Mangaliso (2001) identifies Ubuntu as a genuine source of management insight around relational leadership and collective obligation. The DANF does not dispute the value of Ubuntu. What it observes is that collective obligation can operate in multiple ways: constructively, when it fosters inclusive decision-making, and restrictively, when invoked to subordinate individual autonomy on the basis of gender. Making this distinction analytically visible, rather than treating Ubuntu as uniformly positive or constraining, is part of the DANF's contribution to postcolonial scholarship. Postcolonial scholarship further highlights that the gendered authority scripts Black women executives navigate are not cultural constants. They are actively reproduced and circulated through media, which connects this pillar directly to the paper's communication management contribution.

Complementary Perspectives: Intersectionality and Institutional Theory

Crenshaw's (1989) intersectionality deepens understanding of why Black women executives face a qualitatively different authority challenge than either white women executives or Black male executives. The authority domain conflict the DANF describes is specifically constituted by the intersection of race, gender, and cultural obligation in the post-apartheid South African context; Lewis, Hussen, and Van Vuuren (2013) demonstrate how this intersection shapes the digital and media environments in which South African women negotiate identity and representation. DiMaggio and Powell's (1983) institutional theory provides a complementary structural lens: corporate governance frameworks, performance management systems, and leadership development programmes were designed within a culturally specific model of the executive that does not account for the dual authority environment this paper describes. Institutional theory explains why organisations reproduce these blind spots even when committed to equity in principle, and why structural solutions are required rather than individual-level interventions alone.

THE SOUTH AFRICAN BUSINESS AND CULTURAL CONTEXT

The Cultural and Legal Authority Environment

South Africa's cultural environment is characterised by the coexistence of formal legal frameworks with deeply embedded cultural authority structures. The Recognition of Customary Marriages Act 120 of 1998 (Republic of South Africa, 1998b) gives full legal standing to marriages under African customary law. A CEO who holds fiduciary

responsibility for major organisational decisions is simultaneously, under customary law, a person whose authority in domestic and community spaces is governed by an entirely separate system. This incompatibility is not resolved by constitutional gender equality provisions alone. It is lived daily in decisions about property, employment of family members, cultural participation, and household governance. Poltera and Schreiner (2019) argue that feminist theorists must attend precisely to the institutional and cultural specificities that shape women's leadership in African contexts, rather than importing universal frameworks. The DANF is a direct response to that call.

Digital Media, Social Cognitive Theory, and Organisational Culture

Schein (1985) established that organisational culture is embedded in the broader societal culture in which organisations sit. Lewis, Hussen, and Van Vuuren (2013) demonstrate that digital media platforms actively shape and contest the gendered identities available to South African women: far from being neutral distribution channels, they function as constitutive spaces for the production and circulation of authority scripts. Mhlambi (2011) traces how Black South African television dramas transmit cultural scripts about gender, authority, and family obligation to mass audiences. In the current environment, *Mzansi Magic*, reaching over two million daily viewers in the core professional demographic (MultiChoice Group, 2024), represents a significant organisational communications variable. Bandura's (2001) social cognitive theory demonstrates that people absorb behavioural norms through media exposure, not only through direct experience. The cultural scripts circulating through these narratives, which frame women executives as figures whose authority is contested in domestic spaces, shape the expectations that employees and stakeholders bring to their evaluation of women leaders in real organisations. This is a communication management problem with an organisational solution.

THE DUAL AUTHORITY NAVIGATION FRAMEWORK

Framework Overview and Scholarly Contribution

The DANF maps the structural conditions under which Black South African women executives experience authority domain conflict. It identifies two authority domains, three conflict zones, three navigation strategies, and the cumulative organisational costs of continuous domain navigation. Figure 1 presents the full framework.

What distinguishes the DANF from existing frameworks is threefold. First, while role conflict theory and labyrinth models describe competing demands, the DANF identifies the structural mechanism, capital discontinuity across legally co-existing authority domains, that explains why those demands cannot be managed through individual skill-building alone. Second, unlike boundary theory, which treats the home-work boundary as primarily spatial or temporal, the DANF introduces the authority legitimacy boundary as a distinct analytical category. Third, by incorporating digital media as an active circulator of gendered authority scripts, the DANF connects organisational culture research to communication management scholarship in a way that existing leadership frameworks have not. This third contribution is particularly significant for a paper positioned across management and media studies: it theorises digital media not as background cultural noise but as an active organisational input, making communication strategy a management lever with measurable authority consequences.

Figure 1: Dual Authority Navigation Framework (DANF) (Designed by Author (2026)).

DUAL AUTHORITY NAVIGATION FRAMEWORK (DANF)		
DOMAIN A Organisational Authority	↔	DOMAIN B Cultural Authority
• Formal title and hierarchy • Fiduciary duty • Corporate governance • Employment law • KPI accountability		• Cultural gender scripts • Kinship obligation • Ubuntu collective claims • Family hierarchy • Ritual protocol
THREE AUTHORITY CONFLICT ZONES		
Zone 1: Kinship-Fiduciary Conflict: When family members enter the professional environment as employees or vendors, creating simultaneous and incompatible obligations that existing governance frameworks were not designed to resolve.		
Zone 2: Instruction Authority Conflict: When the executive must direct someone who holds a higher position in the cultural hierarchy, the same words carry different authority depending on which domain is active for the recipient.		
Zone 3: Space and Resource Conflict: When cultural ritual or kinship practice asserts claims over spaces or resources belonging to the executive's professional domain, two incompatible ownership frameworks become simultaneously active.		
NAVIGATION STRATEGIES AND ORGANISATIONAL COSTS		
Strategy	Description	Organisational Cost
Strategic Code-Switching	Adjusting authority register as domain context shifts	Cognitive load, identity fragmentation, decision fatigue
Selective Compliance	Honouring cultural scripts partially to preserve belonging	Psychological stress, perceived inconsistency, boundary erosion
Domain Separation	Maintaining strict boundaries between professional and cultural life	Family conflict, community sanction, career exit risk
CUMULATIVE BUSINESS IMPACT: Executive turnover Governance vulnerability Leadership pipeline loss Organisational culture drag		

Domain A: Organisational Authority

Domain A encompasses the formal authority environment of the organisation. Authority derives from title, hierarchical position, fiduciary accountability, and governance frameworks including King IV (Institute of Directors in Southern Africa, 2016). McKinsey and LeanIn.Org (2023) document how women in executive positions face double standards and have their decisions questioned at significantly higher rates than male peers. These are Domain A barriers for which organisations have at least a partial framework: HR policy, diversity programmes, and unconscious bias training. There is currently no equivalent organisational framework for Domain B.

Domain B: Cultural Authority

Domain B operates on entirely different terms. Authority here is conferred by gender, age, kinship position, and the fulfilment of culturally prescribed obligations. Ubuntu, as Mangaliso (2001) describes, positions the individual within a network of communal relationships whose collective membership carries both support and claim. The Recognition of Customary Marriages Act (Republic of South Africa, 1998b) formalises the legal standing of these obligations, meaning they are not merely social expectations but carry statutory weight that can interact directly with corporate governance decisions. Organisations have not addressed the fact that Domain B follows the executive into professional life through kinship employment decisions, ritual participation, and family expectations about how economic elevation should benefit the wider community.

The Three Conflict Zones

- **Zone 1, Kinship-Fiduciary Conflict**, emerges when the executive must simultaneously honour kinship obligation and fiduciary duty, most acutely when family members enter the professional space as employees or vendors. She navigates a structural dilemma that Western corporate governance frameworks, including King IV, were not designed to accommodate. The conflict of interest guidance is principled but silent on the specific texture of this dilemma when kinship obligation carries parallel legal standing under customary law (Republic of South Africa, 1998b). From an institutional theory perspective, the governance architecture itself encodes assumptions about culturally neutral decision-making that do not hold in this context.
- **Zone 2, Instruction Authority Conflict**, describes the situation in which the executive must exercise professional authority over a person who occupies a culturally superior position in Domain B. The same words carry different authority depending on which domain is active for the recipient. A CEO directing a subordinate who is also her spouse or male elder is simultaneously navigating a cultural script that positions her as the one who receives instruction, not gives it. The executive cannot control which domain is active in her recipient's interpretive frame at any given moment. This conflict zone is specific to the intersection of gender and cultural obligation in the South African context: a Black male executive in the same organisation does not encounter it in the same form.
- **Zone 3, Space and Resource Conflict**, arises when cultural ritual or kinship practice asserts claims over spaces or resources belonging to the executive's professional or personal domain. Two incompatible frameworks become simultaneously active: the executive's legally established ownership, and the cultural claim that her resources are communally available by virtue of kinship membership. Neither framework is internally inconsistent. They were not designed to coexist, and in the absence of a shared resolution mechanism, conflict is managed through interpersonal confrontation rather than structural guidance.

Navigation Strategies and Their Costs

- **Strategic code-switching** involves adjusting authority register, communication style, and self-presentation to match whichever domain is currently active. Yoshino and Smith (2013) found that the majority of respondents reported pressure to cover aspects of their identity at work, with lower engagement and higher intent to leave. A 2023 follow-up confirmed that covering persists a decade later, with Black women among the groups reporting the highest rates (Deloitte DEI Institute and Meltzer Center, 2023). For Black South African women executives, code-switching extends across both domains and amplifies the psychological cost beyond what the original covering literature anticipated.
- **Selective compliance** involves honouring cultural scripts partially to preserve social belonging while maintaining core professional function. This strategy is inherently unstable, because its boundaries must be renegotiated continuously as the executive's profile, income, or community expectations shift. The psychological cost of managing these moving targets is a documented contributor to executive burnout (Schein, 1985).
- **Domain separation** involves maintaining strict boundaries between professional and cultural life, limiting family access to professional resources and declining cultural obligations that conflict with professional responsibilities. This is functionally the most effective strategy for protecting professional performance but carries the highest social cost: exclusion from kinship networks, community sanction, and relationship loss. SHRM (2022) estimates replacing an executive costs between 50 and 200% of annual salary. If domain separation is a primary driver of voluntary exit among Black women executives, the business case for addressing it is direct and urgent.

BUSINESS AND ORGANISATIONAL IMPLICATIONS

Human Resource Management

South African executive development programmes for women almost universally address Domain A barriers. None currently address Domain B. Executive development should incorporate culturally contextualised authority navigation content, including coaching on the psychological costs of continuous domain-switching and structured guidance on handling kinship-professional conflicts with governance integrity. This is not an invitation for organisations to involve themselves in employees' family structures. It is a recognition that the executive development function has a blind spot with measurable retention consequences.

Retention and succession frameworks should explicitly account for the pressures identified in the DANF, including governance training on kinship-fiduciary conflicts and structured mentoring from executives who have navigated similar conditions. SHRM (2022) estimates that replacing an executive costs between 50 and 200% of annual salary: if a significant driver of voluntary exit is unmanaged dual authority navigation stress, organisations that address it will retain talent they have spent years developing. Mentoring and sponsorship structures should be designed to include peers who have navigated dual authority environments. Peer mentoring carries a form of knowledge transfer that broader corporate programmes cannot replicate, and sponsorship, meaning active advocacy from senior leaders with institutional capital to deploy, is particularly important where code-switching costs (Deloitte DEI Institute and Meltzer Center, 2023) reduce the executive's own visibility and voice.

Executive coaching targeting identity work, boundary management, and the psychological load of domain-switching should be standard, not remedial. Psychological wellbeing provision must be culturally competent: the cognitive and emotional costs of continuous domain-switching are structurally produced, not individually pathological. Diversity and inclusion strategy should be redesigned to address authority domain conflict rather than targeting only Domain A representation metrics.

Corporate Governance

King IV (Institute of Directors in Southern Africa, 2016) is a substantive governance framework whose guidance on conflict of interest and fiduciary duty is well developed. What it does not address is the specific governance dilemma arising when an executive's decision-making is shaped by kinship obligations carrying parallel legal standing under the Recognition of Customary Marriages Act (Republic of South Africa, 1998b). A governance framework that treats executives as culturally neutral actors is not fit for the South African context. The Institute of Directors in Southern Africa should consider supplementary guidance addressing kinship-fiduciary conflicts within the customary cultural context. Ethical decision-making in Zone 1 conflicts is not a matter of choosing between right and wrong but of navigating two legitimate but incompatible obligation systems without adequate structural guidance.

Organisational Communication Strategy

Organisations operating in South Africa without a communication strategy for addressing the gendered cultural authority norms their employees absorb from digital media are missing a significant management lever. Lewis, Hussen, and Van Vuuren (2013) establish that digital platforms actively constitute the identity scripts available to South African women, functioning not merely as information channels but as spaces where authority and belonging are continuously produced and contested. Internal leadership visibility campaigns, the deliberate representation of women executives as credible and authoritative in corporate storytelling, and communications that normalise women's executive authority are organisational culture interventions with measurable authority consequences (Bandura, 2001; Schein, 1985).

The DANF's communication management contribution is specific: it frames internal and external communication strategy as a response to the gendered authority scripts that circulate at scale through platforms such as Mzansi Magic. Organisations cannot control what their employees watch. They can actively produce counter-narratives through their own communications infrastructure, and those counter-narratives affect the cultural expectations employees bring to their evaluation of women leaders. For digital media platforms, Porter and Kramer's

(2011) shared value concept applies: narratives that depict women executives navigating dual authority conflict with agency align commercial interest with the broader social interest of shifting cultural authority scripts in the professional environment.

LIMITATIONS AND FUTURE RESEARCH PROPOSITIONS

This paper reflects the scope and constraints of conceptual research. The DANF is proposed from literature and reasoning and is intended as a provisional framework that invites empirical examination. Its propositions are internally coherent but remain to be tested. The study is contextually bounded: it engages a specific intersection of South African cultural obligation, corporate governance regimes, and digital media environments, not directly generalisable to other settings without careful adaptation. As noted in comparable work by Suharti and Hasan (2026), the expression of these dynamics is deeply shaped by cultural context.

P1: Black South African women executives who report higher frequency of authority domain conflict will demonstrate higher rates of role-related stress and lower organisational commitment than those reporting lower conflict frequency.

P2: Among the three navigation strategies, domain separation will be most strongly associated with voluntary executive exit intention, while strategic code-switching will be most strongly associated with psychological burnout.

P3: The frequency and severity of Zone 1 (Kinship-Fiduciary Conflict) will be moderated by the quality of corporate governance training an executive receives, specifically training that addresses culturally contextualised conflict of interest scenarios.

P4: Organisations that implement culturally contextualised executive coaching and peer mentoring targeting dual authority navigation will report lower voluntary exit rates among Black women executives compared to those offering generic programmes.

P5: Increased exposure to digital media narratives that contest women's executive authority will be positively associated with elevated subordinate resistance to women's authority cues in organisational settings.

P6: Internal communication strategies that deliberately position women executives as credible and authoritative will be associated with more positive subordinate attributions of women's leadership legitimacy over time.

The next phase of research is qualitative, involving semi-structured interviews with Black South African women executives across sectors and levels of seniority, to assess the extent to which the identified conflict zones and navigation strategies resonate with lived experience. A subsequent quantitative study could examine the relationship between digital media visibility and managerial perceptions of women executives, providing empirical grounding for the framework's broader communication management implications.

CONCLUSION

South Africa has constructed the formal architecture for gender equity in the workplace. What management scholarship has not yet provided is a framework for understanding what Black women executives experience structurally once they reach the top. This paper has argued that the missing piece is the coexistence of two authority systems whose rules are structurally incompatible, and the daily requirement to navigate between them without adequate institutional support, governance guidance, or organisational acknowledgement.

The Dual Authority Navigation Framework gives HR practitioners, governance bodies, and communications strategists a way of seeing this problem that moves beyond familiar diversity language. Authority domain conflict is a business problem. It costs organisations executives they have invested in. It produces governance vulnerabilities they have not anticipated. And it is reinforced through gendered cultural narratives that circulate at scale through digital media, a dynamic that positions communication management as a strategic function in the response, not merely

a support one. Drawing on African feminist scholarship, particularly the work of Lewis, Hussen, and Van Vuuren (2013) and Poltera and Schreiner (2019), the paper insists that digital media platforms are not passive transmitters of culture but active constitutors of the gendered scripts that Black women executives must navigate daily. Addressing dual authority navigation requires a framework and structure. This paper has made a start.

REFERENCES

- Ashforth, B. E., Kreiner, G. E., & Fugate, M. (2000). All in a day's work: Boundaries and micro role transitions. *Academy of Management Review*, 25(3), 472-491. <https://doi.org/10.5465/AMR.2000.3363315>
- Bandura, A. (2001). Social cognitive theory of mass communication. *Media Psychology*, 3(3), 265-299. https://doi.org/10.1207/S1532785XMEP0303_03
- Bourdieu, P. (1986). The forms of capital. In J. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241-258). Greenwood.
- Commission for Employment Equity. (2024). 24th Annual Report 2023/24. Department of Employment and Labour. <https://www.labour.gov.za/DocumentCenter/Reports/Annual%20Reports/Employment%20Equity/2024/24th%20Commission%20for%20Employment%20Equity%20Annual%20Report.pdf>
- Crenshaw, K. (1989). Demarginalizing the intersection of race and sex: A Black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. *University of Chicago Legal Forum*, 1989(1), 139-167.
- Deloitte DEI Institute & Meltzer Center for Diversity, Inclusion, and Belonging. (2023). Uncovering culture. Deloitte LLP. <https://www2.deloitte.com/us/en/pages/about-deloitte/articles/press-releases/deloitte-deiinstitute-uncoveringculture.html>
- DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48(2), 147-160. <https://doi.org/10.2307/2095101>
- Eagly, A. H., & Carli, L. L. (2007). Women and the labyrinth of leadership. *Harvard Business Review*, 85(9), 62-71.
- Hunt, V., Prince, S., Dixon-Fyle, S., & Yee, L. (2018). Delivering through diversity. McKinsey & Company. <https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/delivering-through-diversity>
- Ibarra, H. (1999). Provisional selves: Experimenting with image and identity in professional adaptation. *Administrative Science Quarterly*, 44(4), 764-791. <https://doi.org/10.2307/2667055>
- Institute of Directors in Southern Africa. (2016). King IV report on corporate governance for South Africa. IoDSA. <https://www.iodsa.co.za/page/kingiv>
- JustShare. (2023). Women in leadership: Assessing gender equality in the JSE Top 40. https://justshare.org.za/wp-content/uploads/2023/09/230912_Women-in-leadership-JSE-Top-40_final.pdf
- Kandiyoti, D. (1988). Bargaining with patriarchy. *Gender & Society*, 2(3), 274-290. <https://doi.org/10.1177/089124388002003004>
- Katz, D., & Kahn, R. L. (1978). *The social psychology of organizations* (2nd ed.). Wiley.
- Lewis, D., Hussen, T. S., & Van Vuuren, M. (2013). Exploring new media technologies among young South African women. *Feminist Africa*, 18, 43-63.
- Mangaliso, M. P. (2001). Building competitive advantage from Ubuntu: Management lessons from South Africa. *Academy of Management Executive*, 15(3), 23-33. <https://doi.org/10.5465/ame.2001.5229453>

McKinsey & Company & LeanIn.Org. (2023). Women in the workplace 2023. <https://www.mckinsey.com/featured-insights/diversity-and-inclusion/women-in-the-workplace-2023>

Mhlambi, I. J. (2011). A world in creolization: Inheritance politics and the ambiguities of a very modern tradition in two Black South African TV dramas. *South African Journal of African Languages*, 31(2), 175-184. <https://doi.org/10.2989/02572117.2011.574970>

MultiChoice Group. (2024). Annual report 2024. <https://www.multichoice.com/investors/annual-reports/>

Nkomo, S. M. (2011). A postcolonial and anti-colonial reading of African leadership and management in organization studies: Tensions, contradictions and possibilities. *Organization*, 18(3), 365-386. <https://doi.org/10.1177/1350508411398731>

Nkomo, S. M., & Ngambi, H. (2009). African women in leadership: Current knowledge and a framework for future studies. *International Journal of African Renaissance Studies*, 4(1), 49-68. <https://doi.org/10.1080/18186870903102014>

Poltera, J., & Schreiner, J. (2019). Problematising women's leadership in the African context. *Agenda*, 33(1), 9-20. <https://doi.org/10.1080/10130950.2019.1613057>

Porter, M. E., & Kramer, M. R. (2011). Creating shared value. *Harvard Business Review*, 89(1/2), 62-77.

Republic of South Africa. (1998a). Employment Equity Act 55 of 1998. Government Printer.

Republic of South Africa. (1998b). Recognition of Customary Marriages Act 120 of 1998. Government Printer. <https://www.justice.gov.za/legislation/acts/1998-120.pdf>

Schein, E. H. (1985). *Organizational culture and leadership*. Jossey-Bass.

Society for Human Resource Management. (2022). Retaining talent: A guide to analyzing and managing employee turnover. SHRM. <https://www.shrm.org/topics-tools/tools/toolkits/retaining-talent>

Suharti, S., & Hasan, A. B. P. (2026). Negotiating power and identity in female leadership within patriarchal organizational cultures. *Dinasti International Journal of Education Management and Social Science*, 7(4), 3734-3744. <https://doi.org/10.38035/dijemss.v7i4.6283>

Yoshino, K., & Smith, C. (2013). Uncovering talent: A new model of inclusion. Deloitte University Leadership Center for Inclusion. https://www.lcld.com/wp-content/uploads/2023/06/Uncovering_Talent_Deloitte.pdf

FROM INVISIBLE BRIDGES TO EMBEDDED ECOSYSTEMS: RETHINKING UNIVERSITY HUBS AS ENGINES OF YOUTH ENTREPRENEURSHIP IN SOUTH AFRICA

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ABSTRACT

This conceptual paper addresses South Africa's persistent youth unemployment challenge by proposing an Embedded University Hub (EUH) Model. While existing business development support (BDS) is characterised by fragmentation and accessibility barriers, the EUH model repositions universities as strategic intermediaries within the entrepreneurship ecosystem. By integrating mentorship, interdisciplinary collaboration and capital linkages into the institutional fabric, the model shifts the theoretical focus from resource scarcity to access architecture. The paper further theorises 'embedded visibility' as a necessary condition for ensuring that support reaches intended beneficiaries. In doing so, it advances testable propositions and policy implications for improving referral coordination and for converting entrepreneurial potential into sustainable, job-creating ventures.

Keywords: youth entrepreneurship, university hubs, business development support, entrepreneurship ecosystem, South Africa.

INTRODUCTION

South Africa continues to grapple with one of the world's most persistent and severe unemployment crises, with overall rates near 30% and the youth unemployment rate above 60% (Statistics South Africa 2025a, 2025b; Habiyaemye et al., 2022; Modise, 2025; World Bank, 2025). The crisis is rooted in structural issues such as lingering inequalities (Bundy, 2020), weak industrial job creation (Mncayi & Shuping, 2021) and growing skill mismatches (Habiyaemye et al., 2022). Unlike many African countries, South Africa's informal sector is relatively small, with just 18-20% of employment, thus limiting its ability to absorb labour (Asmal et al., 2024; Statistics South Africa, 2025d). Youth (ages 15-24) suffer the most, with unemployment at 62.4% in Q1 2025 and 62.2% in Q2 2025 (Statistics South Africa, 2025a, 2025c). Key contributing factors include mismatches between what education supplies and what employers need (Graham et al., 2019; Matabane et al., 2024; Swiss South African Cooperation Initiative 2024), limited work experience (De Jongh et al., 2024), and exclusion from professional networks, especially in rural and township areas (Mseleku, 2025). These dynamics create a "youth unemployment trap" (Yiannakaris, 2019, p. 33), where systemic inequalities, skills deficits and weak networks lock young South Africans out of meaningful work (Habiyaemye et al., 2022; Mseleku, 2022; Vorvornator & Midiniso, 2025).

Given the scale of this crisis, entrepreneurship has been promoted as a key policy tool for job creation and economic growth (Mahlaole & Malebana, 2021; Bowmaker-Falconer et al., 2023; Ebewo et al., 2025). Accordingly, South Africa has invested heavily in entrepreneurship education, incubation and small-business development via agencies and programmes (OECD, 2020; Department of Trade, Industry and Competition [DTIC], 2022). However, despite the presence of many initiatives, including those offered by the Small Enterprise Finance Agency (SEFA), the Small Enterprise Development Agency (SEDA), the National Youth Development Agency (NYDA), university hubs and donor accelerators, empirical evidence suggests that their development impact remains weak (Bowmaker-Falconer & Herrington, 2020; SEFA, 2023, 2024). For instance, SEFA's loan scheme has high default rates and limited reach among micro/informal firms (SEFA, 2023, 2024). Evaluations of SEDA show weak monitoring, fragmented delivery and misaligned training (Maluleke, 2014; Madisha, 2023; Mudau, 2024). Research on NYDA found short-

term self-employment gains but few scalable long-term businesses, due to weak mentorship, limited market access and administrative inefficiencies (Fotoyi, 2022; NYDA, 2023, 2024). University innovation hubs also show uneven outcomes, lacking resources, technical support and strong links to firm performance (Munnik, 2021; Matthee & Solomon, 2025). Data from the Global Entrepreneurship Monitor (GEM) South Africa also indicated a shift toward necessity-driven start-ups and a drop in early-stage activity compared to pre-pandemic levels, thus signalling poor translation of entrepreneurial intent into sustainable ventures (Herrington et al., 2017; Bowmaker-Falconer et al., 2023).

This paradox raises a fundamental question: why does a context with extensive business development support (BDS) infrastructure still struggle to create visible and sustainable entrepreneurial pathways for young people? Existing studies suggest that the problem is not only the availability of support, but the accessibility, visibility and coordination of that support, especially for youth outside major cities, elite institutions and established networks (Khoza & Galawe, 2021; Ismail et al., 2024; Ofosu-Appiah et al., 2025). This paper therefore argues that South Africa's youth entrepreneurship challenge should be understood not simply as a resource gap, but as an access architecture problem. Universities provide a useful institutional site for addressing this problem because they concentrate youth talent, ideas, legitimacy and potential ecosystem linkages, yet their entrepreneurship structures often remain peripheral rather than embedded in everyday institutional life (Ramchander, 2019; Ismail et al., 2024).

To address this gap, this paper develops and proposes an Embedded University Hub (EUH) Model, a conceptual framework that positions universities as central brokers in youth entrepreneurship development. In this model, university hubs function not merely as internal incubators for enrolled students but as embedded conduits that curate external resources, facilitate interdisciplinary and cross-campus collaboration, and build trusted pathways to external partners such as private funders, government agencies, NGOs and regulatory bodies. By embedding BDS into the fabric of campus life, hubs can shift from being marginal to becoming the nerve centres of youth entrepreneurship development. Hence, the contribution of this paper is twofold. Firstly, it reframes the role of universities in entrepreneurship development by moving them from peripheral actors to central access brokers that connect talent with opportunity. Secondly, it introduces testable propositions that highlight how embedding hubs, enabling cross-faculty/campus collaboration and strengthening partnerships can create validated ventures with stronger survival prospects and broader economic impact. In doing so, the paper advances the debate from one focused narrowly on resource scarcity toward one centred on access architecture, thus offering a new lens for conceptualising youth entrepreneurship in South Africa and beyond.

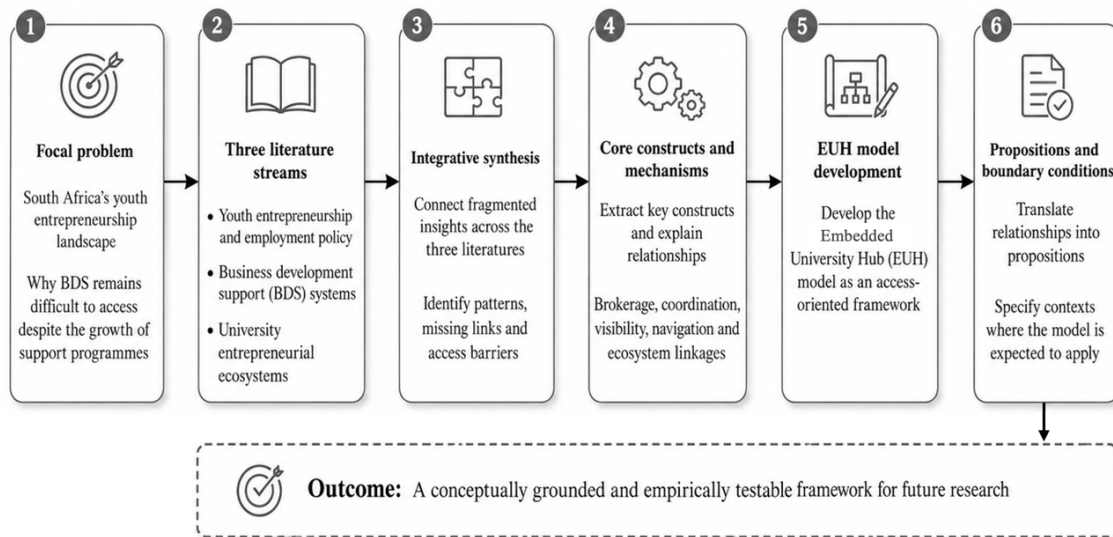
CONCEPTUAL DEVELOPMENT APPROACH

This paper adopted a conceptual and structured theory-building approach, an established method in social science research and one commonly used in management and entrepreneurship studies (Whetten, 1989; Bacharach, 1989; Jaakkola, 2020). Conceptual work is appropriate when the aim is to clarify a focal problem, integrate dispersed insights, and develop a coherent explanation that can later be operationalised and tested empirically (Whetten, 1989; Torraco, 2005; Gilson & Goldberg, 2015; Jaakkola, 2020). In the theory-building tradition, a strong conceptual contribution goes beyond description by clarifying core constructs and explaining the relationships and mechanisms that link them (Whetten, 1989; Bacharach, 1989; Jaakkola, 2020). It explains the “why” and “how” by specifying key constructs, the relationships between them and the logic that connects them (Whetten, 1989; Bacharach, 1989).

Following this logic, this paper begins by defining the focal problem in South Africa's youth entrepreneurship landscape, with specific attention to why BDS can remain difficult to access even when the number of programmes increases. It then develops an integrative synthesis across youth entrepreneurship and employment policy, BDS systems and university entrepreneurial ecosystems. Integrative synthesis is a recognised route for building new conceptual frameworks because it helps connect ideas across literatures that usually sit apart, and it allows researchers to identify mechanisms and missing links (Torraco, 2005; Jaakkola, 2020). The conceptual development process adopted in this paper is summarised in Figure 1. As shown in Figure 1, the model was developed through a staged theory-building process that moves from problem clarification and literature integration to construct development, proposition formulation and boundary specification. Conceptual development in this paper was therefore not treated as an informal narrative exercise, but as a deliberate process of problem clarification, literature integration and model construction. The literature was selected on the basis of its relevance to three interrelated bodies of knowledge: youth entrepreneurship and employment, business development support, and university entrepreneurial ecosystems. Priority

was given to studies and policy-oriented sources that helped explain access barriers, support fragmentation, institutional intermediation and ecosystem coordination.

Figure 1: Theory-building process used to develop the EUH model.



Source: Authors' own illustration based on reviewed conceptual and theory-building literature.

This approach is consistent with conceptual scholarship, where the aim is not simply to exhaust every available study, but to use relevant and theoretically meaningful literature to clarify concepts, connect fragmented debates and develop propositions that extend existing understanding (Whetten, 1989; Torraco, 2005; Gilson & Goldberg, 2015; Jaakkola, 2020). From this synthesis, the paper extracts core constructs and mechanisms and integrates them into the EUH model. The model is strengthened by propositions, since propositions are a standard way to translate conceptual relationships into statements that can be operationalised and tested in future studies (Whetten, 1989; Colquitt & Zapata-Phelan, 2007). In this sense, the propositions do not merely summarise the literature. They specify expected relationships between the university hub function, access to BDS, entrepreneurial capabilities and youth entrepreneurship outcomes. This makes the model open to future empirical assessment and reduces the risk of presenting the framework as a purely descriptive or normative argument.

To strengthen clarity, credibility and testability, this paper also states boundary conditions. This is important because a theory is stronger when it specifies where it applies and where it may not apply, rather than implying it explains everything (Whetten, 1989; Bacharach, 1989). The EUH model is therefore positioned for contexts where universities have, or can reasonably develop, a hub function that enables them to broker relationships with external ecosystem actors such as funders, incubators, government agencies and industry. While the model is motivated by South Africa's conditions, the logic is framed at the level of ecosystem design and access architecture, which makes it transferable to similar settings where support systems are fragmented and young entrepreneurs face visibility and navigation constraints (Jaakkola, 2020; Guerrero et al., 2021; Wurth et al., 2023; Ofosu-Appiah et al., 2025).

The value of the EUH model therefore lies in its ability to organise dispersed insights into a coherent explanation of how universities can function as access-oriented intermediaries within youth entrepreneurship ecosystems. Rather than presenting universities only as providers of entrepreneurship education, the model positions them as coordinating platforms that can reduce information gaps, improve visibility, connect young entrepreneurs to external support actors and strengthen the movement from entrepreneurial intention to venture development. In this way, the model makes a theoretical contribution by extending university entrepreneurial ecosystem thinking into the specific problem of BDS access and youth entrepreneurship support. At the same time, the propositions make the model empirically testable, allowing future studies to examine the relationships between university hub functions, access to BDS, entrepreneurial capabilities and youth venture outcomes.

LITERATURE REVIEW

Entrepreneurship as a Policy Response

Faced with the escalating youth unemployment crisis, entrepreneurship has been consistently advanced as a policy solution in South Africa, with institutional interventions such as entrepreneurship education, incubation and small-business support being positioned as critical tools for economic participation, youth empowerment and job creation (OECD, 2020; DTIC, 2022; Mahlaole, 2021; Mncwango & Adanlawo, 2025). The South African government, along with donor agencies, has invested in a range of interventions, including but not limited to entrepreneurship education, seed funding, incubation and targeted support for small, medium and micro-enterprises (SMMEs) (DTIC, 2022; OECD, 2020). Agencies such as SEFA, NYDA, Department of Small Business Development (DSBD) and SEDA, alongside broader initiatives including the National Empowerment Fund (NEF), the Technology Innovation Agency (TIA) and the DTIC, have all been tasked with reducing barriers for youth-led enterprises (SME South Africa, 2022). However, empirical evidence has presented mixed outcomes of these interventions (Maluleke, 2014; Kelly et al., 2021; Fotoyi, 2022; NYDA, 2019, 2022; Pheiffer & Mphidi, 2024; Rungani, 2025; Basson & Omoruyi, 2025). For instance, NYDA's grant and voucher programmes generate short-term self-employment but few scalable ventures due to weak mentorship, poor market access and administrative inefficiencies (Fotoyi, 2022; NYDA, 2019, 2022). SEDA's business advisory services are hindered by weak monitoring, fragmented delivery and inconsistent support quality (Maluleke, 2014; Kelly et al., 2021; Rankhumise & Muzanenhano, 2025). Evaluations of SEFA's financial support similarly show that it has expanded access but continues to face blockages, high defaults and limited post-financing support (Pheiffer & Mphidi, 2024). Studies consistently highlight weak follow-up, poor mentorship, limited value-chain integration and low accountability (Rungani, 2025; Basson & Omoruyi, 2025). These findings reveal a persistent implementation gap: despite major policy and financial commitments, fragmented coordination and weak aftercare continue to constrain the growth of durable, opportunity-driven ventures.

Business development support in South Africa

South Africa's BDS system has evolved into a diverse ecosystem combining public, private and donor-led initiatives aimed at enhancing the growth and competitiveness of SMMEs (Masutha & Rogerson, 2014; Zilwa, 2020). These programmes generally provide non-financial services such as training, mentorship, business advisory support, incubation and market access facilitation (OECD, 2020; DTIC, 2022). While public agencies such as SEDA, NYDA and SEFA form the institutional backbone, a wide network of private and donor-funded incubators, including the South African Breweries (SAB) Foundation, Allan Gray Orbis Foundation and Innovation Hub, play complementary roles by offering sector-specific or youth-targeted interventions (SAB Foundation n.d.; SME South Africa, 2022; Allan Gray Orbis Foundation, 2025). The core intention behind these BDS mechanisms is to move entrepreneurs beyond survivalist activity by developing managerial capabilities, improving access to markets and technology, and promoting sustainable enterprise growth (Masutha & Rogerson, 2014; Eister & Msimango-Galawe, 2024). Understanding South Africa's BDS ecosystem requires tracing its policy evolution, from early state-led, finance-focused programmes to more diversified, market-linked and innovation-driven approaches. Table 1 outlines key milestones in BDS development for start-ups and SMMEs since the mid-1990s.

Table 1: Key milestones in business development support.

Period	Key support	Notable policy/intervention	Source(s)
Mid-1990s: formal SMME policy foundation	Government formalised SMME support through training, finance, procurement, and targeted group support.	1995 White Paper on small business formalised South Africa's SMME support agenda by prioritising access to finance, business information and advice, training, markets and public procurement for small enterprises.	Government of South Africa (1995).
2000s: incubation and non-financial support expansion	Support expanded beyond grants and loans to incubation, mentorship, training and advisory services.	Business incubation became a strategic SMME support tool, with incubators increasing from 2000 onward.	Buys and Mbewana (2007), Masutha and Rogerson (2014).

2010s–2020s: ecosystem- building, youth support and integrated funding.	Support packages for start-ups including seed finance, innovation programmes, specialised incubators; emphasis on survival, growth and market access.	Policy emphasis on MSME and co- operative funding, start-up support, innovation programmes and ecosystem development.	Peters and Naicker (2013); Tembe (2018); DSBD (2025).
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Source: Authors' own illustration based on reviewed literature.

Although the evolution of BDS policies reflects a growing institutional commitment to entrepreneurship promotion, evidence from recent studies shows that the system's complexity has produced new challenges of fragmentation, uneven reach and weak outcome tracking (Nkontwana et al., 2025; Rankhumise & Muzanenhamo, 2025; Rungani & Potgieter, 2018). For instance, a national evaluation of the Integrated Strategy for the Promotion of Entrepreneurship and Small Enterprises (ISPESE) conducted by DPME/DSBD (2018) found significant overlap among support programmes, poor inter-agency communication and weak referral mechanisms between government departments. Similarly, the National Integrated Small Enterprise Development (NISED) Masterplan (DSBD, 2022) reported that SMME support remains “uncoordinated and fragmented,” with limited alignment between financial and non-financial initiatives. Nkontwana et al. (2025), observed that entrepreneurs often struggle to navigate a complex and overlapping support ecosystem, where duplication of services and inconsistent delivery hinder their ability to secure meaningful assistance. Rungani and Potgieter (2018) tested the relationship between financial and non-financial support and found that, although each improves business performance independently, their interaction effect is weak, thus suggesting a lack of integration between financial schemes and BDS services. Kelly et al. (2021) surveyed 100 SMMEs in Thohoyandou and reported that many entrepreneurs were unaware of available programmes or perceived them as ineffective, highlighting weak communication and referral pathways. Zilwa (2020) and the South African Cities Network (2023) similarly found that service providers operate in silos, resulting in duplication of functions and minimal coordination between agencies. Rankhumise and Muzanenhamo (2025) confirmed these findings through interviews with SEDA business advisors, who identified poor inter-agency collaboration and low visibility of BDS offerings as major obstacles to effective support.

Universities and Entrepreneurial Ecosystem Development

Universities are increasingly recognised as strategic sites for entrepreneurial ecosystem development because they combine knowledge production, talent development, institutional legitimacy and ecosystem linkages (Etzkowitz et al., 2008; Guerrero et al., 2020; Guerrero et al., 2021; Ismail et al., 2024). International evidence has shown that university-based entrepreneurial ecosystems typically combine curricular and co-curricular training, mentoring, incubation, technology transfer, and brokerage of networks and finance, orchestrated as a “whole-of-institution” approach rather than isolated projects (OECD/EU, 2017; Owen et al., 2024). An empirical synthesis by Seitz et al. (2025) reported that well-designed accelerators and incubators located in or linked to universities can improve new-venture performance on average, though effects depend on programme design and local context. A systematic review of university incubators similarly found positive but heterogeneous outcomes and identified integration with research commercialisation, industry linkages and capability building as a key moderator of effectiveness (Ríos Yovera et al., 2025). In South Africa, universities operationalise these functions through national and campus-level platforms: the Entrepreneurship Development in Higher Education (EDHE) programme coordinates student entrepreneurship, competitions and capacity-building across public university programmes (EDHE, 2024; Universities South Africa, 2025), while campus hubs such as Wits's Tshimologong Precinct (Tshimologong, 2022), the Wits Innovation Centre (Wits Innovation Centre n.d.), University of Cape Town Graduate School of Business's Solution Space (Yabo, 2020) and University of Pretoria's TuksNovation (TuksNovation n.d.) provide founder training, mentoring, prototyping support, investor and corporate access and technology transfer pathways. Institutional and programme reports document tangible outputs, but also identify binding delivery gaps such as uneven resourcing, limited cross-faculty integration, and insufficient longitudinal outcome tracking that make it difficult to convert activity into scalable firms (EDHE, 2024; University of the Witwatersrand, 2025; University of Pretoria, 2023).

Embedding entrepreneurial ecosystems within universities draws on their unique concentration of skilled talent, research capacity and institutional credibility, which together can enable the transfer of knowledge, regional collaboration, and the creation of opportunity-driven start-ups when aligned with external partners and industry networks (Guerrero et al., 2020, 2021; Rinkinen et al., 2024). Empirical and review evidence has shown that incubators

and university ecosystems are most effective when training and mentoring are combined with market/network access and technology-transfer support, delivered through co-ordinated institutional designs and assessed with consistent, longitudinal indicators (Ríos Yovera et al., 2025; Seitz et al., 2025; Guerrero et al., 2021; Ndabeni, 2008; Buys & Mbewana, 2007). Studies have also revealed ongoing institutional weaknesses in university entrepreneurship ecosystems, including poor faculty integration, weak external collaboration and low programme visibility (EDHE, 2024; Ismail et al., 2024). When support structures remain peripheral rather than embedded, their impact on innovation and venture creation declines (Ramchander, 2019; Guerrero et al., 2021). Evaluations of incubators and hubs also show fragmented governance and limited coordination, mirroring national BDS inefficiencies (Ndabeni, 2008; Munnik, 2021). Thus, strengthening these ecosystems requires embedding entrepreneurship into academic cores and linking faculties, research and industry to position universities as active ecosystem anchors.

Fragmented Access and Visibility Paradox in Business Development Support

The preceding sections show that South Africa has developed a wide range of entrepreneurship and BDS interventions. However, the presence of multiple support mechanisms does not necessarily mean that young entrepreneurs can identify, access or use them effectively. The central issue, therefore, is not simply programme availability, but the extent to which support is visible, navigable and coordinated for the youth it is intended to serve. In theory, these interventions should create fertile ground for young entrepreneurs to translate ideas into viable ventures (Bowmaker-Falconer et al., 2023). In practice, however, a large proportion of these initiatives remain invisible to the very individuals they are designed to assist (Fotoyi, 2022; Nkontwana et al., 2025). The paradox is not rooted in the scarcity of resources, but rather in the lack of access and visibility within the existing support landscape (Kelly et al., 2021; DSBD, 2022). Empirical and conceptual evidence suggests that entrepreneurial ecosystems are more effective when support mechanisms are accessible, visible and connected to the intended participants (OECD, 2020; Guerrero et al., 2021; Wurth et al., 2023; Ofosu-Appiah et al., 2025). Many South African youth, especially those outside major cities and elite universities, remain unaware of or unable to access existing opportunities (Khoza & Galawe, 2021; Ofosu-Appiah et al., 2025). Overlapping initiatives, complex requirements and jargon-heavy communication favour individuals with networks, digital access and higher education, while excluding those in rural or township areas (Maluleke, 2014; Rankhumise & Muzanhenamo, 2025; Mseleku, 2025; Khumalo & Sibanda, 2023). Consequently, entrepreneurship functions as a selective system, open to a few but exclusionary to many (Rungani, 2025; Basson & Omoruyi, 2025).

Evidence also suggests that fragmented support systems mainly benefit entrepreneurs with stronger social and cultural capital, as they are better positioned to identify opportunities, understand institutional requirements and access relevant networks (Khumalo & Sibanda, 2023; Mseleku, 2025; Ismail et al., 2024; Ofosu-Appiah et al., 2025). Those linked to universities or established networks can better navigate programmes, interpret institutional requirements and communicate effectively with funders (Ismail et al., 2024; Guerrero et al., 2021; Mseleku, 2025). In contrast, youth from under-resourced areas face barriers such as registration, formal proposals and digital submissions, excluding those most in need (Ebrahim & Van den Berg, 2024; DSBD, 2022; Ofosu-Appiah et al., 2025; Nkontwana et al., 2025). This creates a two-tiered ecosystem, visible to the well-connected but inaccessible to the marginalised (Fotoyi, 2022; Munnik, 2021). Field evidence confirms this divide: youth in remote townships often lack awareness of agencies such as SEFA or NYDA, while procedural demands block their entry even when opportunities are found (Fotoyi, 2022; DSBD, 2022; Ebrahim & Van den Berg, 2024). Without mentorship or institutional backing, their ventures rarely advance (Ismail et al., 2024; Ramchander, 2019). Conversely, metropolitan university students benefit from incubators, faculty mentorship and credibility that ease access to funding and networks (EDHE, 2024; OECD, 2020). The key difference lies not in talent but in the visibility and accessibility of opportunity pathways (Guerrero et al., 2021; Ofosu-Appiah et al., 2025). Fragmentation within South Africa's BDS ecosystem worsens exclusion, as agencies like SEFA, NYDA, DSBD and SEDA often operate independently, causing duplication, inconsistent standards and limited outreach (Nkontwana et al., 2025; Rungani, 2025). Moreover, participation favours informed and connected individuals, while marginalised youth remain excluded, especially due to digital divides that restrict access to online applications and support (Kelly et al., 2021; De Jongh et al., 2024; Mseleku, 2025).

The challenge lies not in the absence of programmes but in a fragmented, reactive and inaccessible system (Ismail et al., 2024; Ofosu-Appiah et al., 2025; Khoza & Galawe, 2021). Addressing this requires inclusive, embedded and coordinated structures that democratise access and nurture untapped entrepreneurial potential (Fotoyi, 2022; Ismail et al., 2024; Guerrero et al., 2021). Against this backdrop, this paper proposes an EUH Model that positions

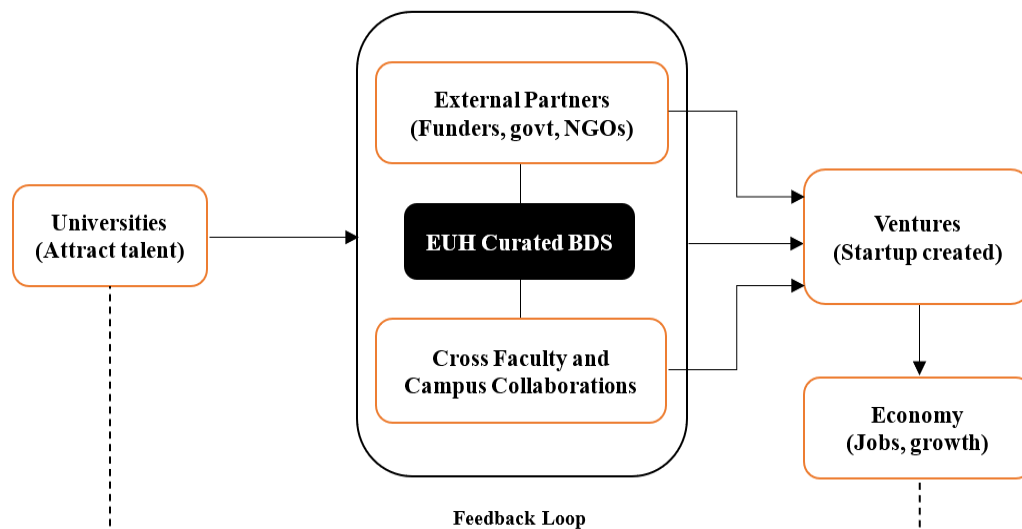
universities, rich in talent, resources and legitimacy, as ecosystem anchors. The literature suggests that by integrating training, mentorship and networks into everyday campus life, universities can turn fragmented support into more cohesive and inclusive systems that bridge youth to opportunity and strengthen entrepreneurship development (OECD/EU, 2017; Guerrero et al., 2021; EDHE, 2024; Ismail et al., 2024; Ofosu-Appiah et al., 2025).

THE EMBEDDED UNIVERSITY HUB MODEL

Globally, universities have shifted from knowledge transmitters to key drivers of innovation and entrepreneurship, acting as anchor institutions in regional and national ecosystems (Etzkowitz & Leydesdorff, 2000; Guerrero et al., 2020, 2021). Building on this narrative of university-based entrepreneurial ecosystems, recent studies suggest that universities can serve as institutionally integrated platforms for entrepreneurship development when they embed support structures within their core academic and organisational systems (Allahar & Sookram, 2019; Guerrero et al., 2021; Jurgelevičius & Raišienė, 2025; Ríos Yovera et al., 2025). These models suggest that when entrepreneurial support is embedded within universities, rather than delivered as peripheral or stand-alone initiatives, accessibility, participation and venture sustainability are more likely to improve (Malecki, 2018; Allahar & Sookram, 2019; Wurth et al., 2023). Empirical studies have also shown that university-anchored entrepreneurship thrives by leveraging youth talent, research and institutional legitimacy to link learning, venture creation and external partnerships (Morris et al., 2017; Jurgelevičius & Raišienė, 2025).

Building on this argument, the proposed EUH Model reconceptualises the university as a central connector that embeds BDS directly into visible and trusted institutional spaces where youth talent naturally converges. The model consists of six interconnected constructs: universities, university hubs, cross-faculty and cross-campus collaborations, external partners, ventures and the economy. Together, these constructs form a self-reinforcing ecosystem. Within this ecosystem, universities offer legitimacy and infrastructure; hubs deliver training and incubation; collaborations drive interdisciplinary learning; partners provide networks and resources; ventures embody entrepreneurial outcomes; and the economy feeds back innovation and employment. The constructs are integrated through visible, student-centred pathways that connect idea generation to market entry, supported by longitudinal tracking of performance and feedback mechanisms (Allahar & Sookram, 2019; OECD, 2020; EDHE, 2024). Although universities are natural entry points for students and graduates, the EUH model is not limited to enrolled students. It also positions universities as community-facing access platforms that can connect surrounding youth entrepreneurs to BDS resources through outreach programmes, alumni networks, local enterprise desks, partnerships and referral systems. Figure 2 clarifies the structural configuration of these six interlinked constructs, stressing the flow of relationships and feedback loops that will enable the EUH model to function as a cohesive and self-reinforcing system.

Figure 2: EUH Model.



Source: Authors' own illustration based on reviewed literature.

Each construct within the model plays a distinct yet interdependent role in promoting entrepreneurship and job creation. Universities provide the institutional legitimacy and resource base that anchor ecosystem activities (Guerrero et al., 2021). University Hubs translate strategy into practice through incubation, mentoring and innovation training (Allahar & Sookram, 2019). Cross-Faculty and Campus Collaborations stimulate creativity and technology transfer by connecting diverse disciplines (Prokop, 2022). External Partners bring market access, investment and policy support (OECD, 2020; Masutha & Rogerson, 2014). Ventures represent the immediate outputs of this process, while the Economy captures long-term outcomes such as job creation, competitiveness and innovation diffusion (Ndabeni, 2008; Ríos Yovera et al., 2025). Empirical studies consistently suggest that ecosystems combining these elements, education, incubation, partnerships and market integration, are associated with stronger venture survival and employment-related outcomes (Wurth et al., 2023; Guerrero et al., 2021; Munnik, 2021).

For instance, universities that embed entrepreneurship into their curricula and governance boost students' intentions and venture creation (Nabi et al., 2018; Guerrero et al., 2021; Mahlaole, 2021; Mahlaole & Malebana, 2021; Ndovela & Chinyamurindi, 2021). University hubs offering mentoring, prototyping and advisory services can strengthen venture readiness, survival prospects and access to funding (Ogunsanya et al., 2024; Blank, 2021; Munnik, 2021; Allahar & Sookram, 2019; Masutha & Rogerson, 2014). Cross-faculty and cross-campus collaborations can foster creativity, innovation and technology transfer (Alessandrini et al., 2013; Prokop, 2022; Ríos Yovera et al., 2025), while strong partnerships with industry, government and investors can increase commercialisation opportunities and employment-related outcomes (Etzkowitz & Leydesdorff, 2000; Sihlobo & Mbatha, 2022; Ismail et al., 2024). Research on incubators, accelerators and spin-offs shows that ventures embedded in university networks achieve higher survival and faster growth due to access to mentorship, investors and knowledge spillovers (Blank, 2021; Schwartz, 2013; Hallen et al., 2020; Wennberg et al., 2011), while regions with dense university–industry–government linkages tend to show stronger innovation, commercialisation and employment-related outcomes (Etzkowitz & Leydesdorff, 2000; Malecki, 2018; Guerrero et al., 2021; Sihlobo & Mbatha, 2022). Through this embedded, integrative approach, the proposed model seeks to transform South African universities into ecosystem nerve centres capable of converting latent youth talent into productive entrepreneurship and sustainable job creation. To make the model easier to operationalise in future studies, Table 2 summarises the main EUH constructs, their working definitions and illustrative indicators that can be used for empirical testing and evaluation.

Table 2: EUH model constructs and suggested indicators.

Constructs	Paper working definition	Example indicators
Universities	Institutional anchor providing legitimacy, a talent pipeline and governance for entrepreneurship support.	Hub budget and staffing; entrepreneurship course coverage; student participation rates.
University Hub (EUH curated BDS)	Coordinating platform that curates BDS services and referral pathways for youth entrepreneurs.	Visibility index; hub usage rate; referral conversion (inquiry to application to acceptance); mentoring intensity.
Cross-faculty and campus collaboration	Interdisciplinary collaboration enabling problem solving, prototyping and technology transfer.	Number of cross-faculty projects; prototype outputs; IP disclosures; team diversity measures.
External partners	Funders, corporates, agencies, NGOs and regulators connected through the hub to provide resources and access.	Partner count and type; depth of engagement; funding and in-kind support; market access opportunities.
Ventures	Start-up creation and performance outcomes emerging from the EUH pipeline.	Start-up formation; survival (12/24 months); revenue growth; employment created.
Economy	Wider development outcomes and feedback signals shaping resources, demand and policy incentives.	Local job creation; sector spillovers; investment attraction; policy feedback.

Source: Authors' own compilation based on reviewed literature. Note: Indicators are proposed examples intended to guide future empirical testing and evaluation and are consistent with common measurement approaches in entrepreneurial ecosystem research and incubation/accelerator evaluation syntheses (Wurth et al., 2023; Seitz et al., 2025; Ríos Yovera et al., 2025) and higher education entrepreneurship measurement (Sieger et al., 2024).

PROPOSITION DEVELOPMENT

According to the literature, entrepreneurial ecosystems are most effective when their components function as interconnected systems rather than isolated parts (Guerrero et al., 2021; Wurth et al., 2023; Allahar & Sookram, 2019). Within these systems, universities act as institutional anchors providing legitimacy, resources and governance for entrepreneurship development (Etzkowitz & Leydesdorff, 2000; Guerrero et al., 2020, 2021; Ismail et al., 2024). When entrepreneurship is embedded in curricula and campus culture, students' entrepreneurial intentions and venture creation are more likely to increase (Nabi et al., 2018; Mahlaole, 2021; Mahlaole & Malebana, 2021; Ndovela & Chinyamurindi, 2021). University hubs translate institutional commitments into practical support through mentoring, incubation and advisory services. Research from multiple literature sources has shown that hubs integrating training, networks and funding improve venture survival, quality and investor readiness (Allahar & Sookram, 2019; Ogunsanya et al., 2024; Munnik, 2021; Seitz et al., 2025).

Cross-faculty and cross-campus collaborations further strengthen the innovation potential of these ecosystems by promoting interdisciplinary learning and technology transfer (Prokop, 2022; Ríos Yovera et al., 2025). Studies from various contexts illustrate that ventures from such collaborations can produce stronger technology-transfer outputs, novel solutions and scalable innovations, thus accentuating the value of integrating diverse disciplines in incubation (Alessandrini et al., 2013; Ríos Yovera et al., 2025; Guerrero et al., 2021). External partners such as industry, investors, government and development agencies also strengthen the ecosystems by providing funding, market access and policy alignment (OECD, 2020; Masutha & Rogerson, 2014; Sihlobo & Mbatha, 2022). Regions with strong university–industry–government linkages show higher commercialisation, spin-off growth and graduate employment, anchoring universities within wider economic systems (Blank, 2021; Schwartz, 2013; Hallen et al., 2020; Wennberg et al., 2011; Etzkowitz & Leydesdorff, 2000; Ismail et al., 2024; Wurth et al., 2023).

Ventures are the direct entrepreneurial outputs of these ecosystem linkages. Research on incubators, accelerators and university spin-offs shows that start-ups embedded in university-related networks can benefit from mentorship, investor access, peer learning and knowledge spillovers, which may improve survival and growth prospects (Blank, 2021; Hallen et al., 2020; Schwartz, 2013; Wennberg et al., 2011). Over time, these ventures may contribute to employment, local supply chains and regional innovation when they are connected to broader ecosystem resources (Malecki, 2018; Guerrero et al., 2021; Ríos Yovera et al., 2025). The economy acts as an upstream force that shifts university capacity and behaviour, via budgets, input costs, student demand, labour-market signals and policy incentives, thereby redirecting resources and priorities (Guerrero et al., 2021; OECD, 2020; Masutha & Rogerson, 2014). These shifts flow through hubs, which alter what gets incubated, funded and transferred to market (Allahar & Sookram, 2019; Prokop, 2022; Munnik, 2021). The result is stronger or weaker venture pipelines in the short term, and over time, region-level jobs, competitiveness and innovation, with mature ventures feeding back into university resources and the economy (Wurth et al., 2023; Malecki, 2018; Etzkowitz & Leydesdorff, 2000; Ndabeni, 2008; Ríos Yovera et al., 2025; Schwartz, 2013; Hallen et al., 2020). Drawing on these findings, the following propositions are advanced to articulate how the EUH model can drive entrepreneurship development (see Table 3).

- P1:** Universities embedded in the EUH model that integrate entrepreneurship into curricula, governance and campus culture will increase the visibility of entrepreneurial opportunities and strengthen students' capacity to pursue venture creation.
- P2:** University hubs within the EUH model that coordinate incubation, mentoring and advisory support will improve venture readiness, survival and scalability by curating access to business development resources and reducing navigation barriers.
- P3:** Cross-faculty and cross-campus collaboration within the EUH model will enhance interdisciplinary innovation and technology transfer, resulting in ventures that are more novel and market-responsive.
- P4:** External partnerships integrated into the EUH model, linking universities with industry, investors and government, will expand access to funding, market opportunities and commercialisation support, leading to stronger venture performance and employment outcomes.
- P5:** Ventures developed through the EUH model will demonstrate higher resilience, sustainability, and job-creation capacity than comparable independent start-ups due to structured mentoring, institutional legitimacy and access to investment networks.

P6: Ventures emerging from the EUH model will generate economic and social outcomes that reinforce university, partner and policy commitment, thereby sustaining ecosystem resources and strengthening long-term innovation and employment effects.

Table 3: Proposition paths in the EUH model.

Proposition	Pathway in the model	Main mechanism	Expected outcome
P1	Universities → Opportunity visibility & student capacity → Venture creation potential.	Embedded entrepreneurship in curriculum, governance, and campus culture increases exposure, legitimacy, and readiness.	Stronger entrepreneurial intentions and capacity to act.
P2	University hub → Coordinated BDS (mentoring/incubation/advisory) → Venture readiness.	Curated support lowers navigation costs and improves readiness steps.	Higher survival, investment readiness, and scalability.
P3	Cross-faculty collaboration → Knowledge recombination & transfer → Innovation quality.	Interdisciplinary teams support creativity, prototyping and technology transfer.	More novel, market-responsive ventures.
P4	External partners → Resources + market access + policy alignment → Commercialisation.	Networks provide funding, market channels and legitimacy for scaling.	Greater commercialisation potential and employment outcomes.
P5	EUH-incubated ventures → Capability + legitimacy + networks → Performance.	Structured mentoring + institutional credibility + investor links strengthen execution.	Higher resilience, sustainability and job creation.
P6	Venture impacts → Feedback loops → Stronger university + ecosystem capacity.	Successful ventures reinforce resources, partnerships and policy support.	Sustained innovation diffusion, competitiveness and employment.

Source: Authors' own compilation based on the proposed EUH model. Note: The pathways summarise the directional logic of the EUH model and show how each proposition links model components to expected outcomes.

DISCUSSION AND CONCLUSION

The propositions developed in this paper reposition universities as embedded access brokers within South Africa's youth entrepreneurship ecosystem. Rather than treating entrepreneurship support as a collection of separate programmes, the EUH Model conceptualises support as an institutional access architecture through which universities can connect youth talent to BDS, mentorship, interdisciplinary collaboration, external partners and market-facing opportunities. The main contribution of the model is therefore not the claim that universities should support entrepreneurship, which is already well established in entrepreneurial university and ecosystem literature, but that universities can act as embedded coordination platforms that make existing support more visible, trusted and navigable. In this way, the model shifts the debate from whether support exists to how support is organised, accessed and converted into venture development outcomes.

Theoretically, the EUH Model integrates insights from the entrepreneurial university tradition (Etzkowitz & Leydesdorff, 2000; Etzkowitz et al., 2008; Guerrero et al., 2020), entrepreneurial ecosystem theory (Wurth et al., 2023; Malecki, 2018; Rinkinen et al., 2024) and socio-ecological access perspectives (Khoza & Galawe, 2021; Ofosu-Appiah et al., 2025; Khumalo & Sibanda, 2023). Through this integration, the model extends existing ecosystem thinking by introducing embedded visibility as a mechanism through which universities can reduce navigation barriers, improve the flow of entrepreneurial support to young people, and enhance the credibility of support mechanisms. Universities are therefore conceptualised not only as knowledge producers or incubator hosts, but as developmental intermediaries that connect human, social and institutional resources across students, faculties, industry, funders, policymakers and surrounding youth communities.

Empirical and conceptual studies converge to support these assumptions. University-incubated ventures have been shown to demonstrate stronger survival prospects, scalability and innovation capacity than many independent start-ups, largely because of structured mentorship, institutional legitimacy and access to curated networks (Blank, 2021; Schwartz, 2013; Hallen et al., 2020; McAdam & McAdam, 2008). Cross collaboration enhances interdisciplinarity, creativity and technology transfer (Lattuca, 2002; Prokop, 2022; Ríos Yovera et al., 2025; Rana et al., 2025), while dense university–industry–government linkages can strengthen commercialisation, job creation and innovation diffusion (Etzkowitz & Leydesdorff, 2000; Guerrero et al., 2021; Sihlobo & Mbatha, 2022; Kabombo et al., 2025). The EUH model thus provides an integrative architecture that aligns these multi-actor mechanisms into a coherent, embedded ecosystem rooted in visibility, coordination and institutional trust. By embedding support directly into campus life, the EUH framework not only complements existing national development strategies such as the NISED Masterplan (DSBD, 2022) but also operationalises calls from the OECD (2020) and EDHE (2024) for universities to act as inclusive innovation hubs. In doing so, it shifts the focus of entrepreneurship promotion from isolated programme delivery toward long-term ecosystem design, turning invisible bridges into visible, navigable pathways that connect young people to opportunity.

Theoretical Contributions

This study offers four core theoretical contributions. Firstly, it advances entrepreneurial ecosystem theory by introducing embedded visibility as a conceptual dimension of ecosystem performance. While prior frameworks have emphasised resource interdependence and institutional density (Wurth et al., 2023; Malecki, 2018; Guerrero et al., 2021), this paper posits that ecosystems function effectively only when their resources are visible, proximate and trusted by target participants (Ofosu-Appiah et al., 2025; Kelly et al., 2021; Nkontwana et al., 2025). Secondly, it extends the entrepreneurial university discourse (Etzkowitz et al., 2008; Guerrero et al., 2020; Sambo, 2018) by theorising universities as embedded access brokers rather than mere incubators or curriculum providers. This reframing expands existing models of university entrepreneurship by emphasising the integration of external BDS systems, cross-faculty/campus collaboration, and external partnerships within institutional governance and everyday student experience (Ismail et al., 2024; Allahar & Sookram, 2019; Dyantyi et al., 2024). Thirdly, it contributes to the literature on BDS by merging higher education and BDS research streams into a single conceptual framework. The EUH Model links fragmented financial and non-financial interventions (Masutha & Rogerson, 2014; Rungani & Potgieter, 2018; Rankhumise & Muzanenhano, 2025) through university-based coordination platforms that enhance synergy and reduce duplication (DSBD, 2022; DPME/DSBD, 2018). Lastly, it proposes a set of testable propositions that can guide empirical work examining how embedded institutional ecosystems influence entrepreneurial intentions, venture performance and employment outcomes. In doing so, it bridges theory with policy-oriented research and establishes a foundation for comparative studies across African and global contexts.

Practical and Policy Implications

The EUH model has significant practical and policy implications. For universities, the model provides a blueprint for integrating entrepreneurship into institutional strategy, teaching and student development. Embedding entrepreneurship within curricula and governance structures can create inclusive and visible support systems that foster innovation, mentorship and venture creation (Ramchander, 2019; Ogunsanya et al., 2024; Thaba-Nkadimene et al., 2024). Universities should institutionalise entrepreneurship offices, streamline access to BDS resources, and promote interdisciplinary collaboration to link diverse forms of knowledge with real-world opportunities (OECD/EU, 2017; Guerrero et al., 2021; Prokop, 2022; EDHE, 2024). For policymakers, the EUH model suggests a move from fragmented programme delivery to coordinated ecosystem-building. Agencies such as DSBD, SEFA and NYDA can partner with universities to decentralise entrepreneurship services and deliver them through embedded campus platforms (OECD, 2020; DSBD, 2022; NYDA, 2023, 2024). Such collaboration aligns with the OECD/EU (2017) recommendation for “whole-of-system” governance and strengthens monitoring and evaluation of youth entrepreneurship programmes (Basson & Omoruyi, 2025; Rungani, 2025). For industry and development partners, the model reinforces the importance of long-term engagement with universities through co-created incubation programmes, internships and innovation challenges (Sihlobo & Mbatha, 2022; Owen et al., 2024; Kabombo et al., 2025). These partnerships can enhance technology transfer, investment readiness and employability, while sustaining feedback loops between the economy and education (Guerrero et al., 2021; Malecki, 2018; Wurth et al., 2023). These implications translate the framework into actionable policy guidance by framing universities as developmental anchors

that connect fragmented support systems, improve equitable access, and align youth entrepreneurship with national priorities for inclusive growth and innovation-led job creation.

Limitations and Future Research

While the EUH model presents a robust conceptual framework, this study is limited by its theoretical nature and reliance on secondary data. The model's assumptions regarding access, visibility and embeddedness require empirical validation across diverse institutional and regional settings. Hence, future research should consider adopting mixed-method and longitudinal designs to assess how embedded university ecosystems affect entrepreneurial intentions, venture sustainability and job creation. Moreover, comparative studies between universities with embedded versus peripheral hubs could clarify which structural elements such as governance models, funding streams and network density most influence venture creation and performance. Furthermore, scholars should consider exploring equity dimensions, by investigating how gender, geography and digital divides shape participation and outcomes within embedded ecosystems. Future research should also contemplate examining policy coordination mechanisms that link BDS agencies, universities and private investors into measurable, interoperable systems.

Conclusion

By reimagining universities as an embedded entrepreneurship hub, this paper contributes to both literature and policy on youth entrepreneurship in South Africa. The EUH model reframes the national challenge from one of resource scarcity to one of access architecture, thus offering a coherent, scalable framework for integrating BDS within everyday campus life. If operationalised effectively, the EUH model can serve as a powerful engine of inclusive growth, turning invisible bridges into visible pathways that allow young South Africans not only to imagine entrepreneurship, but also to pursue and sustain it.

REFERENCES

- Alessandrini, M., Klose, K., & Pepper, M. S. (2013). University entrepreneurship in South Africa: Developments in technology transfer practices. *Innovation*, 15(2), 205-214.
- Allahar, H., & Sookram, R. (2019). A university business school as an entrepreneurial ecosystem hub. *Technology Innovation Management Review*, 9(11), 15-25.
- Allan Gray Orbis Foundation. (2025). *About: Overview*. <https://allangrayorbis.org/about/>
- Asmal, Z., Bhorat, H., Lochmann, A., & Kishan, S. (2024). *Supply-side economics of a good type: Supporting and expanding South Africa's informal economy*. Development Policy Research Unit, University of Cape Town.
- Bacharach, S. B. (1989). Organizational theories: Some criteria for evaluation. *Academy of Management Review*, 14(4), 496-515.
- Basson, N., & Omoruyi, O. (2025). Internal and external factors affecting the growth of SMMEs: A qualitative study. *Southern African Journal of Entrepreneurship and Small Business Management*, 17(1), a919.
- Blank, T. H. (2021). When incubator resources are crucial: Survival chances of student startups operating in an academic incubator. *The Journal of Technology Transfer*, 46(6), 1845-1868.
- Bowmaker-Falconer, A., & Herrington, M. (2020). *Igniting start-ups for economic growth and social change. Global entrepreneurship monitor South Africa (GEM SA) 2019/2020 report*.
- Bowmaker-Falconer, A., Meyer, N., & Samsami, M. (2023). *Entrepreneurial resilience during economic turbulence: GEM South Africa 2022/2023 report*. Stellenbosch University.

Bundy, C. (2020). Poverty and inequality in South Africa: A history. In *Oxford Research Encyclopedia of African History*. <https://doi.org/10.1093/acrefore/9780190277734.013.659>

Buys, A. J., & Mbewana, P. N. (2007). Key success factors for business incubation in South Africa: The Godisa case study: news & views. *South African Journal of Science*, 103(9), 356-358.

Colquitt, J. A., & Zapata-Phelan, C. P. (2007). Trends in theory building and theory testing: A five-decade study of the academy of management journal. *Academy of Management Journal*, 50(6), 1281-1303.

De Jongh, J. J., Mncayi-Makhanya, P., & Mdluli-Maziya, P. (2024). Antecedents of youths who are not in employment, education or training: Micro-level evidence. *Journal of Economic and Financial Sciences*, 17(1), 899.

Department of Trade, Industry and Competition. (2022). *Annual Report 2021/22. Republic of South Africa*. <https://www.thedtic.gov.za/wp-content/uploads/Annual-Report-2022.pdf>

DPME/DSBD (2018). Evaluation of the ISPESE - Full Report, Pretoria: Department of Planning, Monitoring and Evaluation/Department of Small Business Development.

DSBD. (2022). *National integrated small enterprise development (NISED) Masterplan – Final draft*. https://www.gov.za/sites/default/files/gcis_document/202205/nised-masterplan.pdf

DSBD. (2025). Final MSMEs and co-operatives funding policy: MSMEs and Co-operatives Funding Policy for South Africa. Government Notice No. 5869, Government Gazette No. 52109, 13 February 2025. Pretoria: Government Printer. https://www.gov.za/sites/default/files/gcis_document/202502/52109gon5869.pdf

Dyantyi, N., Ncanywa, T., & Nguza-Mduba, B. (2024). Entrepreneurship education as a catalyst for sustainable development in higher education institutions. *Global Journal of Management and Business Research*, 5(8), 1483-1493.

Ebewo, P. E., Schultz, C., & Mmako, M. M. (2025). Towards inclusive entrepreneurship: addressing constraining and contributing factors for women entrepreneurs in South Africa. *Administrative Sciences*, 15(1), 14.

Ebrahim, A. Q., & Van den Berg, C. L. (2024). The barriers to technology adoption among businesses in the informal economy in Cape Town. *South African Journal of Information Management*, 26(1), a1872.

EDHE (2024). *Impact of Entrepreneurship Development in Higher Education Report 2024*. <https://tinyurl.com/4a5jb5dj>

Eister, T., & Msimango-Galawe, J. (2024). Business development services training and entrepreneurial self-efficacy: A focus on necessity and opportunity-driven entrepreneurs. *Southern African Journal of Entrepreneurship and Small Business Management*, 16(1), 1-11.

Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: from National Systems and “Mode 2” to a Triple Helix of university–industry–government relations. *Research policy*, 29(2), 109-123.

Etzkowitz, H., Ranga, M., Benner, M., Guarany, L., Maculan, A. M. & Kneller, R. (2008). Pathways to the entrepreneurial university: towards a global convergence. *Science and Public Policy*, 35(9), 681-695.

Fotoyi, A. (2022). Economic impact assessment of the National Youth Development Agency (NYDA) grant fund in the Eastern Cape, Master’s thesis, Nelson Mandela University.

Gilson, L. L., & Goldberg, C. B. (2015). Editors’ comment: so, what is a conceptual paper?. *Group & Organization Management*, 40(2), 127-130.

Government of South Africa. (1995). *White paper on national strategy for the development and promotion of small business in South Africa*. https://www.gov.za/sites/default/files/gcis_document/201409/163170.pdf

- Graham, L., Williams, L., & Chisoro, C. (2019). Barriers to the labour market for unemployed graduates in South Africa. *Journal of Education and Work*, 32(4), 360-376
- Guerrero, M., Liñán, F., & Cáceres-Carrasco, F.R. (2021). The influence of ecosystems on the entrepreneurship process: A comparison across developed and developing economies. *Small Business Economics*, 57(4), 1733-1759.
- Guerrero, M., Urbano, D., & Gajón, E. (2020). Entrepreneurial university ecosystems and graduates' career patterns: Do entrepreneurship education programmes and university business incubators matter?. *Journal of Management Development*, 39(5), 753-775.
- Habiyaremye, A., Habanabakize, T., & Nwosu, C. (2022). Bridging the labour market skills gap to tackle youth unemployment in South Africa. *The Economic and Labour Relations Review*, 33(4), 786-805.
- Hallen, B. L., Cohen, S. L., & Bingham, C. B. (2020). Do accelerators work? If so, how?. *Organization Science*, 31(2), 378-414.
- Herrington, M., Kew, P., & Mwangi, A. (2017). *Global Entrepreneurship Monitor South Africa Report 2016/2017: Can Small Business Survive in South Africa?* University of Cape Town.
- Ismail, R., Farrington, S., Bignotti, A., Vermeire, J., Knockaert, M., & Crucke, S., 2024. Student entrepreneurship support at South African public universities: An ecosystem perspective. *Southern African Business Review*, 28, 1-24.
- Jaakkola, E. (2020). Designing conceptual articles: Four approaches. *AMS Review*, 10(1), 18-26.
- Jurgelevičius, A., & Raišienė, A. G. (2025). University entrepreneurial ecosystems: Start-up founders' perspectives on critical factors for student start-up success. *Economics and Sociology*, 18(2), 221-245.
- Kabombo, K., Thelma, C. C., & Ngulube, L. (2025). The role of government in promoting academia-industry collaboration and partnership for national development. *International Journal of Novel Research in Humanity and Social Sciences*, 12(3), 1-9.
- Kelly, T. D., Shumba, K., Zindiye, S., & Donga, G. (2021). An evaluation of government support services for SMMEs in Thohoyandou, South Africa. *Journal of Entrepreneurial Innovations*, 2(1), 69-83.
- Khoza, N., & Galawe, J. M. (2021). The impact of business development support training on youth entrepreneurship success in South Africa: A case study of the Gauteng province. *Journal of Entrepreneurial Innovations*, 2(1), 94-105.
- Khumalo N. P., & Sibanda N. (2023). (Non)fungibility of socio-cultural capital for rural-based students in South African universities. *Journal for Transdisciplinary Research in Southern Africa*, 19(1), a1321.
- Lattuca, L. R. (2002). Learning interdisciplinarity: Sociocultural perspectives on academic work. *The Journal of Higher Education*, 73(6), 711-739.
- Madisha, T. L. (2023). SEDA adoption of new media technology for entrepreneurship development in Nkomazi Local Municipality, Master's thesis, University of Zululand, Richards Bay.
- Mahlaole, S. T. (2021). The effects of entrepreneurship education on students' entrepreneurial intentions at the Tshwane University of Technology. Master's thesis. Tshwane University of Technology, Pretoria.
- Mahlaole, S. T., & Malebana, M. J. (2021). The effects of entrepreneurship education on students' entrepreneurial intentions at a South African university of technology. *Journal of Entrepreneurship Education*, 24(S2), 1-16.
- Malecki, E. J. (2018). Entrepreneurship and entrepreneurial ecosystems. *Geography Compass*, 12(3), e12359.

- Maluleke, A. (2014). Challenges faced by Seda in providing training and mentoring support services to SMMEs. Master's thesis, University of the Witwatersrand, Johannesburg.
- Masutha, M., & Rogerson, C. M., (2014). Small enterprise development in South Africa: The role of business incubators. In Rogerson, C. M. and Szymańska, D. editors, *Bulletin of Geography. Socio-economic Series*, No. 26, Toruń: Nicolaus Copernicus University, (pp. 141-155).
- Matabane, M.J., Lodewyk-Raliphada, R., & Graupner, L. I. (2024). Preparing graduates for the job market: A strength-based skill development approach. *SA Journal of Human Resource Management*, 22(0), a2692.
- Matthee, S., & Solomon, G. (2025). Exploring factors hampering the performance of business incubators in South Africa: A public, private, and university business incubator cross-case analysis. *Small Enterprise Research*, 32(2–3), 117-139.
- McAdam, M., & McAdam, R. (2008). High tech start-ups in University Science Park incubators: The relationship between the start-up's lifecycle progression and use of the incubator's resources. *Technovation*, 28(5), 277-290.
- Mncayi, P., & Shuping, K. (2021). Factors affecting labour absorption in South Africa. *Journal of Economic and Financial Sciences*, 14(1), a603.
- Mncwango, S. I., & Adanlawo, E. F. (2025). Reducing youth unemployment through entrepreneurship education interventions: The case of South Africa. *Educational Process: International Journal*, 16, e2025261.
- Modise, J. M. (2025). The South African we want: A vision shaped by current challenges. *MRS Journal of Arts, Humanities and Literature*, 2(7), 81-94.
- Morris, M. H., Shirokova, G., & Tsukanova, T. (2017). Student entrepreneurship and the university ecosystem: A multi-country empirical exploration. *European Journal of International Management*, 11(1), 65-85.
- Mseleku, Z. (2022). Youth high unemployment/unemployability in South Africa: The unemployed graduates' perspectives. *Higher Education, Skills and Work-Based Learning*, 12(4), 775-790.
- Mseleku, Z. (2025). No connections, no employment: Social capital and youth graduate unemployment in South Africa. *Social Sciences*, 6(8), 1533-1546.
- Mudau, A. D. (2024). A case study of the perceptions of stakeholders on local government support for the development and promotion of small, medium and micro enterprises (SMMEs), Master's thesis, Tshwane University of Technology, Pretoria.
- Munnik, D. (2021). Outcomes of SMMEs' participation in incubator programmes in South Africa, Master's thesis, University of Cape Town.
- Nabi, G., Walmsley, A., Liñán, F., Akhtar, I., & Neame, C. (2018). Does entrepreneurship education in the first year of higher education develop entrepreneurial intentions? The role of learning and inspiration. *Studies in Higher Education*, 43(3), 452-467.
- Ndabeni, L. L. (2008). The contribution of business incubators and technology stations to small enterprise development in South Africa. *Development Southern Africa*, 25(3), 259-268.
- Ndovela, M., & Chinyamurindi, W. T. (2021). Entrepreneurial careers: Factors influencing entrepreneurial intentions using a sample of undergraduate exit students. *South African Journal of Higher Education*, 35(3), 146-162.
- Nkontwana, P., Amoa-Gyarteng, K., Burns, J., Rosa, S., & Amsterdam, K. (2025). Entrepreneurial ecosystem building: Co-creating solutions in South Africa. *Research Square*, PrePrint.

- NYDA. (2019). *Impact evaluation study of the voucher programme (2014/15–2016/17)*. <https://tinyurl.com/5rzwksxc>
- NYDA. (2022). *Rapid assessment of the NYDA grant programme (2021/22)*. <https://tinyurl.com/3skz64f3>
- NYDA. (2023). *NYDA annual performance plan*. <https://tinyurl.com/4ynae58t>
- NYDA. (2024). *Annual report 2022/23*. <https://tinyurl.com/3yuwjm6t>
- OECD. (2020). *OECD economic surveys: South Africa 2020*, OECD Publishing, Paris.
- OECD/EU (2017). Supporting entrepreneurship and innovation in higher education in Ireland, OECD Skills Studies, OECD Publishing, Paris.: <http://dx.doi.org/10.1787/9789264270893-en>
- Ofosu-Appiah, S., Boahen, P. A. N., & Agbenyegah, A. T. (2025). Socio-ecological barriers to youth entrepreneurship in sub-Saharan Africa: A systematic review of empirical evidence. *Journal of Innovation and Entrepreneurship*, 14(1), 32.
- Ogunsanya, O., Anwana, E., & Mthembu, N. (2024). University entrepreneurship programmes and their implications for youth development in South Africa's developmental agenda: Case studies from KwaZulu Natal. *African Journal of Inter/Multidisciplinary Studies*, 6(si2), 1-14.
- Owen, R. Vedanthachari, L. N., & Hussain, J. (2024). The role of the university entrepreneurial ecosystem in entrepreneurial finance: Case studies of UK innovation knowledge centres. *Venture Capital*, 26(3), 351-375.
- Peters, R., & Naicker, V. (2013). Small medium micro enterprise business goals and government support: A South African case study. *South African Journal of Business Management*, 44(4), 13-24.
- Pheiffer, D. C., & Mphidi, A. J. (2024). The economic growth in South Africa influenced by corporate fraud at the small enterprise finance agency. *International Journal of Social Science Research and Review*, 7(1), 545-555.
- Prokop, D. (2022). The composition of university entrepreneurial ecosystems and academic entrepreneurship: A UK study. *International Journal of Innovation and Technology Management*, 19(06), 2250020.
- Ramchander, M. (2019). Reconceptualising undergraduate entrepreneurship education at traditional South African universities. *Acta Commercii*, 19(2), 1-9.
- Rana, K., Aitken, S. J., & Chimoriya, R. (2025). Interdisciplinary approaches in doctoral and higher research education: An integrative scoping review. *Education Sciences*, 15(1), 72.
- Rankhumise E. M., & Muzanenhamo A. (2025). An exploratory study on support to small and medium enterprises: Evidence from Seda business advisors, South Africa. In *Economics and Entrepreneurship: The Proceedings of the 10th International Conference on Business and Management Dynamics (ICBMD)*, Edition 1 (No. 1, pp. 21-23). BP International.
- Rinkinen, S., Konsti-Laakso, S., & Lahikainen, K. (2024). University as an opportunity space enabler in a regional entrepreneurial ecosystem. *European Planning Studies*, 32(5), 1010-1028.
- Ríos Yovera, V. R., Ramos Farroñán, E. V., Arbulú Ballesteros, M. A., Vera Calmet, V. G., Aguilar Armas, H. M., Soto Deza, J. M., Licapa Redolfo, R., Martel Acosta, R., & Reyes-Pérez, M. D. (2025). Academic entrepreneurship evolution: A systematic review of university incubators and startup development (2018-2024). *Sustainability*, 17(12), 5365.
- Rungani, E. C. (2025). Assessing the comprehensiveness of managerial support for SMMEs in South Africa. *Administrative Sciences*, 15(9), 336.

Rungani, E. C., & Potgieter, M. (2018). The impact of financial support on the success of small, medium and micro enterprises in the Eastern Cape province. *Acta Commerci*, 18(1), 1-12.

SAB Foundation. (n.d.). *Programme overview*. <https://www.sabfoundation.co.za/overview>

Sambo, W., 2018. A conceptual study of an intrapreneurship ecosystem at South African universities. *Problemy Zarządzania*, 16(1 (73)), 192-215.

Schwartz, M. (2013). A control group study of incubators' impact to promote firm survival. *The Journal of Technology Transfer*, 38(3), 302-331.

SEFA. (2023). *Corporate annual performance plan 2023/24*. Department of Small Business Development. <https://tinyurl.com/yc3fmd8h>

SEFA. (2024). *Annual Report 2023/24*. <https://www.sefa.org.za/uploads/files/files/sefa-Annual-Report-2024.pdf>

Seitz, N., Buratti, M., Lehmann, E. E., & Kurrle, J. (2025). A meta-analysis towards the effectiveness of startup accelerators. *The Journal of Technology Transfer*, 1-41.

Sieger, P., Raemy, L., Zellweger, T., Fueglistaller, U., & Hatak, I. (2024). Student entrepreneurship 2023: Insights From 57 Countries. St.Gallen/Bern: KMU-HSG/IMU-U. <https://tinyurl.com/4u45hd2f>

Sihlobo, S., & Mbatha, S. (2022). University-industry-government research and development collaborations in public higher education institutions in South Africa. *African Journal of Science, Technology, Innovation and Development*, 15(1), 69-78.

SME South Africa. (2022). *A guide to government funding in South Africa*. <https://tinyurl.com/ywju3hvh>

South African Cities Network. (2023). *Nurturing SMMEs: An Evaluation of the SMME support landscape in South Africa*. <https://tinyurl.com/3869a7sn>

Statistics South Africa. (2025a). *Quarterly labour force survey Q1: 2025*. <https://tinyurl.com/ybrwc6uc>

Statistics South Africa. (2025b). *South Africa's youth in the labour market: A decade in review*. <https://www.statssa.gov.za/?p=18398>

Statistics South Africa. (2025c). *Quarterly labour force survey Q2: 2025*. <https://tinyurl.com/5fhvk4v8>

Statistics South Africa. (2025d). *South Africa's informal economy: A lifeline for millions*. <https://www.statssa.gov.za/?p=18255>

Swiss South African Cooperation Initiative. (2024). *Identification of skills gaps in South Africa: A popular research report*. Produced for the Department of Higher Education and Training as part of the Labour market intelligence research programme.

Tembe, F. (2018). Business incubators and SMMEs performance in South Africa. Master's thesis, University of the Witwatersrand, Johannesburg.

Thaba-Nkadimene, K. L., Masebe, P. L., & Mashitoa, L. J. (2024). Examining the level of entrepreneurship education and development within the South African higher education: towards entrepreneurial university. *International Journal of Research in Business and Social Science*, 13(5), 794-802.

Torraco, R. J. (2005). Writing integrative literature reviews: Guidelines and examples. *Human Resource Development Review*, 4(3), 356-367.

- Tshimologong (2022). *Impact report*. <https://tshimologong.joburg/2022-impact-report/>
- TuksNovation (n.d.). *Annual report*. <https://tuksnovation.co.za/annual-report/>
- Universities South Africa. (2025). *Impact entrepreneurship development in higher education report 2024*. <https://tinyurl.com/4a5jb5dj>
- University of Pretoria (2023). 2022 annual report: Technology transfer office. *Department of Research and Innovation*. <https://tinyurl.com/2v8fjyf9>
- University of the Witwatersrand (2025). *Wit annual report 2024*. <https://tinyurl.com/4tbj7348>
- Vorvornator, L., & Midiniso, J. (2025). Entrepreneurship education in higher institutes of learning in South Africa: Challenges and opportunities. *Educational Process: International Journal*, 17, e2025359.
- Wennberg, K., Wiklund, J., & Wright, M. (2011). The effectiveness of university knowledge spillovers: Performance differences between university spinoffs and corporate spinoffs. *Research Policy*, 40(8), 1128-1143.
- Whetten, D. A. (1989). What constitutes a theoretical contribution?. *Academy of Management Review*, 14(4), 490-495.
- Wits Innovation Centre (n.d.). *Resources*. <https://tinyurl.com/y5r7dt6v>
- World Bank. (2025). *Youth unemployment rate for South Africa* [SLUEM1524ZSZAF]. Retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/SLUEM1524ZSZAF>
- Wurth, B., Stam, E., & Spigel, B. (2023). Entrepreneurial ecosystem mechanisms. *Foundations and Trends® in Entrepreneurship*, 19(3), 224-339.
- Yabo, S. (2020). UCT GSB accelerator guides entrepreneurs through pandemic. *University of Cape Town Graduate School of Business*. <https://tinyurl.com/yc2hxzer>
- Yiannakaris, E. C. (2019). The impact of the Raymond Ackerman Academy of entrepreneurial development (RAA) in creating improved and sustainable livelihoods amongst academy graduates. Master's thesis, University of Cape Town.
- Zilwa, P. (2020). Business development services (BDS) and SMME development in South Africa. Master's thesis, University of Cape Town.

PROMOTING DIGITAL INCLUSION THROUGH INDIGENOUS LANGUAGES: IMPLICATIONS FOR SME DEVELOPMENT IN LIMPOPO PROVINCE, SOUTH AFRICA

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ABSTRACT

Orientation: Digital inclusion is increasingly recognised as a key enabler of organisational effectiveness and sustainability among small and medium enterprises (SMEs). However, the role of indigenous languages in facilitating inclusive ICT adoption remains underexplored in the South African context, especially in rural areas.

Research purpose: This study explores how integrating indigenous languages into information and communication technology (ICT) promotes digital inclusion and enhances SME development in South Africa.

Motivation for the study: Despite advances in digital technologies, many SMEs, particularly in rural and linguistically diverse regions, remain excluded due to language barriers, limited infrastructure and inadequate institutional support.

Research approach/design and method: A mixed-methods research design was applied, with quantitative data collected from 116 SMEs and qualitative data obtained through semi-structured interviews with SME owners and managers across district municipalities in Limpopo Province. Descriptive statistics and thematic analysis were used to analyse the data.

Main findings: Integrating indigenous languages into ICT enhances communication, customer engagement, and market accessibility. SMEs utilising indigenous languages reported improved operational efficiency and stronger relationships with local communities.

Practical/managerial implications: The study highlights the need for policymakers to promote multilingual digital platforms, strengthen ICT infrastructure and support SMEs through language-inclusive digital platforms.

Contribution/value-add: This study adds to the literature on digital inclusion and SME development by establishing linguistic accessibility as a fundamental factor influencing ICT effectiveness, business sustainability and inclusive economic growth in South Africa.

Keywords: digital inclusion, indigenous languages, ICT adoption, Small and Medium Enterprises (SMEs), SME development.

INTRODUCTION

Small and medium enterprises (SMEs) play a crucial role in economic development, employment creation, and poverty alleviation in South Africa (Ramsuraj, 2023). In provinces such as Limpopo, SMEs are particularly important for local economies and rural development (Rasimphi et al., 2025). However, Agbo-Adediran et al. (2025) point out that the increasing reliance on digital technologies for business operations, marketing, and customer engagement has created new challenges for SMEs that lack adequate access to information and communication technologies (ICT). Digital inclusion, defined by Vrontis et al. (2022) as the ability of individuals and organisations to access, use, and benefit from digital technologies, has emerged as an important determinant of SME competitiveness and sustainability. Chisika and Yeom (2024) state that while significant progress has been made in expanding digital infrastructure, disparities persist, especially in rural areas where access, affordability, and digital literacy remain limited.

One critical but often overlooked factor contributing to digital exclusion is language (Khan & Hussain, 2025). South Africa is a multilingual society with eleven official languages, yet most digital platforms, software applications,

and online services are predominantly available in English (Makgopa, 2024). Makgopa (2024) further says that this creates barriers for SME owners and employees who are more proficient in indigenous languages such as Sepedi, Tshivenda, and Xitsonga, which are widely spoken in Limpopo Province. The integration of indigenous languages into ICT systems has the potential to enhance digital accessibility, improve user experience, and facilitate greater participation in the digital economy (Sibizo, 2025).

Previous studies highlight that linguistic inclusion can enable SMEs to use digital tools in their preferred languages, thereby improving communication, strengthening customer engagement, and extending their market reach (Gallastegui & Forradellas, 2024; Idialu, 2025; Rachal et al., 2025). Against this backdrop, this study examines how the use of indigenous languages in ICT contributes to digital inclusion and supports SME development in Limpopo Province. The study seeks to provide insights into how language-inclusive digital strategies can improve business performance and promote inclusive economic growth, address barriers to ICT adoption, and increase SME participation in the digital economy in contemporary higher education settings.

LITERATURE REVIEW

Digital Inclusion

Digital inclusion refers to equitable access to and use of ICT resources, enabling individuals and organisations to participate in the digital economy fully (Vrontis et al., 2022). From a theoretical perspective, digital inclusion is underpinned by the Capability Approach developed by Robeyns (2021), which emphasises that true inclusion is not only about access to technology but about expanding individuals' real freedoms to use digital tools in ways that enhance their socio-economic well-being. Sanders (2020) adds that digital inclusion covers not only access to devices and internet connectivity but also the skills, confidence, and support necessary to utilise digital tools effectively. For SMEs, digital inclusion is important for improving operational efficiency, accessing new markets, improving customer relationships, and remaining competitive in an increasingly digitalised business environment (Zulqarnain et al., 2023; Gómez & López, 2024; Rampaul, 2025).

However, digital inclusion remains unevenly distributed, particularly in rural areas where infrastructure constraints and socio-economic inequalities persist (Doloi, 2025). Barriers to digital inclusion include limited connectivity, high data costs, limited digital skills, and insufficient institutional support (Nirman, 2025). Makgopa (2024) postulates that linguistic barriers further exacerbate these challenges by limiting the usability of digital platforms for non-English speakers. This is grounded in the Socio-technical systems theory developed by Appelbaum (1997), which emphasises the interaction between language, users, and technology systems.

Indigenous Languages and ICT

Research by Parajuli (2021) has shown that indigenous languages play a vital role in shaping communication, identity, and social interaction. In the context of ICT, language influences how users engage with digital technologies and interpret information (Salfin et al., 2024). Makananise (2024) reported that the dominance of English on digital platforms often marginalises speakers of indigenous languages, creating digital exclusion. Kumar (2023) indicates that users who are not proficient in English may struggle to navigate digital interfaces, understand content, and utilise online services effectively.

This reinforces usability gaps predicted by human-computer interaction (HCI) theory developed by Dix et al. (2004), which emphasises the importance of user-centred design for effective technology adoption. Integrating indigenous languages into ICT systems can improve usability, accessibility, and user engagement (Ajani et al., 2024). Momen (2025) adds that this includes localising software interfaces, translating digital content, and developing language-sensitive applications. This aligns with Socio-technical systems theory (Appelbaum, 1997), which highlights the need to align technological design with social and cultural contexts. Such efforts may not only improve user experience but also empower communities to participate more actively in the digital economy.

ICT Adoption and SME Development

ICT adoption is widely recognised as a key driver of SME growth and innovation (Holl & Rama, 2024). This view is theoretically supported by the Technology-Organisation-Environment (TOE) framework (Baker, 2011), which explains that technology adoption in firms is influenced by technological readiness, organisational capacity, and environmental conditions. Brandy (2023) argues that digital technologies enable SMEs to streamline operations, reduce costs, improve decision-making, and expand into broader markets. In rural contexts, ICT adoption can facilitate access to information, financial services, and supply chains, thereby enhancing business resilience and competitiveness (Sikder et al., 2025). However, Zamani (2022) reports that adoption levels remain low among many SMEs due to various constraints, including technological complexity and lack of contextual relevance. Language plays a significant role in ICT adoption, as it affects how easily users can interact with digital systems (Salfin et al., 2024). This can also be understood through Socio-technical systems theory (Appelbaum, 1997), which emphasises the alignment between human factors (such as language and skills) and technological systems for successful adoption.

Indigenous Languages and SME Development

The use of indigenous languages in business operations can strengthen relationships with local customers, enhance trust, and improve communication (Rif'at & Imawan, 2025). This is supported by the social identity theory (Tajfel & Turner, 1986), which explains that individuals are more likely to trust and engage with organisations that reflect their cultural and linguistic identity. For SMEs operating in rural areas, language alignment with customers' preferences is a critical factor for success (Ajibade & Mutula, 2020). Ajani et al. (2024) add that SMEs can extend these benefits to their online interactions through integrating indigenous languages into digital platforms. This may lead to improved customer engagement, increased market reach, and enhanced brand loyalty. Furthermore, language-inclusive digital strategies can contribute to broader socio-economic development by promoting inclusivity, reducing inequalities, and supporting local economic participation (Debbarma, 2025).

Research Hypothesis

Digital inclusion has a significant positive influence on ICT adoption among SMEs, ICT adoption has a significant positive influence on SME development, and Digital inclusion has a significant positive influence on SME development. These hypotheses are grounded in the Capability Approach (Robeyns, 2021), the Technology-Organisation-Environment (TOE) framework (Baker, 2011), the Socio-Technical systems theory (Appelbaum, 1997), and the Social Identity Theory (Tajfel & Turner, 1986).

The Capability Approach explains how digital inclusion expands individuals' real freedoms to use technology meaningfully (Robeyns, 2021), while TOE theory explains how organisational and environmental factors influence ICT adoption (Baker, 2011). Socio-technical systems theory supports the interaction between language, users, and technology (Appelbaum, 1997), and Social Identity Theory explains how indigenous languages strengthen trust, engagement, and business relationships in SME contexts (Tajfel & Turner, 1986). The proposed research model illustrates the relationships among the study's key constructs.

This model suggests that SMEs are more likely to benefit from digital inclusion when ICT systems are accessible in indigenous languages, as this improves usability, trust, and adoption. See Figure 1.

Figure 1: Digital inclusion, ICT adoption, and SME development.



RESEARCH DESIGN AND METHODOLOGY

Research Approach

This study adopted a mixed-methods research approach to provide a deeper understanding of how indigenous languages contribute to digital inclusion and SME development in Limpopo Province. The mixed-method approach was considered appropriate, as it enabled the study to capture both measurable patterns of ICT utilisation and indigenous language integration, as well as the contextual experiences of SME owners and managers.

Research Method

Quantitative data were collected through structured questionnaires administered to 116 SME owners and managers operating across district municipalities in Limpopo Province. The questionnaire focused on the use of indigenous languages and ICT among SMEs, particularly in relation to digital accessibility, technology usage and SME development. Qualitative data were collected through semi-structured interviews with SME owners and managers to explore their experiences regarding the incorporation of indigenous languages into ICT systems. The qualitative phase generated key themes such as *“the role of indigenous languages in enhancing communication with customers, improving digital accessibility, strengthening customer engagement, supporting business marketing and facilitating operational efficiency”*.

Research Participants

The study participants were SME owners and managers operating across the five district municipalities of Limpopo Province: Capricorn, Sekhukhune, Mopani, Vhembe, and Waterberg. A total of 116 SMEs participated in the quantitative phase of the study, while qualitative insights were obtained from selected SME owners and managers through semi-structured interviews. Participants represented various business sectors and were selected based on their involvement in SME operations and their experience with the use of ICT and indigenous languages in their business environments. See Table 1.

Measuring Instruments

The study utilised a structured questionnaire and semi-structured interview guide to collect data from SME owners and managers. The quantitative instrument consisted of two researcher-developed measurement scales adapted from Makgopa (2024), namely the Strategic Management scale and the Use of Indigenous Languages and ICT scale. The Strategic Management scale measured SME development-related practices, including organisational processes and

activities supporting business growth. In contrast, the Use of Indigenous Languages and ICT scale assessed ICT utilisation, the application of indigenous languages in business and technology, and the accessibility of ICT among SMEs. The semi-structured interview guide explored participants' experiences with ICT use, the role of indigenous languages in business communication, ICT infrastructure and accessibility challenges, and the contribution of indigenous-language-supported ICT practices to SME development in Limpopo Province.

Research Procedure and Ethical Considerations

Ethical clearance was obtained from the University of KwaZulu-Natal Humanities and Social Sciences Research Ethics Committee (HSS/0254/019D) prior to data collection. Permission to conduct the study was granted by the Limpopo Department of Economic Development, Environment and Tourism (LEDET), which served as the gatekeeper for access to registered SMEs in Limpopo Province. Participants were informed of the study's purpose and their rights before providing written informed consent. Participation was voluntary, and participants were informed that they could withdraw from the study at any stage without any consequences. Confidentiality and anonymity were maintained throughout the research process to protect participants and their business information.

Data Analysis

Quantitative data were captured using Microsoft Excel and exported to the Statistical Package for the Social Sciences (SPSS) for analysis. Descriptive statistics, including frequencies and percentages, were used to summarise the demographic profile of respondents and to analyse responses regarding ICT utilisation, the incorporation of indigenous languages in business and technology, and SME development. Reliability analysis was performed using Cronbach's alpha coefficients to assess the internal consistency of the Strategic Management and Use of Indigenous Languages and ICT scales. Qualitative data collected through semi-structured interviews were analysed using thematic analysis in MAXQDA. The analysis involved transcribing interview data, coding participants' responses, and identifying key themes relating to indigenous language utilisation, ICT accessibility, digital participation, ICT infrastructure challenges and SME development.

RESULTS

The demographic results in Table 1 show that the study focused specifically on variables relevant to digital inclusion, indigenous language usage and SME development. The majority of SMEs were located in the Capricorn District Municipality (32.7%), followed by Sekhukhune (26.0%). This suggests that most participating SMEs operated in areas with relatively higher levels of commercial and digital activity.

The findings in Table 2 indicate that Sepedi was the dominant indigenous language used by SMEs in Limpopo Province (68.0%). This confirms the importance of incorporating local indigenous languages into ICT platforms to improve communication and digital accessibility among SMEs.

The findings in Table 3 show that the majority of SMEs had been operating for 5-10 years (57.5%), suggesting that most businesses had sufficient operational experience to evaluate the roles of ICT and indigenous languages in supporting business development and digital inclusion. Table 4 shows that most SMEs employed 1-5 employees (29.1%), indicating that the sample consisted mainly of small enterprises. This finding supports the need to examine affordable, accessible digital inclusion strategies for smaller businesses operating in rural and semi-urban areas.

The findings in Table 5 indicate that SMEs represented various economic sectors, with construction (16.8%), manufacturing (14.1%), and agriculture (11.6%) being the dominant sectors. The diversity of sectors highlights the importance of inclusive ICT approaches that accommodate different SME operational contexts.

The reliability of the questionnaire was assessed using Cronbach's Alpha coefficients. The findings in Table 6 revealed acceptable internal consistency for all measurement scales, with the Strategic Management scale recording a Cronbach's Alpha value of 0.800 and the Use of Indigenous Languages and ICT scale achieving a value of 0.831.

The overall questionnaire reliability was 0.861, confirming that the instrument was reliable for measuring SME development-related practices and the use of indigenous languages and ICT among SMEs in Limpopo Province.

The results in Table 7 on ICT adoption and Indigenous language usage reveal positive perceptions of the role of Indigenous languages in promoting digital inclusion among SMEs. Most respondents indicated that indigenous languages enhance communication with customers and improve accessibility to ICT platforms. These findings suggest that language-inclusive digital systems can improve SME participation in the digital economy.

The thematic analysis identified several recurring themes regarding the integration of indigenous languages into ICT systems and SME operations. The findings in Table 8 indicate that indigenous languages play an important role in enhancing digital inclusion by improving communication, accessibility and engagement. However, infrastructure limitations, inadequate ICT support, and slow technology adoption continue to hinder the effective use of digital platforms among SMEs.

DISCUSSION

Interpretation of Findings

The findings of this study highlight the importance of digital inclusion and the use of indigenous languages in supporting SME development in Limpopo Province. The results showed that SME owners and managers recognised ICT as an important tool for supporting business activities and participation in the digital environment. This is supported by previous studies, which indicate that ICT adoption assists SMEs in improving access to information, communication processes and business-related activities (Zulqarnain et al., 2023; Gómez & López, 2024). A key finding of the study relates to the role of indigenous languages in facilitating digital inclusion among SMEs. The quantitative findings revealed that SME owners and managers acknowledged the importance of indigenous languages in business activities and in the use of technology. Similarly, the qualitative findings indicated that indigenous languages enhance communication by enabling SMEs to interact effectively with customers and communities within their local contexts. These findings are supported by Makananise (2024), who argues that language barriers can contribute to digital exclusion when digital technologies do not accommodate users' linguistic backgrounds.

The findings further align with Human-Computer Interaction theory by Dix et al. (2004), which emphasises the importance of designing technologies that reflect users' needs, abilities and contexts. In this study, integrating indigenous languages into ICT systems can improve accessibility and usability, particularly for SMEs operating in multilingual environments. Therefore, language-inclusive digital platforms may create opportunities for broader participation in the digital economy.

The findings also support the Capability Approach by Robeyns (2021), which argues that inclusion extends beyond access to resources and focuses on individuals' ability to utilise available opportunities effectively. Although SMEs recognised the importance of ICT, the findings revealed that barriers such as inadequate ICT infrastructure, limited technical support, affordability challenges and slow adaptation to digital technologies continue to affect effective ICT utilisation. Addressing these challenges is important in ensuring that SMEs can fully participate in digital transformation. Furthermore, the findings relate to Social Identity Theory (Tajfel & Turner, 1986), which highlights the importance of cultural and linguistic identity in social interactions. The use of indigenous languages in SME activities can strengthen communication and create meaningful engagement between businesses and their stakeholders. Therefore, promoting indigenous languages within ICT environments can contribute towards more inclusive and culturally responsive digital practices.

Practical Implications

This study was limited to SMEs operating within Limpopo Province; therefore, the findings may not represent the experiences of SMEs in other provinces or contexts. Future studies may conduct comparative research across different provinces and industries to provide broader insights into the role of indigenous languages in promoting digital inclusion.

Limitations and Recommendations for Future Research

This study has limitations that should be considered when interpreting the findings. First, the research was conducted at a single South African university, which limits the generalisability of the results to other institutional contexts. Second, the cross-sectional design prevents causal inferences and does not capture how perceptions of justice and OCB may change over time.

Future research should extend this work by including multiple universities across different regions and institutional types. Longitudinal designs would allow researchers to examine how justice perceptions and OCB evolve over time and in response to organisational changes. In addition, future studies should test more complex models that incorporate mediators and moderators, such as perceived organisational support, leadership style, work engagement, organisational cynicism, and psychological contract fulfilment. These factors help explain when and how organisational justice translates into discretionary behaviour.

Conclusion

This study examined the role of indigenous languages in promoting digital inclusion and supporting SME development in Limpopo Province, South Africa. The findings demonstrate that indigenous languages remain important in SME activities and can contribute towards improving accessibility and participation in ICT environments. The integration of indigenous languages into digital practices offers SMEs opportunities to communicate effectively and engage with diverse communities.

The study further revealed that ICT plays an important role in SME activities; however, challenges such as limited ICT infrastructure, affordability concerns, inadequate support and slow adaptation to digital technologies continue to influence digital participation. Addressing these challenges requires collaborative efforts from policymakers, technology developers and SME support institutions. The study contributes to existing knowledge on digital inclusion by highlighting linguistic accessibility as an important consideration in ICT adoption among SMEs. Promoting indigenous languages in digital environments can contribute to a more inclusive digital transformation and support SME participation in South Africa's multilingual economy.

TABLES AND FIGURES

Table 1: Business location of SMEs (N = 116).

District municipality	Frequency (n)	Percentage (%)
Capricorn	38	32.7
Sekhukhune	30	26.0
Mopani	17	14.7
Vhembe	16	13.8
Waterberg	15	12.8
Total	116	100

Table 2: Indigenous languages used by SMEs.

Indigenous language	Frequency (n)	Percentage (%)
Sepedi	79	68.0
Tshivenda	20	17.2
Xitsonga	17	14.8
Total	116	100

Table 3: Business experience of SMEs.

Business experience	Frequency (n)	Percentage (%)
5–10 years	67	57.5
More than 10 years	44	38.1
Not indicated	5	4.4
Total	116	100

Table 4: Number of employees in SMEs.

Number of employees	Frequency (n)	Percentage (%)
1–5 employees	34	29.1
6–10 employees	24	20.3
11–20 employees	21	17.7
21–50 employees	28	23.9
51–200 employees	11	9.1
Total	116	100

Table 5: Business sector profile.

Economic sector	Percentage (%)
Construction	16.8
Manufacturing	14.1
Agriculture	11.6
Catering and Accommodation	9.7
Retail and Motor Trade	8.8
Wholesale Trade	7.1
Community Services	5.3
Finance and Business Services	4.7
Mining and Quarrying	2.9
Transport and Communication	2.8
Electricity, Gas and Water	0.1
Other	8.2

Reliability Analysis

Table 6: Reliability statistics.

Construct	Cronbach's Alpha	Number of items
Strategic Management scale	0.800	10
Use of Indigenous Languages and ICT scale	0.831	10
Overall questionnaire	0.861	20

Table 7: Indigenous languages in ICT usage among SMEs.

Statement	Agree (%)	Strongly Agree (%)	Neutral (%)	Disagree (%)
Indigenous languages improve communication with customers	43	31	21	2
ICT enhances business activities	37	32	28	3
Indigenous languages improve digital accessibility	42	35	19	1

Qualitative Findings

Table 8: Themes emerging from Qualitative analysis.

Theme	Description
Improved communication through indigenous languages	Participants indicated that using local languages improved understanding and communication between SMEs and customers.
Enhanced ICT accessibility	Indigenous language integration made digital platforms easier for SME owners and customers to use.
Increased customer engagement	SMEs highlighted that communicating through local languages strengthened relationships with community members.
ICT infrastructure challenges	Participants reported barriers such as limited connectivity, affordability issues and inadequate ICT support.
Slow adaptation to digital technologies	Some SMEs experienced resistance from customers who preferred traditional face-to-face interactions.

REFERENCES

- Agbo-Adediran, I., Adeusi, O. C., Bello, A. B., & Afolabi, O. N. (2025). Analysing the impact of AI adoption and ICT platforms in improving customer engagement of small and medium-sized enterprises (SMEs). *Applied Sciences, Computing, and Energy*, 2(2), 284-298.
- Ajani, Y. A., Oladokun, B. D., Olarongbe, S. A., Amaechi, M. N., Rabi, N., & Bashorun, M. T. (2024). Revitalizing indigenous knowledge systems via digital media technologies for sustainability of indigenous languages. *Preservation, digital technology & culture*, 53(1), 35-44.
- Ajibade, P., & Mutula, S. M. (2020). Promoting SMEs effectiveness through innovative communication strategies and business-IT alignment. *Problems and Perspectives in Management*, 18(3), 233.
- Appelbaum, S. H. (1997). Socio-technical systems theory: an intervention strategy for organizational development. *Management decision*, 35(6), 452-463.
- Baker, J. (2011). The technology–organization–environment framework. *Information Systems Theory: Explaining and Predicting Our Digital Society*, Vol. 1, 231-245.
- Brandy, S. (2023). Overcoming challenges and unlocking the potential: Empowering Small and Medium Enterprises (SMEs) with data analytics solutions. *International Journal of Information Technology and Computer Science Applications*, 1(3), 150-160.

- Chisika, S. N., & Yeom, C. (2024). Bridging the digital divide: Advancing equitable internet access in rural Kenya for sustainable development. *Asia-Pacific Journal of Convergent Research Interchange (APJCRI)*, 187-202.
- Debbarma, M. (2025). Linguistic Diversity and National Integration in India: Challenges, Policies and Pathways to Inclusivity. *Journal of Asian and African Studies*, 00219096251400655.
- Dix, A. (2004). *Human-computer interaction* (Vol. 1). Pearson Education.
- Doloi, H. K. (2025). Digital inclusion for rural growth: Internet usage and smart villages development. *Asia-Pacific Journal of Rural Development*, 35(1), 40-57.
- Gallastegui, L. M. G., & Forradellas, R. R. (2024). FASECO: A Framework for Advanced Support of E-Commerce and digital transformation in SMEs with natural language processing-enhanced analysis. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(4), 100412.
- Gómez, A. L., & López, S. J. (2024). Innovation and transformation: Keys to the success of SMES in the digital age. *Journal of Economics, Innovative Management and Entrepreneurship*, 2(3).
- Holl, A., & Rama, R. (2024). Spatial patterns and drivers of SME digitalisation. *Journal of the Knowledge Economy*, 15(2), 5625-5649.
- Idialu, P. O. (2025). Linguistic Capital and Economic Mobility: A Critical Examination of the Language Marketplace Among Small and Medium-Scale Enterprises. *Imprint and Copyright*. Sanders, R. (2020). Digital inclusion, exclusion and participation. *Glasgow: Iriss*, 2020-04.
- Khan, A., & Hussain, A. (2025). The Role of Language in Digital Marginalization: A Critical Discourse Analysis of Linguistic Exclusion in Online Platforms and Policies. *Pakistan Journal of Humanities and Social Sciences*, 13(3), 120-136.
- Kumar, R. (2023). English language and digital literacy: Navigating the information age. *Journal of International English Research Studies (JIERS)*, ISSN: 3048-5231, 1(2), 25-31.
- Makananise, F. O. (2024). Decolonial Thinking of Digital Media Inequalities and Indigenous Language Marginalisation of the Global South from the South African Context. In *Decolonising Digital Media and Indigenisation of Participatory Epistemologies* (pp. 17-39). Routledge.
- Momen, A. (2025). Identifying the Contributions of Mother Language to the Sustainable Development of Bangladesh. *Mother Language*, 9(1), 5-43.
- Nirman, I. A. P. (2025). Barriers to digital participation in developing countries: Identifying technological, social, and cultural obstacles to community involvement. *GSC Advanced Research and Reviews*, 23(2), 061-071.
- Parajuli, B. (2021). Role of language in shaping cultural identity. *Marsyangdi Journal*, 112-118.
- Rachal, I. D., Sindhu, K., Selvakumari, R., Sudha, S., Pathak, P., Devi, J. M., & Anand, N. (2025). The Role Of English Language Proficiency In Enhancing Social Media Advertising Effectiveness For Business Growth. *Lex Localis: Journal of Local Self-Government*, 23.
- Rampaul, K. (2025). Digital transformation and SME growth in emerging markets. *Journal of Emerging Markets and Management*, 1(1), 15-25.
- Ramsuraj, T. (2023). Assessing the role of entrepreneurship industry and SMEs to economic growth in South Africa. *International Journal of Research in Business and Social Science*, 12(7), 283-291.
- Rasimphi, T. E., Tinarwo, D., & Mulaudzi, T. S. (2025). Success And Failure Factors of Rural Cooperatives and Smmes in Limpopo Province, South Africa: A Scoping Review. *South Africa: A Scoping Review*.

- Rif'at, D. F., & Imawan, K. (2025). Communication Between Ethnic Chinese and Indigenous People in the Retail Business. *Journal of World Science*, 4(7), 1023-1034.
- Robeyns, I. (2021). The capability approach. In *The Routledge handbook of feminist economics* (pp. 72-80). Routledge.
- Salfin, S., Kurniadi, P., & Erwin, E. (2024). Language Development in the Digital Age, A Literature Review on the Influence of Technology on Human Communication. *Sciences du Nord Humanities and Social Sciences*, 1(01), 01-07.
- Sibizo, B. T. (2025). Bridging the Digital Divide: Exploring the Integration of South African Indigenous Languages in ICT for Economic Growth. *Digital Policy Studies*, 4(1), 1-17.
- Sikder, A. S., Hasan, M. M., & Alam, M. J. (2025). Role of ICT in Building Resilience of Medium-Sized Enterprises During Economic Crises.: ICT on Medium-Sized Enterprises. *International Journal of Imminent Science & Technology*, 3(3).
- Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behaviour. *Psychology of intergroup relations*, 2, 7-24.
- Vrontis, D., Chaudhuri, R., & Chatterjee, S. (2022). Adoption of digital technologies by SMEs for sustainability and value creation: Moderating role of entrepreneurial orientation. *Sustainability*, 14(13), 7949.
- Zamani, S. Z. (2022). Small and Medium Enterprises (SMEs) facing an evolving technological era: a systematic literature review on the adoption of technologies in SMEs. *European Journal of Innovation Management*, 25(6), 735-757.
- Zulqarnain, M., Mustehsan, M., Balouch, U. K., & Munir, S. (2023). Assessing the influence of financial inclusion and digital finance on SMEs performance: the moderating role of technological adaptation. *Journal of Management: Small and Medium Enterprises (SMEs)*, 16(3), 459-476.

MANAGING RELATIONSHIPS OF SUPPLIERS IN A SOUTH AFRICAN STATE-OWNED ENTERPRISE

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ABSTRACT

Supply Chain Management (SCM) departments, specifically supply chain functions, account for the majority of expenditure in most organisations. Meanwhile, their role has been misunderstood, devalued, and underutilised, and their strategic relevance has not been recognised. As a result, the majority of South Africa's state-owned entities have inadequate supply chain procurement practices. The interpretivism paradigm was used in this study. The paradigm has, therefore, helped the researcher to explore supplier relationship management (SRM) within the selected SOE in South Africa. Interpretivism paradigm collect data from experienced potential participants, and this study collected data from supply chain officials employed in the supply chain section within the state-owned enterprise (SOE) in South Africa. Therefore, the research design utilised is an exploratory design, which explores concepts and ideas on a subject to find more theories about the SRM in the SOE. A qualitative research method was adopted, and semi-structured interviews were employed to gather data regarding current supplier relationship management practices within the supply chain function of a state-owned enterprise. 13 supply chain officials working in the supply chain environment in the State-Owned Enterprises (SOE) were interviewed until a saturation point was reached. The findings of this study indicate that there are poor procurement practices within the SOEs regardless of government initiatives established to address a lack of accountability, inconsistency in the application of procurement policies, a lack of supporting structures and fragmented supply chain processes. The detailed findings indicate that the procurement function is regarded as an administrative function within the SOEs, thereby placing less importance on SRM functions within the SOEs. The findings also show that there is poor contract management during the procurement process, thereby creating opportunities for high levels of corruption in the SOEs. The study found that there are processes that are not followed properly or are not performed at all. The SOEs undervalue their suppliers, which leads to poor SRM. SOEs' inadequate procurement practices/policies created additional obstacles in supplier relationship operations. As a result of the aforementioned challenges, this study offered techniques that might be employed to address the problems discovered within the supply chain operations in the only SOE selected in South Africa. Based on these findings, many recommendations were made to improve the effectiveness of the selected SOE's connections with its suppliers. This study proposes that the SOE establish clear communication channels and engage with suppliers regularly to discuss requirements, address issues, and identify areas for improvement. The other enterprises' SRM procedures need to be improved through positive initiatives like reducing corruption, and the suppliers should be recognised for the growth of SRM in the SCM.

Keywords: supplier relationship management, supply chain management, procurement practices, competency theory.

INTRODUCTION

State-Owned Enterprise (SOE) is legal entity created by the government to assist in commercial activities on the government's behalf in order to achieve economic growth (Matteo 2020), which benefits the company, the government, and the county, as a whole. In some instances, the government does not own 100 per cent of the company's shares or ownership. It can be 50 per cent of the shares or even less (Keton 2020). SOEs play an important role in the South African economic landscape, with activities in sectors such as transport, energy, minerals, defence, post and telecommunications, industries, forests, and holiday resorts. SOEs are sometimes controlled by law or generally compelled to abide by certain laws, meaning they are roles and regulations; however, limited competition is allowed in some companies such as telecommunications (Katarzyna, Akos & Piotra 2020). Examples of SOEs in South Africa include Transnet, Eskom, South African Airways, Passenger Rail Agency (PRASA), Denel and other

institutions under state ownership and control, such as the Development Bank of Southern Africa (DBSA) and other independent development trust (Setino, Marcus & Ambe 2016).

SRM is used by supply chain professionals who work with the suppliers in sections such as supply chain or procurement, project management and operations. SRM is sometimes compared with customer relationship management (CRM) because most of the principles used in CRM are about the relationship between the suppliers and the purchasers (Mingzhi & Jaimiew 2019). SRM is used by private businesses, public sectors and SOE companies in South Africa (Setino, Marcus & Ambe 2016). SRM is a business practice that provides ways in which relationships are developed and well-maintained. However, there are many factors affecting the SRM. These differ from business to business or country to country due to management vision and mission, venture capital available, the skills level of the workforce and the nature of market demand for the product and service. Each factor reflects an organisation's unique value and vision (Kim & Choi 2020)

SRM has become increasingly important as buyer and supplier networks become more global and interdependent and as companies rely more on strategic suppliers. SRM creates a framework for both identifying the strategic supply partners and organising the relationship lifecycle. Its practices create a common frame of reference to enable effective communication between an enterprise and suppliers and measure supplier performance (Tuan 2021).

SRM is the process of getting the materials and goods that the company needs at a given time and place, while SCM is the process of converting those goods into products and distributing them to consumers as efficiently as possible. It is important to note that there is a direct relationship between SRM and SCM (Mingzhi & Jaimiew 2019). Furthermore, Mingzhi and Jaimiew (2019) and Etensive (2025) maintain that the main role of SRM is to streamline and make the processes between the supplier and enterprise in the chain more effective. Naude, Ambe, and Kling (2013) suggest that there is a very close integration between SRM and internal supply chain management (ISCM), and integrating supplier constraints is crucial. The aim of this study was to evaluate and explore recent factors influencing the effectiveness of the relationship between SOEs and their suppliers in South Africa by explaining the strategies to improve SRM in the SOEs. However, the study examined the SRM process in the SOE and explored the relationship between SRM and supply chain performance in SOEs.

PROBLEM STATEMENT

A study conducted by Naude, Ambe and Kling (2013) focused on the SRM anathema for the South African public procurement sector. However, Amoako, Boakye, Adaku and Famiyeh (2018) looked at SRM and firm performance in developing economies for a moderated mediation analysis of flexibility capability and ownership structure, while Rungsithong and Meyer (2020) explained more about trust and knowledge sharing of international buyer/supplier relationships in Thailand. In the South African context, there is limited evidence that studies have been conducted on SRM in SOEs; most research across the world has focused on supply chain management, not SRM. Furthermore, this research study will close the gap by evaluating and exploring more of the recent factors influencing the effectiveness of the relationship between SOEs and their suppliers in South Africa. Young, Murray and Wilkinson (2017) and Amoako, Boakye, Adaku and Famiyeh (2018) note that new knowledge and solutions will be available for future studies within the supply chain management in SRM practices, which will be beneficial to the future suppliers and the SOEs. Suppliers sometimes fail to comply with the supply chain practices because procurement officials, project managers and supply chain professionals are not well-informed (lack of skills) about SRM.

Main research questions:

- 1- What are the key factors and strategies that influence SRM at a selected SOE in South Africa?
- 2- How is the SRM performance in the selected SOE in South Africa?

LITERATURE REVIEW

This study reviews literature on Competency Theory, Supplier Relationship Management, Supply Chain Management, and State Owned Enterprises.

Competency Theory

Prahalad (1995) and Winterton, and Turnbow (2020) explained that competency theory provides an important theoretical lens for investigating SRM in the SOE, in the context of this study, which looks at SRM implementation in a South African SOE. Competency theory describes how organisational capacities, skills, knowledge, and behaviours influence the efficacy of supply chain and procurement operations. Given the findings of bad procurement procedures, inadequate contract management, a lack of supplier growth, and limited strategic acknowledgment of SRM, competency theory is especially important in explaining these flaws, as suggested by Chouhan and Srivastava (2014). Competency theory gives a solid framework for comprehending the issues that SRM faces in the selected SOE. Furthermore, Saunders, Lewis and Thornhill (2016) described that it underlines that long-term supplier relationships are established not only on policies and regulations, but also on the capabilities of the people and systems who manage them. According to Prahalad (1995), effective SRM implementation requires strategic alignment, technical expertise, relational capability, and analytical skills. In the context of this study, poor SRM implementation, poor contract management, limited supplier development, and supplier undervaluation can all be regarded as indicators of competency deficiencies within the SOE's supply chain function; therefore, developing competences at all organisational levels is vital for improving SRM effectiveness, enhancing supply chain performance, and eventually contributing to better service delivery and economic growth in South Africa as suggested by Winterton, and Turnbow (2020).

Definition of Supply Chain Management and Supplier Relationship Management

In the last 20 years, Supply Chain Management (SCM) has emerged as a major business development instrument, particularly in South Africa where it was implemented by the private sector earlier than the public and state-owned companies (CIPS 2019; Mhelembe & Mafini 2019). The role of SCM is broad and includes a number of functions: procurement, manufacturing, and distribution, with the Supplier Relationship Management (SRM) becoming a strategic sub-discipline (Mikell 2023). SRM is not just a transactional buying process; it is aimed at long-term value relationship (Samiul, Saman & Leslie 2023). Although procurement, purchasing and supply management are terms that are used interchangeably, authors point out some stark differences. Procurement covers pre-award (e.g. tendering) and post-award (e.g. payment) phases (CIPS 2019), whereas SRM is an effort to minimize the inefficiency and enhance service quality in SOEs (Giunipero & Patterson 2016). SRM also considers the input of suppliers in company success and builds healthy relationships (Human 2016; Moritz et al. 2023). Although SRM is connected to procurement and vendor management, researchers believe that it is a necessary part of effective SCM (Satyam 2023).

Challenges and Risks Faced by the Selected SOE Concerning Supplier Relationship Management

SOEs in South Africa have a vital role in the transport, utilities, and construction sectors, but they are also in a very problematic position that undermines the sustainability of the national economy (Willie et al. 2021; Katarzyna, Akos & Piotra 2020). Although Supplier Relationship Management (SRM) is a strategic approach, its adoption in SOEs has been unsuccessful because of the wastage of resources and negative results (Thompson 2018). Some of the main issues that Debnath (2020), Matthews (2021), and Mkiva (2023) name are the lack of investments, short-term ROI, poor leadership, skills, and vision. Additional obstacles also comprise the absence of professional support, the imbalance of power, ineffective collaboration, and category management conflicts, and the overall lack of a common understanding among stakeholders, which reduces the success of SRM in SOEs.

Solutions for Enhancing SOE Performance

In order to counter these challenges, nations should strike the balance between state ownership and competitive performance. These are formulating transparent legal and regulatory frameworks and building autonomous supervisory arrangements (World Bank Group 2014). The appointment of SOE boards must be purely based on merit and governance as well as technical competencies, without politics (Nimeh, Abdallah & Sweis 2023). According to empirical research, commercial mandates of independent boards are proven to enhance the performance of SOEs

considerably (Osman et al. 2017). Realistic and measurable performance objectives should be established by the governments, which should incorporate social and financial results (Barrett & Fazekas 2020; Carr & Griffin 2021). In other countries such as Sweden and New Zealand, scorecards are applied to measure such things as financial ratios and effectiveness in public services (Choudhary & Sangwan 2019). Underperformance can be revealed with the help of regular monitoring by means of audits, reviews, and reporting (Klaas 2022; Keton 2020). SOEs have to provide competitive and performance-based payments and career advancement opportunities to attract top talent (Katarzyna et al. 2020). Continual training and objective assessment must be associated with incentives, and poor performers should be handled accordingly (Moise 2018; Funer 2021). Such reforms have the potential of creating a more responsible, effective and sustainable SOE sector.

METHODOLOGY

This study employed qualitative research method. The qualitative research would be appropriate in this study since the results of the study would be established based on responses of the participants to the research question on supplier relationship management in the selected SOEs in South Africa. In addition, qualitative research was also used and it also helped identify new knowledge regarding the use of SRM in the selected state-owned enterprise in South Africa. To increase the understanding of qualitative research, the paper has described or defined the qualitative research, the categories of qualitative research strategies as well as the strengths and weaknesses that should be considered when conducting qualitative research.

During the interviews, the researcher took notes to record any events that would not be captured by audio recording, as recommended by Saunders, Lewis and Thornhill (2016). Before the interviews began, permission to record and share the recording with the trained professional (data information technology analyst) was obtained from all the participants as recommended by Yin (2011). According to Saunders, Lewis and Thornhill (2012), a semi-structured interview allows the researcher to have a list of themes and key questions to be covered and allows additional questions (sub-questions) as well as follow-up questions to get more insight into the topic. In this study, semi-structured interviews helped to explore the study research questions and objectives to determine SRM within the selected SOE. In addition, the interview guide that was developed covered the following four aspects regarded as being critical to SRM in the selected SOE: the value and contribution of SRM, implementation of SRM processes, implementation of supply management within multiple stages of the SRM process and SRM challenges encountered by supply chain officials and the suppliers.

The secondary data used in this study comprised an extensive literature review of the selected SOE SRM/SCM policies and procedures, SOEs policies and procedures, books, SOEs reports, as well as articles. Both primary and secondary sources of data collection, as stipulated above for this study, are tabulated in summary in Table 1, as suggested by Efe (2023).

Table 1: Type of research design data collection summarised sources.

Primary sources	Secondary sources
Face-to-face semi-structured interviews	Academic literature such as textbooks, articles, journals, conference proceedings, theses and dissertations
Observations and notes taken during the interviews	SOEs/Government documents such as SOEs SRM acts, policies and regulations
SOEs policies	SOEs website

Source: Makhubela (2018).

Details of Transcripts

The study conducted interviews with 9 supply chain general staff and management in the selected SOE. The outcome of the interview was then transcribed and loaded into ATLAS.ti to be coded thematically and then the themes identified.

Ways in Which the SRM Can Be Improved in the Selected SOE

Based on the empirical data, numerous techniques have been proposed to improve SRM in the selected SOE. For starters, open and transparent communication with suppliers is critical for establishing confidence and resolving difficulties quickly. Establishing defined performance metrics and conducting regular evaluations ensures that providers meet expectations and enables the discovery of areas for improvement. Diversifying the supplier base helps lessen dependence on a single source, therefore lowering the risks associated with supply disruptions.

Investing in technology, such as supply chain management software, improves visibility and coordination throughout the supply chain, enabling real-time tracking and effective resource management. Collaboration and partnership programmes, such as collaborative improvement initiatives and innovation projects, help deepen relationships and promote mutual growth. Implementing rigorous risk management frameworks, including contingency planning and scenario analysis, prepares the supply chain to deal with unforeseen interruptions efficiently. Furthermore, providing hands-on technical assistance, offering financial incentives, and cultivating long-term relationships with key suppliers can dramatically improve supplier performance. Regular assessments and audits, together with constructive feedback, enable suppliers to identify areas for improvement and support their ongoing development. Implementing quality assurance activities and compliance training ensures suppliers fulfil demanding standards and regulations.

Implications for Future Research Directions

In this study, several suggestions for future research have emerged. The first suggestion is that further research should be conducted to examine the implementation of supplier relationship management in the state-owned enterprises of leading supplier relationship practices to establish management initiatives and address supplier relationship challenges (addressing poor contract management during the procurement cycle, poor implementation of supplier management within multiple stages of the procurement cycle and procurement challenges encountered by supply chain officials. Moreover, further studies should be conducted to identify supplier relationship management strategies that they might need to adopt in order to develop from administrative to strategic supplier relationship management functions.

The SOEs underestimate the suppliers, and this leads to poor SRM. There are no programmes for suppliers that can lead to supplier developments and supplier performance. Suppliers benefit nothing from the enterprises. However, the enterprises do nothing about it; that is the main reason why there is no growth in the SRM and also no recognition of SRM; therefore, the enterprises should take that into consideration. The last suggestion for future research indicates that since this study utilised qualitative research methodology, a further study should be conducted utilising a mixed methods approach in order to collect both non-numerical and numerical data rather than collecting single data.

CONCLUSION

Poor administration of selected tendering and a lack of consequence management for selected tendering, particularly when goods, construction work, and services are acquired through closed tendering. Poor supplier management implementation precisely, the absence of tools to monitor and measure supplier performance. Meanwhile, the supply chain departments of SOEs remain at the administrative level. However, other SOEs are trying to transition from an administrative to a strategic role. Currently, the other enterprises' SRM procedures need to be improved by any initiatives, and the suppliers should be recognised for the growth of SRM in the SCM.

REFERENCES

- Amoako-Gyampah, K., Boakye, K. G., Adaku, E. & Famiyeh, S. (2018). Supplier relationship management and firm performance in developing economic a moderated mediation analysis of flexibility capability and ownership structure. *International Journal of production economics*, 208:160-200.
- Barrett, E. & Fazekas, M. (2020). Supplier relationship management, anti-corruption in aid-funded procurement: is corruption reduced or merely displaced? *World development*, 13(2):190-310

- Carr, L. & Griffin, N. (2021). Variation of purchasing is involved: Case involved: Case of supplier collaborations in new product development. *International Journal of Procurement Management*, 1(7):103-108.
- Choudhary, K. & Sangwan, S.K. (2019). Adoption of green practices throughout the supply chain: an empirical investigation. Bench marking. *An international Journal*, 26(6):1-24.
- Debnath, S. (2020). Green is information system framework to support environmental sustainability of firms. *International Journal of business information system*, 4:1-42.
- Efe, A. (2023). Narrative analysis: definitions, methods & examples [online]. Available at: <https://forms.app/en/blog/what-is-narrative-analysis> . Accessed 14 January 2023.
- Funer, N. (2021). Curbing corruption in public procurement: Indicators that may help prevent detect and investigate malpractices. *Journal Of Procurement Policy*, 34(7):736-746.
- Human, S. (2016). Building a sustainable excellence in public finance management (PFM) in South Africa. *African Journals of Public Affairs*, 5(7):12-55
- Katarzyna, S., Akos, D. & Piotra, M. (2020). State owned enterprises and economic growth: Evidence from the post, leman period. *Economic Modelling*, 99:1-39.
- Keton, A. (2020). Factors affecting effective management of the procurement function at north sub-country. *World Academic Journal of Business And Applied Sciences*, 1(7):1-29.
- Kim, Y.J., & Choi, T.M. (2020). A united nations' sustainable development goals perspective for sustainable textile and apparel supply chain management. Transportation research part: *Logistics and Transportation Review*, 141:1-38.
- Klaas, S. (2022). State of the art of purchasing 2022. *Journal of Entrepreneurship, Technology Management*, 22(2):56-98.
- Marcus, I., Ambe, R., Setino, R. & Ellsworth, C.J. (2022). Supply chain performance measurement: Framework for state-owned entities in South Africa. *Department of applied management, college of economic and management sciences. University of South Africa, Pretoria South Africa*, 11(2): 33-60.
- Matteo, L. (2020). Knowledge creation in state owned enterprises: structural change and economic dynamic, *Alessandria Figus*, 53(1):77-85.
- Matthews, Y.Z.(2021). Supply chain management and challenges. *Assembly Automation*, 29(1):52-60.
- Mhelembe, K. & Mafini, C., (2019). Modelling the link between supply chain risk, flexibility and performance in the public sector. *South Africa Journal of Economic And Management Sciences*. 22(1):1-12.
- Mikell, S.L. (2023). Government accountability in the overseas operations of china's state-owned enterprises and private. *Unpublished doctoral thesis. Politics class, Princeton University: China*.
- Mingzhi, L. & Jaimiew, L.J, (2019). Optimal subsidies in the competition between private states owned enterprises. *International Review of Economies and Finance*, 76,123-1244.
- Mkiva, Z. (2023). Department of Public Enterprises (DPE). 2023/24 annual performance plan: NCOP public enterprises and communication. Conference paper presented at the international conference on business, 19 May 2023, anc, Eastern Cape. Pp 10:50-66
- Moritz, S. Philippe, P.B. & Alex, C. (2023). Decarbonising state owned power companies: *A Framework For Applying Policy Actions*. 2nd edition. Oxford.
- Naude, M. J., Ambe, I. M. & Kling, R. (2013). Supplier relationship management – anathema for the South African public procurement sector. *Journal Of Transport and Supply Chain Management*, 7(1):1-49
- Nimeh, H.A. Abdallah, A. & Sweis, R. (2018). Lean supply chain management practices

- Osman, M.N.M., Nawi, R.S. & Ismail, R. (2017). Factors affecting systematic implementation of reduce and recycle in construction industry. *International Supply Chain Management*, 6(1):270-278.
- Rungsithong, I. (2020). Trust and knowledge sharing in context: *A study of international buyer-supplier relationships in Thailand*. *Industrial Marketing Management*, 88, 112-124.
- Samiul, I., Saman H.A. & Leslie, J. W. (2023). A supplier selection & order allocation planning framework by integrating deep learning, principal component analysis, and optimization techniques. *International Journal, Mechanical and Industrial Engineering*, 4(3):16-28.
- Satyam, J.P. (2023). *Supplier relationship management on product quality in the medical device industry*. Doctoral thesis. School of business, technology, and health care administration, Capella University: United States.
- Saunders, M., Lewis, P. & Thornhill, A. (2012). *Research Methods for Business Students*. 6th ed. Harlow: Pearson education.
- Saunders, M., Lewis, P. & Thornhill, A. (2016). *Research Methods For Business Studies*. 7th ed. Harlow: Pearson education.
- Setino, R. (2020). Critical success factors for implementation of a supply chain management strategy in state owned entities in South Africa. *Journal Contemporary Management*, 17(1):183-201.
- Thompson, S.K. (2012). *Wiley series in probability and statistics sampling*. 3rd ed. Toronto: Wiley.
- Tuan, L. (2021). Promoting logistics performance in Vietnam-based manufacturing firms: The role of service-oriented high-performance work systems and mediation mechanisms. *International Journal Of Physical Distribution And Logistics Management*, 49(1):1-24.
- Willie, N.M., & Mncedi, G. 2021. Challenges faced by state owned entities and economic development in South Africa [online]. Available at: http://hdl.handle.net/109/52976_10-91/. Accessed 17 January 2023.

ADDITIVE MANUFACTURING FOR SUSTAINABLE SUPPLY CHAIN TRANSFORMATION: AN INTEGRATED DECISION-SUPPORT FRAMEWORK FOR INDUSTRIAL IMPLEMENTATION

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ABSTRACT

Additive manufacturing (AM) has increasingly emerged as a strategic capability with potential to improve manufacturing flexibility, supply-chain resilience, and sustainable production performance. However, implementation outcomes remain uneven across industrial contexts due to differences in technical feasibility, operational suitability, and organisational readiness. This study examines AM implementation within resilient and sustainable supply-chain systems through an interdisciplinary literature synthesis integrating engineering, operations-management, and organisational capability perspectives. The analysis demonstrates that AM provides strongest strategic value under conditions characterised by low-to-medium production volume, high component complexity, rapid responsiveness requirements, and disruption-sensitive supply environments. The findings further indicate that implementation success depends not only upon manufacturing capability, but also upon alignment between operational production requirements, workforce capability, governance adaptation, certification requirements, and digital infrastructure readiness. While AM offers opportunities for distributed manufacturing, digital inventory management, and improved production flexibility, its benefits remain contingent upon the organisational capacity to integrate these capabilities effectively within existing manufacturing and supply-chain systems. To integrate these dimensions systematically, the study develops an implementation-oriented decision-support framework structured around three interrelated dimensions: technical feasibility, operational suitability, and strategic implementation readiness. The framework conceptualises AM implementation as a systems-level capability-development process rather than a discrete technology-adoption initiative. The study contributes to AM and supply-chain resilience literature by providing a unified analytical framework explaining how technological capability, operational conditions, and organisational adaptation interact to shape implementation outcomes. The findings additionally provide practical guidance for managers evaluating AM deployment within resilient and sustainable manufacturing systems and offer a foundation for future empirical research examining implementation effectiveness across different industrial sectors and operational environments.

Keywords: additive manufacturing, supply-chain resilience, sustainable manufacturing, dynamic capabilities, distributed manufacturing, industrial systems integration.

INTRODUCTION

Global manufacturing systems continue to experience increasing disruption arising from geopolitical instability, supply shortages, transportation interruptions, environmental pressures, and rapidly changing market conditions. These challenges have intensified interest in manufacturing technologies capable of improving production flexibility, operational responsiveness, and supply-chain resilience. Among these technologies, additive manufacturing (AM) has emerged as a significant area of industrial and academic attention due to its capability to support distributed production, digital inventory systems, rapid prototyping, and component customisation.

Unlike conventional subtractive manufacturing systems, AM enables layer-by-layer fabrication directly from digital models, thereby reducing tooling dependency and increasing production flexibility (Ngo et al., 2018). These capabilities have positioned AM as a potentially important contributor to resilient and sustainable manufacturing

systems, particularly within industries characterised by complex components, low-to-medium production volumes, and disruption-sensitive supply environments (Khajavi et al., 2014; Verboeket & Krikke, 2019).

The COVID-19 pandemic further accelerated scholarly and industrial interest in AM due to its role in supporting emergency production responsiveness and localised manufacturing capability during periods of global supply disruption. Existing studies increasingly associate AM with reduced inventory dependency, decentralised production capability, shorter lead times, and improved operational adaptability (Ford & Despeisse, 2016; Ivanov & Dolgui, 2020). Additive manufacturing has also been linked to sustainability-oriented manufacturing strategies through material-efficiency improvements, waste reduction, and digital production integration (Peng et al., 2018). Despite these advantages, implementation outcomes remain highly uneven across industrial environments. Many organisations continue to encounter barriers involving qualification complexity, production scalability limitations, workforce capability shortages, digital-infrastructure dependency, and governance adaptation requirements. Existing literature frequently evaluates AM either from engineering-oriented or operations-management perspectives independently, providing limited integration of the technical, operational, and organisational dimensions shaping implementation success.

This study addresses this gap through an interdisciplinary literature synthesis integrating AM capability, supply-chain resilience, and organisational readiness perspectives. The study conceptualises AM implementation as a systems-level capability-development process rather than a discrete technology-adoption initiative. Dynamic capabilities theory provides the primary theoretical foundation because successful implementation requires organisations to integrate technological capability, operational adaptation, and institutional transformation simultaneously (Teece, 2007). The study investigates the following research questions:

- Under what operational conditions does AM provide meaningful resilience and sustainability advantages?
- How do technical manufacturing constraints influence implementation feasibility?
- What organisational capabilities moderate successful AM implementation?

The paper contributes by developing an integrated decision-support framework structured around technical feasibility, operational suitability, and strategic implementation readiness. The framework provides a systems-oriented explanation of how AM implementation outcomes emerge across different industrial conditions and organisational contexts.

LITERATURE REVIEW

Additive Manufacturing and Sustainable Production

Additive manufacturing has increasingly been associated with sustainable and flexible manufacturing capability due to its potential to reduce material waste, improve design efficiency, and support distributed production systems. Unlike conventional subtractive manufacturing processes, AM fabricates components layer-by-layer directly from digital models, thereby reducing tooling dependency and enabling rapid design modification (Ngo et al., 2018). Existing studies identify several sustainability-related advantages associated with AM, including material-efficiency improvements, reduced warehousing requirements, shorter production lead times, and increased customisation capability (Ford & Despeisse, 2016; Peng et al., 2018). Additive manufacturing has also been linked to decentralised manufacturing models capable of reducing transportation dependency and supporting localised production responsiveness during supply disruptions.

However, the literature also demonstrates that sustainability outcomes remain highly context dependent. Energy consumption, post-processing requirements, powder-material production, and limited scalability may reduce anticipated environmental advantages under certain production conditions (Gebler et al., 2014). Consequently, AM should not be interpreted as inherently sustainable across all industrial applications.

Supply-Chain Resilience and Distributed Manufacturing

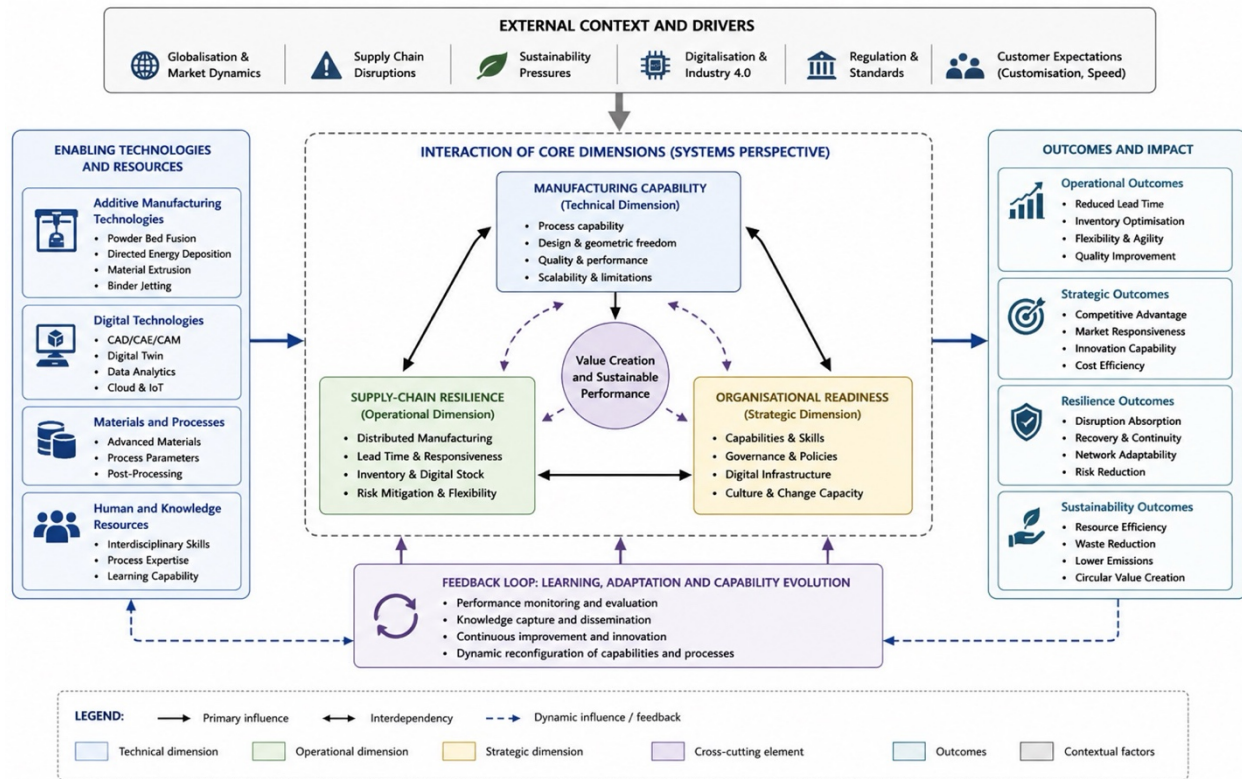
Supply-chain resilience literature emphasises organisational capability to anticipate, absorb, adapt to, and recover from disruption events (Bhamra et al., 2011; Ivanov & Dolgui, 2020). Increasing supply-chain volatility has intensified interest in manufacturing systems capable of supporting operational flexibility and distributed production capability. Within this context, AM has increasingly been associated with resilience-oriented production strategies because of its ability to support digital inventory systems, spare-parts digitisation, rapid prototyping, and localised manufacturing responsiveness (Khajavi et al., 2014). During disruption-sensitive conditions, these capabilities may reduce dependency upon centralised production systems and extended logistics networks. However, resilience outcomes emerge not from technological capability alone, but from the interaction between manufacturing capability, operational responsiveness, and organisational readiness. Nevertheless, the literature indicates that AM also introduces new forms of operational vulnerability involving cybersecurity exposure, quality-control coordination, certification complexity, and digital-infrastructure dependency. The resilience contribution of AM therefore depends upon how effectively organisations integrate manufacturing capability within broader operational and governance systems.

Organisational Capability and Dynamic Adaptation

The literature further demonstrates that successful AM implementation depends heavily upon organisational readiness and institutional adaptation capability. Dynamic capabilities theory provides an important interpretive framework because AM implementation requires organisations to integrate technological capability, operational redesign, workforce development, and governance adaptation simultaneously (Teece, 2007). This perspective aligns with the systems-oriented view adopted in the present study, where manufacturing capability, operational resilience requirements, and organisational readiness interact to shape implementation outcomes. Effective integration of enabling technologies, digital infrastructure, process capabilities, and human resources is therefore critical for translating technological potential into sustained organisational and operational performance. Implementation barriers frequently identified within the literature include workforce capability shortages, qualification complexity, interoperability challenges, digital-infrastructure requirements, and resistance to organisational change. Companies possessing stronger cross-functional coordination capability and digital integration capacity appear more likely to achieve sustainable implementation outcomes (Stadtfeld & Gruchmann, 2024). Existing AM research frequently examines engineering capability, operational performance, and organisational adaptation independently. Comparatively limited research currently integrates these dimensions within a unified implementation-oriented analytical framework. To address the fragmented treatment of technical, operational, and organisational factors within existing AM research, Figure 1 presents the systems-oriented conceptual positioning adopted in this study.

Figure 1 illustrates the interaction between manufacturing capability, operational resilience requirements, and institutional adaptation processes. The framework positions AM as a systems-level organisational capability whose effectiveness depends upon alignment between technical feasibility, operational conditions, and organisational readiness. The framework further indicates that enabling technologies and resources, including AM technologies, digital technologies, materials and processes, and human knowledge resources, provide the foundational capabilities supporting interaction among these dimensions. Through this interaction, organisations are better positioned to generate operational, strategic, resilience, and sustainability outcomes. Accordingly, this study develops an integrated implementation-oriented framework examining how AM contributes to resilient and sustainable supply-chain systems across different industrial contexts.

Figure 1: Systems-oriented conceptual positioning integrating additive-manufacturing capability, supply-chain resilience, and organisational readiness.

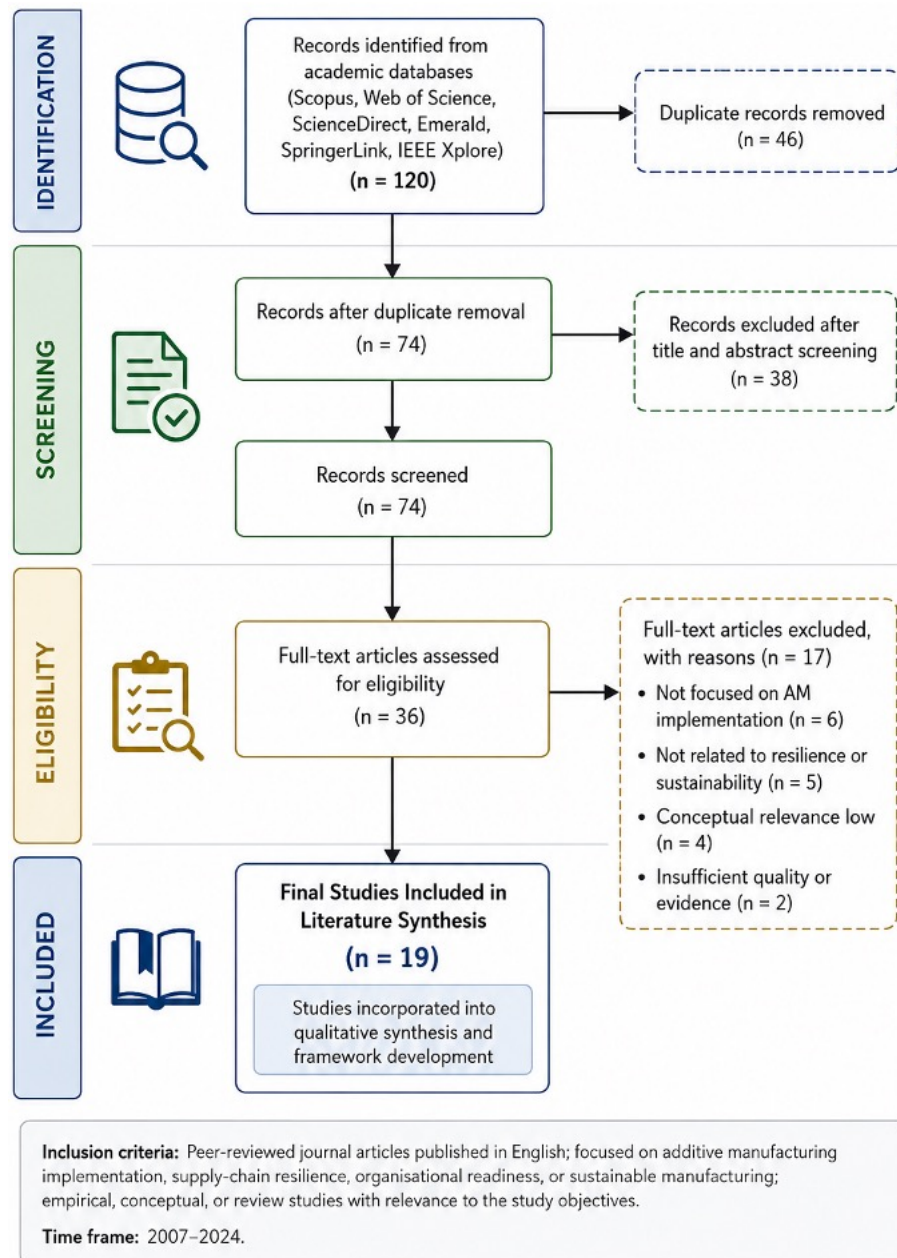


METHODOLOGY

This study adopts a structured interdisciplinary literature-synthesis approach integrating principles associated with systematic-review methodology. The review combines AM engineering research with operations-management, supply-chain resilience, and organisational capability literature to develop an implementation-oriented analytical framework. The literature-selection process involved database identification, keyword screening, relevance evaluation, and thematic synthesis. Searches were conducted using combinations of terms including AM, 3D printing, supply-chain resilience, distributed manufacturing, sustainable manufacturing, and dynamic capabilities. Priority was given to peer-reviewed journal articles addressing industrial implementation, operational performance, organisational adaptation, and resilience implications associated with AM deployment.

The review process focused specifically on studies examining metal AM systems, particularly laser powder bed fusion (L-PBF), due to their increasing industrial relevance within aerospace, biomedical, automotive, and advanced manufacturing sectors. Additional emphasis was placed on literature addressing distributed manufacturing capability, digital inventory systems, production flexibility, and implementation readiness. To support this analysis, Figure 2 summarises the structured literature-selection and screening process used to identify studies relevant to AM implementation, resilience capability, and sustainable manufacturing systems.

Figure 2: Structured literature-selection and screening process used to identify studies relevant to AM implementation, resilience capability, and sustainable manufacturing systems.



The final literature synthesis incorporated nineteen peer-reviewed studies selected on the basis of relevance to AM implementation, supply-chain resilience, organisational readiness, and sustainable manufacturing systems. As shown in Figure 2, the literature-selection and screening process enabled integration of engineering, operations-management, and organisational studies while excluding sources lacking implementation relevance or conceptual alignment with resilient manufacturing systems. The selected studies were synthesised using three analytical dimensions: technical feasibility, operational suitability, and strategic implementation readiness. Technical feasibility focused on manufacturing-process capability, scalability, reliability, and engineering constraints. Operational suitability considered alignment between AM capability and production-system requirements, including responsiveness, production volume, and resilience-related operational conditions. Strategic implementation readiness addressed organisational factors such as workforce capability, governance adaptation, digital infrastructure, and

institutional integration. This thematic synthesis informed development of the integrated implementation-oriented framework used to explain how manufacturing capability, operational conditions, and organisational adaptation collectively shape AM implementation outcomes across industrial contexts.

RESULTS AND ANALYSIS

The literature synthesis demonstrates that AM contributes most effectively to resilient and sustainable supply-chain systems when implemented selectively within operational environments requiring production flexibility, rapid responsiveness, distributed manufacturing capability, and reduced tooling dependency. Across the reviewed studies, AM demonstrated strongest strategic suitability within low-to-medium volume production environments characterised by high component complexity and disruption-sensitive supply conditions.

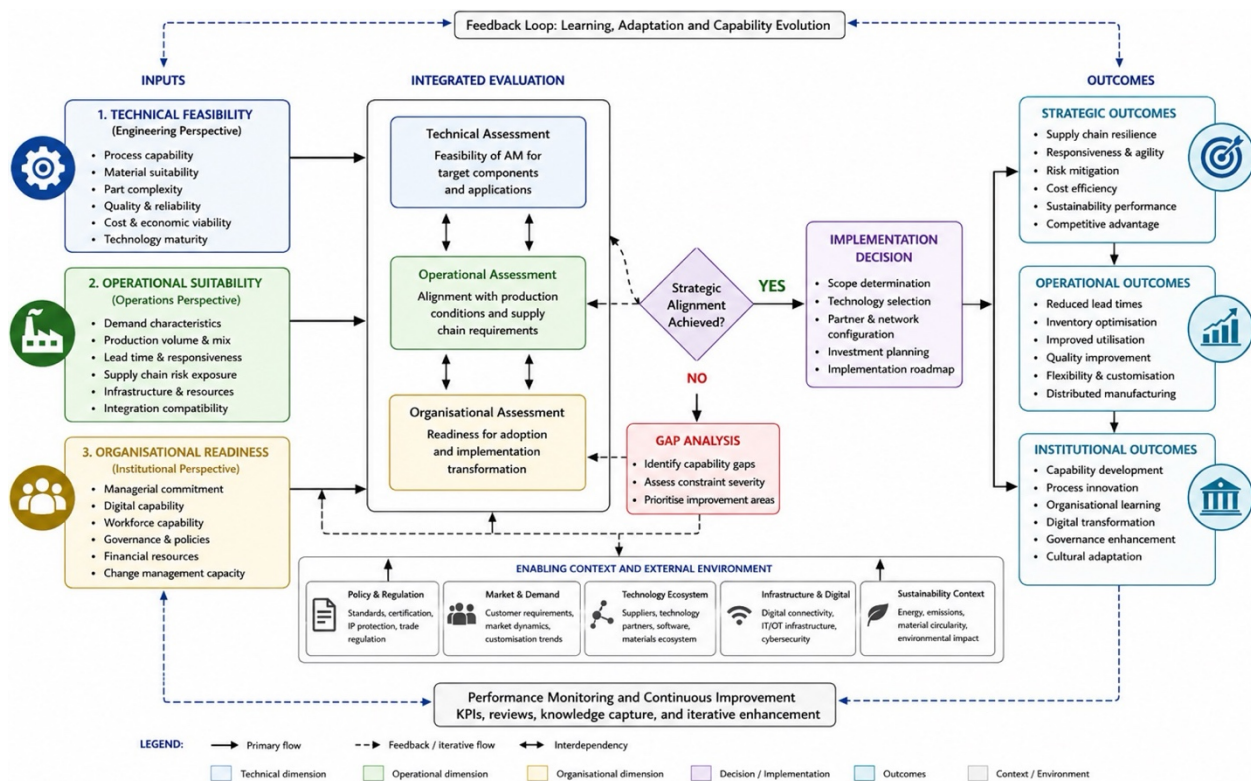
The engineering literature consistently identifies L-PBF systems as particularly valuable for applications involving lightweight optimisation, advanced geometric complexity, and rapid design adaptation (DeRoy et al., 2018; Herzog et al., 2016). These capabilities enable production of components that may be difficult or economically impractical using conventional manufacturing methods. However, several technical constraints continue to affect broader industrial scalability, including process variability, residual stress accumulation, porosity formation, and extensive post-processing requirements (King et al., 2014; Yadollahi & Shamsaei, 2017).

Operationally, the findings indicate that AM may improve supply-chain resilience through distributed production capability, digital inventory systems, shorter lead times, and reduced dependency upon centralised manufacturing structures (Khajavi et al., 2014; Verboeket & Krikke, 2019). These advantages became particularly visible during disruption-sensitive conditions such as the COVID-19 pandemic, where AM supported emergency manufacturing responsiveness and localised production adaptation.

Nevertheless, the literature also demonstrates that resilience benefits remain conditional rather than universally applicable. Distributed manufacturing systems enabled by AM may simultaneously introduce operational vulnerabilities involving cybersecurity exposure, quality-control inconsistency, certification complexity, and digital-infrastructure dependency. Consequently, AM does not eliminate operational risk but instead reconfigures the structure of manufacturing and supply-chain dependencies. The findings further indicate that implementation success depends heavily upon organisational capability and institutional adaptation processes. Companies possessing stronger digital capability, workforce expertise, governance flexibility, and cross-functional integration capacity appear substantially more capable of achieving sustainable AM implementation outcomes. This supports the dynamic capabilities perspective that manufacturing technologies generate strategic value only when supported by complementary organisational and operational competencies (Teece, 2007). To integrate these findings systematically, Figure 3 presents the proposed implementation-oriented decision-support framework developed from the interdisciplinary literature synthesis.

Figure 3 illustrates that AM implementation outcomes emerge through interaction between three interrelated dimensions: technical feasibility, operational suitability, and organisational readiness. The framework further demonstrates that implementation effectiveness is influenced by broader environmental conditions involving sustainability pressures, regulatory requirements, market dynamics, and digital infrastructure capability. The feedback-loop structure additionally reflects the continuous organisational adaptation processes associated with dynamic capabilities development.

Figure 3: Integrated decision-support framework illustrating the interaction between technical feasibility, operational suitability, and organisational readiness in additive-manufacturing implementation within resilient and sustainable supply-chain systems.



The study contributes theoretically by integrating AM research with supply-chain resilience and dynamic capabilities perspectives within a unified implementation-oriented framework. Existing literature frequently evaluates AM from either engineering or operational viewpoints independently. In contrast, the present study demonstrates that implementation outcomes remain highly contingent upon coordinated interaction between technological capability, operational production conditions, and organisational adaptation capacity.

The proposed framework provides practical guidance for industrial managers evaluating AM deployment strategies. The findings indicate that organisations should avoid approaching AM adoption solely as a technology-acquisition decision. Instead, implementation evaluation should incorporate manufacturing feasibility, operational fit, workforce capability, qualification requirements, governance adaptation, and digital integration simultaneously as proposed by the framework in **Figure 3**. Managers should additionally recognise that AM is most effective when aligned with resilience objectives, responsiveness requirements, and high-value production strategies rather than cost-minimisation logic alone. Selective implementation within strategically appropriate production environments is therefore likely to produce more sustainable operational outcomes than broad technology substitution approaches. The findings further suggest that organisations pursuing AM integration should invest not only in production systems, but also in workforce development, digital infrastructure capability, certification expertise, and cross-functional operational coordination. Long-term implementation success depends upon organisational capacity to integrate technological capability within broader manufacturing and supply-chain systems effectively.

CONCLUSION

This study examined AM implementation within resilient and sustainable supply-chain systems through an interdisciplinary synthesis integrating engineering capability, operational suitability, and organisational readiness perspectives. As such, the following conclusions can be drawn from this study.

- The findings demonstrate that AM provides strongest strategic value under conditions characterised by high component complexity, low-to-medium production volume, rapid responsiveness requirements, and disruption-sensitive supply environments.
- The analysis further shows that AM should not be interpreted as a universally superior replacement for conventional manufacturing systems. While AM offers advantages involving distributed production capability, digital inventory systems, reduced tooling dependency, and production flexibility, implementation outcomes remain highly dependent upon alignment between technical capability, operational conditions, and organisational readiness.
- The proposed framework contributes by integrating AM research with supply-chain resilience and dynamic capabilities perspectives within a unified implementation-oriented structure. The framework demonstrates that successful implementation depends not only upon manufacturing feasibility, but also upon workforce capability, governance adaptation, digital infrastructure readiness, and institutional integration capacity.
- From a practical perspective, the findings suggest that organisations should adopt a strategically selective approach toward AM. Implementation decisions should therefore evaluate production requirements, resilience objectives, qualification readiness, and operational fit simultaneously rather than treating AM solely as a technology-acquisition initiative.

Overall, the study demonstrates that AM possesses significant potential to support resilient and sustainable manufacturing transformation. However, its effectiveness depends less upon technological capability alone than upon the organisation's ability to integrate manufacturing innovation strategically within broader operational and supply-chain systems.

LIMITATIONS AND FUTURE RESEARCH

This study remains conceptual in orientation and does not include empirical validation through case studies, simulation modelling, or quantitative performance assessment. Consequently, while the framework provides implementation-oriented guidance, its applicability across different industrial contexts requires further empirical investigation. The analysis additionally focused primarily on metal AM systems, particularly L-PBF. Other AM processes may exhibit different operational capabilities, cost structures, and implementation conditions. Future research should therefore examine AM implementation through industry case studies, comparative operational analysis, and quantitative resilience assessment. Additional investigation is also required regarding governance, cybersecurity, workforce capability development, and sustainability implications associated with distributed AM systems. Further interdisciplinary research integrating engineering, operations-management, and organisational perspectives may strengthen understanding of how AM contributes to resilient and sustainable industrial transformation under changing global manufacturing conditions.

REFERENCES

- Bhamra, R., Dani, S., & Burnard, K. (2011). Resilience: the concept, a literature review and future directions. *International journal of production research*, 49(18), 5375-5393.
- DebRoy, T., Wei, H. L., Zuback, J. S., Mukherjee, T., Elmer, J. W., Milewski, J. O., ... & Zhang, W. (2018). Additive manufacturing of metallic components—process, structure and properties. *Progress in materials science*, 92, 112-224.
- Ford, S., & Despeisse, M. (2016). Additive manufacturing and sustainability: an exploratory study of the advantages and challenges. *Journal of cleaner Production*, 137, 1573-1587.
- Gebler, M., Uiterkamp, A. J. S., & Visser, C. (2014). A global sustainability perspective on 3D printing technologies. *Energy policy*, 74, 158-167.

Herzog, D., Seyda, V., Wycisk, E., & Emmelmann, C. (2016). Additive manufacturing of metals. *Acta Materialia*, 117, 371-392.

Ivanov, D., & Dolgui, A. (2020). Viability of intertwined supply networks: extending the supply chain resilience angles towards survivability. A position paper motivated by COVID-19 outbreak. *International journal of production research*, 58(10), 2904-2915.

Khajavi, S. H., Partanen, J., & Holmström, J. (2014). Additive manufacturing in the spare parts supply chain. *Computers in industry*, 65(1), 50-63.

King, W. E., Barth, H. D., Castillo, V. M., Gallegos, G. F., Gibbs, J. W., Hahn, D. E., ... & Rubenchik, A. M. (2014). Observation of keyhole-mode laser melting in laser powder-bed fusion additive manufacturing. *Journal of Materials Processing Technology*, 214(12), 2915-2925.

Ngo, T. D., Kashani, A., Imbalzano, G., Nguyen, K. T., & Hui, D. (2018). Additive manufacturing (3D printing): A review of materials, methods, applications and challenges. *Composites Part B: Engineering*, 143, 172-196.

Peng, T., Kellens, K., Tang, R., Chen, C., & Chen, G. (2018). Sustainability of additive manufacturing: An overview on its energy demand and environmental impact. *Additive manufacturing*, 21, 694-704.

Stadtfeld, G. M., & Gruchmann, T. (2024). Dynamic capabilities for supply chain resilience: a meta-review. *The International Journal of Logistics Management*, 35(2), 623-648.

Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic management journal*, 28(13), 1319-1350.

Verboeket, V., & Krikke, H. (2019). The disruptive impact of additive manufacturing on supply chains: A literature study, conceptual framework and research agenda. *Computers in Industry*, 111, 91-107.

Yadollahi, A., & Shamsaei, N. (2017). Additive manufacturing of fatigue resistant materials: Challenges and opportunities. *International Journal of Fatigue*, 98, 14-31.

A SYSTEMATIC LITERATURE REVIEW ON PEOPLE ANALYTICS USING EXCEL

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ABSTRACT

The human resources management (HRM) literature addresses people analytics, and it is defined differently. In this article, a new definition is developed that includes Excel as a data analysis tool. The definition suggests that human capital is the key to driving business performance, so human capital theory has been adopted as an appropriate theoretical framework. Another literature trend is that Africans have a shortage of people analysis, and most of the literature comes from India, the United States of America, and Europe. Other studies have shown that they refer to different kinds of statistical techniques and that HRM practitioners possess descriptive analysis and lack diagnostic and predictive analysis, but they do not show which or how these statistical techniques can be used to solve research problems. The inclusion criteria for sources analysed were 20 or more citations. The data analysis techniques were document analysis from 2015 to date. The article proposes a framework for people analysis focusing on how people analytics can create business impact. The managerial implication of the framework is that integrating statistical analysis with people analytics enhances HRM data-driven decision-making and supports strategic organisational planning.

Keywords: AI tools, Excel, people analytics framework, descriptive and inferential statistics.

INTRODUCTION

People analytics has gained momentum as a transformational approach in HRM, leveraging data to support decision-making, advance institutional performance, and increase efficiency. People analytics enables HRM decision-making to move beyond intuition-based decision-making, enabling the use of evidence-based culture in HRM practices. Additionally, people analytics' growing importance is underscored by the complexities of the dynamic workforce and the need for organisations to adapt to ever-changing market conditions. Businesses face various HRM challenges, including employee turnover, skills shortages, and the growing demand for inclusion and diversity. People analytics provides tools such as Excel to effectively address the changes (Wolniak et al., 2024).

The motivation for writing this article is that people define analytics differently. Therefore, these definitions, along with a new one, are developed later in the article. In addition, there are fewer studies on people analytics conducted in South Africa, as most studies are conducted in India, the United States and Europe. People analytics is a growing field, and some trends and definitions have been developed until 2022, but the latter was developed before the spread of artificial intelligence (AI) in 2023 (Nawaz et al., 2024).

The trend in people analytics literature indicates that HRM practitioners lack competencies in statistical analysis, including the use of Excel and other data analysis software. There is no consensus in the literature on whether people analytics should be within or outside the HRM division (Ali & Elias, 2023). This article argues that people analytics should be part of the chief executive officer's (CEO) office and that HRM should report directly to the CEO. The rationale for this stance is that the CEO is accountable for business objectives, such as revenue and customer growth. Since people analytics is a new field, and there is scepticism about its impact on the organisation, it will be easier to implement when the CEO is on board, unlike expecting HRM to implement, as it does not have the business acumen and analytics capabilities that marketing and finance do.

The literature also shows that 17% of organisations use people analytics to make predictions and forecasts. This shows that people's analytics are using descriptive statistics, which focus mainly on reporting historical data.

The lack of use of inferential statistics suggests that HR reporting is less strategic and more operational; hence, the value of the chief human resource officer (CHRO) is diminished, as they cannot demonstrate a strategic mindset like their peers in finance. It is also noticeable in literature that there is no universal people analytics framework, and 22% of the organisations are still at the stage of deciding which data analytics tool to use (Nair, 2023). Hence, this article is relevant as it addresses this gap. Based on the above discussion, the article aims to address the following questions: how can Excel be used for both descriptive and inferential statistics, and which elements should be included in the people analytics framework? The article's objectives were:

- To determine how Excel can be used to conduct descriptive and inferential statistical analyses.
- To identify the key elements that should be included in a people analytics framework.

In the next section, the article begins by conceptualising people's analytics and provides the rationale for using Excel. The research methodology used to address the research questions is elucidated, and the results are discussed. The article ends with the managerial implications and recommendations for practitioners and future research.

LITERATURE REVIEW

People analytics is about data mining, using either qualitative or quantitative techniques to manage employees effectively. It is also about data gathering, transformation and dissemination of information. This can be conducted using data analysis software to generate descriptive and inferential statistics outputs and to visualise the data (Shafie et al., 2024). An observation in the literature is that people analytics is defined differently; definitions do not include HRM dimensions such as well-being, employee relations, and occupational safety, and thus do not include artificial intelligence (AI). AI in HRM is about using data mining to do strategic planning, automate recruitment, selection processes and write job descriptions, develop learning material and store the training data, collect and analyse the performance data, use neural networks to determine pay fairness, it can be used as an auxiliary system in resolving stereotypes, and be used to schedule disciplinary and grievance meetings (Jia et al., 2018). Based on the above information, the definition proposed for people analytics is the following: It is a methodology that uses quantitative evidence-based methods in talent management, training and development, diversity and strategic management, well-being, and employee relations to achieve business success using descriptive or inferential statistics (diagnosis and prediction) aided by an AI plug-in in Excel.

AI as an Aid in Excel

There are different AI tools, such as Chat Generative Pre-Trained Transformer (GPT) and Copilot, that are either embedded in Excel or can be used to create formulas and use prompts to create the desired insights. Insight can be generated through prompt engineering, which involves either creating a question or writing instructions based on what the people analytics team aims to achieve. In Excel, AI tools can be downloaded; some are free, and some are sold. Benefits of using AI in Excel include data cleaning, flagging, and organising data. People analysts should also ensure they align with the organisation's policy on using data in AI, because if it is uploaded, it becomes public, which might infringe employee privacy and expose the organisation to a lawsuit for a breach of confidentiality clause. Another caveat is that people analytics should determine the veracity of the output, which might be one hundred per cent up to date (Nawaz et al., 2024).

Additionally, Microsoft Excel has its versatile data analysis capabilities. Excel offers a range of analytics capabilities (data sorting, filtering, and multiple calculations). Excel can be used as a visualisation tool, including graphs and charts, which allow data to be presented clearly and understandably (Paul van der Laken, 2018). The visuals communicate essential insights to HRM professionals and stakeholders, and provide clear, data-driven guidance for decision-making. An additional advantage of integrating people analytics is that Excel can be used to connect to other data sources, and HRM professionals can import and analyse data from different platforms. The ability to integrate with other tools enables comprehensive people analytics and the use of data from various sources. Using Excel for people analytics is cost-effective compared to more advanced software, yet it still allows complex data analysis.

People Analytics Conflicting Methodologies

Methodology is the way in which people analytics steps are implemented in the organisation. There is no consensus in the literature on the methodology for people analytics. One theory is that HRM activities (recruitment and selection, promotion and compensation) lead to HRM results such as employee engagement and job satisfaction. They also suggest that HRM results are a comparison of business results, such as customer satisfaction, productivity, and increased sales (Jobs, 2024). One limitation of this school of thought is that it does not demonstrate a direct link between HRM outcomes and business outcomes. In addition, business outcomes like sales are driven by external factors such as economic prosperity (Skosana et al., 2024). On the other hand, other scholars believe that people analysts should focus on addressing the business problem, and once organisations show how they achieve profitability results, employees will be satisfied with their work (Boselie et al., 2005).

People Analytics Theoretical Frameworks

Two theoretical frameworks are applicable to this article and align with the definition developed. One of them is the Human Capital Theory (HCT), developed by Becker (1962). It aligns with this definition because it states that during talent management activities such as recruitment and selection, objective measures like experience and qualifications should be used. HCT speaks to the significant need to invest in employees through training and education to improve their capabilities and, eventually, overall organisational performance. People analytics support HCT by providing data-driven insights to inform human capital investment decisions. Additionally, the identification of skills gap and training needs of employees is enabled through people analytics (Tuovinen, 2024). The HRM department can determine areas of improvement by analysing employee assessments and performance metrics. Investing in human capital through training programmes should improve employees' skills, thereby increasing job satisfaction and productivity, and this approach aligns with HCT.

HCT's key aspect is return on investment (ROI) in human resources. The effectiveness of development and training can be measured using people analytics. Organisations can assess the success of the investment by tracking the performance of employees before and after educational interventions (Maleka et al., 2017). HCT supports people analytics in recruitment methods used by organisations. The hiring process can be refined by using data from employees' profiles to select candidates with the right qualifications, skills, and attributes that ensure higher performance and commitment. Furthermore, data-driven decisions ensure that organisations invest in the right, dedicated talent, thereby improving overall human capital, as enshrined in the HCT theory.

Another theory aligned with the article's objectives is the Ability, Motivation, and Opportunity (AMO) model. The AMO theory is an essential framework used to understand how to improve employee performance, while people analytics provides tools to assess and implement effective strategies (Bos-Nehles et al., 2023). HRM professionals may design targeted training programmes after analysing performance metrics and identifying employees lacking competencies. Furthermore, trends in employee performance can be revealed through people analytics and necessary training to enhance the abilities of employees for them to meet their job responsibilities (Falletta & Combs, 2021). Moreover, employee motivation can be understood by using people analytics. Organisations can focus on employee engagement and find what drives workforce motivation by making use of performance metrics and survey data (Luo et al., 2024).

Furthermore, various organisational motivation programmes can be assessed by people analysts and allow HRM professionals to develop new recognition methods that may increase employees' motivation. Furthermore, opportunities for employees can be identified through people analytics, and the necessary steps can be taken to develop skills and motivation (Kaur & Malik, 2025). Also, barriers that prevent employees from performing at their best can be highlighted through analysing data on promotions, resource allocation and job responsibilities. Such obstacles can be addressed by creating a conducive environment and maximising employees' potential.

RESEARCH METHODOLOGY

The researcher conducted document analysis to address the research questions. It is mainly used by researchers who want to analyse static and unchanging text in books, journals and conference papers to identify themes and

subsequently develop a framework (Morgan, 2022). It is also used to triangulate the secondary data, and the approach in this article was postpositivist (Hall & Jordan, 2025) because of the way the research questions were phrased (Refer to the introduction section).

To address the first research question, documents from 2015 to date were included. The keywords used were HRM, people or talent analytics, Excel, and capability. The exclusion criteria were business analytics, as it focuses on logistics, marketing and manufacturing metrics (Yalcin et al., 2022), which are beyond the people analytics definition conceptualised in this article. To address the second research objective, documents, mainly journals, from 2015 to date were included in the analysis. The inclusion criteria were citations from 20 or more people, the workforce, and talent analytics. Twenty ($n=20$) citations in research are regarded as significant (Ngatuvai et al., 2021). Hence, the minimum inclusion criterion was used.

The methodology used in this article is adapted from the people analytics article conducted by Prasetyaningtyas et al. (2022). It starts with developing research question/s, then the next step is searching for documents in Google Scholar. It entails data analysis, including quantifying the number of documents that meet the inclusion criteria. In addition, the methodology includes data interpretation, limitations of the article, and recommendations for future research.

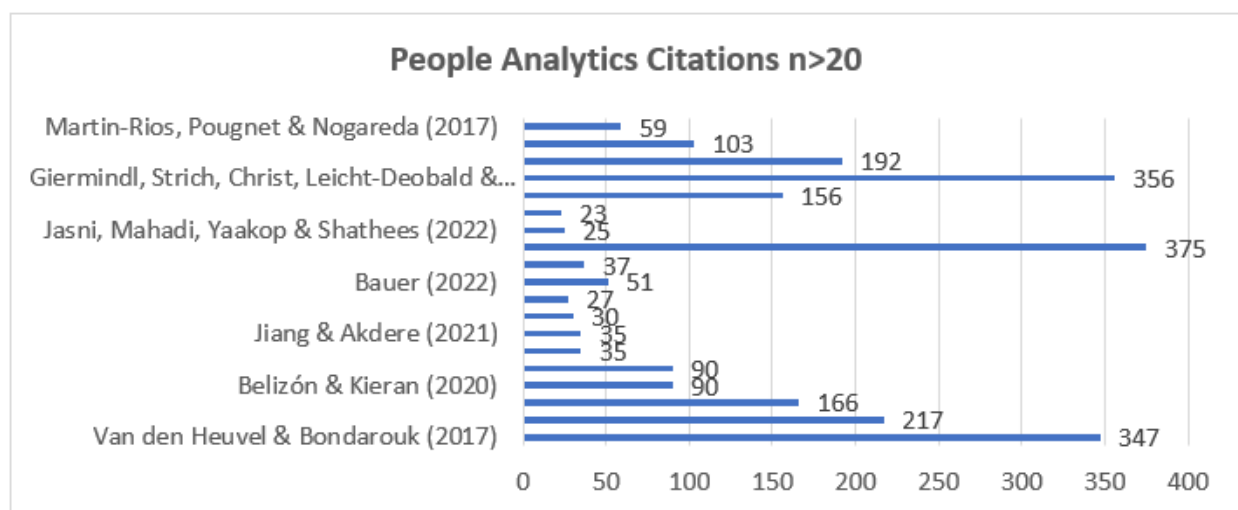
RESULTS AND FINDINGS

This section is organised in line with the research questions; it starts by showing how to use descriptive and inferential statistics in Excel. The second part of the section outlines the elements included in people analytics frameworks.

Excel Capability for Descriptive and Inferential Statistics

Excel, as a data analysis tool, can calculate descriptive statistics, such as means, standard deviations, modes, and variances, to name a few. It has an AI plug-in like Chat Copilot. After downloading it from Add-Ins, the people analyst can write a prompt requesting that it generate a figure showing citation analytics. AI tools like Copilot and ChatGPT are plug-ins for Excel, and they aid the researcher in obtaining the information required to address the research questions. Before AI plug-ins in Excel, people analytics must either memorise or know the formulas and step-by-step by heart. With the aid of AI, the people analytics must insert a correct prompt, and the required information is generated within the section. This shows that one of the skills people analytics should possess is prompt engineering, an aspect the literature is silent on. Prompt engineering is defined as the “process of creating natural language instructions, or prompts, to extract knowledge ... in an organised manner”, (Vatsal & Dubey, 2024).

Figure 2: People analytics articles with high citations.



Another capability of Excel is the Data Analysis tool, which can be used to calculate various inferential statistics, such as correlation, T-tests, and regression. Both descriptive and inferential statistical techniques are available on the Data Analysis tool. Using either ChatGPT or Copilot, people analytics can use prompt engineering to generate outputs and gain insights into how to interpret them.

Elements of the People Analytics Framework

Table 1: Elements to develop a people analytics framework.

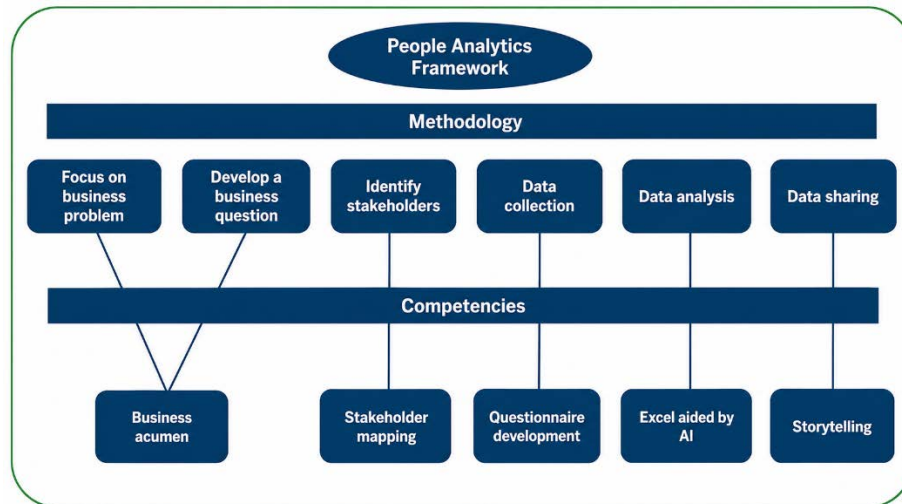
Authors	Citations	Methodology	Proposed Framework
Van Den Heuvel and Bondarouk (2017)	n=347	Focus on the business question using people analytics.	Technology is the main driver of HRM processes (from automation to AI, from self-service analytics to reporting, and from analysis to reporting).
Nocker and Sena (2019b)	n=154	The focus is on talent management as people analytics.	Talent analytics (retention, planning and engagement).
McCartney et al. (2021)	n=166	Focus on business objectives.	HRM analyst competence model, which includes communication and storytelling, Consulting, technical knowledge, research and discovery, HRM and Business acumen, data fluency and data analytics.
Belizón and Kieran (2022)	n=90	It focuses on decisions, activities, and events that can shape the legitimacy of people analytics in organisations.	People analytics legitimacy subprocesses – institutional work and delaying, enabling and accelerating elements.
Cho et al. (2023)	n=42	The article focuses on people analytics.	The framework developed entails defining, collecting, analysing, sharing and reflecting.
Jiang and Akdere (2022)	n=35	Focus on how people analytics (e.g. performance management) can be used to improve organisational performance.	The people analytics framework is developed based on statistical techniques.
Chornous and Gura (2020)	n=32	Focus on how people analytics (e.g. performance management).	The people analytics framework is developed based on statistical techniques.
Abbott (2025)	n=50	The advert focuses on people analytics.	The course advocates including the business case.
Karmańska (2020)	n=22	It focuses on people analytics (i.e. recruitment, talent management, retention, and performance management).	The defining, collecting, analysing, sharing and reflecting.
Margherita (2022)	n=205	Focus on how people analytics, also known as talent, human resources, and human capital,	Focus on advanced statistical analysis and the role of AI.

		enhance business performance.	
Fraile et al. (2023)	n=26	The article focuses on people analytics.	Conservative approach to data analysis, lack of data governance, reskilling and upskilling, data accuracy and reliability, and management resistance.
Kashive and Khanna (2017)	n=23	It focuses on people analytics (i.e. recruitment, talent management, retention, and performance management).	The framework entails business acumen, consulting, data analysis, storytelling, communication and research and discovery. The authors recommend skills that include techniques with software tools (excluding Excel), analytical (problem-solving, decision-making), communication, business, organisational, and customer advantage.
Peeters et al. (2020)	n=95	People analytics impact on organisational performance.	The people analytics effectiveness frameworks elements include enablers (i.e. support of top management, data and infrastructure), deliveries (i.e. organisational research, employee monitoring and evidence-based culture), stakeholder management (i.e. HRM professionals, managers, other analytics teams, employees) and governance (i.e. data government, governance of the function and governance of the external social legitimacy).
Huang et al. (2023)	n=85	Focus on the people analytics impact on business outcomes.	Model of personalised HRM by the adoption of advanced HRM analytics and artificial intelligence (AI) to provide tailored HRM solutions.
Nawaz et al. (2024)	n=123	Focus on how AI can save time in executing people analytics.	AI in HRM practices (accuracy, automation, computing power & capacity, real-time experience, personalisation, and time saving and cost saving) and use structural equation modelling to analyse the data.
Gurusinghe et al.(2021)	n=129	People analytics should align with business outcomes and be driven by top management.	Developed a conceptual model that shows how focusing on business outcomes would lead to talent retention and requisition.

DISCUSSION

This article aims to examine how Excel can be utilised to perform descriptive and inferential statistical analyses within a people analytics framework, and to identify the key elements that should be included in the framework from the literature review. The literature was reviewed, and based on the findings, this study contributes to the body of knowledge by proposing people analytics, as shown in Figure 2.

Figure 2: Proposed people analytics framework.



Source: Authors (2026).

The framework's developed definition is in section 2 and emphasises AI's role as an aid to people analytics during data analysis. It can be adumbrated that this framework aligns with the school of thought that focuses on addressing the business problem, and when the business is sustainable and profitable, employees would be paid well and would be satisfied (Skosana et al., 2024). In addition, the data in Table 1 showed that such a focus leads organisations to acquire and retain talented employees, thereby giving them a competitive edge. The framework shows that people's analytics should focus on developing a "so what" business question. Such questions should show which statistical techniques are used and add value in resolving the business problem. Competencies needed to identify a business problem and answer the research question include business acumen, which involves understanding business processes and procedures. This shows that people analytics professionals who understand business processes would find it challenging to develop appropriate research questions and people analytics metrics that would address the business problem.

Identifying stakeholders is a prerequisite for every people analytics project to have an impact. During stakeholder engagement, which includes designing the article and data collection, the survey can be used and must comprise closed-ended questions, since the philosophical position of this article is post-positivism. In addition, the LAPM, which stands for logic (i.e. rationale for the article), analytics (i.e. using the right descriptive and inferential statistics), process (i.e. ensuring validity and reliability) and process (i.e. impact and effectiveness on strategic and business). It can be argued that using the LAPM methodology involves examining people analytics (i.e., performance and attrition) and their impacts on business productivity and organisations' strategic goals. To be effective in data collection, analysts must have the competencies to develop and contextualise closed-ended items and know which metrics to use (e.g., absenteeism and attrition rates, time-to-time). Once the data has been collected and analysed, it should be communicated in a format that business leaders understand. In people analytics, communicating the results is known as storytelling. This suggests that when people present results analytically, they should not focus on how they derived the statistical formula. Instead, they must demonstrate how people's analytics will improve business outcomes. An example could be: "Reducing the absenteeism rate by 20% will save the organisation R2 million."

MANAGERIAL IMPLICATIONS

It needs to be stressed that the framework in Figure 2 assumes that a team or people with analytics expertise are in place. If their organisation does not have them, a business case should be developed to create such a position or team. A business case shows the sense of urgency of how people analytics will resolve the business problem. In addition, the vision or strategic value of people analytics should be shown, along with how it will leverage AI to deliver on that value and address business problems. The organisation that implements people analytics should ensure that the people analytics recommendations are actioned and inculcate the culture of making decisions based on the data (Joseph,

2024). When developing a business case for a people analytics unit or position, the challenges must be considered. It has been established that there is a shortage of people with analytics competencies. Another challenge is a lack of synergy between the theory and practice of people analytics, and a shortage of people analytics professionals with a deep understanding of business. It has been found that people analytics have been used to maintain the status quo and drive a certain agenda. Hence, it is recommended that for people analytics to be used effectively, it must not be part of the HRM division. In addition, when HRM practitioners are trained in people analytics, they should attend a course that combines hands-on activities with a theoretical framework.

Evidence has shown that for the business case to be implementable, senior management, if possible, the CEO should take the lead. Other stakeholders include the executive responsible for customer care, who ensures that employees attend customer care training and implement performance management for staff who deal directly with customers. Managers should be aware that in some instances, when they create a business case for the people's analytics unit or people, it might be met with scepticism. One reason might be that, in organisations, decisions are not made based on data. Another reason might be that the value of people analytics within the organisation is not as well established as analytics in marketing and finance, for example. One strategy to gain buy-in is to conduct a pilot article and use its results and the benefits it creates. The storytelling shows the benefits and impact of the pilot in resolving a business problem, thereby demonstrating the value of people's analytics.

CONCLUSION

The purpose of this article was to give an overview of people's analytics, focusing on Excel as the data analytics tool. This article begins by identifying gaps in the literature. It argued that the definition, discussed in section 2, did not include AI as an aid when using the statistical analysis tool. Hence, this article contributed to people analytics by creating a new definition. The rationale for using Excel was that it is a data analytics tool used by organisations, and it can perform descriptive and inferential statistics. It was noted that it has AI tool plug-ins like Copilot and ChatGPT, which aid both aspiring and seasoned people analytics professionals with formal tools and a step-by-step guide for conducting advanced statistical techniques to answer business questions. The theories that were deemed appropriate for HCT and AMO. With regards to the AMO framework, people analytics provides tools to assess and implement effective strategies. Despite being conducted within the context of developing a framework, the current article had limitations. One limitation is that it did not include sources before 2015 or those with fewer than 20 citations. Also, the keywords (people, talent, and human resource analytics) were limiting, as other articles might have used human capital. These limitations can inform future research and include, for example, the living wage calculation, which was not covered in this article. Overall, the study concludes that integrating statistical analysis with a people analytics framework strengthens HRM decision-making and supports strategic organisational planning. The findings also suggest that Excel remains a valuable analytical platform for introductory and intermediate people analytics applications.

REFERENCES

- Abbott, J. (2025). *MANA 7380: People Analytics: HR Transformation through Data* (pp. 1–5). University of Houston.
- Ali, E., & Elias, H. (2023, January 26). Potential Application of HR Analytics to Talent Management in the Public Sector: A Literature Review. *2023 International Conference on Cyber Management and Engineering (CyMaEn)*. 2023 International Conference on Cyber Management and Engineering (CyMaEn). <https://doi.org/10.1109/cymaen57228.2023.10051107>
- Belizón, M. J., & Kieran, S. (2022). Human resources analytics: A legitimacy process. *Human Resource Management Journal*, 32(3), 603–630. <https://doi.org/10.1111/1748-8583.12417>
- Hall, J. N., & Jordan, L. S. (2025). *Sankofa: The Relevance of the Past for the Future of Qualitative Health Research*. *Qualitative Health Research*, 35(4–5), 570–572. <https://doi.org/10.1177/10497323251322421>

- Huang, X., Yang, F., Zheng, J., Feng, C., & Zhang, L. (2023). Personalized human resource management via HR analytics and artificial intelligence: Theory and implications. *Asia Pacific Management Review*, 28(4), 598–610. <https://doi.org/10.1016/j.apmr.2023.04.004>
- Jia Q., Guo Y., Li R., Li Y.R., & Chen Y.W. (2018). A Conceptual Artificial Intelligence Application Framework in Human Resource Management. *Electronic Business*, 106–114.
- Jiang, Y., & Akdere, M. (2022). An operational conceptualization of human resource analytics: Implications for in human resource development. *Industrial and Commercial Training*, 54(1), 183–200. <https://doi.org/10.1108/ICT-04-2021-0028>
- Jobs. N. (2024). *HRM Value Chain*. Available from: <http://.com/pulse/hr-value.neco-jobs-pvt-ltd>
- Joseph, W. J. (2024). *Next-Gen HR: How People Analytics and Business Acumen Drive Leadership in Strategy* [USF Tampa Graduate Theses and Dissertations.]. <https://digitalcommons.usf.edu/etd/10637>
- Kashive, N., & Khanna, V. T. (2017). Study of Early Recruitment Activities and Employer Brand Knowledge and Its Effect on Organization Attractiveness and Firm Performance. *Global Business Review*, 18(3_suppl), S172–S190. <https://doi.org/10.1177/0972150917693334>
- Kaur, H., & Malik, P. (2025). HR practices and subjective well-being: A systematic review and conceptual model based on the AMO framework. *Human Systems Management*. <https://doi.org/10.1177/01672533251339610>
- Luo, G., Zhu, G., & Guo, Y. (2024). How to motivate employee green behavior in the Chinese context: A configurational study integrating the AMO framework with regulatory focus theory. *Asia Pacific Journal of Management*. <https://doi.org/10.1007/s10490-024-09986-w>
- Maleka, M. J., Mmako, M. M., & Swarts, I. (2017). Antecedents of Affective Commitment of Human Resource Management Practitioners Attending a Professional Body Convention. *Journal of Economics and Behavioral Studies*, 9(3(J)), 121–132. [https://doi.org/10.22610/jebs.v9i3\(J\).1751](https://doi.org/10.22610/jebs.v9i3(J).1751)
- Margherita, A. (2022). Human resources analytics: A systematization of research topics and directions for future research. *Human Resource Management Review*, 32(2), 100795. <https://doi.org/10.1016/j.hrmr.2020.100795>
- McCartney, S., Murphy, C., & McCarthy, J. (2021). 21st century HR: A competency model for the emerging role of HR Analysts. *Personnel Review*, 50(6), 1495–1513. <https://doi.org/10.1108/PR-12-2019-0670>
- Morgan, H. (2022). Conducting a Qualitative Document Analysis. *The Qualitative Report*. <https://doi.org/10.46743/2160-3715/2022.5044>
- Nair, S. R. (2023). The Impact of Digitalization on Women's Entrepreneurship: A Perspective from Emerging Markets". In Nelson, W. D. (Eds.) 'Advances in Business and Management'. Volume 21. (Pp.69-98). New York: Nova Science Publishers, Inc. Available from: In *Advances in Business Management* (Vol. 21, pp. 69–98). Nova Science Publishers, Incorporated.
- Nawaz, N., Arunachalam, H., Pathi, B. K., & Gajenderan, V. (2024). The adoption of artificial intelligence in human resources management practices. *International Journal of Information Management Data Insights*, 4(1), 100208. <https://doi.org/10.1016/j.jjime.2023.100208>
- Ngatuvai, M., Autrey, C., McKenny, M., & Elkbuli, A. (2021). Significance and implications of accurate and proper citations in clinical research studies. *Annals of Medicine and Surgery*, 72, 102841. <https://doi.org/10.1016/j.amsu.2021.102841>
- Nocker, M., & Sena, V. (2019). Big Data and Human Resources Management: The Rise of Talent Analytics. *Social Sciences*, 8(10), 273. <https://doi.org/10.3390/socsci8100273>

Paul van der Laken. (2018). *Data-driven human resource management: The rise of people analytics and its application to expatriate management*. Ridderkerk.

Raynes, T., Paauwe, J., & Van De Voorde, K. (2020). People analytics effectiveness: Developing a framework. *Journal of Organizational Effectiveness: People and Performance*, 7(2), 203–219. <https://doi.org/10.1108/JOEPP-04-2020-0071>

Shafie, M. R., Khosravi, H., Farhadpour, S., Das, S., & Ahmed, I. (2024). A cluster-based human resources analytics for predicting employee turnover using optimized Artificial Neural Networks and data augmentation. *Decision Analytics Journal*, 11, 100461. <https://doi.org/10.1016/j.dajour.2024.100461>

Skosana, T. B., Maleka, M. J., & Ngonyama-Ndou, T. (2024). Antecedents of employees' well-being at four municipalities within the Nkangala district: An affective event theory perspective. *Journal of Contemporary Management*, 21(2), 278–301. <https://doi.org/10.35683/jcm23.073.276>

Tuovinen, S. (2024). *Uncovering the key competencies of HR leaders and their competence development means. Master's program in Knowledge Management & Leadership*, Master's thesis.

Van Den Heuvel, S., & Bondarouk, T. (2017). The rise (and fall?) of HR analytics: A study into the future application, value, structure, and system support. *Journal of Organizational Effectiveness: People and Performance*, 4(2), 157–178. <https://doi.org/10.1108/JOEPP-03-2017-0022>

Vatsal, S., & Dubey, H. (2024). *A Survey of Prompt Engineering Methods in Large Language Models for Different NLP Tasks* (Version 2). arXiv. <https://doi.org/10.48550/ARXIV.2407.12994>

Wolniak, R., Dolata, M., Hadryjańska, B., & Wysokińska-Senkus, A. (2024). Employing business analytics in industry 4.0 settings for human resource analytics. *Scientific Papers of Silesian University of Technology. Organization and Management Series*, 2024(197), 629–640. <https://doi.org/10.29119/1641-3466.2024.197.34>

Yalcin, A. S., Kilic, H. S., & Delen, D. (2022). The use of multi-criteria decision-making methods in business analytics: A comprehensive literature review. *Technological Forecasting and Social Change*, 174, 121193. <https://doi.org/10.1016/j.techfore.2021.121193>

IDENTIFYING ATTRITION PREDICTORS USING THE FUZZY TOPSIS AND LOGISTIC REGRESSION

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ABSTRACT

This article aims to identify predictors of attrition using the fuzzy Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) and logistic regression. A review of the literature shows that traditional statistical methods are used to identify predictors, but do not support multi-criteria decision-making under uncertainty. To provide theoretical grounding for the current study, Mobley et al.'s (1979) model, grounded in the withdrawal decision process, was adopted. The study was influenced by the positivist paradigm, and it was quantitative. A dataset of 1,470 employees from Kaggle was used to achieve the study objective. The data were analysed in Python, and since the target variable was binary, logistic regression was deemed an appropriate statistical technique. The logistic regression model identified employees with predicted attrition probabilities ranging from approximately 0.08 (lowest risk) to 0.85 (highest risk). A strong negative Spearman's rank correlation of approximately -0.89 was found between Fuzzy-TOPSIS coefficients and logistic regression. The other key insight was that sales had the highest attrition rate (20.63%). Another key finding was that, in the research and innovation department, younger employees have fewer total years of work experience and earn lower monthly income. They also tend to have slightly lower job satisfaction. The study's implications are that it equips managers with strategies to mitigate costly employee attrition.

Keywords: attrition trends, fuzzy TOPSIS, logistic regression, Python, Shapley Additive exPlanation.

INTRODUCTION

Employee attrition is a people analytics metric that poses a significant challenge for organisations globally and is of interest to both academics and human resource management (HRM) practitioners (De Vos et al., 2020). HRM practitioners are aware that attrition is disruptive as it is costly in terms of sourcing, developing, and onboarding new employees (Bussin, 2018). In addition, academicians have established that attrition is disruptive, leading to the loss of institutional memory and diminished productivity. HRM practitioners and academicians are aware of the challenge of replacing talented employees (Tshwane et al., 2023). In addition, they believe it is imperative to conduct research like the current one. There are various attrition frameworks, but this study is grounded in Mobley et al.'s (1979) employee turnover model, which frames attrition as a decision influenced by cognitive factors such as job satisfaction, alternative employment opportunities, and expected utility. Previous research using Mobley et al.'s (1979) model established trends such as increased employee mobility, shifting career aspirations, and intensified competition for skilled talent, which further exacerbate attrition. These factors have transformed employee retention into a vital strategic focus for HRM departments that aim to maintain not only organisational performance but also a competitive edge in their respective fields (Anitha & Amala, 2025; Urme, 2023).

While considerable research using the Mobley et al. (1979) model has explored the antecedents of employee attrition, much of this work has traditionally relied solely on statistical or machine-learning algorithms, such as logistic regression (Maleka, 2023; Wardhani & Lhaksmana, 2022). Such research did not measure whether Shapley Additive exPlanation (SHAP) was calculated (Varkiani et al., 2025), whereas the current study does. Another limitation of attrition research based solely on predictive models (e.g., logistic regression) is that they often fall short of supporting the complex, multi-criteria decision-making processes that managers must navigate in HRM, especially given the economic, psychological, and organisational factors that must be weighed simultaneously (Rubenstein et al. 2018).

Purpose of the Study

As observed in previous research, the HRM literature is limited in integrating logistic regression modelling with fuzzy MCDM, especially in the Global South. Hence, in this study, they were integrated to address this research gap. The objectives of the study were:

- To identify the research trends in the department of the organisation;
- Use fuzzy numbers to identify employees who are at risk to attrite; and
- To identify factors that predict employee attrition.

In the next section, the attrition literature is reviewed. The methodology used to address the study objectives is then elucidated. The study results are presented in line with the objectives, and the paper concludes with a discussion that includes theoretical contributions, managerial implications, limitations, and future research.

LITERATURE REVIEW

Employee attrition continues to be best understood through the seminal work of Mobley et al. (1979), whose employee turnover model conceptualises withdrawal as a cognitive and sequential decision-making process driven by job satisfaction, perceived alternatives, and expected utility. Recent people analytics research further extends Mobley et al.'s theoretical contributions by incorporating predictive modelling and explainable artificial intelligence (AI), demonstrating that factors such as age, total working years, monthly income, education field, and job satisfaction exert measurable influence on attrition decisions (Mombblison, 2025). Together, these contemporary insights show that Mobley et al.'s (1979) framework remains a foundational lens for understanding turnover, while modern analytical techniques deepen our understanding of the predictors shaping employees' decision pathways (Mızrak, 2023).

The cost of employee attrition is both monetary and non-monetary. In terms of the former, companies spent a lot of money on onboarding, recruiting, and training of newly appointed employees (Gross, 2022). In terms of the latter, companies lose employees with institutional memory, and their performance diminishes (Phaladi & Ngulube, 2024). Rubenstein et al. (2018) adumbrate that the cumulative effects of voluntary turnover extend to reduced team cohesion and long-term organisational effectiveness. Demirel and Çubukçu (2021) opined that Fuzzy Multi-Criteria Decision-Making (MCDM) approaches, including Fuzzy TOPSIS, are especially valuable because they distinguish between beneficial and non-beneficial criteria, convert expert judgments into triangular fuzzy numbers, and compute closeness coefficients that rank candidates. Hasib et al. (2025) averred that MCDM empowers managers and researchers in addressing the uncertainty and imprecision inherent in evaluating candidate skills, competencies, and potential fit.

Existing literature on employee attrition has historically evolved along two separate methodological paths, with researchers focusing on predictive modelling or fuzzy TOPSIS, but rarely integrating both. Previous research relied solely on predictive techniques such as logistic regression or other classification models (e.g., decision trees, random forest, or XG Boost, which offer strong classification insights but do not support multi-criteria decision-making under uncertainty, an important limitation for HRM practitioners who must balance economic, psychological, and organisational factors simultaneously (Maleka, 2023). Conversely, fuzzy TOPSIS studies emphasise ranking alternatives or evaluating HRM criteria but typically do not incorporate predictive analytics capable of estimating individual attrition probabilities (Hasib et al., 2025). The fragmentation of these approaches has contributed to a methodological gap, with limited HRM research—particularly in the Global South. By integrating logistic regression with Fuzzy TOPSIS, the current study bridges this long-standing methodological divide, offering a novel framework that simultaneously predicts attrition risk and ranks employees using fuzzy multicriteria reasoning, thereby advancing the body of knowledge in people analytics. In the next section, the methodology followed to address the study objectives is elucidated.

METHODOLOGY

Discussed in this section are the research design, sampling distribution, statistical analysis, and ethical considerations.

Research Design

The research design of the study was a combined approach (predictive and MCDM), and the study was influenced by a positivism paradigm. The study also employed a cross-sectional research design, as the data analysed were collected over a single interval (Maree, 2016). The data used to generate insights into the attrition predictors was not collected by the authors but obtained from Kaggle. The rationale for using Kaggle data is that it has been audited, thereby increasing the validity and authenticity of the study's findings.

Sampling Distribution

The number of employees was 1470, and their average age was 37. The oldest employee was 60, and the youngest was 18. There 71.7% employees who did not work overtime, 45.8% were married, 32.0% were single, and 22.3% were divorced. Sixty per cent (60.0%) of respondents were males, 83.9% did not attrite. Most respondents (38.9%) had a bachelor's qualification, and the majority (65.4%) were from the research and innovation department. Most of the respondents (59.7%) had been in the life science education field, and their other distribution of education fields was as follows: medical (31.3%); Marketing (5.8%); Technical Degree (2.9%); Human Resource (1.6%), and Other (1.0%). Most employees have worked for 1 company (24.0%), followed by those who have never worked for another company (17.3%). The rest are distributed as follows: 2 companies (14.1%), 3 companies (13.7%), 4 companies (12.6%), 5 companies (7.8%), 6 companies (5.6%), 7 companies (3.0%), 8 companies (1.3%), and 9 companies (0.7%). Approximately 52% of employees have been with the company for 7 years or less, indicating that most staff have relatively shorter tenure within the organisation.

Statistical Analysis

The data were analysed in Python. Fuzzy numbers were used to identify employees at risk of attrition. Fuzzy TOPSIS framework supports multi-criteria decision-making under uncertainty by defining criteria such as cost and attrition reduction, applying linguistic scales converted into triangular fuzzy numbers, normalising and weighting the fuzzy decision matrix, and computing fuzzy positive and negative ideal solutions; the closeness coefficient then ranks alternatives based on proximity to the ideal (Chen, 2000). Then, logistic regression was used to estimate odds ratios and to understand the impact of each predictor; a Shapley Additive exPlanation (SHAP) was calculated (Varkiani et al., 2025).

Ethical Consideration

The researchers did not have to apply for ethical clearance as they used secondary data. In addition, they have ensured that the data are presented accurately and made available in the public domain, so that other researchers can verify the calculations in this study. The company name is also anonymised, and the researchers have used language that does not harm the reputation of the organisation.

RESULTS

This section of the study explains the results and is structured according to the study objectives.

Departmental Attrition Trend Analysis

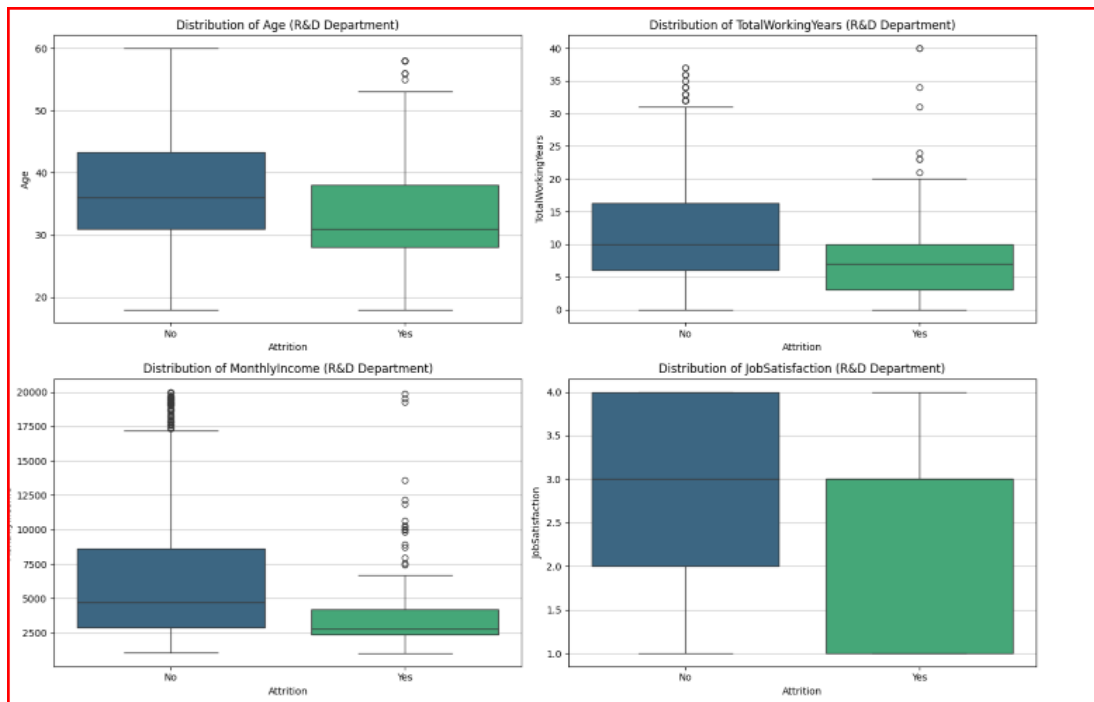
The descriptive statistics are shown in Table 1. Attrition was highest in the sales department (20.63) and lowest in the research and innovation department.

Table 1: Descriptive statistics.

Attrition per Department	Yes	No	Total	Attrition Rate
Sales	92	354	446	20.63
Human Resources	12	51	63	19.07
Research & Development	133	828	961	13.84

In summary, Figure 1 revealed that employees in the R&D department. The data showed that those who attrite are generally younger, have fewer total working years, and earn significantly less monthly income. They also tend to have slightly lower job satisfaction.

Figure 1: Attrition trends in the research and development department.



FUZZY Results

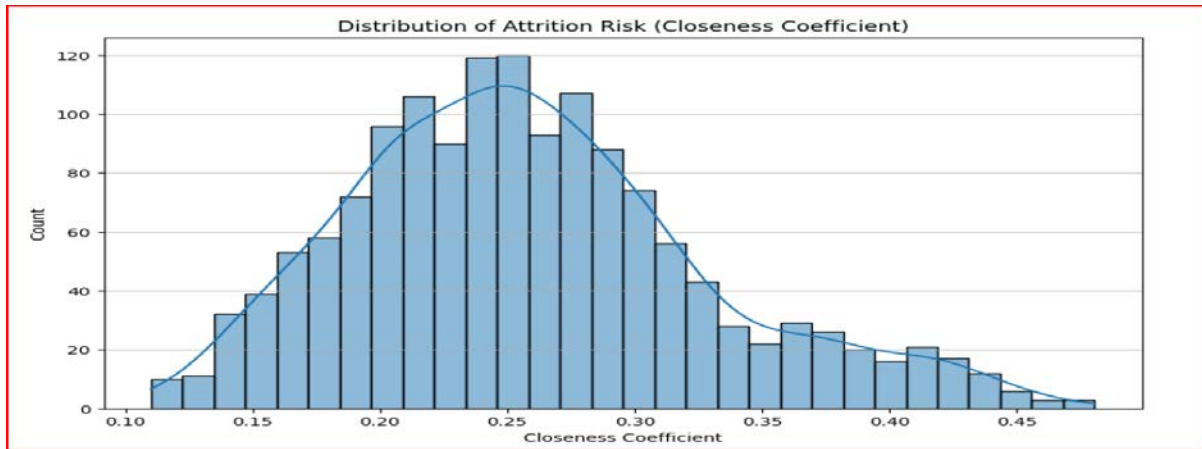
Shown in Table 2 is a summary of the top and bottom 5 employees at attrition risk. A delta value of 0.1 was applied to convert crisp normalised values into triangular fuzzy numbers (TFNs) during fuzzification. The results revealed that employee 1116 consistently ranks lowest in attrition risk across all δ values. Other low-risk employees (105, 894, 749, 1374) also appear consistently, indicating a stable ranking for employees least likely to leave. The highest-risk employees fluctuate slightly with δ (e.g., employee 585 appears only at $\delta = 0.15$ and 0.20). The data also shows that employees 171, 777, 731, and 853 consistently appear in the high-risk group, suggesting persistent attrition concerns. The high stability of the Fuzzy-TOPSIS model indicates that varying the delta parameter for fuzzification (which converts crisp values into triangular fuzzy numbers) does not significantly affect the model's output or the resulting employee attrition risk rankings. This means the model produces consistent and robust rankings despite slight changes in this fuzzification parameter. Consequently, this stability enhances the trustworthiness and reliability of the attrition risk assessments derived from the model, supporting confident decision-making based on these rankings.

Table 2: Top and bottom 5 employees at attrition risk.

Delta (δ)	Top 5 Employees (Lowest Risk)	Closeness Coefficient	Bottom 5 Employees (Highest Risk)	Closeness Coefficient
0.05	1116, 105, 894, 749, 1374	0.4788, 0.4691, 0.4676, 0.4649, 0.4596	689, 731, 853, 777, 171	0.1153, 0.1133, 0.1111, 0.1099, 0.1099
0.10	1116, 894, 105, 749, 1374	0.4806, 0.4704, 0.4699, 0.4667, 0.4611	689, 731, 853, 171, 777	0.1151, 0.1134, 0.1111, 0.1101, 0.1101
0.15	1116, 894, 105, 749, 1374	0.4802, 0.4706, 0.4703, 0.4681, 0.4615	585, 731, 853, 171, 777	0.1155, 0.1139, 0.1115, 0.1105, 0.1105
0.20	1116, 105, 894, 749, 1374	0.4795, 0.4706, 0.4694, 0.4685, 0.4616	585, 731, 853, 171, 777	0.1161, 0.1144, 0.1120, 0.1109, 0.1108

The distribution of attrition is shown in Figure 2. According to Chen (2000), a closeness coefficient is a numerical measure used in the TOPSIS method to rank alternatives based on their relative proximity to the ideal solution. It is calculated as the ratio of the distance of an alternative from the Fuzzy Negative Ideal Solution (FNIS) to the sum of the distances from both the Fuzzy Positive Ideal Solution (FPIS). As shown in the figure, it is skewed to the right, suggesting that most employees have a low attrition risk.

Figure 2: Distribution of attrition risk.



Predictors of Attrition

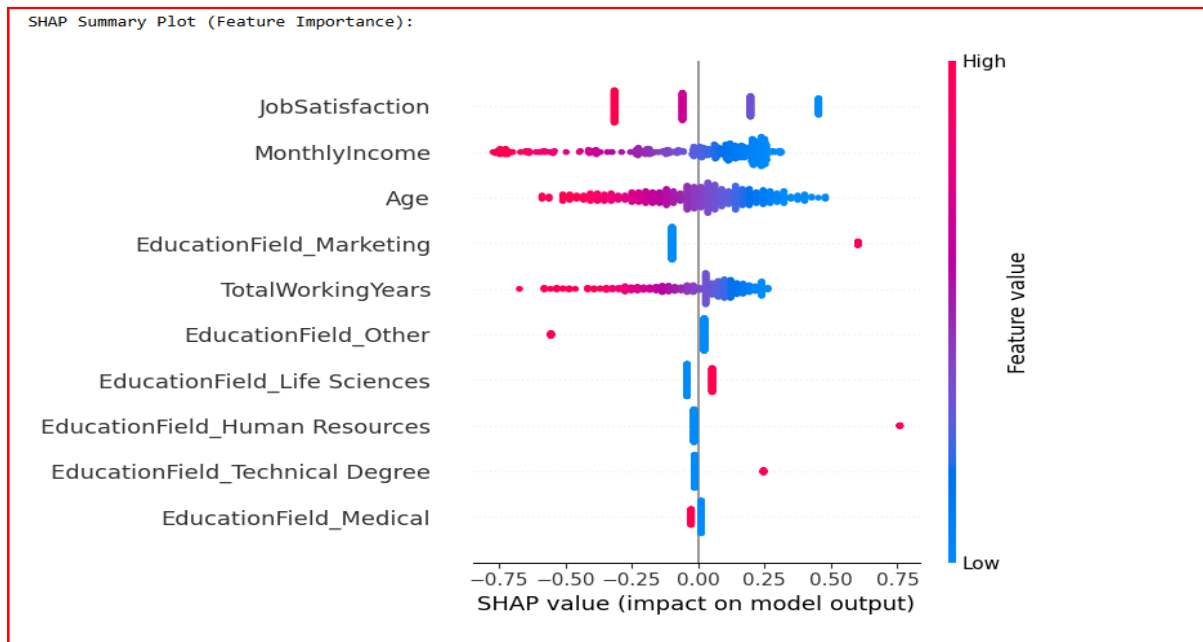
The logistic regression results are shown in Table 3. There are odd ratios that were above and below 1. An odds ratio (OR) is a measure of association that compares the odds of an outcome in one group to those in a reference group; values greater than 1 indicate higher odds, and values less than 1 indicate lower odds (Field, 2018). For the Education Field_Human Resources: the odds ratio = 2.17. This can be interpreted that an employee with this educational background is 2.17 times more likely to attrite compared to an employee without this background (all things being equal). The other results can be interpreted the same way.

Table 3: Logistic regression.

Features	Odds ratio
Education_Field_Human Resources	2.17
Education_Field_Marketing	2.01
Education_Field_Technical Degree	1.11
Education_Field_Life Sciences	0.96
Education_Field_Other	0.56
Job Satisfaction	0.46
Total Working Years	0.39
Monthly Income	0.34
Age	0.34

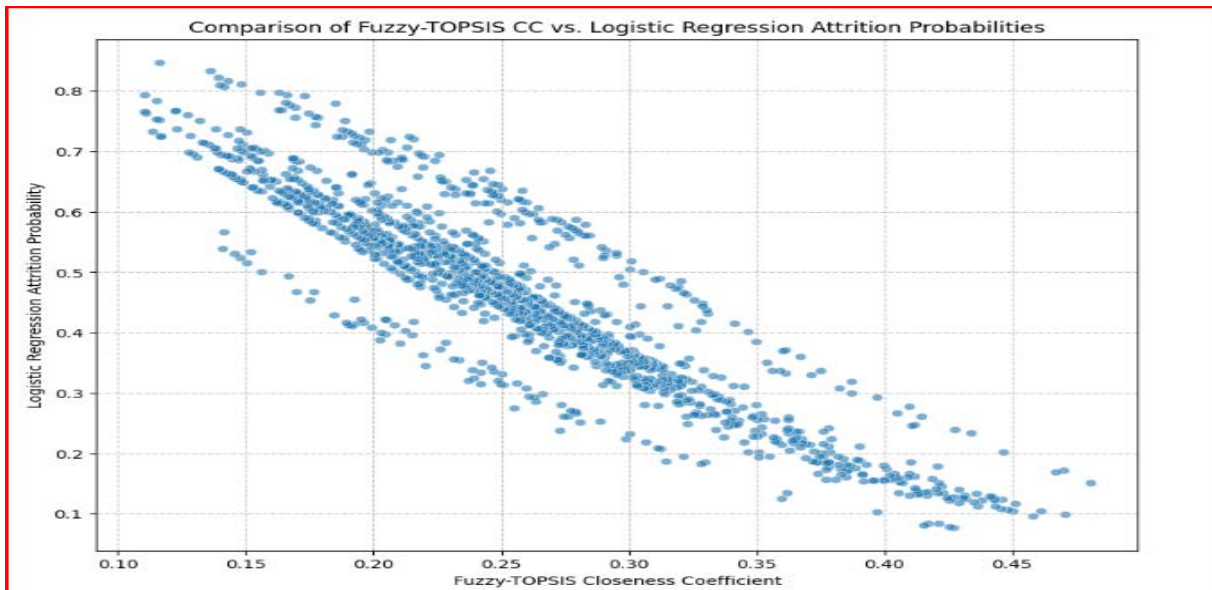
The SHAP results are presented in Figure 3. The key insights from the results are that predictors such as Age, Monthly Income, Total Working Years, and Job Satisfaction typically have negative SHAP values for higher feature values, meaning that higher age, income, years of experience, and job satisfaction decrease the likelihood of attrition. On the other hand, certain education field categories, notably Education Field Human Resources and Education Field Marketing, tend to have positive SHAP values, indicating that being in these fields increases the likelihood of attrition.

Figure 3: SHAP results.



The comparison of the fuzzy results and the logistics regression is shown in Figure 4. A strong inverse Spearman's rank correlation of approximately -0.89 was found, with higher Fuzzy-TOPSIS closeness coefficients indicating lower attrition risk and higher logistic regression probabilities indicating higher attrition risk.

Figure 4: Comparison of fuzzy TOPSIS and Logistics regression.



DISCUSSION

The purpose of the study was to identify predictors of attrition using fuzzy TOPSIS and logistic regression. The study's results indicate that the logistic regression model identified employees with predicted attrition probabilities ranging from approximately 0.08 (lowest risk) to 0.85 (highest risk). The result from this model indicates that there are probabilities that employees can leave an organisation and others are ready to stay. This aligns with Mobley et al. (1979), who noted that the employee decision-making process can be driven by job satisfaction, perceived alternatives, and expected utility. This can lead to some employees staying and others leaving based on the perception. According to Maleka (2023), the decision to leave is positioned as a psychologically mediated process rather than a singular behavioural outcome. Recent research has continued to affirm and extend this model (Momblison, 2025). Additionally, the study result has a strong negative Spearman's rank correlation of approximately -0.89 based on Fuzzy-TOPSIS coefficients and logistic regression. The result supports the view by Mobley et al.'s argument, which posits that turnover is shaped by both cognitive appraisals and labour-market dynamics. Furthermore, another key insight from this study was that sales had the highest attrition rate (20.63%). This may be caused by various underlying factors, such as poor management, low salaries, poor departmental culture, or burnout, which are not under the department's control. This result and position were supported by Rubenstein et al. (2018), who pointed out that the effects of voluntary turnover extend to reduced team cohesion and long-term organisational effectiveness.

The study further found that employees in the research and development department had revealed that, on average, younger employees have fewer total working years and earn less monthly income. This could be due to various factors that lead to resignations in the department of research and development, including burnout and low remuneration. Based on the literature review, the research has pointed out that Demirel and Çubukçu (2021) stated that fuzzy MCDM approaches, such as Fuzzy TOPSIS, are very valuable because they can distinguish between beneficial and non-beneficial criteria, convert expert judgments into triangular fuzzy numbers, and compute closeness coefficients to rank candidates. The study's implications are that it equips managers with strategies to mitigate employee attrition, which is costly for organisations. The other implication is that high attrition rates in organisations cause instability and burnout, as employees may be taking on a heavy workload, leading to stressed employees and lower productivity. HRM departments should develop alternative solutions so that the organisation does not lose its cultural values and memories due to attrition. Additionally, the organisation must cover the costs associated with attrition, job advertisements, and training provided to new recruits.

Limitations of the Study

This study offers meaningful contributions to the understanding of employee attrition; however, several limitations should be acknowledged. First, the analysis relied on secondary data from Kaggle, which limits control over variable selection and contextual accuracy regarding organisational processes and employee experiences. Although the dataset is audited and publicly available, secondary data-use restrictions limit the inclusion of additional variables that could enhance predictive power. The dataset originated from a single organisation. As organisational cultures, leadership styles, compensation structures, and labour-market conditions vary significantly, findings may not be fully generalisable across industries or geographical contexts. As a result, the predictors identified in this study may not exhibit the same level of influence in different organisational settings. The study employed a cross-sectional design, which precluded causal inferences. Because the data captured employee characteristics at a single point in time, they do not allow for examining changes in attitudes, satisfaction, or labour-market dynamics that may develop over time. Consequently, temporal patterns in attrition behaviour remain unexplored. Finally, the dataset is limited to demographic and job-related variables. Factors such as employee engagement, burnout, organisational justice, leadership style, and psychological climate, known contributors to attrition, were not included. The absence of these variables restricts the comprehensiveness of the analysis.

Recommendations for Future Research and Management

Several opportunities exist for future research to expand upon the present findings. First, studies should incorporate data from multiple organisations or sectors to enhance external validity. Comparative analysis may reveal whether specific predictors operate consistently across diverse organisational environments or are context dependent. Future research should adopt longitudinal designs to examine how predictors of attrition evolve over time. Longitudinal data would allow researchers to track changes in job satisfaction, career mobility, and labour-market conditions, offering deeper insights into the dynamic nature of the turnover process. Expanding the methodological framework to include hybrid AI MCDM techniques is recommended. Approaches such as XGBoost, and deep learning models could provide richer predictive capabilities and uncover nonlinear relationships that logistic regression may overlook. Scholars should explore simulation-based techniques, such as stochastic attrition modelling, to evaluate the organisational and financial implications of turnover. Simulation models can help HRM departments forecast the impacts of attrition under various scenarios and design cost-effective retention strategies.

The following are the managerial recommendations:

- Prioritise the retention interventions mechanisms for employees consistently identified as high-risk (585, 689, 731, 853, 777, 171);
- Employees who are identified as assets for the organisation, such as the employees with the highest closeness coefficients (1116, 894, 105) could be recognised and potentially allowed to serve as mentors or role models for the organisation; and
- Employees can be rewarded through monetary and non-monetary awards.

CONCLUSION

This study aimed to create insights about predictors of attrition using fuzzy TOPSIS and logistic regression. It used Mobley et al.'s (1979) model to give it theoretical grounding. The motivation for conducting this study is that previous research revealed that previous attrition used predictive and ranking methods separately. The study used a quantitative approach and was influenced by positivism. Based on the results, the study concludes that employees are never satisfied, especially when their conditions of service are not met. The HRM department must take the initiative to find ways to reduce attrition, as it is costly to the organisation. It is further concluded that resignations can be reduced, especially in high-demand departments such as research and development. Employees in such departments should be allowed to maintain work-life balance and job satisfaction, and their working conditions should be improved by periodically increasing their remuneration. Lastly, higher age income, years of experience, and job satisfaction decrease the likelihood of attrition.

REFERENCES

- Anitha, K., & Amala, J. (2025). Future of Work: Generations and Retaining Talent Focus. In *Modern Trends and Future Innovation in Human Resource Management* (pp. 239-258). IGI Global.
- Bussin, M. (2018). *Retention strategies: The key to attract and retain excellent employees*. Randburg: KR Publishing
- Chen, C.T. (2000). Extensions of the TOPSIS for group decision-making under fuzzy environment. *Fuzzy Sets and Systems*, 114(1), 1–9.
- Demirel, Z., & Çubukçu, C. (2021). Measurement of Employees on Human Resources with Fuzzy Logic. *EMAJ: Emerging Markets Journal*, 11, 1–7.
- De Vos, A., Van der Heijden, B. I., & Akkermans, J. (2020). Sustainable careers: Towards a conceptual model. *Journal of vocational behavior*, 117, 103196.
- Field, A. (2018). *Discovering statistics using IBM SPSS Statistics*. (5th ed.). Sage Publications.
- Gross, A. (2022). Think a Company Retirement Plan is Expensive? Try Not Having. Available at: <https://www.ijoin>
- Hasib, N., Rizvi, S.W.A. & Katiyar, V. (2025). Fuzzy Based Model for Mitigating Employee Attrition. *Proceedings of the 7th International Conference on Finance, Economics, Management and IT Business (FEMIB 2025)*, 105-117.
- Maleka, M.J. (2023). Using the Ensemble Method to Predict Employee Attrition at the Multinational Consulting Corporation. Published in the IBC proceedings
- Maree, K. (2016). *First steps in research*. Pretoria: Van Schaik.
- Mızrak, F. (2023). Analyzing Criteria Affecting Decision-Making Processes of Human Resource Management in the Aviation Sector-A Fuzzy Logic Approach. *Journal of Aviation*, 7(3), 376-387
- Mobley, W.H., Griffeth, R.W., Hand, H. H. & Meglino, B.M. (1979). Review and Conceptual Analysis of the Employee Turnover Process. *Psychological Bulletin*, 86(3), 493-522
- Momblison, D.D. (2025). A study of the relationship between emotional intelligence and affective organizational commitment and their effect on turnover intentions. Ph.D. in Business Administration, Liberty University.
- Phaladi, M. P., & Ngulube, P. (2024). Understanding tacit knowledge loss in public enterprises of South Africa. *SA Journal of Human Resource Management*, 22, 2229.
- Rubenstein, A. L., Eberly, M. B., Lee, T. W., & Mitchell, T. R. (2018). Surveying the forest: A meta-analysis, moderator investigation, and future-oriented discussion of the antecedents of voluntary employee turnover. *Personnel psychology*, 71(1), 23-65.
- Tshwane, G.S., Maleka, M.J., & Tladi, P.M. (2023). Investigating turnover intention in a financial organisation in Gauteng. *SA Journal of Human Resource Management/SA Tydskrif vir Menslikehulpbronbestuur*, 21(0), a2177. <https://doi.org/10.4102/sajhrm.v21i0.2177>
- Urme, U.N. (2023). The impact of talent management strategies on employee retention. *International Journal of Science and Business*, 28(1), 127-146.
- Varkiani, S.M., Pattarin, F. & Fabbri, T. (2025). Predicting employee attrition and explaining its determinants. *Expert Systems With Applications*, 272 (2025) 126575.
- Wardhani, F. H., & Lhaksmana, K. M. (2022). Predicting employee attrition using logistic regression with feature selection. *Sinkron: jurnal dan penelitian teknik informatika*, 6(4), 2214-2222.

CONVERSATIONAL AGENTS IN SERVICE CONTEXTS: A LITERATURE REVIEW

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ABSTRACT

This paper presents a literature review of conversational agents (CAs) and their evolving role in service interactions. CAs are artificial intelligence-driven systems designed to simulate human-like communication through text, voice, and multimedia interfaces. They support customers with tasks ranging from answering queries to delivering personalised recommendations across multiple digital platforms. CAs can adopt diverse roles, such as experts, peers, or assistants, while leveraging natural language processing to enable flexible and intuitive interactions. Their ability to mimic conversational cues and detect emotional signals enhances user engagement and experience. This review synthesises existing knowledge to outline CAs' key characteristics, interaction modalities, and service roles, and highlights their growing relevance in contemporary service environments.

Keywords: conversational agents, chatbots, artificial intelligence, service interactions.

INTRODUCTION AND CONTEXT

Conversational agents (CAs) are increasingly shaping contemporary service interactions by simulating human-like communication through text, voice, and multimedia interfaces. Extant literature conceptualises CAs often referred to interchangeably as chatbots, virtual assistants, or dialogue systems – as artificial intelligence (AI)-driven tools capable of supporting customers through natural language exchanges (e.g., Pantano & Pizzi, 2020; Tudor et al., 2020). CAs operate across multiple platforms; they offer services such as customer support and personalised recommendations. Prior research highlights their multimodal capabilities, adaptive roles (e.g., expert, peer, or coach), and increasing sophistication through natural language processing (NLP) and machine learning. Importantly, CAs can replicate human conversational cues and, in some cases, detect emotional signals, which enhance user engagement. This paper synthesises the fragmented conceptualisations of CAs to provide a unified understanding of their functionalities, interaction modalities, and service roles. In doing so, it establishes a foundation for examining their implications in complex service contexts, including customer experience and service recovery.

LITERATURE REVIEW

CAs are systems designed to mimic human conversation through computer interfaces. Pantano and Pizzi (2020) highlighted the growing role of chatbots and virtual assistants in assisting customers with tasks ranging from answering basic queries to providing tailored product recommendations. Similarly, Tudor et al. (2020) and Radziwill and Benton (2017) described CAs or chatbots as systems developed to simulate human-machine interaction; they noted that the terms CA and chatbot are often used interchangeably. Tudor et al. (2020) and Ansari et al. (2024) suggested that most chatbots are text-based systems, whereas Lebeuf (2018) defined them as informal conversational systems that replicate natural, human-like exchanges. Tudor et al. (2020) also emphasised that CAs use a range of input/output modalities – text (chatbots), speech (voice assistants), and multimedia (video and animation) – to support diverse communication styles between users and systems.

CAs can adopt different roles depending on their programmed personality. For example, they may act as coaches (facilitating action), peers (engaging in casual dialogue), or experts (providing knowledgeable advice) (Tudor et al., 2020). Similarly, Pfeuffer et al. (2019) described CAs as AI-based systems capable of supporting customers through natural language, particularly within text-based interfaces. Fadhil and Gabrielli (2017) added that CAs operate

via voice-enabled or text-based interfaces, which provide flexibility in user interaction. McTear (2022) explained that users are not required to input specific commands, as CAs are designed to interpret natural, flexible language. Dale (2016) and McTear et al. (2016) stated that CAs are programmed to interact in anthropomorphic ways, through text or speech, to enable communication that resembles human dialogue. CAs simulate conversation that feels natural to users, and replicate mannerisms and cues typical of human interaction. Abdul-Kader and Woods (2015) likewise defined CAs as AI-driven systems employing NLP to facilitate human-like conversations. Although the literature introduces varied terminology, such as CAs, embodied CAs (ECAs), chatbots, dialogue systems, companions, and virtual/digital assistants, Dale (2016) argued that all these terms share the same foundation of natural language communication.

Tudor et al. (2020) clarified that CAs primarily deliver services such as customer support and product recommendations via platforms including websites, mobile applications, and messaging systems like Facebook Messenger. These services rely on text, voice, or image modalities to exchange information. Shevat (2017) defined chatbots as computer programs capable of interacting with users across multiple platforms, such as mobile phones, desktops, websites, and robotic devices, which offer benefits such as 24/7 availability and broad accessibility. The terms digital assistant, virtual assistant, smart bot, and question-answer bot are often used interchangeably to describe these systems.

Herbert and Kang (2018) examined how CAs interpret user messages semantically and syntactically by considering word significance, sentence structure, and the scripting languages that guide dialogue management. Dhinakaran et al. (2022) added that CA responses may be rule-based, machine learning-driven, or AI-powered depending on the model. Abdul-Kader and Woods (2015) stated that CAs use NLP to interpret and respond to user input and can be programmed to exhibit human-like qualities, such as politeness or friendliness, to make interaction feel natural. Wagnier et al. (2015) highlighted that CAs can detect emotional cues through voice recognition or behavioural observation, which strengthens user engagement. Yasavur et al. (2014) described robotic assistants as ECAs connected to intelligent virtual agents. Graesser et al. (2017) noted the increasing sophistication of CAs, including their ability to evaluate their own actions and suggest products or services. Wang et al. (2015) defined CAs as rational agents that use multiple modalities (speech, gaze, and gesture) to communicate, thereby replicating human-like interaction; this is referred to as multimodal communication, which is particularly relevant in healthcare contexts because it offers users a personalised interface and enhances engagement across sectors.

THE EVOLUTION OF CONVERSATIONAL AI

The rapid development of AI and NLP has paved the way for a wide range of AI-powered chatbots and associated conversational technologies. These innovations span from simple rule-based systems to highly sophisticated generative AI agents, which are now integrated across multiple sectors to support human–computer interaction (Chen et al., 2024; Ozuem et al., 2025). Rule-based, menu-based, and Structured Query Language (SQL)-driven bots function through predefined pathways and structured queries. They are most effective for transactional tasks and routine customer service interactions. By contrast, more complex AI-driven chatbots employ Artificial Intelligence Markup Language (AIML) to deliver flexible, context-sensitive dialogue (Bhuthada et al., 2023). Parsing-based bots use NLP techniques to interpret and respond to user input dynamically, thereby creating a more interactive and context-aware interface. Rational and skilled bots are designed to engage users over longer periods (Chandra et al., 2022).

The emergence of generative AI has further enhanced chatbot capability by allowing systems to generate coherent and relevant content. Hybrid chatbots combine rule-based logic with generative models. The growth of social messaging platforms has led to the proliferation of messaging bots that facilitate engagement and interaction through channels such as WhatsApp and Facebook Messenger (Wahid et al., 2023). As De Cremer et al. (2023) explained, generative AI represents a new generation of AI technologies capable of producing digital content in response to user prompts. The rise of speech-based CAs and voice assistants, such as Siri and Alexa, have brought conversational AI into a multimodal environment that allows users to engage via both text and speech (Hoy, 2018; Geetha et al., 2021). ECAs and robotic platforms represent the next frontier; they combine conversational competence with physical embodiment to create immersive, human-like experiences (Cassell et al., 2000).

Feine et al. (2019) advocated that CAs can be categorised in various ways, yet there remains a lack of consensus on how classification influences chatbot design and interaction (Følstad, 2019). Adamopoulou and

Moussiades (2020) proposed classifications based on comprehension, domain of service, goal orientation, input processing methods, human assistance levels, and improvement mechanisms. Open-domain agents engage across a wide range of topics, whereas closed-domain agents perform specific functions, such as task completion or companionship. Goal orientation further divides agents into informative, conversational, and transactional types. Input processing follows rule-based, retrieval-based, or generative models. Some chatbots operate autonomously while others rely on human oversight, which is a safer approach in sectors such as healthcare where sensitive decisions may arise. The ongoing evolution of CAs has resulted in increasingly diverse designs and functionalities tailored to user needs (Mathur & Singh, 2018). Conversational AI technologies enable systems to understand and respond to both text-based and voice-based human communication (Fryer et al., 2020; Ozuem et al., 2025). These agents aim to reproduce human-like conversation to improve customer service and user experience. Unlike static chatbots that provide preprogrammed answers, CAs manage contextualised dialogue and facilitate natural interaction (Oh & Rudnick, 2002).

Although the terms chatbot and CA are often used interchangeably, there are key distinctions. Chatbots are software programs designed to simulate human conversation; they are commonly used for answering questions, completing tasks, or making purchases (Hill et al., 2015). CAs, however, employ NLP to bridge human and computer language through algorithms that identify keywords and phrases (Wahl et al., 2018). They also use natural language understanding to interpret user emotion and intent. By evaluating previous interactions and preferences, CAs generate contextually relevant responses (Kiuchi et al., 2025).

In customer service contexts, CAs have transformed interactions by offering 24/7 availability, efficient resolution of common issues, and improvements in user satisfaction (Araujo, 2018). Pattern-matching chatbots operate by comparing user input with stored text in a database to produce suitable responses. From a marketing perspective, CAs can closely replicate a personal shopping experience by personalising suggestions, presenting tailored product information, and influencing consumer decisions (Mari et al., 2024; Ranieri et al., 2024). Numerous successful examples illustrate this progression. Google Assistant, for instance, can understand complex queries and provide personalised responses, while Amazon's Alexa, used globally, allows users to complete diverse tasks via natural language commands (Berdasco et al., 2019; Alexakis et al., 2019).

Historically, Weizenbaum's (1966) ELIZA marked the first text-based CA; it laid the foundation for later developments in computer science, information systems, and human-computer interaction. Subsequent research (Dale, 2016) highlighted the challenges of comparing studies due to the variety of terminology used across disciplines. However, text-based chatbots have been widely used in customer service, healthcare, and education to create engaging, friendly, and human-like experiences (Feine et al., 2019). Recent advances in messaging platforms and user preference for technology-mediated interaction have accelerated adoption (Araujo, 2018). Text-based chatbots are now commonplace on websites and messaging applications such as Facebook Messenger and WeChat (Brandtzaeg & Følstad, 2018; Feine et al., 2019).

Singh and Namin. (2025) categorised chatbots according to testing and evaluation techniques; they identified four principal types: rule-based, retrieval-based, generative, and hybrid. These categories require distinct evaluation techniques due to their differing complexities and learning mechanisms. Similarly, Chakraborty et al. (2023) classified CAs, including chatbots, into voice bots, hybrid chatbots, social messaging bots, menu-based bots, skill bots, keyword-driven bots, transactional bots, and no-code/low-code chatbots. Their study noted that chatbots increasingly demonstrate self-learning capabilities that improve accessibility and adaptability for users. Collectively, chatbots differ in intelligence, dialogue management, and contextual comprehension. Chakraborty et al. (2023) argued that these distinctions go beyond technical design to influence the quality of human-machine communication. Saetra (2023) supported this by noting that AI-driven chatbots employ neural networks and deep learning, which enable more complex and contextually sensitive interactions, examples include ChatGPT and LaMDA. McLean et al. (2021) further emphasised that virtual assistants using machine learning and NLP can adapt to user preferences, which enhances brand-related interaction and engagement quality.

AIML simplifies chatbot construction through a stimulus-response framework (Ahmad et al., 2018). Chatbots therefore act as computerised programs intended to simulate human interaction and deliver real-time customer service via NLP (Shweta & Adhiya, 2022). As Behera et al. (2021) and Hsu and Lin (2023) observed, chatbots are increasingly integrated into retail to improve customer experience, shorten response times, and provide continuous global service.

Social messaging bots embedded in platforms such as Facebook Messenger and WhatsApp support continuous, informal communication (Chakraborty et al., 2023). AI-driven CAs, also termed virtual assistants, can understand user behaviour and preferences, and generate personalised and contextual responses (Shweta & Adhiya, 2022). Menu-based bots, by contrast, offer predefined button options for user selection; the options guide users through structured queries until the required information is obtained (Chakraborty et al., 2023). Rule-based chatbots deliver predefined responses to predictable questions (Shweta & Adhiya, 2022). Although rule-based chatbots are consistent and reliable, they lack flexibility and often frustrate users when unexpected queries arise. Their low computational demand and cost make them appealing for task-specific automation. Hybrid chatbots combine rule-based logic with AI-based learning, which enables flexible, intelligent conversation. Transactional bots support online transactions, such as purchases or payments, while no-code/low-code bots allow non-technical users to design chatbots via drag-and-drop interfaces (Chakraborty et al., 2023).

ECAs resemble human beings and interact using both verbal and non-verbal cues, such as facial expressions and gestures, offering the empathy and engagement that are absent from text-based systems (Mercado et al., 2023; Cassell et al., 2000). Ahmad et al. (2018) identified chatbots that simulate natural small talk and parsing-based bots that analyse sentence structure to understand meaning. Ahmad et al. (2018) also described additional chatbot designs such as pattern-matching chatbots that identify specific keywords, for example, they respond 'Goodbye' to 'Bye-bye'. Markov chain-based bots predict subsequent words or sentences from user input and produce less scripted and more dynamic dialogue.

Other specialised bots include skill bots (e.g. booking taxis or checking weather), keyword-driven bots (identifying key terms within user input), and SQL-driven bots (verifying stored data before continuing dialogue). SQL-driven bots use predefined questions (e.g., name, date of birth, password) to authenticate users against a relational database before proceeding; they ensure personalised yet secure interaction (Azemi & Ozuem, 2026; Ahmad et al., 2018). Human–robot interaction research has expanded through speech and object recognition and natural language understanding (Novielli, 2010). Voice interfaces, first introduced in the early 1990s for self-service tasks (McTear et al., 2016), now underpin mainstream personal assistants such as Siri, Cortana, and Google Assistant (McTear, 2022). These voice-based agents offer hands-free interaction and foster emotional connection and long-term engagement (McLean et al., 2021).

CONCLUSION

AI and conversational algorithms have become integral to modern life; they influence the way people communicate, shop, and access services. From purchasing electronics and booking flights to reserving accommodation on platforms such as Airbnb, AI has reshaped the customer experience by streamlining interactions and personalising service delivery. Several factors continue to transform how societies collect and process data, and societies increasingly rely on AI and machine learning technologies. AI now enables humans to interact seamlessly with devices such as televisions, mobile phones, and household appliances through voice and gesture commands. These developments are gradually replacing traditional methods of communication and information retrieval (Marr, 2018). Through such technologies, the use of AI has blurred the boundaries between human and machine; intelligent algorithms are integrated into everyday decision making and lifestyle choices. The modern era of AI is characterised by rapid advancements in automation, predictive analytics, and adaptive learning systems. Machine learning, a branch of AI that allows systems to learn from data without explicit programming, has been central to this evolution. By processing vast datasets, machine learning models identify patterns, make recommendations, and even anticipate user needs. This capacity for continuous learning and improvement represents a significant departure from earlier static, rule-based systems.

REFERENCES

- Abdul-Kader, S., & Woods, J. (2015). Survey on Chatbot Design Techniques in Speech Conversation Systems. *International Journal of Advanced Computer Science and Applications*, 6(7).
- Adamopoulou, Eleni & Moussiades, Lefteris. (2020). An Overview of Chatbot Technology. 373-383. 10.1007/978-3-030-49186-4_31. Ahmad, N. A., Che, M. H., Zainal, A., Abd Rauf, M.F., & Adnan, Z. (2018). Review of Chatbots Design Techniques. *International Journal of Computer Applications*, 181(8), 7–10.
- Alexakis, G., Panagiotakis, S., Fragkakis, A., Markakis, E. and Vassilakis, K., 2019. Control of smart home operations using natural language processing, voice recognition and IoT technologies in a multi-tier architecture. *Designs*, 3(3), p.32.
- Ansari, A., Upadhyay, T., Vaidya, H., & Kapruwan, A. (2024, June). Chatbots for Mental Health: Leveraging LSTM and Seq2Seq Architectures to Enhance User Well-being. In *2024 IEEE International Conference on Information Technology, Electronics and Intelligent Communication Systems (ICITEICS)* (pp. 1–9). IEEE.
- Araujo, T. (2018). Living up to the chatbot hype: The influence of anthropomorphic design cues and communicative agency framing on conversational agent and company perceptions. *Computers in Human Behavior*, 85, 183–189. <https://doi.org/10.1016/j.chb.2018.03.051>.
- Azemi Y, Ozuem W (2026), "Paid search advertising across stages of the customer shopping journey: a shopping goal theory perspective". *Information Technology & People*, Vol. 39 No. 8 pp. 32–49, doi: <https://doi.org/10.1108/ITP-03-2023-0223>
- Behera, R.K., Bala, P.K. & Ray, A. Cognitive Chatbot for Personalised Contextual Customer Service: Behind the Scene and beyond the Hype. *Inf Syst Front* 26, 899–919 (2024). <https://doi.org/10.1007/s10796-021-10168-y>
- Berdasco, A., López, G., Diaz, I., Quesada, L., & Guerrero, L.A. (2019, November). User experience comparison of intelligent personal assistants: Alexa, Google Assistant, Siri and Cortana. In *Proceedings*, 31(1), 51. MDPI.
- Bhuthada, S., Madabhushi, M., & Shivani, S. (2023). Chatbot. *International Journal of Scientific Research in Engineering and Management*. <https://doi.org/10.55041/ijssrem17697>.
- Brandtzaeg, P. B., & Følstad, A. (2018). Chatbots: changing user needs and motivations. *Interactions*, 25(5), 38–43.
- Cassell, J., Sullivan, J., Prevost, S., & Churchill, E. F. (2000). *Embodied Conversational Agents*. MIT Press. <https://doi.org/10.7551/mitpress/2697.001.0001>.
- Chakraborty, C., Pal, S., Bhattacharya, M., Dash, S. and Lee, S.S., 2023. Overview of Chatbots with special emphasis on artificial intelligence-enabled ChatGPT in medical science. *Frontiers in artificial intelligence*, 6, p.1237704.
- Chandra, S., Shirish, A., & Srivastava, S. (2022). To Be or Not to Be ...Human? Theorizing the Role of Human-Like Competencies in Conversational Artificial Intelligence Agents. *Journal of Management Information Systems*, 39, 969–1005. <https://doi.org/10.1080/07421222.2022.2127441>.
- Chen, Y., Wang, H., Yu, K., & Zhou, R. (2024). Artificial Intelligence Methods in Natural Language Processing: A Comprehensive Review. *Highlights in Science, Engineering and Technology*. <https://doi.org/10.54097/vfwgas09>.
- Dale, R. (2016). The return of the chatbots. *Natural Language Engineering*, 22(5), 811–817. doi:10.1017/S1351324916000243.

De Cremer, D., Bianzino, N. M., & Falk, B. (2023). How generative AI could disrupt creative work. *Harvard Business Review*. <https://hbr.org/2023/04/>

Dhinakaran, D. A., Martinengo, L., Moon-Ho, R., Joty, S., Kowatsch, T., Atun, R., & Lorainne, T.C. (2022). Designing, Developing, Evaluating, and Implementing a Smartphone-Delivered, Rule-Based Conversational Agent (DISCOVER): Development of a Conceptual Framework. *JMIR mHealth and uHealth*, 10(10).

Fadhil, A., & Gabrielli, S. (2017). Addressing challenges in promoting healthy lifestyles: the ai-chatbot approach. In *Proceedings of the 11th eai international conference on pervasive computing technologies for healthcare* (pp. 261–265). ACM.

Feine, J., Gnewuch, U., Morana, S., Maedche, A. (2019). A Taxonomy of Social Cues for Conversational Agents. *International Journal of Human-Computer Studies*, Volume 132, Pages 138-161, ISSN 1071-5819, DOI:10.1016/j.ijhcs.2019.07.009

Følstad, A., & Skjuve, M. (2019). Chatbots for customer service: user experience and motivation. CUI '19: Proceedings of the 1st International Conference on Conversational User Interfaces. 1-9. DOI:[10.1145/3342775.3342784](https://doi.org/10.1145/3342775.3342784)

Fryer, L. K., Coniam, D., Carpenter, R., & Lapusneanu, D. (2020). Bots for language learning now: Current and future directions. *Language Learning & Technology*, 24(2), 8–22. <http://hdl.handle.net/10125/44719>

Geetha, V., Gomathy, C.K., Vardhan, K.M.S. and Kumar, N. P. (2021). The Voice Enabled Personal Assistant for Pc using Python. *International Journal of Engineering*, 10, 162–165. <https://doi.org/10.35940/IJEAT.D2425.0410421>

Graesser, A. C., Cai, Z., Morgan, B., & Wang, L. (2017). Assessment with Computer Agents That Engage in Conversational Dialogues and Trialogues with Learners. *Computers in Human Behavior*, 76, 607.

Herbert, D., & Kang, B. H., 2018. Intelligent conversation system using multiple classification ripple down rules and conversational context. *Expert Systems with Applications*, 112, 342–352.

Hill, J., Randolph Ford, W., & Farreras, I. G. (2015). Real conversations with artificial intelligence: A comparison between human–human online conversations and human–chatbot conversations. *Computers in Human Behavior*, 49, 245–250.

Hoy, M. (2018). Alexa, Siri, Cortana, and More: An Introduction to Voice Assistants. *Medical Reference Services Quarterly*, 37, 81–88. <https://doi.org/10.1080/02763869.2018.1404391>.

Hsu, C. L., & Lin, J. C. C. (2023). Understanding the user satisfaction and loyalty of customer service chatbots. *Journal of Retailing and Consumer Services*, 71, 103211.

Kiuchia, K., Otsu, K., & Teramurac, T. (2025). Artificial Intelligence Ethics in Psychological Support Services: A Scoping Review with Systematic Literature Search. https://doi.org/10.31234/osf.io/sztdn_v1

Lebeuf, C. R. (2018). *A taxonomy of software bots: towards a deeper understanding of software bot characteristics* [MSc dissertation, University of Victoria].

Mari, A., Mandelli, A., & Algesheimer, R. (2024). Empathic voice assistants: Enhancing consumer responses in voice commerce. *Journal of Business Research*, 175, 114566. <https://doi.org/10.1016/j.jbusres.2024.114566>.

Marr, B. (2018). How is AI used in education--Real world examples of today and a peek into the future. *Forbes Magazine*, 25.

Mathur, V., & Singh, A. (2018). The rapidly changing landscape of conversational agents. 10.48550/arXiv.1803.08419.

McLean, G., Osei-Frimpong, K., & Barhorst, J. (2021). Alexa, do voice assistants influence consumer brand engagement? - Examining the role of AI powered voice assistants in influencing consumer brand engagement. (2021). *Journal of Business Research*, 312–328. ISSN 0148-2963, <https://doi.org/10.1016/j.jbusres.2020.11.045>.

McTear, M. (2022). *Conversational AI: Dialogue systems, conversational agents, and chatbots*. Springer Nature.

McTear, M., Callejas, Z., & Griol, D. (2016). *The conversational interface: talking to smart devices* [online] (pp. 51-72). Cham: Springer International Publishing.

Mercado, J., Espinosa-Curiel, I. E., & Martínez-Miranda, J. (2023). Embodied conversational agents providing motivational interviewing to improve health-related behaviors: Scoping review. *Journal of Medical Internet research*, 25, e52097.

Novielli, N., de Rosis, F., & Mazzotta, I. (2010). User attitude towards an embodied conversational agent: Effects of the interaction mode. *Journal of Pragmatics*, 42(9), 2385–2397.

Oh, A. H. & Rudnicky, A. I. (2002). Stochastic natural language generation for spoken dialog systems', *Computer Speech and Language*, vol. 16, no. 3-4, pp. 387-407. [https://doi.org/10.1016/S0885-2308\(02\)00012-8](https://doi.org/10.1016/S0885-2308(02)00012-8)

Ozuem, W., Ranfagni, S., & Willis, M. (2024). *Digital Transformation for Fashion and Luxury Brands: Theory and Practice*. Palgrave Macmillan.

Ozuem, W., Willis, M., Ranfagni, S., & Fandi Omeish. (2025). Thematic Analysis in an Artificial Intelligence-Driven Context: A Stage-by-Stage Process. *International Journal of Qualitative Methods*, 24. <https://doi.org/10.1177/16094069251362982>

Ozuem, W., Ranfagni, S., Willis, M., Salvietti, G., & Howell, K. (2024). Exploring the relationship between chatbots, service failure recovery and customer loyalty: A frustration–aggression perspective. *Psychology & Marketing*, 41, 2253–2273. <https://doi.org/10.1002/mar.22051>

Pantano, E., & Pizzi, G. (2020). Forecasting artificial intelligence on online customer assistance: Evidence from chatbot patents analysis. *Journal of Retailing and Consumer Services*, 55, 102096. <https://doi.org/10.1016/j.jretconser.2020.102096>

Pfeuffer, N., Benlian, A., Gimpel, H. and Hinz, O. Anthropomorphic Information Systems (2019, August). *Business & Information Systems Engineering*, 61(4). [dx.doi.org/10.1007/s12599-019-00599-y](https://doi.org/10.1007/s12599-019-00599-y).

Radziwill, N. M., & Benton, M. C. (2017). Evaluating quality of chatbots and intelligent conversational agents. 10.48550/arXiv.1704.04579.

Ranieri, A., Di Bernardo, I., & Mele, C. (2024). Serving customers through chatbots: positive and negative effects on customer experience. *Journal of Service Theory and Practice*, 34(2), 191–215. <https://doi.org/10.1108/JSTP-01-2023-0015>

Sætra, H.S. (2023). Generative AI: Here to stay, but for good? *Technology in Society*, Volume 75, 102372, ISSN 0160-791X, <https://doi.org/10.1016/j.techsoc.2023.102372>.

Shevat, A. (2017). *Designing bots: Creating conversational experiences*. O'Reilly Media, Inc.

Shweta, P., & Adhiya, K. (2022, June). Comparative study of feature engineering for automated short answer grading. In *2022 IEEE World Conference on Applied Intelligence and Computing (AIC)* (pp. 594–597). IEEE.

Singh, S.U. and Namin, A.S., 2025. A survey on chatbots and large language models: Testing and evaluation techniques. *Natural Language Processing Journal*, 10, p.100128.

Tudor Car L, Dhinakaran DA, Kyaw BM, Kowatsch T, Joty S, Theng YL, and Atun Ret al. (2020). Conversational Agents in Health Care: Scoping Review and Conceptual Analysis. *J Med Internet Res.*, 22(8), e17158. PMID: 32763886. doi: 10.2196/17158.

Wahid, R., Mero, J., & Ritala, P., 2023. Editorial: Written by ChatGPT, illustrated by Midjourney: generative AI for content marketing. *Asia Pacific Journal of Marketing and Logistics*. <https://doi.org/10.1108/APJML-10-2023-994>.

Wahl, B., Cossy-Gantner, A., Germann, S., & Schwalbe, N. R. (2018). Artificial intelligence (AI) and global health: how can AI contribute to health in resource-poor settings? *BMJ Global Health [online]*, 3(4). <https://gh.bmj.com/content/3/4/e000798>.

Wang, C., Bickmore, T., Bowen, D. J., Norkunas, T., Campion, M., Cabral, H., Winter, M. & Paasche-Orlow, M. (2015). Acceptability and feasibility of a virtual counselor (VICKY) to collect family health histories. *Genetics in Medicine*, 17(10), 822–830. <https://www.nature.com/articles/gim201511>

Wargnier, P., Malaisé, A., Jacquemot, J., Benveniste, S., Jouvelot, P., Pino, M., & Rigaud, A. S. (2015, March).

Towards attention monitoring of older adults with cognitive impairment during interaction with an embodied conversational agent. In *2015 3rd IEEE VR International Workshop on Virtual and Augmented Assistive Technology (VAAT)* (pp. 23–28). IEEE.

Weizenbaum, J. (1966). ELIZA—a computer program for the study of natural language communication between man and machine. *Communications of the ACM*, 9(1), 36–45.

Yasavur, U., Lisetti, C., & Rishe, N. (2014). Let's talk! speaking virtual counselor offers you a brief intervention. *Journal on Multimodal User Interfaces*, 8(4), 381–398. <https://doi.org/10.1007/s12193-014-0169-9>

CONTESTED HERITAGE AND DARK TOURISM GOVERNANCE: AN AFROCENTRIC REVIEW OF STRATEGIC AND ETHICAL CHALLENGES

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ABSTRACT

Dark Tourism, that seeks to explore sites of tragedy, suffering, and historical injustices have been primarily developed and framed by Eurocentric academic perspectives. The South African context has several sites of struggle, and resilience including Robben Island, and the Apartheid Museum; however, these sites are often challenged with multiple demands for commodification, ineffectual governance, and the moral complexities of how to portray history. This paper uses an Afrocentric perspective to critically evaluate governance, strategy and ethics at contested South African Heritage Sites. The paper identifies actionable recommendations for decentralized governance, ethical storytelling, and community centred revenue models for reframing South Africa's Heritage Sites not only as national spaces but also as global exemplars of ethical tourism practices. Through the lens of Afrocentricity this study critiques the prevailing practices in the governance, ethics, and strategies of dark tourism, highlighting the need for decolonization. Furthermore, this study demonstrates how principles of Ubuntu (human interconnectedness), and Restorative Justice can be used to reframe governance to centre the local community and their narratives. Findings suggest that there needs to be a transition from Eurocentric models of commodification to Afrocentric models of commodification based on indigenous languages. Ultimately, this paper will identify sustainable and socially just strategies to position South African dark tourism sites as potential global examples of ethically governed heritage sites and culturally just practice.

Keywords: Afrocentricity, dark tourism, contested heritage, governance, ethics, South Africa.

INTRODUCTION

The South African heritage environment reflects the long-lasting impact of colonialism, slavery, and apartheid. Sites such as Robben Island, the Apartheid Museum, Constitutional Hill, and Freedom Park do not simply serve to memorialize a painful past; they attract international visitors who transform sites of pain into major tourist destinations. However, the governance of these sites raises important issues regarding the management, interpretation, and consumption of contested heritage in a society that continues to experience systemic oppression (Motena, 2021; McGinn & De Kamper, 2019). Although there is much potential for these sites to promote education, reflection, and reconciliation, their value is diminished by the tension between commodifying contested heritage and the appropriate representation and ethical storytelling. Dark tourism, typically defined as traveling to sites associated with death, suffering, or tragedy, has primarily been studied using Eurocentric frameworks (Lennon & Foley, 2000; Stone, 2026). As such, most of the research has focused on Western memorial traditions and the management practices of these traditions (Svendsen & Campbell, 2010; Clark & Franzmann, 2006; Coronado, Vidal, Ravilli, Rosario, Sants, Guzman, 2023). Consequently, the voices of Africans and the lived experiences/epistemologies of local communities are often overlooked (Mutanga, 2025). While the use of Eurocentric approaches to the study of dark tourism has provided researchers with some insight into the subject, it has failed to capture the complexity of the contested heritage in African contexts (Roll & Meyer, 2021; Light, 2017)). In opposition to Eurocentric approaches, an Afrocentric approach provides a critical corrective. It emphasises indigenous epistemologies, cultural continuity, community custodianship, and ethical storytelling (Chawane, 2016). The purpose of this study is to conduct a critical literature review focusing on governance, ethics, and strategy of South Africa's contested heritage sites within the context of the broader discussion of dark tourism. An evaluation of existing scholarship, identifying the gaps in the literature, and incorporating Afrocentric

perspectives will be used to demonstrate the transformative potential of decolonial approaches to the management of contested heritage. This study does not propose a new framework; rather, it critiques the literature to demonstrate how South Africa's contested heritage can contribute to the development of global strategies and policies related to the ethical and strategic governance of dark tourism.

LITERATURE REVIEW

Dark Tourism and the Persistence of Eurocentrism

The study of dark tourism has primarily been conducted using Eurocentric theories which prioritise the commodification of tragedy and the packaging of Western memorialisation traditions (Stone, 2026). As a result, the global narrative has come to be defined by tragedy as it is historicized and packaged, and Africa's experience of tragedy is marginalised. This does not occur by accident. It occurs as a direct result of the epistemic dominance of Western scholarship which continues to suppress the use of indigenous epistemology and lived experience of trauma in Africa (Rogerson & Visser, 2017). South African sites of trauma, such as Robben Island and the Apartheid Museum, demonstrate the inability of these Eurocentric theories to capture the immediacy of trauma in Africa. Here, trauma is not relegated to a remote past. Instead, trauma is present and entwined with the current struggles for justice. Eurocentric theories are unable to capture this immediacy. Therefore, Africa's heritage is reduced to consumable symbols. An Afrocentric perspective will dismantle this hierarchy. An Afrocentric perspective will reframe the study of dark tourism as a means of cultural reclamation and collective healing. An Afrocentric perspective will also challenge the notion that Western memorialisation is universally applicable (Chawane, 2016). The same tensions exist throughout the Global South. For example, Rwanda's genocide memorial sites, such as Nyamata and Murambi, have been criticized for prioritising international narratives over survivor voices. Consequently, there are questions regarding whose trauma is being represented (Wolfe, Ndizeye & de Beer, 2025; Lăpugean, 2015). Likewise, Ghana's slave forts at Cape Coast and Elmina, have negotiated between the demand for diasporic tourism and local cultural reclamation. This negotiation has resulted in the same epistemological conflict between commodification and dignity (Adu-Ampong & Dillet, 2024). These comparative studies support the global applicability of Afrocentric critiques, thereby locating South Africa's contested heritage within a broader postcolonial struggle over memory and representation.

Contested Heritage: Memory, Power, and Politics

Contested heritage studies often acknowledge the tensions between state narratives and marginalized voices. However, contested heritage studies rarely examine the mechanisms by which power silences communities (McGinn & de Kamper, 2019). Robben Island is an example of this. The global branding of Robben Island as Mandela's prison, conceals the experiences of lesser-known political prisoners. The Apartheid Museum, although celebrated internationally, has been criticized for commodifying apartheid trauma to meet tourist expectations (Motena, 2021). Freedom Park, which was designed to incorporate indigenous cosmologies, may risk political instrumentalisation, undermining its potential for fostering real cultural solidarity (Mufamadi, (2023; Ndlovu, 2024). These examples demonstrate how heritage sites can be battlegrounds in which state interests and market forces supplant community custodianship. Afrocentric frameworks expose this disparity by arguing that heritage is not simply a form of symbolic capital, but a living system of justice in which marginalised voices must exercise authority over the narrative.

Strategic Management in Dark Tourism: Possibilities of Transformation

Although governance literature frequently criticizes the inefficiency of managerial processes, it rarely examines the colonial hierarchies embedded in the processes of heritage management. Reforms implemented in the post-apartheid era promised greater inclusivity, however, governance still exists as a centralized model that privileges state driven symbolism over grassroots custodianship (McGinn & de Kamper, 2019). Robben Island and Freedom Park are two examples of how national reconciliation narratives obscure complex histories. The public-private governance structure of the Apartheid Museum complicates transparency further, as it prioritizes financial viability over equity (Motena, 2021). Afrocentric critiques of governance argue against the reliance on Eurocentric hierarchies, suggesting instead that decentralized governance models should be developed based on indigenous knowledge systems and shared custodianship. By reframing governance as cultural justice, as opposed to

managerial efficacy, Afrocentric theory challenges the very epistemological bases of heritage management (Chawane, 2016).

Conflicting Ethics: From Commodification to Stewardship

The ethical debates surrounding the commodification of dark tourism often debate whether the commodification of suffering trivializes it (Sharpley & Stone, 2009). However, because trauma in South Africa is not historicized, but instead, it remains lived, commodification constitutes an act of epistemic violence. Robben Island's focus on Mandela's legacy erases the voices of other prisoners, reducing their memories to consumer-friendly heritage (Motena, 2021). The Apartheid Museum cleanses apartheid trauma for international audiences, focusing on spectacle as opposed to authenticity. These examples illustrate how Eurocentric ethics legitimize the exploitation of people as a means of remembering. Afrocentric ethics reject the passivity of consumption. They argue that heritage should be viewed as stewardship and healing. Thus, the involvement of survivors, the integrity of the narrative, and the cultural continuity of heritage sites become imperative ethical considerations, placing heritage sites as forums for dignity and decolonial education (Chawane, 2016).

Strategic Management: Aligning Identity and Sustainability

Strategic Management literature regularly emphasizes profitability and global demand; however, this neoliberal framing ignores cultural authenticity and local empowerment. Constitution Hill represents this dilemma. Constitution Hill has struggled to maintain profitability without sacrificing its historical integrity (Shotholo, 2020). Western management models view heritage as mere marketable assets and disregard community custodianship. Afrocentric management critiques this reductionism. They suggest the development of revenue-redistribution models that are culturally centered, and that utilize strategies based on Ubuntu. These alternatives do not merely find a balance between profit and authenticity. They redefine sustainability as cultural continuity and community empowerment. Therefore, they demonstrate the inadequacies of Western strategic paradigms.

Afrocentric Critique: A Paradigm Shifts in Heritage Management

Eurocentric scholarship continues to dominate the study of dark tourism. The voices of Africans continue to be relegated to the periphery (Rogerson & Visser, 2017). This imbalance is not solely due to academic oversight. The imbalance is reflective of the structural inequities in global knowledge production. Afrocentricity provides more than an alternative. Afrocentricity represents a paradigm shift that frames contested heritage as spaces of decolonial education, cultural justice and global solidarity (Chawane, 2016). By foregrounding African epistemologies, Afrocentric theory challenges the universality of Eurocentric models and places South Africa as a leader in re-imagining dark tourism globally. Figure 1 outlines the conceptual framework used in this review, showing how governance, ethics, and strategy are interpreted through an Afrocentric lens in contrast to prevailing Eurocentric approaches.

Figure 1: Conceptual model showing tensions between Eurocentric and Afrocentric approaches in governance, ethical storytelling, and strategic management.



METHODOLOGY

The main research methodology for this study was a critical literature review which assessed how heritage and dark tourism sites have been governed, ethically managed and strategized using secondary resources. Articles and institutional reports that were peer-reviewed, published between 2010 and 2025 and available on Scopus, Web of Science and Google Scholar databases were identified using systematic retrieval methods. All steps involved in the literature review followed transparent and reproducible procedures consistent with those outlined by systematic reviews and in particular PRISMA (Moher et al, 2009), thereby ensuring methodological quality of the screening and selection process. The three South African sites were selected for their differing governance arrangements and symbolism and are therefore representative of South African heritage and dark tourism. To enable a comparative examination of localised trauma as lived experience and global trauma as historicised memory; international case studies of sites that have experienced similar historical trauma to Robben Island, e.g. Auschwitz and Hiroshima were also examined. Thematic coding based on a qualitative and interpretative methodology informed by humanistic approaches allowed the researcher to identify structural gaps, recurring tensions and emergent themes in the contested heritage management of these sites. The use of an Afrocentric theoretical framework provided the opportunity to critically evaluate Eurocentric biases and to reconceptualise heritage as cultural reclamation, ethical stewardship and decolonial education (Chawane, 2016). Systematic synthesis of data, interdisciplinary triangulation of heritage studies, tourism management and Africa epistemologies, and comparative analysis of local South African sites and symbolic global cases were used to ensure methodological rigour. These methodological designs permitted a rigorous investigation of the governance and ethical aspects of heritage and dark tourism sites.

DISCUSSIONS

The tensions that exist between the governance, ethics, and strategy of South African dark tourism reveal deeper epistemological contradictions. At their core is the contradiction between Eurocentric heritage management models that favour centralized authority, commodification, and economic profitability and the views of Afrocentricism that promote cultural reclamation, dignity, and community custodianship. This contradiction is not only illustrative of the limitations of dominant global discourses. The contradiction also presents the potential for Afrocentric theory to transform the way contested heritage management is conceptualized. Through case studies of Robben Island, Freedom Park, the Apartheid Museum and Constitution Hill, this section will discuss these tensions and highlight the necessity of moving from Eurocentric hierarchies to more inclusive community-centered approaches.

Governance Tensions: Illustrations of Epistemological Conflicts

Governance tensions provide some of the most vivid illustrations of the contradictions that exist between Eurocentric and Afrocentric ways of understanding heritage. For example, the state driven interpretations of Robben Island and Freedom Park have created significant obstacles for local communities and survivors. State driven interpretations of these sites reduce the lived experiences of local communities and survivors to abstract, tourist-friendly symbolism that supports either national or global tourism priorities (McGinn & de Kamper, 2019). For example, Robben Island emphasizes Nelson Mandela's legacy of resistance. However, the diversity of the experiences of lesser-known political prisoners is not represented. Similarly, Freedom Park includes indigenous cosmologies in its design. However, Freedom Park has faced criticisms of political instrumentalization. Political instrumentalization could undermine Freedom Park's potential for creating genuine cultural solidarity (Motena, 2021). These examples illustrate a larger pattern of Eurocentric governance structures. Centralized decision making flattens complex histories and turns heritage sites into commodified attractions.

The Marginalisation of Local Voices: An Obstacle to Decentralise Governance

The marginalization of local voices inherent in state driven governance structures creates space for the commodification of trauma. The commodification of trauma is further facilitated by the profit-oriented strategic priorities of tourism. Sites such as Robben Island and the Apartheid Museum demonstrate the ethical dilemmas that arise from the intersection of governance and commodification. While Robben Island's global narrative focuses on Mandela's resistance, it excludes local nuances and marginalizes the collective memory of other political prisoners (Motena, 2021). Similarly, the Apartheid Museum packages South Africa's traumatic past into neat, curated exhibits

that are designed to meet the market-driven expectations of global tourism. Often, these exhibitions are constructed at the expense of authenticity and dignity.

Strategic Management Tensions: Ethical Dilemma

Strategic management tensions further complicate the ethical dilemmas associated with the commodification of trauma. Strategic management tensions reinforce the priority placed on financial imperatives over cultural preservation. For example, Constitution Hill demonstrates the difficulties of achieving a balance between generating revenue and preserving cultural authenticity (Shotholo, 2020). Western management models prioritize profitability and marketing to meet global tourist demands. Frequently, these models fail to engage local custodians and/or prioritize cultural identity. On the contrary, Afrocentric critiques suggest viable alternatives that prioritize sustainable revenue sharing models and operationally grounded frameworks of African epistemologies. For example, values of Ubuntu (human interconnectedness) and Restorative Justice create opportunities for aligning tourism profitability with community empowerment and cultural continuity. These alternatives challenge the commodification of trauma by reframing heritage management in terms of principles of solidarity and ethical stewardship.

Transformative Potential of Afrocentric Theory

In conclusion, the various forms of tensions presented above illustrate the transformative potential of Afrocentric theory in the conceptualization of contested heritage management. Rather than viewing heritage sites as passive memorials or commoditized attractions, Afrocentric theory re-conceptualizes them as active spaces for cultural reclamation, decolonial education, and solidarity. By centering African epistemologies, including indigenous knowledge systems and Restorative Justice, heritage governance transcends functional concerns to pursue broader projects of cultural justice. Therefore, by expanding upon existing research, this section will explore these tensions using case studies of Robben Island, Freedom Park, the Apartheid Museum, and Constitution Hill, and highlight the need for a shift away from Eurocentric hierarchies toward more inclusive, community-centered approaches.

CONCLUSIONS

South Africa's dark tourism is shaped by three main issues: 1) State-driven narratives versus community-led custodianship; 2) Commodification and dignity; and 3) Profitability vs Cultural Continuity. These tensions highlight the limits of European-centric management frameworks that continue to suppress native voices and exacerbate existing socio-economic inequalities. To counteract the current status quo, there is an urgent need for the adoption of Afrocentric approaches to heritage management that will allow heritage sites to become ethically engaged, culturally reclaimed, and socially just spaces. Afrocentric frameworks represent a paradigmatic shift in the governance and interpretation of contested heritage. Instead of relying on market-based reasoning or external interpretive authorities, they rely upon African epistemologies, lived experiences and values like Ubuntu and Restorative Justice. Heritage Sites can then be transformed into not just spaces for memory and tourist consumption, but as spaces for healing, dialogue, and collective empowerment. This transformation will provide South Africa with the opportunity to play a meaningful role in international debates about decolonization and ethical tourism based on the values of dignity, inclusion, and historical accountability. There are several key recommendations that can be made to operationalize this paradigmatic shift. The first recommendation is to transform governance structures at the local level through the creation of decentralized and participatory stewardship models that involve local communities, historians, survivor communities, and indigenous leaders. Such a model will create more inclusive, contextual, and less centralized decision-making processes compared to many of the Western-based frameworks that currently exist.

The second recommendation is to prioritize ethical storytelling in the curation and interpretation of heritage sites. Ethical storytelling requires the active participation of survivors and descendant communities in the curation and interpretation of heritage sites. It is essential to ensure that stories of trauma are told respectfully, accurately, and in a manner that is restorative rather than exploitative or reductionist. Similarly, visitor engagement strategies that incorporate Afrocentric values will foster critical thinking, empathy and other forms of reflection as opposed to mere consumerism.

Thirdly, more equitable systems of revenue distribution must be developed to address the continued inequities that exist among communities related to the economic benefits derived from heritage sites. Directing tourism income

toward community-based initiatives (e.g., education, health care and micro-enterprise opportunities) will allow communities that have borne the historical burden of these sites to benefit economically from them.

Fourthly, a fundamental transformation in the way heritage sites are marketed must occur. Rather than commodifying suffering, heritage site narratives must emphasize resilience, agency and cultural identity. Not only does such an approach challenge the exploitive representation of trauma, but it also reflects a more ethical and internationally aware form of tourism.

Lastly, the concept of sustainability must be broadened to include both economic and social/cultural aspects. Integrating African values and principles into operational strategies will enable heritage sites to achieve a balance between financial viability, authenticity, community empowerment and long-term restorative outcomes. Overall, South Africa's contested heritage sites offer the potential to redefine the global discussion of dark tourism. If South Africa adopts and implements Afrocentric principles and participatory governance models, the focus of heritage sites can be shifted from exploitation and spectacle to one centered around dignity, equity, and common humanity. While this transformation is necessary for redressing past injustices in South Africa, it also places South Africa in a position of leadership in rethinking ethics in heritage management globally.

REFERENCES

- Asante, M. K. (2017). *The Afrocentric idea*. Temple University Press.
- Adu-Ampong, E. A., & Dillette, A. (2024). Commemoration and commodification: Slavery heritage, Black travel and the #YearofReturn2019 in Ghana. *Tourism Geographies*, 26(1), 120–139.
- Chawane, M. (2016). The emergence of Afrocentricity: A historical appraisal. *Yesterday & Today*, 16, 78–99.
- Clark, J., & Franzmann, M. (2006). Authority from grief, presence and place in the making of roadside memorials. *Death Studies*, 30(6), 579–599.
- Coronado, J. B., Vidal, M. P. L., Ravilli, G. A., Rosario, M. D., Santos, A. M. L., & Guzman, M. P. S. (2023). Conception of death in different cultures and funeral rites in Bolivia, China, Indonesia, Madagascar and USA. *SAP Community and Interculturality in Dialogue*, 3, 64–64.
- Dei, G. J. S. (2018). *Indigenous knowledge and decolonial research: African perspectives*. Springer.
- Lăpugean, M. (2015). Speaking about the unspeakable: Trauma and representation. *BAS: British and American Studies*, 21, 85–91.
- Lennon, J., & Foley, M. (2000). *Dark tourism: The attraction of death and disaster*. Continuum.
- Light, D. (2017). Progress in dark tourism and thanatourism research: An uneasy relationship with heritage tourism. *Tourism Management*, 61, 275–301.
- McGinn, S., & de Kamper, G. (2019). Heritage management in post-apartheid South Africa: Balancing contestation and conservation. *Journal of Heritage Studies*, 25(4), 567–584.
- Meskill, L. (2019). *A future in ruins: UNESCO, world heritage, and the dream of peace*. Oxford University Press.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine*, 6(7), e1000097.
- Motena, T. (2021). Governance challenges in South Africa's heritage sites: A critical appraisal. *African Journal of Cultural Studies*, 18(3), 200–215.

- Mufamadi, J. (2023). Freedom Park as a place of memory: Symbolic reparations, Indigenous African knowledge systems and reconciliation. In *Social memory as a force for social and economic transformation* (pp. 21–35). Routledge.
- Mutanga, O. (2025). Navigating epistemic borders: Lived experiences of Global South researchers in knowledge production. In *Navigating complex research terrains: The experiences of social researchers in the Global South* (pp. 1–19). Springer Nature Switzerland.
- Ndlovu, N. (2021). Community voices in South African heritage: Oral histories and participatory practices. *African Studies Review*.
- Ndlovu, X. (2024). *Contesting heritage: A political analysis of Freedom Park and Voortrekker Monument in South Africa* (Master's thesis, University of the Witwatersrand).
- Pathak, A., Jena, B., & Kalra, S. (2013). Qualitative research. *Perspectives in Clinical Research*, 4(3), 192–197.
- Rogerson, C. M., & Visser, G. (2017). South African tourism geographies: Progress and prospects. *South African Geographical Journal*, 99(1), 1–15.
- Röll, V., & Meyer, C. (2021). Tackling Eurocentric perspectives on cultural world heritage: Suggestions for including postcolonial approaches in world heritage education. In *Heritage—New Paradigm*. IntechOpen.
- Sharpley, R., & Stone, P. R. (2009). *The darker side of travel: The theory and practice of dark tourism*. Channel View Publications.
- Shotholo, M. (2020). Constitution Hill: Navigating historical narratives and financial sustainability. *South Africa Tourism Management Journal*, 22(6), 332–347.
- Stone, P. R. (2026). Revisiting dark tourism: A critique of Eurocentric paradigms. *Annals of Tourism Research*, 50(1), 10–25.
- Svendsen, E. S., & Campbell, L. K. (2010). Living memorials: Understanding the social meanings of community-based memorials to September 11, 2001. *Environment and Behavior*, 42(3), 318–334.
- Wolfe, S., Ndizeye, O., & de Beer, A. M. (2025). Survivor agency in the post-genocide memorialization process in Rwanda. *Journal of Genocide Research*, 27(2), 131–154.

OWNER-LED CORPORATE SOCIAL RESPONSIBILITY INITIATIVES: AN UBUNTU APPROACH

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ABSTRACT

This article examines corporate social responsibility (CSR) from the viewpoint of business owners, drawing on the African philosophy of Ubuntu, which emphasises community welfare, compassion, and connectedness. This study focuses on the owner's perspective, particularly how their approach to CSR is influenced by ethical and community-based values, even though corporate and stakeholder views are commonly utilised to assess CSR. Using qualitative research methods, the study investigates the purpose, strategies, and results of owner-led CSR activities within the Ubuntu framework. Purposeful sampling and semi-structured interviews were utilised to collect data in order to identify organisations participating in CSR. Ten business owners were interviewed, and the data saturation principle which states that interviews should continue until no new themes emerge, was used to determine the sample size. Thematic analysis was conducted to analyse data. The findings demonstrate that business owners view CSR as both a strategic business tool and a moral and cultural obligation. According to Ubuntu principles, reasons to engage in CSR include a sense of responsibility to protect long-term sustainability, promote employee well-being, and uplift the community. Owners reported positive outcomes, such as improved staff morale, increased brand loyalty, and strengthened community relations, despite challenges like limited funding, a lack of institutional support, and striking a balance between profitability and social impact. The study suggests that indigenous knowledge systems such as Ubuntu be more thoroughly integrated into CSR policy and discourse, particularly in African and emerging market contexts. It also calls for additional assistance from the government to support owner-led CSR initiatives that prioritise human dignity, inclusion, and mutual development.

Keywords: corporate social responsibility, Ubuntu viewpoint, African philosophy, business owners, owner-led CSR initiatives.

INTRODUCTION

The premise that businesses are not only economic players but also social entities responsible to a wide range of stakeholders, including employees, customers, suppliers, and local communities, has made corporate social responsibility (CSR) a fundamental component of contemporary business practice (Akpan & Oluwagbade, 2023). As such, formal corporate policies, regulatory compliance, and stakeholder expectations have been the main topics of traditional CSR research, which frequently highlights the viewpoints of executives, managers, and institutional actors (Shrestha & Timalseña, 2023). However, the viewpoints of business owners themselves have received relatively little attention, particularly in emerging economies. Indigenous knowledge systems, cultural values, and community-based philosophies frequently have a significant impact on how corporate ethics and practices are shaped in these situations (Aluko et al., 2025). So, developing an understanding of different viewpoints is essential to creating a more comprehensive understanding of CSR that engages with locally grounded approaches to social responsibility and goes beyond standardised frameworks.

Ubuntu is one indigenous ideology that is very pertinent in the African context. Ubuntu places a strong emphasis on compassion, connectivity, and the welfare of society as a whole. Its fundamental idea, which is usually summed up as "I am because we are," implies that personal achievement and identity are inextricably linked to the common good (Lamfiti & Koetsier, 2025). In the context of CSR, Ubuntu urges business owners to implement strategies that are not only profit-driven but also seek to produce real benefits for the communities in which they operate (Makwara et al., 2023). Ubuntu-based CSR focuses on ethical reciprocity, social cohesiveness, and long-term

community impact, in contrast to traditional CSR approaches that could prioritise legal compliance, business image, or shareholder returns (Maluleka & Ross, 2025).

This study examines how Ubuntu values influence business owners' motives, strategies, and outcomes in their social responsibility endeavours, with a particular focus on owner-led CSR activities in Africa. Three main research questions are the focus of the study: First, how do entrepreneurs view corporate social responsibility in the context of Ubuntu? What drives owners to participate in CSR initiatives, and how do cultural values influence these motivations? Third, what are the difficulties and results of owner-led CSR projects in African settings? By addressing these issues, the study advances a culturally grounded view of corporate social responsibility (CSR) and demonstrates how indigenous ideologies like Ubuntu can direct moral business conduct in developing nations. This viewpoint enhances the scholarly conversation on CSR and offers insightful suggestions to organisations looking to integrate social responsibility with local cultural values, promoting long-term success that benefits the organisation and the community at large.

Owner-Led CSR

Studies have increasingly demonstrated that the personal values, ethical beliefs, and motivations of individual business owners play a crucial role in shaping CSR initiatives, particularly within small- and medium-sized enterprises (SMEs) (Nijns et al., 2024), even though organisational CSR policies and formal frameworks frequently dominate research and practice. Owner-led CSR often takes the form of initiatives that go beyond legal requirements or financial gain and frequently places a strong emphasis on local community involvement, such as funding healthcare, education, and infrastructure projects that deal with pressing social issues (Oldham, 2024). Personal values, cultural or philosophical principles, and the desire to build mutually beneficial connections with stakeholders are often the driving forces behind these initiatives (Akpan & Oluwagbade, 2023).

Furthermore, owner-led CSR frequently places a higher priority on long-term sustainability than on immediate financial benefit, understanding that the stability and well-being of the local community are closely linked to the success of the organisation (Akpan & Oluwagbade, 2023). In addition to increasing social legitimacy and trust, this strategy strengthens SMEs' resilience, allowing them to prosper in resource-constrained and competitive contexts (Anggie & Werdanyaningsih, 2024). Owner-led CSR essentially shows how personal ethics, cultural values, and strategic business objectives coincide, proving that individual business owners' motivations are crucial to the success and influence of CSR programs. In African contexts, owner-led CSR for instance, may be influenced by native philosophies like as Ubuntu, which emphasises interconnectedness and relational responsibility and encourages business owners to provide social value in addition to economic value (Kupangwa, 2025).

Ubuntu Philosophy

Ubuntu is a communal African ethical framework that places a strong emphasis on empathy, human connection, and the well-being of society as a whole. Ubuntu, which has its roots in African philosophical traditions, is centred on the notion that a person's identity and well-being are inextricably linked to those of the community. This philosophy is summed up in the often quoted proverb, "I am because we are" (Lamfiti & Koetsier, 2025). This philosophy encourages social cohesiveness and moral behaviour at the individual and societal levels by emphasising relational responsibility, moral reciprocity, and a common sense of humanity (Lamfiti & Koetsier, 2025).

Ubuntu promotes corporate strategies that put human dignity, social justice, and mutual development ahead of profit maximisation (Mangaliso et al., 2018). In order to ensure the business operations favourably impact the well-being of the community as a whole, companies that adhere to Ubuntu principles frequently concentrate on building good relationships with suppliers, employees, and local communities (Chetty & Price, 2024). According to Akpan & Oluwagbade (2023), integrating Ubuntu into CSR offers a culturally appropriate substitute for Western-centric CSR, which frequently places a higher priority on compliance and shareholder interests. By fusing local values with moral business conduct, this Ubuntu-based strategy integrates social responsibility into business operations rather than viewing it as an external duty.

CSR in African Contexts

In the distinct socioeconomic contexts in which African companies operate, institutional support for CSR is either inadequate or uneven. Formal systems like government incentives, regulatory monitoring, and structured CSR reporting are often underdeveloped or inconsistently enforced, in contrast to many developed nations (Shakil et al., 2025). In light of this, businesses, particularly small and medium-sized enterprises (SMEs), frequently rely on local philosophies, cultural norms, and corporate values to direct socially responsible operations (Maluleka & Ross, 2025). In this situation, indigenous knowledge systems—like the African concept of Ubuntu can offer a potent ethical framework that directs corporate decision-making, fortifies community relationships, and increases legitimacy (Kupangwa, 2025). Ubuntu encourages business owners to consider not only profitability but also the welfare of their employees, suppliers, and the local community. It places a strong emphasis on interconnection, empathy, and the welfare of society.

African SMEs also demonstrate how Ubuntu-informed CSR is operationalised across industries. For instance, Agri-tech company Twiga Foods collaborates directly with smallholder farmers in Kenya to guarantee fair pricing, offer training, and enhance market accessibility (Raji et al., 2024). By encouraging mutually beneficial interactions that improve local livelihoods and help the business' long-term sustainability, this strategy exemplifies Ubuntu principles. To ensure that corporate success is connected to the welfare of the local community, SMEs in the hospitality and retail sectors in South Africa frequently make investments in neighbourhood schools, medical facilities, and employee welfare initiatives (Akpan & Oluwagbade, 2023). This is an example of a relational approach to CSR, where economic results are entwined with the prosperity of the community.

Ubuntu-Informed CSR

Examples of Ubuntu-informed CSR are frequently seen in the manufacturing industry. Small-scale producers of food and textiles in Ghana use fair wage policies, local sourcing, and skill-building initiatives to ensure that suppliers and workers profit from company expansion (Akpan & Oluwagbade, 2023). These methods improve the reliability of supply chains that are essential to profitability while also bolstering community loyalty and confidence. Ubuntu ideals have been utilised in the technology sector by African businesses such as Farmcrowdy in Nigeria and M-Farm in Kenya, which link small-scale farmers with digital platforms that offer real-time pricing, market access, and financial literacy programs (Choruma et al., 2024). These initiatives improve farmers' livelihoods while generating long-term value for the tech platforms by expanding user bases and building community credibility.

Despite the beneficial effects of CSR inspired by Ubuntu, SMEs encounter difficulties when putting it into practice. The size and complexity of CSR activities are limited by a lack of funding and employees especially for businesses with narrow profit margins (Nakpodia et al., 2026). There is also uncertainty over standards and expectations that may result from weak regulatory frameworks and uneven enforcement, which might lessen incentives to invest in socially responsible practices (Akpan & Oluwagbade, 2023). Additionally, striking a balance between social effect and revenue is still a difficult task. For instance, the initiatives that promote employee welfare or community development, could include up-front expenses that momentarily lower margins (Ardiansyah & Alnoor, 2024).

SMEs use effective strategies that balance Ubuntu principles with corporate sustainability to overcome these obstacles. Strategic integration, in which CSR projects are intimately linked to core corporate operations, is one popular method. For example, Twiga Foods creates a win-win situation for farmers and the company by connecting fair trade policies with supply chain efficiency. Another tactic is resource leveraging, in which companies collaborate with community organisations, local government initiatives, or NGOs to increase social impact without going over budget (Akpan & Oluwagbade, 2023). Additionally, SMEs use progressive implementation, beginning with small-scale employee or community projects that can be expanded as resources permit (Elpisah, 2023). Subsequently, a lot of businesses use reputation-based incentives because they understand that socially conscious business practices boost customer trust, attract talent, and improve brand loyalty, which contribute to sustainable growth (Yan et al., 2022).

All things considered, incorporating Ubuntu into CSR offers African SMEs a culturally based strategy that makes up for institutional shortcomings while promoting moral, sustainable, and community-focused business practices. SMEs can address social needs, develop resilience, and produce mutually reinforcing benefit for the

community and business by integrating relational responsibility, empathy, and communal welfare into their operations. Ubuntu-inspired CSR shows that profitability and social responsibility don't have to conflict; they can coexist with ethical, strategic, and culturally aware business practices.

METHODOLOGY

This study employed a qualitative research methodology to investigate business owners' viewpoints on CSR from an Ubuntu lens. This method worked especially well for analysing the complex, culturally rooted ethical frameworks and incentives that influence owner-led CSR initiatives in African settings. Qualitative research allows an in-depth examination of subjective experiences, allowing participants to express their values, motivations, strategies, and perceived outcomes in their own words, in contrast to quantitative methods that frequently prioritise measurable indicators or standardised survey responses (Pregoner, 2024). This is particularly crucial in the African setting, where traditional, Western-centric frameworks may not adequately reflect the local knowledge systems like Ubuntu that often inform CSR activities.

Sampling

Purposive and snowball sampling were used in the study. Business owners that actively participate in CSR activities and whose practices embody Ubuntu's values such as relational responsibility, communal well-being, and ethical reciprocity were identified through purposeful sampling. Participants were chosen from a variety of small and medium-sized manufacturing businesses (SMEs). The total number of participants was then increased by snowball sampling, which relies on recommendations from the first respondents to contact other company owners whose CSR practices represent owner-led, culturally based efforts. Ten business owners comprised the final sample, which was large enough to capture a variety of viewpoints while retaining depth for insightful qualitative analysis.

Data Collection

Semi-structured, in-depth interviews were conducted under the guidance of an interview protocol that addressed three main topics: (1) how CSR is conceptualised within the Ubuntu framework; (2) the ethical and cultural motivations behind CSR initiatives; and (3) the tactics, difficulties, and perceived results related to these initiatives. Semi-structured interviews provide flexibility, allowing the interviewer to go deeper into developing themes while allowing participants to comment on their experiences. The interviews took place in person, lasted between 45 and 90 minutes, and were audio recorded with the participants' permission to ensure data accuracy. During the interviews, the researcher also took notes to record nonverbal clues, immediate reflections, and contextual information.

Examples of questions were as follows:

1. What does corporate social responsibility mean to you,
2. How do Ubuntu values affect your perception of it?
3. What drives you to participate in CSR initiatives?
4. What particular difficulties do you encounter while putting these initiatives into practice?

The purpose of these open-ended questions was to encourage participants to think back on their experiences and offer in-depth, rich narratives. The transcripts were coded in order to find patterns, recurrent themes, and emergent topics in the data collected from these interviews. Deductive coding was used by the researcher to record pre-identified Ubuntu and CSR characteristics, including relational responsibility, communal well-being, and ethical reasons.

Data Analysis

Thematic analysis was used in the study to systematically examine and analyse the data. A combination of deductive and inductive methods were used to code the verbatim transcriptions of audio recordings. While inductive coding enabled the emergence of unexpected themes and insights from participant narratives, deductive coding was guided by theoretical notions relating to Ubuntu and CSR. To ensure consistency and clarity, the researcher went through various stages of coding and refinement. This led to the identification of key themes, including Ubuntu-based ethical motivations, community engagement tactics, methods for striking a balance between profitability and social impact,

and difficulties caused by a lack of resources and inadequate institutional frameworks. Thematic analysis facilitated the synthesis of rich, context-specific insights, highlighting how cultural values, ethical commitments, and pragmatic business considerations converge to shape owner-led CSR initiatives in African SMEs.

Ethical Consideration

The research approach was centred around ethical considerations. The researcher gave each participant a thorough description of the study's objectives, methods, and possible advantages and disadvantages prior to their participation. Each participant's informed consent was obtained by the researcher, who emphasised the participants' freedom to discontinue participation at any time without facing any repercussions. The researchers used pseudonyms in all transcripts, notes, and reports to ensure confidentiality. To avoid unauthorised access, the researcher used password-protected devices to safely store data.

Reflexivity

Throughout the entire research process, reflexivity was essential. In regard to the participants, the researcher actively considered positionality, cultural presumptions, and personal biases. Reflexive techniques like keeping a research journal, peer debriefing, and critical self-evaluation were used to increase transparency and reduce subjectivity because it was acknowledged that the researcher's personal views on CSR, business ethics, and Ubuntu could affect both data collection and interpretation. By taking a reflective approach, the researcher was able to pay attention to the viewpoints of the participants and make sure that the analysis was based on the cultural contexts and real-world experiences of African business owners rather than on theoretical presumptions.

FINDINGS AND DISCUSSIONS

The study revealed important information about how business owners view corporate social responsibility (CSR), why they participate in it, the challenges they encounter in putting it into practice, and the results of implementing CSR activities.

Theme 1: Ubuntu-Informed Conceptualisation of CSR as an Embedded Ethical Practice

Across interviews, business owners consistently framed corporate social responsibility (CSR) not as a formalised programme, compliance mechanism, or reporting activity, but as an embedded ethical orientation shaping everyday business conduct. CSR was perceived as inseparable from operational decision-making, interpersonal relationships, and leadership practices. This understanding was deeply rooted in Ubuntu principles of interconnectedness, collective responsibility, and human dignity.

Participants emphasised the inherently relational nature of business, asserting that enterprises exist within communities and derive their legitimacy, meaning, and sustainability from these social relationships. Statements such as *“CSR is not a separate programme in my business”* and *“The business exists within society”* reflect a worldview in which social responsibility is morally intrinsic rather than optional or transactional. Some owners also described *charitable engagements undertaken in their personal capacity, further blurring distinctions between personal ethics and business practice*. These findings are consistent with Gangi et al. (2020), who argue that SMEs often engage in informal, implicit, and unarticulated CSR activities.

The discussion highlights how Ubuntu reframes CSR as a moral and relational practice, challenging formalised and Western-centric CSR models that prioritise shareholder value or regulatory compliance. Ubuntu-informed CSR instead foregrounds ethical responsiveness, mutual care, and social cohesion, positioning responsibility as an indigenous ethical system embedded in lived entrepreneurial practices rather than imported managerial frameworks (Akpan & Oluwagbade, 2023; Kupangwa, 2025).

Theme 2: Culturally Grounded Motivations for CSR Engagement

A second theme concerns the motivations underlying owner-led CSR, which were predominantly intrinsic, normative, and culturally grounded rather than externally driven. Three interrelated motivations emerged: community responsibility, employee well-being, and long-term sustainability.

Sub-theme 2.1: Community Responsibility

Owners perceived their relationship with the community as reciprocal and morally binding. Expressions such as “*That is not optional; it is an obligation*” reflect Ubuntu’s normative emphasis on mutual dependence and social obligation. In contexts characterised by limited government intervention and service provision, owners felt a heightened responsibility to contribute to local development, reinforcing the role of small businesses as key social actors within their communities (Makwara et al., 2023).

Sub-theme 2.2: Employee Well-being

Employees were frequently described using familial language, reflecting Ubuntu’s human-centred ontology. Ethical responsibility toward employees was linked to organisational resilience, with owners noting improved morale, commitment, and performance when employee well-being was prioritised (Chetty & Price, 2024). This aligns with perspectives that view ethical employment practices as both morally necessary and strategically beneficial.

Sub-theme 2.3: Sustainability Orientation

Ubuntu also informed a long-term sustainability orientation. Owners recognised that exploitative practices undermine both social harmony and business continuity, motivating “*CSR engagement as an ethical commitment to endurance rather than short-term profitability.*”

The discussion underscores that these motivations differ fundamentally from legitimacy- or reputation-driven CSR models. Ubuntu anchors CSR in moral obligation and collective well-being, a dynamic particularly salient in African business contexts where informal institutions and cultural norms exert significant influence on entrepreneurial behaviour (Shakil et al., 2025).

Theme 3: Structural and Contextual Constraints on Owner-Led CSR

Despite strong ethical commitment, business owners faced considerable challenges in the implementation and sustainability of CSR initiatives. This theme highlights the structural fragility of owner-led CSR within resource-constrained environments.

Financial limitations were the most frequently cited constraint, with several owners reporting that “*CSR initiatives were funded from personal resources*”. Weak institutional and governmental support further exacerbated these challenges, compelling owners to independently shoulder social responsibilities (Shakil et al., 2025). The tension between profitability and social investment was particularly pronounced during periods of economic uncertainty, revealing the vulnerability of discretionary CSR practices in unstable contexts.

The discussion situates these constraints within broader institutional and policy deficiencies. In the absence of enabling frameworks such as tax incentives, financial support, or formal recognition, CSR remains dependent on individual altruism and is difficult to scale or sustain (Hoang et al., 2024; Nicoara & Kadile, 2024). This finding underscores the necessity of supportive entrepreneurial ecosystems that recognise and reinforce socially responsible business conduct.

Theme 4: Multi-Level Outcomes of Ubuntu-Informed CSR

Despite contextual constraints, participants reported positive outcomes at the employee, organisational, and community levels, illustrating the value-generating potential of Ubuntu-informed CSR.

Sub-theme 4.1: Employee Outcomes

Owners consistently reported “*improved employee morale, reduced absenteeism, and lower staff turnover*”. Employees’ perceptions of being valued translated into higher productivity and stronger organisational commitment. These findings align with Štreimikienė and Ahmed (2021), who demonstrate a positive relationship between employee morale and performance.

Sub-theme 4.2: Business and Market Outcomes

CSR engagement was also associated with reputational and market benefits. Owners reported “*enhanced customer trust, loyalty, and referrals following CSR initiatives*”. While not pursued as a marketing strategy, ethical engagement functioned as an informal relational asset, supporting Yan et al. (2022), assertion that CSR contributes to customer commitment and reputational capital.

Sub-theme 4.3: Community Outcomes

Communities responded positively to business involvement, offering social legitimacy and reciprocal support. Businesses were increasingly perceived as integral components of the local social fabric rather than external profit-seeking entities. These outcomes reinforce Ubuntu’s principle of interconnectedness, demonstrating that social value creation and economic resilience are mutually reinforcing rather than competing objectives (Kupangwa, 2025).

Theme 5: Ubuntu as an Alternative CSR Paradigm

Integrating the findings, the final theme positions Ubuntu as a normative and theoretical alternative to dominant CSR paradigms. Ubuntu-informed CSR aligns business practice with social justice, ethical responsibility, and long-term sustainability, offering a culturally resonant framework for responsible entrepreneurship in emerging market contexts (Kupangwa, 2025; Maluleka & Ross, 2025). While institutional weaknesses limit the scalability of CSR initiatives, the evidence suggests that Ubuntu-informed CSR fosters trust, resilience, and inclusive development. These findings support calls to integrate indigenous ethical frameworks into policy design, business education, and CSR scholarship (Chetty & Price, 2024).

Overall, the study demonstrates that owner-led CSR among African SMEs is relational, ethically embedded, and culturally grounded in Ubuntu philosophy. Although financial and institutional constraints persist, Ubuntu-informed CSR generates both social and economic value, challenging the assumed dichotomy between ethics and profitability. Instead, the findings suggest that culturally embedded responsibility can simultaneously sustain businesses and strengthen communities.

IMPLICATIONS FOR PRACTICE AND POLICY

The findings suggest that rather than being a formalised or compliance-driven role, CSR in SMEs can be most successful when viewed as an intrinsic ethical practice based on indigenous values. Using the Ubuntu values of interconnection, compassion, and reciprocity, SME owners and managers should include CSR into daily managerial choices, leadership conduct, and stakeholder connections. Even in situations with limited resources, putting a strong emphasis on employee well-being and ongoing community involvement can improve organisational resilience, trust, and long-term performance. Additionally, managers are urged to embrace gradual and capacity-based CSR strategies that prioritise business sustainability over short-term profit maximisation.

From a policy perspective, the results emphasise the need for more inclusive and context-sensitive CSR frameworks that acknowledge owner-led, informal, and culturally rooted activities that are typical of SMEs. To lessen SMEs' dependency on personal resources while engaging in CSR, policymakers could offer supportive mechanisms like incentives, recognition programmes, and financial access. Responsible business practices can be further improved by incorporating indigenous ethics like Ubuntu into policy design, SME support initiatives, and entrepreneurship education. In emerging economic situations, acknowledging and promoting Ubuntu-informed CSR has the potential to build stronger communities, more resilient businesses, and inclusive socioeconomic growth.

CONCLUSION

This study examines owner-led CSR through the African philosophy of Ubuntu and highlights its importance in shaping ethical and socially embedded business practices. The findings show that business owners view CSR as both a strategic and moral obligation, guided by values of interconnectedness, compassion, and collective well-being. Rather than treating CSR as a formal or compliance-driven activity, owners integrate it into everyday business operations, emphasizing employee welfare, community development, and long-term sustainability.

Although owner-led CSR generates positive outcomes such as improved employee morale, stronger community relations, and enhanced business legitimacy, its implementation is constrained by financial limitations, weak institutional support, and the challenge of balancing social goals with profitability. These findings underscore the need for enabling environments that support socially responsible entrepreneurship.

The study calls for greater integration of indigenous knowledge systems like Ubuntu into CSR policy and practice and emphasizes the role of governments and development organizations in providing structural support. Overall, Ubuntu-informed CSR offers a culturally grounded and sustainable approach to ethical business that aligns economic success with social development in African and emerging market contexts.

REFERENCES

- Akpan, J. U., & Oluwagbade, O. (2023). Social and environmental responsibility in accounting: Beyond financial metrics. *International Journal of social sciences and management research*, 9(9), 163-188.
- Aluko, H. A., Watson, A., Islam, N., Fernandes, F. A. P., Aluko, A. O., Ayertey, S., & Baig, M. M. (2026). Rethinking Business Practices: Harnessing Indigenous Knowledge Systems and Sustainable Strategies for Resilient Entrepreneurial Success. *Business Strategy and the Environment*, 35(2), 2563-2580.
- Anggie, M., & Werdanyaningsih, S. (2024). Empowering Communities through SME Development: A Qualitative Study on Management Approaches. *Golden Ratio of Community Services and Dedication*, 4(2), 81-89.
- Aradiansyah, M., & Alnoor, A. (2024). Integrating corporate social responsibility into business strategy: creating sustainable value. *Involvement International Journal of Business*, 1(1), 29-42.
- Chetty, K., & Price, G. (2024). Ubuntu leadership as a predictor of employee engagement: A South African study. *SA Journal of Human Resource Management*, 22, 2462.
- Choruma, D. J., Dirwai, T. L., Mutenje, M. J., Mustafa, M., Chimonyo, V. G. P., Jacobs-Mata, I., & Mabhaudhi, T. (2024). Digitalisation in agriculture: A scoping review of technologies in practice, challenges, and opportunities for smallholder farmers in sub-saharan africa. *Journal of agriculture and food research*, 18, 101286.
- Elpisah, E. (2023). Towards inclusive growth: Community-centered management strategies for SMEs. *Golden Ratio of Community Services and Dedication*, 3(1), 29-39.
- Gangi, F., Meles, A., Monferrà, S. and Mustilli, M. 2020. Does corporate social responsibility help the survivorship of SMEs and large firms? *Global Finance Journal*, 43: 100402.
- Hoang, A., Nguyen, D. T., & Le, P. U. (2024). Economic policy uncertainty and corporate social responsibility: evidence from emerging countries. *Cogent Business & Management*, 11(1), 2375625.

- Kupangwa, W. (2025). The African philosophy of Ubuntu and family businesses: a perspective article. *Journal of Family Business Management*, 15(1), 57-67.
- Lamfiti, V., & Koetsier, J. (2025). Ubuntu. In *Vocabulary for Sustainable Consumption and Lifestyles* (pp. 254-256). Routledge.
- Makwara, T., Dzansi, D. Y., & Chipunza, C. (2023). Contested notions of Ubuntu as a corporate social responsibility (CSR) theory in Africa: an exploratory literature review. *Sustainability*, 15(7), 6207.
- Maluleka, S. M., & Ross, E. (2025). Ubuntu or compliance? Knowledge, attitudes, and practices of owners of small-medium-sized enterprises in Johannesburg, South Africa regarding corporate social responsibility. *Journal of African Business*, 26(2), 418-437.
- Mangaliso, M. P., Mangaliso, Z., Knipes, B., Jean-Denis, H., & Ndanga, L. (2018, July). Invoking Ubuntu philosophy as a source of harmonious organizational management. In *Academy of Management Proceedings* (Vol. 1, No. 2018, p. 15007). Briarcliff Manor, NY 10510: Academy of Management.
- Nakpodia, F., Olan, F., Ogunyemi, T., & Hasan, A. (2026). Navigating the roadblocks: exploring challenges in implementing corporate social responsibility (CSR) initiatives in a Sub-Saharan African economy's small and medium enterprises (SMEs). *European Business Review*, 38(1), 17-45.
- Nicoara, C., & Kadile, V. (2024). The potential of CSR engagement in UK SMEs. *Journal of the International Council for Small Business*, 6(1), 157-174.
- Nijnsens, S. (2024). *What's in it for me?: owner-CEO-driven CSR : how formative experiences shape corporate social responsibility* [Drexel University]. <https://doi.org/10.17918/00001958>
- Oldham, S. (2024). Embedding owner-manager values in the small and medium sized enterprise context: A Lockean conceptualisation. *Journal of Business Ethics*, 194(3), 561-581.
- Pregoner, J. D. (2024). Research approaches in education: A comparison of quantitative, qualitative and mixed methods. *IMCC Journal of Science*.
- Raji, M. A., Olodo, H. B., Oke, T. T., Addy, W. A., Ofodile, O. C., & Oyewole, A. T. (2024). The digital transformation of SMES: a comparative review between the USA and Africa. *International Journal of Management & Entrepreneurship Research*, 6(3), 737-751.
- Shakil, A. A. Z., Hossain, M. M., Khan, M. M. H., Noyon, S. I., & Ripon, M. B. B. (2025). A systematic review of corporate social responsibility practices in emerging markets. *Business and Social Sciences*, 3(1), 1-9.
- Shrestha, R., & Timala, C. (2023). Perceived External CSR from Employees' Perspective in Nepalese Banking Industry. *Nepal Journal of Multidisciplinary Research*, 6(3), 145-155.
- Yan, X., Espinosa-Cristia, J. F., Kumari, K., & Cioca, L. I. (2022). Relationship between corporate social responsibility, organizational trust, and corporate reputation for sustainable performance. *Sustainability*, 14(14), 8737.

RECONCEPTUALISING SOCIAL ENGAGEMENT IN SOUTH AFRICAN HIGHER EDUCATION: FROM MORAL AGENDA TO INSTITUTIONAL ECOSYSTEM

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ABSTRACT

Socially engaged scholarship constitutes a salient response strategy of higher education institutions to address societal challenges, especially in a post-COVID South Africa. While engagement is celebrated and even elevated as an ethical practice, the field's prevailing discourse can at times overlook the material, interpersonal and temporal conditions that support it. This paper frames socially engaged scholarship as an institutional ecology, considering the interactions between academics, communities, institutional governance, policy-making and sociopolitical contexts. Drawing on longitudinal praxis between 2021 and 2025, the paper highlights important conceptual misinterpretations, temporal lapses and overall omissions. There is a need for alignment between institutional expectations, the acknowledgement of relational labour, the establishment of long-term relationships, and being reflexive in our research. The paper provides a deeper understanding of socially engaged scholarship and thus presents a more comprehensive view of community engagement and outcomes, and a more nuanced understanding of the benefits and limitations. It also maps the features of metrics and valuation, and explores how decentralised reporting, publishing-oriented reward structures, and inconsistent institutional support affect participation. The paper emphasises the need for future research to include longitudinal studies, equitable workload distribution models, and context-sensitive evaluation approaches. This serves to disrupt celebratory and instrumentalist views, offering higher education institutions a way forward to support ethically sound, institutionally viable and socially engaged scholarship with transformative potential.

Keywords: socially engaged scholarship, higher education in South Africa, institutional ecology of knowledge co-creation, community engagement, reflective practice.

INTRODUCTION

Universities are increasingly seen as important contributors to creating solutions to social, economic and development challenges, particularly in light of the complex challenges that they face (Compagnucci & Spigarelli, 2020). Universities globally and also in Africa are now expected to generate not just disciplinary knowledge, but also relevant, responsive and impactful knowledge (Compagnucci & Spigarelli, 2020). In South Africa, these imperatives are magnified by deep socio-economic disparities, past injustices and the public mission associated with state-funded higher education (Vally, 2021). There is a growing interest in socially engaged scholarship as a way for universities to make academic work relevant to community needs, and thus to also support decolonisation efforts (Pali, 2024). Although socially engaged scholarship is often presented as a moral and civic duty, institutionalisation has created new tensions that have yet to be fully explored in the literature (Compagnucci & Spigarelli, 2020). The positive aspects of 'engagement' are celebrated in policy speak and institutional strategies, but what it does, under what conditions, and how this is sustained and assessed, are often hidden from view.

The COVID-19 pandemic significantly amplified these tensions. In addition, COVID-19 impacted not only student learning, institutional support, and the general operation of higher education, but also influenced scholars' ability to meaningfully connect and collaborate with the communities they engage with (Otu et al., 2023; Plessis et al., 2022). Limited resources and increasing academic pressures in higher education institutions jeopardised research sustainability and access to resources in jeopardy. This state of affairs compounds the researchers' workloads as they juggle teaching and research duties (Bamberg et al., 2021; Steynberg et al., 2024). To date, the literature on socially

engaged scholarship has primarily addressed the outcomes sought, best-practice models to follow, and the moral value of university-community partnerships (Fransman, 2018). Although such studies have been instrumental in legitimising engagement, they often underestimate the structural and organisational dynamics that shape how engagement work is lived by academics (Burger, 2022).

Rather than being viewed as work embedded within institutional norms of value, governance, and responsibility, community engagement is often depicted as a voluntary expansion of academics' scholarly identity or personal dedication (Burger, 2022). Assigned responsibility is thus implicitly linked to individuals' key performance indicators on a yearly basis. Unfortunately, minimal attention is paid to the influence of institutional structure and policy consistency on academics' compliance with performance indicators for community engagement (Netshandama, 2021).

This article argues that current perspectives on what characterises socially engaged scholarship are inadequate. When this form of scholarship is mainly seen as a moral obligation or as secondary to academia, the importance of emotional and relational work (Lin, 2023) and the ongoing effects of disconnection on support and acknowledgement (Steynberg et al., 2024) could be overlooked. We therefore need to better understand the non-celebratory form of narrative, especially as it applies to socially engaged scholarship as a complex process constituted by interwoven institutional relationships (Burger, 2022).

Furthermore, the COVID-19 pandemic has highlighted pre-existing inequalities and emphasised the need for more adaptable and inclusive teaching methods, strengthening the argument for reevaluating these strategies (Azionya & Nhedzi, 2021). In this regard, the present article proposes a redefinition of socially engaged scholarship as an institutional ecology. This perspective emphasises the connections between academic, community, governance, performance, and socio-political relationships (Velasco et al., 2021). Instead of debating the necessity of engagement, we focus on identifying areas of socially engaged scholarship in today's university, the factors that promote or hinder it, and the individuals who sustain it over time (Pule, 2024). This approach also resonates with broader discourses on decolonising higher education and incorporating indigenous knowledge systems (Johnson & Mbah, 2024; Pali, 2024).

The paper further contributes to scholarship on higher education in three poignant ways, while also reconceptualising socially engaged scholarship as an institutional ecology. These aspects include, firstly, that socially engaged scholarship provides a frame of reference for comprehending engagement that transitions beyond individual efforts (Burman, 2024). Secondly, it draws attention to the inferred tensions regarding value, labour and continuity in socially engaged scholarship that are often overlooked in conversations about efforts to engage communities (Bamberg et al., 2021; Steynberg et al., 2024). Thirdly, it offers a generative counterposition for reimagining research practice and policy with a view to sustain better, more equitable, socially engaged scholarship (Iwara, 2023). This also implies that university leadership should lead strategic transformation not only in the interests of more widespread and equitable social programmes, but also in the service of the public good.

CONCEPTUAL FRAMING

Socially Engaged Scholarship as Institutional Ecology

Socially engaged scholarship has often been confused with community engagement, service learning and/or public outreach – a confusion that leads to conceptual vagueness that affects both the practice and the acknowledgement within institutions (Compagnucci & Spigarelli, 2020). Although the second two intensification efforts may work towards similar goals, socially engaged scholarship has a unique focus on reciprocal knowledge co-creation, methodological rigour, and scholarly contribution (Heiden-Rootes et al., 2025). If universities cannot differentiate between socioeconomic status and temporary or symbolic involvement, engagement could turn into an action performed for the sake of compliance rather than being recognised as genuine academic work in the long run (Netshandama, 2021).

To address this ambiguity, we frame socially engaged scholarship within an institutional ecology framework (Velasco et al., 2021). This viewpoint advocates acknowledging the interdependent relationships among actors, structures, and processes. Therefore, this viewpoint extends past simply being committed to ethical directions in

communities. Indeed, this community of practice does not exist in a vacuum. Rather, it occurs through the interactions among academia, community, policy, governance, and disciplinary practices (Burman, 2024). Socially engaged scholarship is centred on relationship-building, establishing established practices, and seeking understanding of the overall framework. It includes ongoing collaboration, sensitive research methods that acknowledge participants as co-creators of knowledge, and supportive settings that facilitate collaboration (Loh et al., 2021). Such a relational epistemology recognises that the production and worth of knowledge are influenced by power structures, institutional hierarchies, and debates over epistemology (Cullen et al., 2023).

In South Africa, engagement must be understood in relation to the legacies of colonialism and apartheid, in which certain systems of knowledge have been shaped by inequality (Pali, 2024). This suggests that socially engaged scholarship is not just volunteering or community service, but scholarship grounded in co-produced knowledge (Fransman, 2018). It also engages and grapples with the systemic opportunities and limitations within its community and institutional contexts (Burger, 2022). Socially engaged scholarship, therefore, operates within broader social, political, and historical processes. Admittedly, policy, resource availability, and evolving societal expectations rooted in history shape this context (Vally, 2021).

Alternative conceptions, whether voluntarist or instrumental, are too simplistic to capture the full richness of engagement (Burman, 2024). While these ecological models emphasise what drives people's motivations or their immediate reactions, they tend to miss the bigger picture. They do not account for the structural, relationship-based, and time-related factors that enable social-ecological systems to endure over the long term. Additionally, the focus on individual choices can unfairly place the blame on people for not participating, without acknowledging the larger systemic obstacles that can get in the way. The institutional ecology perspective, on the other hand, provides an opportunity to explore how socially engaged scholarship is enacted and institutionalised at multiple scales (September-Brown et al., 2023) – thus allowing researchers to question not just the outcomes of engagement, but how institutional settings can facilitate or hinder the effectiveness of partnerships (Lin, 2023).

Socially engaged scholarship is about to become part of the fabric of academia (Burman, 2024). This shift in perspective proposes that engagement will move from being seen as a mere alternative or rare occurrence to being an intrinsic part of scholarly practice. Embracing this shift has the potential to enrich both our academic pursuits and the communities we serve. It is expected to be increasingly influenced by institutional policies, governance structures, and the broader socio-economic landscape, paving the way for a more collaborative and community-oriented approach in academia (Iwara, 2023). Moreover, it paves the way for assessing and crafting engagement responses that are sustainable, fair, and aligned with long-term institutional and societal objectives (Velasco et al., 2021). In such a reading, the groundedness of any such work would be especially important, as in many cases, universities are assigned national missions of social justice and decolonisation alongside other academic tasks (Pali, 2024).

LANDSCAPE REVIEW

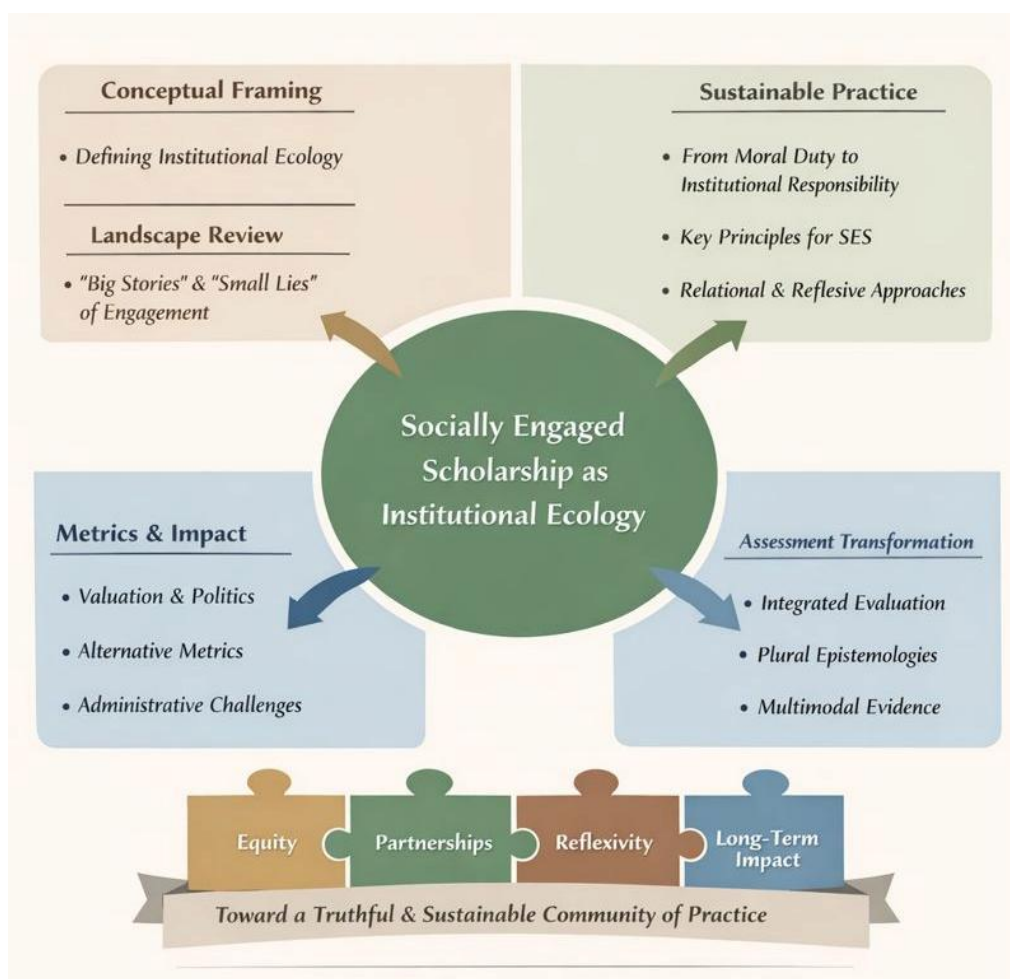
The “Big Stories” and the “Small Lies” in Engaged Scholarship

When socially engaged scholarship is viewed only as a form of community engagement, it may be seen as an extension of public outreach. This has resulted in conceptual confusion and perspectives that detract from both its implementation and the recognition it receives (or should receive) within institutions (Compagnucci & Spigarelli, 2020). Unlike its cousin practices, socially engaged scholarship is distinguished by its pursuit of knowledge co-creation, strong methodologies, and scholarly outputs (Heiden-Rootes et al., 2025). When universities cannot clearly distinguish between engagement in the inception of service learning and voluntary community engagement, this may result in episodic or symbolic work. Such supervised work then becomes a compliance model, rather than a lifelong scholarly byproduct (Netshandama, 2021).

This paper sets out to conceptualise socially engaged scholarship as an institutional ecology, a metaphor describing the interconnectedness of actors, structures, and processes (Velasco et al., 2021). Engagement practices are rooted not only in individual decisions but also in interactions between academics, communities, institutional policies, governance, and disciplinary norms (Burman, 2024). The institutional ecological perspective provides tools for understanding the recognition and evaluation of socially engaged scholarship at various levels (September-Brown et al., 2023). This view invites researchers to focus on the consequences of engagement and institutional factors that

facilitate or obstruct it (Lin, 2023). Socially engaged scholarship emphasises fostering relationships, working with, or questioning established methodologies, and operating in supportive environments (Loh et al., 2021). Such an understanding of relationships takes into consideration the dynamics of power, the structures of institutions, and the disputes over knowledge regarding how it is created and evaluated (Cullen et al., 2023). Figure 1 below draws together the main points in the discussion above by representing socially engaged scholarship as an institutional ecology, which shows the interconnections between conceptualisation, practice, assessment and impact. It locates co-creative supervisory development within these interrelational fields, making more visible the nature and role of engagement.

Figure 1: Co-Creative Supervisory Development Framework.



Note: Image generated using CHATGPT (Version 5.0), from the author-supplied prompts, 2026.

Socially engaged scholarship is increasingly recognised as a critical part of academic culture and a growing area of concern in educational institutions (Burman, 2024). Rather than being a sporadic effort, engagement is now viewed as a fundamental component of the academic landscape. It is shaped by the regulations and policies of the institutions involved, as well as by the wider social and economic contexts in which they operate. This shift emphasises the importance of integrating community connection and real-world impact into scholarly work, making it a core part of the academic endeavours (Iwara, 2023). It also paves the way for comparing and designing sustainable, equitable, and long-term institutional and social engagement strategies (Velasco et al., 2021). This alignment is especially critical in situations where universities are required to develop social justice and decolonisation missions alongside their academic business-as-usual (Pali, 2024). This framing also allows the following sections to analyse the relations, methods, and institutions of involvement (Teli et al., 2020).

It offers a conceptual lens for critically evaluating knowledge production, impact and institutional settings that also enable socially engaged scholarship in South African higher education (Netshandama, 2021). By taking this approach, the article goes beyond applauding engagement lifestyles or activities as goals in their own right to thoughtfully analyse the foundations and relationships that enable or limit genuinely transformative scholarship (Burman, 2024).

REPOSITIONING ENGAGEMENT FOR SUSTAINABLE PRACTICE

Shifting from a Moral Obligation to Sustainable Approaches in Community-Engaged Scholarship

Moving Beyond Ethical Imperatives: Socially engaged scholarship is often framed as an ethical duty, but this perspective overlooks the essential structural, relational, and temporal conditions for its sustainability (Lin, 2023). Its framing as a moral imperative can paradoxically place the onus on individual academics and obviate the institutional, policy and governance settings that enable or inhibit desirable practice (Burman, 2024). It can, in certain contexts, be sporadic, fragile and devalued in institutional reward structures without a coherent perspective (September-Browne et al., 2023).

This is particularly common in South African tertiary settings, where participation in such efforts is commonly understood as redressing past wrongdoings and calling for social accountability (Vally, 2021). Furthermore, while these calls have moral significance, they can also serve as a cover for systemic change. If engagement relies solely on the goodwill and emotional effort of individual scholars rather than on institutional support, its long-term viability may be uncertain (Ndofirepi & Cross, 2022). The unfortunate result is that those who have the most to gain from powerful partnerships are often forced to pay exorbitant costs, and society's problems remain unchallenged.

New Opportunities for Conceptualising Socially Engaged Scholarship ES as Sustainable Institutional Practice: From this perspective, the framework of socially engaged scholarship is not simply a series of related activities, but an intricate network of researchers, communities, institutional rules and regulations, resource allocation and governance arrangements (Teli et al., 2020). This view shifts the focus from individual ethics to institutional design, recognising that sustainability requires institutions to align.

Ecologically speaking, power not only plays out in individual interactions but also in institutional structures, regulations, and processes (Loh et al., 2021). Universities operate under shifting policies, resource constraints, performance measures, and academic standards (Burman, 2024). These elements affect the types of engagement possible, who is engaged, and how their contributions are recognised (Cullen et al., 2023). By emphasising these structural aspects, an ecological perspective encourages us to move beyond merely acknowledging individual enthusiasm and capability, instead allowing us to investigate the conditions that either support or obstruct engagement (September-Brown et al., 2023).

Key Principles for Sustainable Socially Engaged Scholarship

Structural Alignment: Expectations and Supports: The Groundwork for a Sustainable Socially Engaged Scholarship. Engagement that is coherent, fluid, or flexible can result in an efficient university community, and in its turn, efficiency is reflected in consistency. Such an alignment can be achieved by creating robust models of work that recognise and value both the relational and administrative components of labour. To this end, career structures need to be developed to recognise socially engaged scholarship as a contribution to scholarly practice. This requires institutional structures, administrative support and funding (Iwara, 2023). Importantly, engagement without this alignment would rely on individual benevolence.

Where there is no structural alignment, we could coin the term “engagement debt”—the gap between what it is hoped scholars will do and what the organisation provides in support (Burman, 2024). One can contrast these conditions with those in which workload allocations ignore the time it takes to develop authentic partnerships, where promotion committees recognise engagement as tangential to research and/or teaching, and where administrative support is negligible – academics either squeeze the work into overburdened diaries or take a financial hit by doing

unpaid labour (Netshandama, 2021). This is especially problematic in contexts with historical inequities, as such contexts may reinforce notions of who can and cannot afford to engage, and who is engaged (Lin, 2023).

Relational Continuity: Engagement is an inherently relational concept that develops over time (Loh et al., 2021). Trust, shared respect, and co-produced knowledge cannot be built through episodic interventions; instead, they are developed through long-term partnerships with communities (Velasco et al., 2021). Short-term projects are usually more visible and easier to evaluate, but they often do not lead to significant change. Engaged projects can also strengthen unequal power dynamics between academics and community partners (Heiden-Rootes et al., 2025).

Longitudinal relationality would require developing a culture of long-term engagement with universities, rather than a project-based approach (Vally, 2021). Universities must be willing to counter demands for short-term, readily measurable and monetisable outcomes, in favour of longer temporalities that enable collaboration (Burman, 2024). This reorientation is crucial in postcolonial settings such as South Africa, where historical knowledge differentials between universities and communities or societies persist, and dismantling these requires an explicit, long-term commitment (Pali, 2024).

Reflexive Practice: To apply such an approach into a network thus means to work on several levels. At an individual level, “academics need to constantly challenge themselves about their positionality about power relations and assumptions in communities” (Cullen et al., 2023). Here, ethics and culture play a significant role in enabling socially engaged scholarship to be on a solid footing and to be adaptable, while acknowledging the complex considerations that are part of co-producing knowledge (Fransman, 2018). Reflexivity in this case refers not only to a recognition of positionality, but also to the explicit consideration of how such effects research questions, methodology, and the distribution of benefits (Lin, 2023).

Equally critical is institutional reflexivity. Organisations should critically assess how policy, remuneration, and governance determine who can participate meaningfully in, and/or co-own development (Netshandama, 2021). This also includes questioning whose voices are heard in decision-making about engagement, which types of partnerships are privileged, who determines success, and whose interests are served by recognition (Burman, 2024). In the absence of institutional reflexivity, individual reflexive practice can compensate for organisational change (September-Brown et al., 2023).

Integrated Recognition: Sustainable scholarship relies upon the formal recognition of intellectual contributions and relational work that sustains them (Burger, 2022). This includes the recognition of scholarly outputs, mentoring, capacity-building and administration, among others, and the inclusion of such efforts in performance appraisals and evaluations (Iwara, 2023). A lack of recognition renders much of the work that sustains engagement invisible, such as mentoring and relational work, often done by women and scholars from marginal backgrounds (Bamberg et al., 2021).

Ultimately, recognition also means challenging hierarchical structures of knowledge that privilege some types of scholarly work over others (Pali, 2024). When universities focus mainly on traditional peer-reviewed research and thus view community-based knowledge as less important, they create a system that values some types of knowledge over others. This undermines the idea of creating knowledge together (Burman, 2024).

Beyond Symbolic Engagement: By redefining socially engaged scholarship, we move from moral appeals to a focus on “pragmatic, structural, and conceptual sustainability” (Burman, 2024). Engagement is now seen not just as a personal ethical choice, but as a systemic function embedded within the academic ecosystem (Velasco et al., 2021). Viewed in this way, universities are better positioned to enable ongoing engagement efforts through acknowledging this in workloads, recognition of engagement in promotions, and administrative support for such work (Iwara, 2023).

This approach towards socially engaged scholarship also focuses on equity in labour engagement (Lin, 2023). When engagement is framed primarily as a moral duty, it is often the disproportionately burdened of marginalised or maligned groups within academia. Such groups often include early-career researchers, women and non-dominant race or ethnic scholars, who are most deeply affected by the historical injustices of the past (Bamberg et al., 2021). Outsourcing the responsibility for engagement can make the distribution more equitable. This will allow for the recognition of engagement activities in ways that support rather than hinder academic careers (Burman, 2024).

Ultimately, this strategy supports sustainable collaboration that benefits society (Velasco et al., 2021). Longer-term and institutionalised partnerships make it possible to move beyond "white lies" and into more open, collaborative and transformative modes of knowledge production (Teli et al., 2020). Such a view enables universities to engage in something more than symbolic engagement – they become an active part of the solution to societal problems (Vally, 2021).

VALUATION, METRICS AND THE POLITICS OF IMPACT IN SOCIALLY ENGAGED SCHOLARSHIP

The Paradox of Measurement in Socially Engaged Research

Despite recurring calls to rethink how scholarly impact is conceived and measured, socially engaged scholarship sits awkwardly within the dominant research evaluation frameworks across academia. Despite universities placing greater emphasis on societal impact as a strategic priority, performance systems within institutions appear to be grounded in publication-driven measures that continue to favour accredited journal outputs at the expense of relational-process and community-facing scholarly activity. This inherent friction creates structural disincentives for faculty to engage with communities meaningfully (Netshandama, 2021), yet there are no parallel mechanisms of recognition and reward.

The potential conflict between traditional and alternative views impact assessment. Indeed, the struggle between traditional and alternative forms of impact assessment represents broader debates in bibliometrics and research evaluation. Such publication metrics as the Journal Impact Factor have attracted considerable criticism for skewing research practice and favouring specific fields and ways of knowing. As research assessment takes on greater importance in career progression and institutional performance, the pressure to comply with narrow metrics grows, and this can come at the expense of scholarship that is innovative and/or responsive to communities (Burman, 2024).

The South African Situation: Fragmentation and Inconsistency

The importance of impact reporting has been increasing in the South African higher education environment, with national quality assurance and policy frameworks prioritising social responsibility (Vally, 2021). However, research on the impact of socioeconomic status is piecemeal and varies in its application across campuses. Evidence gathering is often done retrospectively via reporting templates that emphasise processes rather than co-constructed knowledge, co-ownership and ongoing relational outputs (September-Brown et al., 2023). As a result, the social and epistemic value of engaged work is often lost in formal evaluation processes.

This invisibility is not simply an oversight; it rather indicates a profound epistemological hierarchy rooted within institutional evaluation frameworks (Burman, 2024). The lack of the necessary language, terminology or metrics to analyse regulation as a relational concept fundamentally diminishes both the intellectual and practical dimensions of our engagement. What community-engaged scholars convey is that the core of their contributions - developing relationships, building trust, and co-creating knowledge - is precisely the facet that proves challenging to quantify, report, and justify within these more conventional accountability frameworks (Netshandama, 2021).

Alternative Metrics: Promise and Limitations

Innovative metrics for measuring research, such as alternative metrics (altmetrics), can offer some answers. Altmetrics allows for the tracking of interactions with researchers' publications, including how their scholarship has been downloaded or mentioned online or in social media by interdisciplinary audiences. This broadens the evidence beyond traditional citation indicators (Fransman, 2018). When applied correctly, these indicators can demonstrate various forms of knowledge mobility, how practice informs understanding and how public discourse has been shaped. Mentions on Twitter, blog articles, references in policy documents, and coverage in mainstream media are all indicators of impact that traditional citation metrics often overlook.

However, this paper argues that altmetrics is not neutral and should not be regarded as exhaustive. In the absence of qualitative insight, these approaches risk falling into a similar reductionist trap as they seek to avoid.

Almetrics, often relied on by sectoral stakeholders, can also be manipulated and are not applied evenly across disciplines or regions. This raises concerns about whether they truly capture meaningful engagement or impact. It is an even more complicated issue for the Global South. Community engagement, while important, leads to less visibility of work online or fewer citations in policies that research pursued from a global audience (Milan & Treré, 2019).

Multimodal Evidence and Qualitative Assessment

For socially engaged scholarship, "impact" is best conceptualised as a mix of quantitative indicators and qualitative evidence documenting changes in behaviour (influence, uptake) and relationships. This evidence may be in the form of citations in policy documents and notes or minutes of community advisory meetings. It can also be co-produced visual artefacts and community members' recollections that capture changes in knowledge or practices (September-Brown et al., 2023). Such multimodal evidence is more consistent with the values of socially engaged scholarship, but is infrequently included in current institutional reporting practices.

The difficulty of measuring the qualitative and relational aspects of impact is symptomatic of wider dilemmas in evaluation systems. Although qualitative evidence can be rich, nuanced, and contextualised, it is often perceived by certain institutional actors as 'less objective' than quantitative metrics (Berrocal & De Rosa, 2026) and sometimes requires extensive labour-intensive gathering, which is hard to standardise, presenting obvious challenges.

However, without a structured emphasis on qualitative aspects, the significant effects of involvement, such as changes in community capacity, institutional behaviour, or collaborative policy innovation, are generally not documented (Netshandama, 2021), at least not within a clearly identifiable research framework.

The Administrative Burden and Fragmentation

Adding to these difficulties is the overhead of having a fragmented data-gathering process. Faculty and staff are frequently called upon to provide nearly identical information to numerous campus units — research offices, community engagement centres, and quality assurance outlets — in different formats, with varying due dates and expectations. Such duplication also doubles as a time-consuming and emotionally exhausting drag on the sustainability of engaged scholarship, especially in underfunded environments with high teaching and administrative demands (Netshandama, 2021).

Different reporting expectations reflect an incoherence in engagement reporting. Rather than establishing efficient systems that allow multiple stakeholders to benefit from technology, universities continue to add new reporting systems to existing ones without simplifying or removing duplicate components. As a consequence, there exists an ecology of competing metrics, templates and processes that benefit those with the capacity to navigate complexity (September-Brown et al.).

Recognition Politics and Labour

Furthermore, we argue that ultimately, the politics of the evidence-based rubric also determines whose expertise is valued and whose work is recognised. However, when institutions' reward and recognition systems still favour conventional scholarly outputs, social engagement scholarship can be seen as "voluntary" rather than "real" research (Iwara, 2023). This framing has multiple implications, particularly for early-career researchers, women, and scholars from marginalised communities, who are often also the most vulnerable to overresponsibility; it is precisely these groups who shoulder a large part of CE work (Bamberg et al., 2021).

The debasement of engagement labour upholds and reinforces wider injustices in the academy. Placing engagement in the category of an optional addendum to "real" research rather than a valid form of scholarly contribution would mean that there is an incentive for those with the least institutional protection and more moral or political urgency to bring about social change (Burman, 2024).

TOWARD INTEGRATED AND REFLEXIVE ASSESSMENT

The solution to this problem is not just to tweak the metrics, but to shift assessment cultures and recognise engagement as a form of scholarly contribution. This encompasses:

- **Structural Alignment:** Aligning institutional policies, workload models and promotion processes that consider engagement as a form of scholarship rather than ‘additional work’.
- **Plurality within Epistemology:** Creating assessment models that privilege a range of forms of knowledge production, intersecting with locally oriented/co-produced/practice-oriented research (Burman, 2024).
- **Reflexive Practice** involves creating opportunities for scholars, communities, and institutional leaders to reflect on what impact means. It prompts questions about who benefits from it, and whose values guide those definitions (Vally, 2021).
- **Multimodal Evidence:** Effective methods must be established for collecting and analysing qualitative evidence. These methods must uphold scientific standards while recognising the complexity and connections that are vital to engaged scholarship (September-Brown et al., 2023).
- **Infrastructure:** Assigning resources to supporting organisations to fully document their impacts at grant, programme and narrative levels with reference to both grant administration and payback (Iwara, 2023).

From Aspiration to Enablement

Without implementing the changes outlined above, the notion of socially responsive universities will remain aspirational. The current approaches to evaluation could inadvertently foster the kind of long-term, reflective scholarship that universities purport to encourage through community engagement. By continually assessing impact using traditional research metrics and by further complicating assessment through additional institutional layers, universities are undermining their stated dedication to engagement.

A more reasonable model would recognise that (a) we need specialised measures of the impact of socially engaged scholarship, ones specifically suited to this kind of work; ones that take process as seriously as product in their emulation and replication paradigms; that make room for qualitative evidence alongside quantified data; and which ‘spread the love’ not only in terms of who gets headlined, but also in terms of who eats at table with others. We are not lamenting a reduction in accountability but rather the challenges to the refreshing wind of engaged scholarship when its institutions support (not obstruct) its application and longevity.

Without such transitions, calls for responsive universities risk remaining little more than wishful thinking. Existing evaluation systems may even inadvertently discourage the kind of long-term, thoughtful, community-focused scholarship that universities claim to value. By continuing to measure all efforts only through conventional research indicators, institutions send a clear signal that responsive research is less valued. Admittedly, expanding assessment criteria across different institutional frameworks may mean that the pursuit becomes muddled. In the end, universities undermine their own stated commitment to engagement with extant practices. A more unified approach would recognise that we can evaluate the impacts of socially engaged scholarship only with frameworks developed explicitly for this kind of work — approaches that respect both processes and products, make room for evidence that is both qualitative and quantitative, and afford fair recognition across the academy. This is not a call for decreased accountability, but for accountability systems that are based on the real work of engaged scholarship and support it, rather than getting in the way.

Reflexivity and the Scholarly Positioning of Socially Engaged Scholarship

The Measurement Paradox: There is much talk of redefining and recasting impact and the evaluation of impact, but socially engaged scholarship continues to find itself at odds with traditional research evaluation and assessment frameworks in HEIs. While universities are increasingly prioritising social impact in their strategic plans, their measurement systems continue to focus on metrics that reward publication outputs, emphasising quality journal articles and conference papers at the expense of collaborative, process-focused and community-based academic scholarship. This lack of alignment results in structural disincentives for academics who undertake long-term engagement with the community, giving rise to a key tension between the idealist claims of universities and what their reward systems explicitly incentivise (Compagnucci & Spigarelli, 2020).

The notion of impact, at the national policy framework level, at the individual or institutional level, and in the South African HE sectors, has brought impact reporting to the fore through national quality assurance agendas and policy frameworks that emphasise social responsiveness. The impact of socioeconomic status has been assessed using various methods, yielding different results across institutions. Notably, engagement efforts are frequently documented retrospectively, in reporting formats that do not reflect co-produced knowledge, shared ownership of results, or relational activities over extended periods (Netshandama, 2021). The epistemic and social value of engaged work is thus often effaced under formal evaluation systems, even as it constitutes precisely the type of knowledge production that universities profess to support.

Beyond the Number of Citations using Novel Tools for New Evaluation Methodologies: New models of research evaluation, such as those developed in the next section, can help address these shortfalls. Through the reflexive use of such engagement activities, different forms of interaction can be monitored and analysed to illuminate how research circulates between audiences, how it is used in practice, and how it informs practice and public debates. However, these measures are neither neutral nor comprehensive proxies for impact. Without qualitative analysis, they may well end up producing the inverse of the reductive logic they want to deconstruct.

As such, the relationship between types of measurement remains difficult to untangle across most disciplines – likely measuring entirely different dimensions of research influence. Although some of these indices may relate to instantaneous online visibility and social media interaction, which can serve as proxies for general research interest, they operate on dimensions that are quite orthogonal to conventional academic measures. This point is critical: open articles do indeed attract more readers. They are demonstrably better accessed, but the nature of this relationship to social engagement as a proxy for impact (and other forms of impact) is contextual (Fransman, 2018).

Multimodal Evidence for Socially Engaged Scholarship Impact: In the context of socially engaged scholarship, impact is best conceptualised as a blend of quantitative metrics and evidence-based information on influence, uptake and relational change. Such evidence might include excerpts from policy, minutes of community advisory meetings, images or visual artefacts coproduced with community members, and narratives about changes in practice or new understandings. These types of multimodal evidence more closely reflect the values of socially engaged scholarship, yet they are not supported by traditional institutional reporting systems (Greenhalgh et al., 2016).

Studies of effective co-production programmes show that impact assessment frameworks must address both outputs and processes. Other success principles include enlightened systems-level views that take into consideration emergence and local adaptation, thus framing research as a creative enterprise centred on human experience, as well as careful attention to governance, relationships, and conflict resolution. Where impact is judged only according to traditional criteria, such dimensions of successful collaboration remain entirely invisible, and are thus undercounted as actual contributions to the overall societal good and the relational labour that it requires (Assegai et al., 2021).

The Burden and Disincentives of Administration: Scholars in this field may also face the challenge of multiple data-collection systems. They may be asked to provide the same kinds of information to different university offices (research, community engagement, quality assurance) in different formats, with varying timelines and expectations. This double work is time- and emotion-consuming, as well as unsustainable, particularly when engaged scholarship takes place in under-resourced environments with excessive teaching and administrative loads (Netshandama, 2021), where none (or little) of this additional work is recognised.

In addition, institutional reward systems that still operate hierarchically and favour "traditional" research outputs reinforce the framing of socially engaged research as an "extra" or voluntary activity rather than a genuine intellectual endeavour. This framing has consequences. When promotion committees value academics primarily based on journal outputs and research income; things that, up until recently, tended to leave engaged scholars at a disadvantage, the message from those already holding senior faculty positions to early career colleagues is that engagement with communities will either have to be added onto an already cramped workload schedule, or it will be perceived as getting in the way of "real" research. Engagement is, therefore, for the time being, mostly restricted to those with enough seniority, job security and a willingness to take risks and to those who prioritise moral obligations over institutional recognition or career advancement. This reality deepens the inequities around who can participate in such efforts (Burman, 2024).

The Politics of Knowledge Valuation: Of significance for the present argument, the politics of impact measurement shape who is seen as producing valuable knowledge, and who receives credit for their work. While institutional reward structures focus on traditional scholarship, there is a risk that social engagement scholarship will be seen as something to do in addition to the "real" academic work. The kinds of information used to measure impact can never be neutral; they are technologies that carry assumptions about what constitutes valued knowledge, who may author it and what types of work should be rewarded.

Specific statistics can replicate gendered or even geographic twilights, undermining academic publishing more broadly. There is indeed evidence that some Global South researchers' articles are widely read but receive less recognition than papers that do similar work in the Global North, suggesting that alternative strategies for valuing research are not complementary measures for accounting for geographic inequality in research valuation (Mikulewicz et al., 2023).

Towards Transformed Evaluation Cultures: Solving these problems would involve more than just technical fixes to metrics; it would involve a reconfiguring of evaluative cultures, acknowledging what we know already in principle, that engagement is fundamental as an academic contribution. This reconceptualisation involves several elements. Firstly, university leaders should develop clear policies acknowledging that contributions to socially engaged scholarship are as significant in tenure and promotion decisions as research publications. Secondly, the academic community need to focus on developing data systems that help researchers track their impact across the many dimensions of life without reinventing the wheel (Burman, 2024).

Thirdly, professional associations and disciplinary fields should articulate standards for evaluating and crediting socially engaged scholarship across sectors. Making this transition cannot be accomplished solely through metrics. Meaningful transformative work in socially engaged scholarship necessitates a transformation in institutional culture that recognises and appreciates the relational effort, emotional insight, and community responsibility essential for ongoing engagement. Without these changes, the aspirations for universities to be socially relevant are likely to remain just that—aspirational rather than supported by the institution (Lin, 2023). If universities really do want to support academic research being engaged with the community, then their reward structures, workload policies, administrative support and governance mechanisms must all be adjusted in ways that reflect not simply declarations of intention, but also the conditions under which community-engaged scholarship is a practice actively managed by an institution rather than a burden that individuals have to try to overcome despite the structure.

CONCLUSION

Socially engaged scholarship has the capacity to transform higher education by enabling collaborative knowledge production and strengthening universities' social responsibility. However, tapping into this potential entails more than simply a question of moral exhortation or episodic projects or campaigns. The analysis presented in the present article suggests that socially engaged scholarship should be viewed as an institutional ecology, embedded in the complex interactions between actors, governance structures, policies, and socio-political contexts.

This reinterpretation emphasises the key relational, structural, and temporal aspects that will help to maintain engagement practices that are both sustainable and credible. Moving beyond celebratory and instrumental narratives, the present article highlights persistent gaps in research: the unequal distribution of duties and engagement responsibilities, and the gap between institutional expectations for engagement and rewards. By recognising these aspects, we pave the way for a more honest, fair, and analytically thorough conversation about socially engaged scholarship.

This article hopes to make an important contribution to institutional engagement. It offers a different lens on engagement - not simply an activity that institutional staff should do because it is good for them, but as a creative and viable approach to institutional growth. This reframing links the notion of doing the right thing with effective organisation. This article emphasises several important aspects of how educational institutions operate. Firstly, it clarifies that the policies, workloads and structures within these institutions can support or undermine efforts to implement equitable and effective educational practices. Secondly, it underscores that researchers working in this area need to be mindful of their roles and the environments in which they work. This enables them to conduct ethical and rigorous research.

These findings have deeply meaningful implications for research, practice and policy. It is recommended that researchers adopt a longitudinal, ecologically valid approach to engagement in order to capture its relational and temporal aspects. Policies and reward structures, as well as research administrative support, should all be oriented toward engagement goals. Institutions need to orient their policies, reward structures and support provided by the research administration towards clear engagement goals that explicitly acknowledge socially engaged scholarship's intellectual and relational centre. This is important, because paying attention to positionality and context is as necessary for ethical rigour as for methodological depth. Policymakers and those with academic leadership should create environments that foster socially engaged scholarship while encouraging more realistic valuations (beyond one-dimensional aspects) of its unique grip in specific contexts.

In recognising both possibilities and constraints, higher education can be a force for ethically-based, institutionally sustainable, and socially effective social equity. In this way, universities can seize the full promise of socially engaged scholarship - not just knowledge that matters within, but also across, the communities in which they are implicated.

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REFERENCES

- Assegaai, T., Schneider, H., & Scott, V. (2021). Developing a district-level supportive supervision framework for community health workers through co-production in South Africa. *BMC Health Services Research*, 21(1): 337. <https://doi.org/10.1186/s12913-021-06350-2>
- Aziona, C. M., & Nhedzi, A. (2021). The digital divide and higher education challenge with emergency online learning: analysis of tweets in the wake of the COVID-19 lockdown. *Turkish Online Journal of Distance Education*, 22(4): 164–182. <https://doi.org/10.17718/tojde.1002822>
- Bamberg, I., Carolissen, R., Sader, S., & Moletsane, R. (2021). Feminist decoloniality as care: Alternate paths to supporting black women's academic identities and fostering critical social cohesion. *Alternation Interdisciplinary Journal for the Study of the Arts and Humanities in Southern Africa*, 28(2): 185–212. <https://doi.org/10.29086/2519-5476/2021/v28n2a8>
- Berrocal, B. B., & De Rosa, A. (2026). Beyond metrics: Social impact, assessment frameworks, and alternative evaluation methods applied in organizations. *Culture Crossroads*, 32: 61–77. <https://doi.org/10.55877/cc.vol32.565>
- Burger, M. (2022). Participations: Rethinking South African universities' development-oriented community engagement. *Communicare*, 36(2): 1–24. <https://doi.org/10.36615/jcsa.v36i2.1560>
- Burman, C. (2024). Re-imagining engaged scholarship in South Africa. *South African Journal of Higher Education*, 1(2): 50–74. <https://doi.org/10.21504/721gvq46>
- Compagnucci, L., & Spigarelli, F. (2020). The third mission of the university: A systematic literature review on potentials and constraints. *Technological Forecasting & Social Change*, 161: 120284. <https://doi.org/10.1016/j.techfore.2020.120284>
- Cullen, B., Snyder, K. A., Rubin, D., & Tufan, H. (2023). They think we are delaying their outputs. The challenges of interdisciplinary research: Understanding power dynamics between social and biophysical scientists in international crop breeding teams. *Frontiers in Sustainable Food Systems*, 7: 1250709. <https://doi.org/10.3389/fsufs.2023.1250709>
- Fransman, J. (2018). Charting a course to an emerging field of “research engagement studies”: A conceptual meta-synthesis. *Research for All*, 2(2): 185–229. <https://doi.org/10.18546/RFA.02.2.02>

- Greenhalgh, T., Jackson, C., Shaw, S., & Janamian, T. (2016). Achieving research impact through cocreation in community-based health services: Literature review and case study. *Milbank Quarterly*, 94(2): 392–429. <https://doi.org/10.1111/1468-0009.12197>
- Heiden-Rootes, K. M., Asiimwe, R., Rastogi, M., & Miller, R. B. (2025). Pathways for public impact: Utilizing engaged scholarship for translating systemic family therapy research to policy and practice. *Journal of Marital and Family Therapy*, 51(4): 1–11. <https://doi.org/10.1111/jmft.70076>
- Iwara, I. (2023). Fundamental tenets of a rural-based entrepreneurial university: A South African perspective. *International Journal of Entrepreneurial Knowledge*, 2(11): 57–66. <https://doi.org/10.37335/ijek.v11i2.201>
- Johnson, A. T., & Mbah, M. F. (2024). Disobedience, (dis)embodied knowledge management, and decolonization: Higher education in the Gambia. *Higher Education*, 88: 1909–1926. <https://doi.org/10.1007/s10734-024-01192-3>
- Lin, M. (2023). “Actually changing our way of being”: Transformative organizing and implications for critical community-engaged scholarship. *Social Science*, 12: 562. <https://doi.org/10.1080/0161956X.2017.1324661>
- Loh, P., Ackerman, Z., & Fidalgo, J. (2021). A relational approach to transforming power in a community-university partnership. *Gateways: International Journal of Community Research and Engagement*, 14(2): 1–16. <https://doi.org/10.5130/ijcre.v14i2.7749>
- Mikulewicz, M., Caretta, M. A., Sultana, F., & Crawford, N. J. W. (2023). Intersectionality & climate justice: A call for synergy in climate change scholarship. *Environmental Politics*, 31(1): 1–12. <https://doi.org/10.1080/09644016.2023.2172869>
- Milan, S., & Treré, E. (2019). Big data from the South(s): Beyond data universalism. *Television & New Media*, 20(4): 319–335. <https://doi.org/10.1177/1527476419837739>
- Ndofirepi, A., & Cross, M. (2022). 5 - Reconnecting the university to society: The role of knowledge as public good in South African higher education. *Journal of Higher Education in Africa*, 14(1). <https://doi.org/10.57054/jhea.v14i1.1509>
- Netshandama, V. O. (2021). The (im)possibility of monitoring and evaluating the impact of community engagement performance in South African universities: A review. *South African Journal of Higher Education*, 37(1): 166–184. <https://dx.doi.org/10.20853/37-1-5667>
- Otu, M., Ehiane, S., Maapola-Thobejane, H., & Olumoye, M. Y. (2023). Psychosocial implications, students’ integration/attrition, and online teaching and learning in South Africa’s higher education institutions in the context of COVID-19. *Sustainability*, 15: 6351. <https://doi.org/10.3390/su15086351>
- Pali, K. J. (2024). Markers and tools to facilitate decolonisation of theological education in Africa. *Religions*, 15: 783. <https://doi.org/10.3390/rel15070783>
- Plessis, M. D., Jansen van Vuuren, C. D., Simons, A., Frantz, J., Roman, N. V., & Andipatin, M. (2022). South African higher education institutions at the beginning of the COVID-19 pandemic: Sense-making and lessons learnt. *Frontiers in Education*, 6: 740016. <https://doi.org/10.3389/educ.2021.740016>
- Pule, N. (2024). Knowledge creation by student leaders to promote their own leadership development: A multi-university social dream-drawing project. *Journal of Student Affairs in Africa*, 12(2): 85–98. <https://doi.org/10.24085/jsaa.v12i2.5416>
- September-Brown, P., Daniels, P., Hart, C., & September-Brown, D. (2023). Decentralised systemising of scholarship of engagement in higher education towards societal impact. *South African Journal of Higher Education*, 37(4): 266–285. <https://doi.org/10.20853/37-4-5307>
- Steynberg, L., Grundling, J., & Venter, M. (2024). Neoliberalism's shadows: modern slavery in South African higher education. *Transformation in Higher Education*, 9(0): a405. <https://doi.org/10.4102/the.v9i0.405>

Teli, M., Foth, M., Sciannamblo, M., Anastasiu, I., & Lyle, P. (2020). Tale of Institutioning and Commoning: Participatory design processes with a strategic and tactical perspective. In C. D. Gaudio & L. Parra-Agudelo (Eds.), *Proceedings of the 16th Participatory Design Conference 2020 – Participation(s) Otherwise*, 1(1): 159–171. ACM, New York. <https://doi.org/10.1145/3385010.3385020>

Vally, S. (2021). Reimagining university-community engagement. *South African Journal of Higher Education*, 37(1): 53–71. <https://orcid.org/0000-0001-9156-1775>

Velasco, D., Boni, A., Delgado, C., & Rojas-Forero, G. D. (2021). Exploring the role of a Colombian university to promote just transition. An analysis from the human development and regional transition pathways to sustainability. *Sustainability*, 13(11): 6014. <https://doi.org/10.3390/su13116014>

THE INFLUENCE OF DESTINATION ATTRIBUTES ON LOYALTY: THE ROLES OF TRUST AND HEDONIC EXPERIENCE AMONG BRAZILIAN TOURISTS IN PORTUGAL

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ABSTRACT

This study examines the influence of destination attributes on destination loyalty among Brazilian tourists visiting Portugal, considering the roles of trust and hedonic experience. Data were collected through an online questionnaire administered to 191 Brazilian tourists and analyzed using PLS-SEM. The findings indicate that destination attributes positively influence trust and hedonic experience, while trust positively affects hedonic experience and destination loyalty. However, destination attributes do not directly influence loyalty. The study contributes to tourism marketing literature by emphasizing the importance of emotional and relational dimensions in explaining destination loyalty.

Keywords: destination attributes; destination loyalty; trust; hedonic experience; Brazilian tourists.

INTRODUCTION

The increasing competitiveness among tourist destinations, combined with the diversification of tourism offerings and the transformation of tourists' profiles and expectations, has led tourism organizations to develop strategies focused on differentiation and value creation. In this context, Cooper, Hall and Scott (2021) emphasize that tourism destinations need to differentiate themselves by developing distinctive value propositions and delivering meaningful experiences capable of attracting and retaining visitors in increasingly competitive markets. Similarly, Swarbrooke and Horner (2020) emphasize that understanding tourists' behaviour, motivations and decision-making processes is essential for developing effective tourism marketing strategies and responding to changing consumer needs.

In the case of Portugal, this issue is particularly relevant due to the strategic importance of tourism to the national economy and the country's growing international recognition as a tourist destination. In this sense, understanding the factors that influence tourist loyalty has become essential for strengthening the destination's competitiveness and sustainability.

Accordingly, this study examines how the attributes of Portugal as a tourist destination influence the loyalty of Brazilian tourists, considering the role of trust in the destination and the quality of the hedonic experience during the stay. More specifically, the study seeks to answer the following research question: How do Portugal's destination attributes influence the loyalty of Brazilian tourists, and what role do trust in the destination and hedonic experience play in this relationship?

Despite the extensive research developed in the field of tourism marketing, there is still a need to deepen knowledge regarding the determinants of tourist loyalty and to diversify the empirical contexts under analysis. In this study, the object of investigation is Portugal as a tourist destination, while the unit of analysis consists of Brazilian tourists visiting the country. From the perspective of these tourists, data are collected to assess the variables destination attributes, trust in the destination, quality of hedonic experience and destination loyalty, with the aim of examining whether destination attributes and trust influence the quality of the hedonic experience and impact destination loyalty. Therefore, this study intends to contribute to the theoretical development of tourism marketing literature while simultaneously providing useful recommendations for tourism companies and public entities responsible for promoting Portugal as a tourist destination.

THEORETICAL BACKGROUND

According to the World Tourism Organization (1999), tourism is recognized as a social, cultural and economic phenomenon associated with the movement of people outside their usual environment for leisure, business or other non-remunerated purposes. At the same time, the increasing competitiveness among tourist destinations and the transformation of tourists' preferences have encouraged destinations to develop strategies focused on differentiation, value creation and visitor loyalty.

In this context, Portugal has consolidated its position as an internationally recognized tourist destination, particularly due to attributes such as gastronomy, wine, hospitality, safety, historical-cultural heritage and natural landscapes (Rodrigues & Brito, 2009; Mano & Costa, 2018). Simultaneously, the Brazilian market has gained increasing relevance in Portuguese tourism, both in terms of visitor numbers and economic contribution.

Destination Attributes

Destination attributes refer to the specific characteristics that make a destination attractive and influence tourists' choices, experiences and future behaviors (Kim et al., 2012; Lew, 1987). These attributes may be tangible, such as infrastructure, accessibility, safety and natural resources, or intangible, such as hospitality, destination image and perceived service quality (Dean & Suhartanto, 2019; Yoon & Uysal, 2005).

According to Kim (1998), a tourist destination comprises a set of natural, cultural, functional and symbolic elements capable of satisfying visitors' needs and expectations. Murphy, Pritchard and Smith (2000) further argue that the tourism experience results from the interaction between tourists and the destination environment, involving both contact with local infrastructure and the surrounding sociocultural context. In this sense, destination attributes play a determinant role in shaping tourists' perceptions of the destination, influencing not only the lived experience but also future behaviors related to revisit intentions and recommendations.

Destination Loyalty

Destination loyalty is considered one of the central concepts in tourism marketing and is generally understood as tourists' intention to revisit a destination and recommend it to others (Oliver, 1999). Beyond the behavioral dimension, loyalty also includes an attitudinal component reflected in favorable attitudes, spontaneous recommendation and emotional attachment to the destination (Kumar & Kaushik, 2017).

In a context of intense competition among tourist destinations, loyalty assumes strategic importance since retaining tourists tends to be less costly than attracting new visitors (Kandampully et al., 2015). Furthermore, loyal tourists contribute to destination promotion through positive word-of-mouth and the spontaneous sharing of experiences. However, Oliver (1999) warns that satisfied tourists do not always become loyal, particularly due to the frequent desire to discover new destinations and experiences. Nevertheless, positive perceptions regarding a destination tend to increase revisit and recommendation intentions.

Trust in the Destination

Trust is widely recognized as a fundamental element in the development of long-term relationships between consumers and organizations, brands or tourist destinations (Morgan & Hunt, 1994; Beldad et al., 2010). In tourism, trust becomes especially relevant due to the intangible nature of tourism services and the impossibility of experiencing the destination before traveling, which increases the perceived risk associated with travel decisions. According to Ponte et al. (2015), trust in a destination refers to tourists' willingness to accept vulnerability based on the expectation that the destination will fulfill its promises and meet their expectations. Williams and Baláž (2021) add that trust in tourism results from the interactions established among tourists, tourism businesses, local residents and public institutions. Therefore, trust reduces perceived risk, strengthens relational ties with the destination and positively influences tourists' future behaviors.

Quality of Hedonic Experience

The tourism experience constitutes one of the key concepts in consumer behavior research, as tourists seek not only products or services but also holistic experiences capable of generating emotions, pleasure and lasting memories (Pine & Gilmore, 1998). Hedonic experience refers to the emotional, sensory and affective dimensions associated with tourism consumption (Addis & Holbrook, 2001). According to Bridges and Florsheim (2008), tourists seek experiences capable of providing pleasure, fantasy, emotional involvement and multisensory stimulation. In this context, elements such as gastronomy, hospitality, cultural heritage, entertainment and the destination environment may contribute to memorable experiences.

The literature also highlights that tourism experiences are subjective and individual, varying even among tourists visiting the same location or participating in the same activities (Ooi, 2005). When the experience is positive, it tends to generate favorable memories and positive attitudes toward the destination (Ali et al., 2016). In the present study, the quality of hedonic experience is understood as tourists' overall evaluation of the emotional, pleasurable and memorable dimensions of the experience lived at the destination.

Hypotheses Development

Destination attributes influence tourists' perceptions and evaluations regarding a tourist destination. When visitors perceive positive, coherent and distinctive attributes, they tend to develop favorable expectations and lower perceived risk regarding the tourism experience. In this sense, destination attributes may contribute to the development of trust in the destination. Thus, the following hypothesis is proposed:

H1: Destination attributes positively influence trust in the destination.

Destination attributes also play an important role in shaping tourism experiences. The literature highlights that tourism consumption has a strong hedonic component, as tourists seek pleasurable, emotional and memorable experiences (Bridges & Florsheim, 2008; Hirschman & Holbrook, 1982). Therefore, attributes such as hospitality, gastronomy, cultural heritage, physical environment and entertainment may enhance feelings of pleasure, relaxation and emotional involvement during the trip. Accordingly, the following hypothesis is proposed:

H2: Destination attributes positively influence the quality of the hedonic experience at the destination.

Trust in the destination may also influence the quality of the tourism experience. When tourists perceive a destination as trustworthy, they tend to feel more comfortable, secure and emotionally engaged, enhancing positive hedonic experiences (Chang, 2014; Singh & Sirdeshmukh, 2000). Thus, the following hypothesis is proposed:

H3: Trust in the destination positively influences the quality of the hedonic experience at the destination.

Several studies also demonstrate that trust constitutes a relevant antecedent of loyalty. Tourists who perceive a destination as trustworthy tend to show higher revisit intentions and greater willingness to recommend the destination to others (Chen & Phou, 2013; Kumar & Kaushik, 2017). Accordingly, the following hypothesis is proposed:

H4: Trust in the destination positively influences destination loyalty.

The literature also suggests that positive tourism experiences influence tourists' future attitudes and behaviors. When the experience generates pleasure, satisfaction and positive memories, the likelihood of revisit

intentions, recommendations and spontaneous sharing of experiences with others increases (Ali et al., 2016; Ramseook-Munhurrin et al., 2015). Therefore, the following hypothesis is proposed:
H5: The quality of the hedonic experience positively influences destination loyalty.

Finally, destination attributes may directly influence tourists' loyalty. When visitors perceive a destination as attractive, safe, welcoming and distinctive, the probability of revisit intentions and recommendations increases. Kumar and Kaushik (2017) argue that tourists' identification with the destination positively impacts loyalty. Thus, the following hypothesis is proposed:
H6: Destination attributes positively influence destination loyalty.

METHODOLOGY

This study adopts a quantitative, descriptive and cross-sectional research design with a causal approach. The proposed conceptual model was tested using partial least squares structural equation modelling (PLS-SEM) through SmartPLS 4.0.

Data Collection

The target population comprised Brazilian adults aged over 18 years who had previously traveled to Portugal for tourism purposes. Data were collected through an online questionnaire developed using Google Forms, a widely used and effective data collection technique in tourism and leisure research due to its accessibility, convenience and ease of administration (Jennings, 2010; Veal, 2017).

The questionnaire was disseminated by the authors through their personal and professional social media networks, including Facebook, Instagram, LinkedIn and WhatsApp. A non-probabilistic convenience and snowball sampling approach was adopted, encouraging participants to share the questionnaire with other Brazilian tourists who had previously visited Portugal.

Before distributing the final version of the questionnaire, a pre-test was conducted with a convenience sample of 10 respondents in order to assess the clarity of the wording, questionnaire structure, completion time and potential errors. Minor adjustments were subsequently introduced to improve the accessibility and clarity of the instrument. The questionnaire was organized into three sections. The first section introduced the study objectives, explained the research conditions and ethical considerations, and included a screening question to ensure respondents matched the target population criteria. The second section included items measuring the study constructs, while the final section collected respondents' socio-demographic information.

All measurement scales were adapted from previously validated studies and adjusted to the context of this research (Table 1). This approach was adopted to ensure construct validity and comparability with previous tourism studies. The constructs were measured using five-point Likert scales ranging from "1 = strongly disagree" to "5 = strongly agree" (Fodness, 1994).

Sample Characteristics

A total of 191 valid responses were obtained from Brazilian tourists. Most respondents had visited Portugal once for tourism purposes (47.6%) within the previous five years (79.6%), stayed in the country for more than nine days (57.1%) and traveled with family members (43.5%). In addition, the majority of respondents were female (62.8%), aged between 30 and 39 years (27.7%), held a higher education qualification (46.1%) and were married or living in a civil partnership (68.6%).

Data analysis was conducted using SPSS and SmartPLS software. To minimize common method bias, respondents were assured of anonymity and informed that there were no right or wrong answers. Harman's single-factor test indicated that common method bias was not a significant concern, as the first factor explained only 11.5% of the total variance (Podsakoff et al., 2003). Following the recommendations of Hair et al. (2017), the measurement model was first assessed in terms of reliability, convergent validity and discriminant validity. The structural model and

the significance of the hypothesized paths were subsequently evaluated using a bootstrapping procedure with 5,000 subsamples.

RESULTS

Measurement Model Results

Items with factor loadings below the recommended threshold of 0.70 were removed from the model. Subsequently, the model was re-estimated using only the indicators that demonstrated satisfactory individual reliability.

The assessment of the measurement model included the analysis of internal consistency reliability and convergent validity. Internal consistency was evaluated through Cronbach's alpha and composite reliability, with all constructs presenting values above the recommended threshold of 0.70 (Hair et al., 2017). Convergent validity was assessed using the Average Variance Extracted (AVE), and all constructs exceeded the recommended minimum value of 0.50 (Bagozzi & Yi, 1988), confirming adequate convergent validity (Table 1).

Table 1: Construct Reliability and Validity.

Constructs	Cronbach's Alpha	Composite Reliability	AVE
Destination Attributes	0.766	0.850	0.588
Destination Loyalty	0.893	0.927	0.763
Quality of Hedonic Experience	0.836	0.890	0.670
Trust in the Destination	0.905	0.941	0.841

Source: Authors' own elaboration based on PLS results.

Discriminant validity was assessed using both the Fornell–Larcker criterion and the Heterotrait–Monotrait ratio (HTMT). According to the Fornell–Larcker criterion, the square root of the AVE for each construct should exceed its correlations with the remaining constructs (Fornell & Larcker, 1981). As shown in Table 2, this condition was satisfied for all constructs. Additionally, the HTMT values presented in the upper-right section of Table 2 were all below the recommended threshold of 0.85, further confirming adequate discriminant validity between the constructs (Henseler et al., 2015).

Table 2: Discriminant Validity: Fornell–Larcker Criterion and HTMT.

	Destination Attributes	Destination Loyalty	Quality of Hedonic Experience	Trust in the Destination
Destination Attributes	0.767	0.500	0.503	0.546
Destination Loyalty	0.421	0.873	0.762	0.852
Quality of Hedonic Experience	0.413	0.666	0.818	0.718
Trust in the Destination	0.458	0.776	0.642	0.917

Source: Authors' own elaboration based on PLS results.

Structural Model Results

The R^2 values indicate that the model explains 65.2% of the variance in Destination Loyalty, 43.1% in Quality of Hedonic Experience and 21.0% in Trust in the Destination. According to Hair et al. (2017), the model demonstrates substantial explanatory power for Destination Loyalty, moderate explanatory power for Quality of Hedonic Experience and acceptable explanatory power for Trust in the Destination, suggesting that the proposed antecedents are particularly relevant in explaining tourists' loyalty toward Portugal as a tourist destination.

The effect size (f^2) analysis revealed that Trust in the Destination exerted a large effect on both Destination Loyalty ($f^2 = 0.525$) and Quality of Hedonic Experience ($f^2 = 0.456$). Destination Attributes showed a moderate effect on Trust in the Destination ($f^2 = 0.265$), whereas the remaining relationships presented small or negligible effects, according to the thresholds proposed by Hair et al. (2017). The model fit assessment indicated acceptable fit

indices. The estimated model presented an SRMR value of 0.073, below the recommended threshold of 0.08, suggesting a satisfactory model fit. Additionally, the NFI value of 0.817 indicates an acceptable overall model fit.

The hypothesis testing results indicate that five out of the six proposed hypotheses were supported (table 3). Destination Attributes exerted a positive and significant influence on Quality of Hedonic Experience ($\beta = 0.151$, $t = 2.049$, $p < 0.05$) and Trust in the Destination ($\beta = 0.458$, $t = 7.552$, $p < 0.001$), supporting H2 and H1, respectively. In turn, Trust in the Destination positively influenced both Destination Loyalty ($\beta = 0.581$, $t = 5.806$, $p < 0.001$) and Quality of Hedonic Experience ($\beta = 0.573$, $t = 7.329$, $p < 0.001$), supporting H4 and H3. Likewise, Quality of Hedonic Experience showed a positive and significant effect on Destination Loyalty ($\beta = 0.276$, $t = 2.862$, $p < 0.01$), supporting H5. However, the direct relationship between Destination Attributes and Destination Loyalty was not statistically significant ($\beta = 0.041$, $t = 0.515$, $p > 0.05$); therefore, H6 was not supported.

Table 3: Structural Model Results.

Hypotheses	Original Sample (O)	T Statistics	P Values	Results
H1: Destination Attributes → Trust in the Destination	0.458	7.552	0.000	Supported
H2: Destination Attributes → Quality of Hedonic Experience	0.151	2.049	0.041	Supported
H3: Trust in the Destination → Quality of Hedonic Experience	0.573	7.329	0.000	Supported
H4: Trust in the Destination → Destination Loyalty	0.581	5.806	0.000	Supported
H5: Quality of Hedonic Experience → Destination Loyalty	0.276	2.862	0.004	Supported
H6: Destination Attributes → Destination Loyalty	0.041	0.515	0.607	Not supported

Source: Authors' own elaboration based on PLS results.

Discussion of Results

In line with the findings of Schlesinger et al. (2020), the attributes of Portugal as a tourist destination positively influence the quality of the hedonic experience among Brazilian tourists, contributing to memorable, enriching, exciting and stimulating experiences. Considering the items used to measure destination attributes, factors such as the cleanliness of major tourist attractions, the quality of tourism services, the protection of natural resources and the positive image of the destination significantly enhance tourists' emotional involvement and reinforce the distinctive character of the tourism experience in Portugal.

These findings support the view that tourism experiences are not shaped solely by traditional hedonic dimensions associated with entertainment and leisure, but also by functional and symbolic destination attributes capable of generating comfort, safety, well-being and emotional engagement. In this sense, elements such as service quality and environmental preservation appear to increase the pleasure and meaning associated with the tourism experience, fostering positive memories and emotions. Furthermore, destination image emerged as a particularly relevant factor, suggesting that the symbolic and identity-related perception of Portugal stimulates tourists' imagination and contributes to a more distinctive and emotionally engaging experience. This result is consistent with the literature on hedonic tourism experiences, which argues that tourists seek experiences capable of generating emotions, fantasy, novelty and personal enrichment (Pine & Gilmore, 1998; Bridges & Florsheim, 2008).

It is also important to highlight that, although destination attributes were found to be relevant in generating trust in the destination, they did not demonstrate the ability to directly explain destination loyalty among Brazilian tourists. This finding suggests that attributes such as cleanliness, service quality, environmental protection and a positive destination image contribute to reinforcing the perception of Portugal as a trustworthy destination capable of meeting tourists' expectations and delivering satisfactory experiences.

However, these attributes alone appear insufficient to generate future behavioral intentions, such as revisiting the destination, recommending Portugal to family and friends or speaking favorably about the country. Therefore, the findings suggest that tourist loyalty depends less on the functional evaluation of destination attributes and more on the trust developed toward the destination and on the quality of the hedonic experience during the stay.

The results further reveal that Brazilian tourists not only trust Portugal as a tourist destination, but also demonstrate strong loyalty intentions. Respondents reported high intentions to revisit the destination (mean = 4.72), participate in similar activities during future visits (mean = 4.13) and speak favorably about Portugal whenever possible (mean = 4.59). These findings confirm that trust in the destination exerts a positive and statistically significant influence on destination loyalty, corroborating previous studies (Kumar & Kaushik, 2017; Ham & Han, 2013; Kandampully & Suhartanto, 2000). This result supports Oliver's (1999) perspective that loyalty extends beyond purely cognitive or functional evaluations and also encompasses emotional, relational and attitudinal dimensions.

Overall, the findings suggest that trust in the destination and the quality of the hedonic experience are central determinants of destination loyalty. In addition, trust positively influences the hedonic experience itself, highlighting the importance of psychological and emotional bonds in shaping revisit intentions and recommendation behaviors. Taken together, the results indicate that Brazilian tourists' loyalty toward Portugal is primarily driven by the destination's ability to create emotionally meaningful experiences and establish long-term trust-based relationships.

CONCLUSION

Motivated by the opportunity to experience the history and culture associated with their ancestors and historical ties with Portugal, Brazilian tourists tend to travel to Portugal mainly with family members and remain in the country for relatively extended periods. The findings of this study allowed the research question to be answered and the proposed objectives to be achieved.

This study examined four key constructs within the tourism context: destination attributes, defined as tourists' perceptions of the functional and symbolic characteristics of Portugal as a destination; trust in the destination, reflecting tourists' confidence in the destination's ability to meet expectations; quality of the hedonic experience, referring to the pleasurable, emotional and memorable aspects of the travel experience; and destination loyalty, expressed through revisit intentions and positive recommendations.

The results demonstrate that destination attributes positively influence trust in the destination and the quality of the hedonic experience. In turn, both trust and hedonic experience exert a positive influence on destination loyalty among Brazilian tourists. However, destination attributes did not reveal a significant direct effect on loyalty, suggesting that tourists' future behavioral intentions are shaped less by the functional evaluation of the destination and more by the emotional and relational dimensions developed during the tourism experience.

The findings further indicate that tourism attractions, service quality, environmental conditions and destination image contribute to creating memorable, emotionally engaging and enriching experiences, strengthening tourists' trust in Portugal and increasing their willingness to revisit the destination, recommend it to others and speak favorably about the country. In this sense, destination loyalty appears to emerge primarily from emotionally meaningful experiences and trust-based relationships established throughout the tourist experience.

From an international perspective, these findings suggest that destinations competing in culturally connected tourism markets cannot rely solely on attractive destination attributes to generate loyalty. Instead, they should focus on developing trust-based relationships and emotionally engaging experiences capable of strengthening long-term connections with international tourists.

These conclusions reinforce previous studies suggesting that the relationship between tourists and destinations is built through interactions with tourism services, organizations, local communities and the overall destination environment (Hyun, 2009; Kim et al., 2009; Wu & Chang, 2006; Nunkoo & Smith, 2013; Artigas et al., 2017). Therefore, tourism stakeholders should not focus exclusively on promoting destination attractions, but also on fostering trustworthy, emotionally engaging and memorable tourism experiences capable of strengthening long-term tourist loyalty.

Contributions

From a theoretical perspective, this study contributes to the tourism marketing literature by reinforcing the importance of integrating functional, emotional and relational dimensions in the explanation of destination loyalty. The findings suggest that the existence of well-known tourist attractions alone is insufficient to ensure tourist loyalty if tourism organizations, local residents, hosts and the surrounding environment fail to create welcoming, trustworthy and emotionally engaging experiences.

More specifically, this study contributes to the literature by demonstrating that destination attributes do not directly influence destination loyalty among Brazilian tourists visiting Portugal, but rather exert an indirect effect through trust in the destination and the quality of the hedonic experience. This finding advances previous research by clarifying the mechanisms through which destination characteristics translate into future behavioural intentions.

In this sense, the study highlights the central role of trust in the destination and the quality of the hedonic experience as key mechanisms through which destination attributes influence tourists' future behavioral intentions. The results further reinforce the experiential and relational perspectives of tourism consumption, suggesting that destination loyalty emerges primarily from emotionally meaningful experiences and positive interactions with the destination environment. Furthermore, by simultaneously integrating destination attributes, trust in the destination and hedonic experience within a single structural model, this study provides a more comprehensive understanding of destination loyalty by combining functional, relational and experiential perspectives that have often been examined separately in previous tourism studies. Additionally, this study contributes empirical evidence regarding Brazilian tourists visiting Portugal, a context that remains relatively underexplored in the tourism literature despite the growing relevance of this market for Portuguese tourism. The study also offers international relevance by providing insights into loyalty formation within culturally connected tourism markets characterised by shared language and historical ties. These findings may therefore be useful for understanding tourist behaviour in other international contexts involving strong cultural affinities between origin and destination countries.

From a practical perspective, the findings suggest that tourism managers and destination marketing organizations should invest not only in promoting tourist attractions, but also in improving the overall tourism environment, sustainability practices and the development of a coherent and emotionally appealing destination image. In particular, Turismo de Portugal should continue promoting Portugal and its destination attributes within the Brazilian market through advertising campaigns, events and relationship marketing initiatives, emphasizing the country's tourism diversity, hospitality and historical-cultural heritage in order to stimulate visitation and revisit intentions.

The findings also suggest the importance of diversifying tourism products beyond traditional urban tourism in Lisbon and Porto through the development of sustainable tourism routes, thematic circuits and experiential programs capable of generating more memorable and emotionally engaging experiences.

Finally, the results reinforce the importance of valuing tourism professions through continuous training and human resource development initiatives focused on hospitality, service quality and customer experience management, contributing to the maintenance of a positive destination image and to the strengthening of long-term tourist loyalty toward Portugal.

Limitations and Future Research

This study presents some limitations that should be acknowledged. First, the use of a relatively small non-probabilistic convenience sample limits the generalizability of the findings. Second, the cross-sectional design restricts the ability to establish causal relationships over time. Additionally, the study focused exclusively on Brazilian tourists visiting Portugal, which may limit the applicability of the results to other tourism markets and cultural contexts.

Future research could employ larger and more diverse samples, adopt longitudinal approaches and compare tourists from different nationalities in order to strengthen the external validity of the findings. Furthermore, although this study focused on the hedonic dimension of the tourism experience, future studies could also examine the role of eudaimonic experiences, such as personal growth, authenticity, cultural enrichment and self-development, in explaining destination loyalty.

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REFERENCES

- Addis, M., & Holbrook, M. B. (2001). On the conceptual link between mass customisation and experiential consumption: An explosion of subjectivity. *Journal of Consumer Behaviour*, 1(1), 50–66. <https://doi.org/10.1002/cb.53>
- Ali, F., Ryu, K., & Hussain, K. (2016). Influence of experiences on memories, satisfaction and behavioral intentions: A study of creative tourism. *Journal of Travel & Tourism Marketing*, 33(1), 85–100. <https://doi.org/10.1080/10548408.2015.1038418>
- Artigas, E. M., Yrigoyen, C. C., Moraga, E. T., & Villalón, C. B. (2017). Determinants of trust towards tourist destinations. *Journal of Destination Marketing & Management*, 6(4), 327–334. <https://doi.org/10.1016/j.jdmm.2017.03.005>
- Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74–94. <https://doi.org/10.1007/BF02723327>
- Beldad, A., de Jong, M., & Steehouder, M. (2010). How shall I trust the faceless and the intangible? A literature review on the antecedents of online trust. *Computers in Human Behavior*, 26(5), 857–869. <https://doi.org/10.1016/j.chb.2010.03.013>
- Bridges, E., & Florsheim, R. (2008). Hedonic and utilitarian shopping goals: The online experience. *Journal of Business Research*, 61(4), 309–314. <https://doi.org/10.1016/j.jbusres.2007.06.017>
- Chang, K. C. (2014). Examining the effect of tour guide performance, tourist trust, tourist satisfaction, and flow experience on tourists' shopping behavior. *Asia Pacific Journal of Tourism Research*, 19(2), 219–247. <https://doi.org/10.1080/10941665.2012.739189>
- Chen, C. F., & Phou, S. (2013). A closer look at destination: Image, personality, relationship and loyalty. *Tourism Management*, 36, 269–278. <https://doi.org/10.1016/j.tourman.2012.11.015>
- Cooper, C., Hall, C. M., & Scott, D. (2021). *Tourism: The contemporary tourism industry* (3rd ed.). Goodfellow Publishers.
- Dean, D., & Suhartanto, D. (2019). The formation of visitor behavioral intention to creative tourism: The role of push–pull motivation. *Asia Pacific Journal of Tourism Research*, 24(5), 393–403. <https://doi.org/10.1080/10941665.2019.1572631>
- Fodness, D. (1994). Measuring tourist motivation. *Annals of Tourism Research*, 21(3), 555–581. [https://doi.org/10.1016/0160-7383\(94\)90120-1](https://doi.org/10.1016/0160-7383(94)90120-1)
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.2307/3151312>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Sage.
- Ham, S., & Han, H. (2013). Role of perceived fit with hotels' green practices in the formation of customer loyalty: Impact of environmental concerns. *Asia Pacific Journal of Tourism Research*, 18(7), 731–748. <https://doi.org/10.1080/10941665.2012.695290>

- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Hirschman, E. C., & Holbrook, M. B. (1982). Hedonic consumption: Emerging concepts, methods and propositions. *Journal of Marketing*, 46(3), 92–101. <https://doi.org/10.2307/1251707>
- Hyun, S. S. (2009). Creating a model of customer equity for chain restaurant brand formation. *International Journal of Hospitality Management*, 28(4), 529–539. <https://doi.org/10.1016/j.ijhm.2009.02.006>
- Jennings, G. (2010). *Tourism research* (2nd ed.). Wiley.
- Kandampully, J., Zhang, T., & Bilgihan, A. (2015). Customer loyalty: A review and future directions with a special focus on the hospitality industry. *International Journal of Contemporary Hospitality Management*, 27(3), 379–414. <https://doi.org/10.1108/IJCHM-03-2014-0151>
- Kandampully, J., & Suhartanto, D. (2000). Customer loyalty in the hotel industry: The role of customer satisfaction and image. *International Journal of Contemporary Hospitality Management*, 12(6), 346–351. <https://doi.org/10.1108/09596110010342559>
- Kim, H. B. (1998). Perceived attractiveness of Korean destinations. *Annals of Tourism Research*, 25(2), 340–361. [https://doi.org/10.1016/S0160-7383\(98\)00007-3](https://doi.org/10.1016/S0160-7383(98)00007-3)
- Kim, T. T., Kim, W. G., & Kim, H. B. (2009). The effects of perceived justice on recovery satisfaction, trust, word-of-mouth, and revisit intention in upscale hotels. *Tourism Management*, 30(1), 51–62. <https://doi.org/10.1016/j.tourman.2008.04.003>
- Kim, J. H., Ritchie, J. R. B., & McCormick, B. (2012). Development of a scale to measure memorable tourism experiences. *Journal of Travel Research*, 51(1), 12–25. <https://doi.org/10.1177/0047287510385467>
- Kumar, V., & Kaushik, A. (2017). Destination brand experience and visitor behavior: The mediating role of destination brand identification. *Journal of Travel & Tourism Marketing*, 35(5), 649–663. <https://doi.org/10.1080/10548408.2017.1385645>
- Lew, A. A. (1987). A framework of tourist attraction research. *Annals of Tourism Research*, 14(4), 553–575. [https://doi.org/10.1016/0160-7383\(87\)90071-5](https://doi.org/10.1016/0160-7383(87)90071-5)
- Mano, A., & Costa, R. (2018). Imagem projetada de Portugal como destino turístico: Análise qualitativa do portal oficial de promoção turística. *Revista Turismo & Desenvolvimento*, 29, 65–83.
- Morgan, R. M., & Hunt, S. D. (1994). The commitment-trust theory of relationship marketing. *Journal of Marketing*, 58(3), 20–38. <https://doi.org/10.1177/002224299405800302>
- Murphy, H. C., Chen, M. M., & Cossutta, M. (2016). An investigation of multiple devices and information sources used in the hotel booking process. *Tourism Management*, 52, 44–51. <https://doi.org/10.1016/j.tourman.2015.06.004>
- Murphy, P., Pritchard, M. P., & Smith, B. (2000). The destination product and its impact on traveller perceptions. *Tourism Management*, 21(1), 43–52. [https://doi.org/10.1016/S0261-5177\(99\)00080-1](https://doi.org/10.1016/S0261-5177(99)00080-1)
- Nunkoo, R., & Smith, S. L. J. (2013). Political economy of tourism: Trust in government actors, political support, and their determinants. *Tourism Management*, 36, 120–132. <https://doi.org/10.1016/j.tourman.2012.11.018>
- Oliver, R. L. (1999). Whence consumer loyalty? *Journal of Marketing*, 63(Special Issue), 33–44. <https://doi.org/10.2307/1252099>
- Ooi, C. S. (2005). A theory of tourism experiences: The management of attention. In T. O'Dell & P. Billing (Eds.), *Experiencescapes: Tourism, culture and economy* (pp. 51–68). Copenhagen Business School Press.
- Pine, B. J., & Gilmore, J. H. (1998). Welcome to the experience economy. *Harvard Business Review*, 76(4), 97–105.

- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Rodrigues, Z., & Brito, P. (2009). A imagem turística de Portugal no Brasil: A influência dos atributos na formação da imagem de um destino turístico. *Revista Portuguesa e Brasileira de Gestão*, 8(2), 39–50.
- Schlesinger, W., Cervera-Taulet, A., & Pérez-Cabañero, C. (2020). Exploring the links between destination attributes, quality of service experience and loyalty in emerging Mediterranean destinations. *Tourism Management Perspectives*, 35, 100699. <https://doi.org/10.1016/j.tmp.2020.100699>
- Singh, J., & Sirdeshmukh, D. (2000). Agency and trust mechanisms in consumer satisfaction and loyalty judgments. *Journal of the Academy of Marketing Science*, 28(1), 150–167. <https://doi.org/10.1177/0092070300281014>
- Swarbrooke, J., & Horner, S. (2020). *Consumer behaviour in tourism* (4th ed.). Routledge.
- Veal, A. J. (2017). *Research methods for leisure and tourism: A practical guide* (5th ed.). Pearson.
- Williams, A. M., & Baláž, V. (2021). Tourism and trust: Theoretical reflections. *Journal of Travel Research*, 60(8), 1619–1634. <https://doi.org/10.1177/0047287520961177>
- Turismo de Portugal. (2020, November 2). *World Travel Awards: Portugal volta a ser o melhor destino europeu*. Retrieved July 21, 2021, from <https://turismo-portugal.com/portugal-volta-a-ser-o-melhor-destino-europeu/>
- World Tourism Organization. (1999). *Tourism satellite account (TSA): The conceptual framework*. UNWTO.
- Wu, J. J., & Chang, Y. S. (2006). Effect of transaction trust on e-commerce relationships between travel agencies. *Tourism Management*, 27(6), 1253–1261. <https://doi.org/10.1016/j.tourman.2005.06.011>
- Yoon, Y., & Uysal, M. (2005). An examination of the effects of motivation and satisfaction on destination loyalty: A structural model. *Tourism Management*, 26(1), 45–56. <https://doi.org/10.1016/j.tourman.2003.08.016>

DETERMINANTS OF INNOVATION: A PERSPECTIVE FROM HIGHER EDUCATION FACULTY MEMBERS

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ABSTRACT

Knowledge sharing plays a crucial role in fostering innovation in higher education institutions. This study examines how internal networking, shared values, and team cohesion influence knowledge sharing and innovation among research groups in Portuguese higher education institutions. Data were collected from 174 faculty members and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). The findings reveal that shared values positively influence knowledge sharing, which in turn enhances innovation. However, internal networking and team cohesion did not significantly affect knowledge sharing. The study provides empirical evidence from the Portuguese context and offers practical implications for managing research groups and promoting innovation in higher education.

Keywords: knowledge sharing, innovation, higher education, shared values, PLS-SEM.

INTRODUCTION

Higher Education Institutions (HEIs) face increasing challenges associated with globalisation, reductions in public funding, and the need to respond to new social, economic, and technological demands. In this context, innovation plays a strategic role in institutional competitiveness, value creation, and scientific and social development (Cabeza-Pullés et al., 2020). Universities and polytechnic institutes are no longer solely centres of teaching and research; they are now also expected to produce applicable knowledge, foster entrepreneurship, and contribute to regional and national innovation.

Knowledge constitutes one of the most relevant resources in contemporary organisations, particularly in knowledge-intensive contexts such as HEIs. The ability to generate, store, transfer, and apply knowledge has become essential for improving organisational processes, supporting decision-making, and promoting innovation (Nazem, 2012; Bertolazo et al., 2020). Consequently, knowledge management assumes particular importance in academic organisations.

Among the various processes associated with knowledge management, knowledge sharing stands out as an essential mechanism for fostering organisational learning, creativity, and innovation. Knowledge sharing enables the transformation of individual knowledge into collective knowledge, facilitating the circulation of experiences, ideas, and competencies among organisational members (Al-Husseini & Elbeltagi, 2018). In academic contexts, where scientific research strongly depends on collaboration among researchers, this process becomes particularly relevant.

Despite the importance attributed to knowledge sharing, gaps remain regarding the organisational and relational factors that influence its occurrence within academic research groups. The literature identifies several antecedents of knowledge sharing, including internal networking, shared values, and team cohesion; however, findings remain inconclusive, especially within the higher education context.

Accordingly, this study proposes and tests a conceptual model examining the influence of internal networking, shared values, and team cohesion on knowledge sharing and, subsequently, the impact of knowledge sharing on innovation within research groups in Portuguese HEIs.

This study contributes to the literature in three main ways. First, it advances current knowledge by examining the determinants of knowledge sharing within Portuguese higher education institutions, a context that remains underexplored despite increasing pressures for innovation and collaboration. Second, it provides empirical evidence regarding the mechanisms through which knowledge sharing contributes to innovation in academic research groups. Third, it offers practical insights for academic leaders and policymakers seeking to strengthen collaborative cultures and innovation capabilities in higher education institutions

LITERATURE REVIEW AND HYPOTHESES

Knowledge Management and Knowledge Sharing

Knowledge management refers to the set of organisational practices aimed at the creation, acquisition, storage, dissemination, and application of knowledge to improve organisational performance (Bertolazo et al., 2020). In knowledge-intensive organisations, such as universities and research centres, effective knowledge management is particularly important.

Knowledge may take different forms, namely explicit knowledge and tacit knowledge. While explicit knowledge can be easily codified and transmitted, tacit knowledge is associated with individual experience, skills, and perceptions, making it more difficult to formalise and transfer (Polanyi, 1966). Knowledge sharing plays a central role in transforming tacit knowledge into organisational knowledge.

According to Al-Kurdi et al. (2020), knowledge sharing is a social process through which individuals exchange experiences, competencies, and relevant information for problem-solving and organisational learning. In academic environments, this process promotes scientific collaboration, knowledge production, and the development of innovative solutions.

The literature demonstrates that knowledge sharing is associated with improvements in organisational performance, collective learning, and innovation (Ode & Ayavoo, 2020). However, the effectiveness of this process depends on cultural, relational, and organisational factors.

Innovation in Higher Education Institutions

Innovation is commonly defined as the implementation of new ideas, processes, products, or work methods that create value for the organisation (Daft, 1978). In the context of HEIs, innovation may emerge through the development of new pedagogical methodologies, new research practices, new academic services, or organisational improvements. Innovation in academic environments strongly depends on institutions' ability to create and share knowledge. Previous studies demonstrate that effective knowledge management practices positively contribute to organisational creativity and innovation (Adro et al., 2022; Al-Husseini & Elbeltagi, 2018).

Knowledge sharing promotes interaction among researchers, stimulates collective learning, and facilitates the development of innovative solutions. Consequently, organisations that foster collaborative cultures tend to present higher levels of innovation.

Internal Networking

Internal networking refers to the relationships and connections established among organisational members. Strong internal networks facilitate communication, social interaction, and access to specialised knowledge (Henttonen et al., 2013). The literature generally suggests that dense relational structures favour information circulation, reduce academic isolation, strengthen scientific collaboration, and increase the likelihood of knowledge sharing within research groups.

However, findings regarding the relationship between internal networking and knowledge sharing remain inconclusive. While internal networks may facilitate communication and access to expertise, excessively closed networks can reduce exposure to diverse perspectives, limit innovative thinking, and hinder the exchange of novel ideas. These inconsistencies highlight the need for further investigation into the role of internal networking in promoting knowledge sharing within higher education settings.

H1: Internal networking positively influences knowledge sharing.

Shared Values

Shared values represent common beliefs, norms, and goals that guide organisational members' behaviour (Schein, 1985). The existence of shared values promotes trust, cooperation, and organisational alignment.

Trust constitutes a central element in knowledge sharing, particularly in contexts where knowledge represents a source of power or competitive advantage. Organisational environments characterised by trust and cooperation favour greater willingness to share knowledge.

In academic research groups, shared values may strengthen interpersonal relationships and encourage scientific collaboration.

H2: Shared values positively influence knowledge sharing.

Team Cohesion

Team cohesion refers to the degree of closeness, commitment, and emotional connection among group members. Cohesive teams tend to exhibit higher levels of trust, mutual support, and collaboration, creating favourable conditions for interaction and collective learning.

Previous studies suggest that team cohesion facilitates knowledge sharing by encouraging open communication and strengthening interpersonal relationships among team members. In academic research groups, cohesion may increase researchers' willingness to exchange experiences, provide mutual support, and collaborate on scientific activities.

However, the relationship between team cohesion and knowledge sharing is not unequivocal. While cohesive teams may benefit from stronger collaboration, some authors argue that excessive cohesion can foster conformity behaviours, discourage critical thinking, and reduce openness to external ideas and alternative perspectives (Sánchez-Navas & Ferràs-Hernández, 2015). These contrasting findings suggest that the influence of team cohesion on knowledge sharing may depend on the organisational context and group dynamics, highlighting the need for further investigation within higher education institutions.

H3: Team cohesion positively influences knowledge sharing.

Knowledge Sharing and Innovation

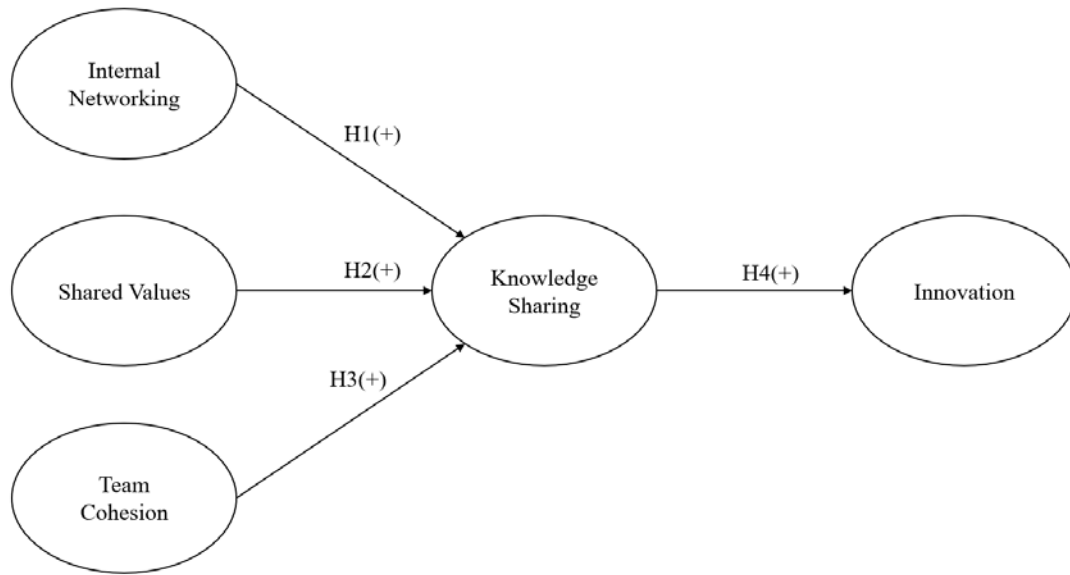
Knowledge sharing constitutes one of the main mechanisms through which organisations develop innovative capabilities. The circulation of ideas, experiences, and competencies facilitates organisational learning and stimulates creativity.

Previous studies demonstrate that high levels of knowledge sharing are associated with better innovation outcomes in knowledge-intensive organisations (Jamshed & Majeed, 2019; Ode & Ayavoo, 2020).

In higher education, scientific collaboration and the dissemination of knowledge among researchers may foster scientific, organizational, and pedagogical innovation.

H4: Knowledge sharing positively influences innovation.

Figure 1: Conceptual Model.



METHODOLOGY

Research Design

This study follows a quantitative, cross-sectional, and conclusive-causal research approach. The objective is to empirically test the relationships among internal networking, shared values, team cohesion, knowledge sharing, and innovation.

Population and Sample

The target population consists of higher education faculty members integrated into research groups within Portuguese HEIs. Due to the impossibility of accessing the entire population, a non-probability convenience and snowball sampling technique was adopted. Data were collected through an online questionnaire distributed via social networks and academic contacts. A total of 174 valid responses were obtained.

Data Collection Instrument

The questionnaire was divided into three sections. The first section presented the study objectives and guaranteed participants' anonymity and confidentiality. The second section included the measurement items for the latent variables. The third section collected sociodemographic information.

Variables were measured using previously validated scales from the literature and assessed using a five-point Likert scale (see Table 1).

Tabel 1: Operationalization of Variables.

Construct	Source
Knowledge Sharing	Adapted from Bock et al. (2005); Cabeza-Pullés et al. (2020)
Innovation	Adapted from Jansen et al. (2006); Cabeza-Pullés et al. (2020)
Internal Networking	Adapted from Chiu et al. (2006); Cabeza-Pullés et al. (2020)
Team Cohesion	Adapted from Wendt, Euwema, & Van Emmerik (2009)
Shared Values	Yang & Farn (2009)

Source: Authors' own elaboration.

Sample Characterisation

The sample consists of 57.5% female participants and 42.5% male participants. Most respondents are over 41 years old and hold doctoral or postdoctoral degrees. Regarding disciplinary areas, 34.5% of respondents belong to the Business and Management field, while 28.5% work in departments composed of 11 to 25 members. Concerning research experience, 38% of respondents have between 11 and 20 years of academic career experience, and 65.9% are full-time faculty members. Additionally, 72.6% belong to a research centre, and 84.9% teach in polytechnic institutions.

Data Analysis Techniques

Data were analysed using SPSS and SmartPLS software. The conceptual model was tested through Partial Least Squares Structural Equation Modelling (PLS-SEM). The analysis followed two stages: assessment of the measurement model and assessment of the structural model.

RESULTS

Measurement Model Assessment

Indicator reliability was assessed through factor loadings. Following Chin's (1998) recommendations, items with loadings below 0.70 were removed. Convergent validity was assessed using Average Variance Extracted (AVE), while internal consistency was analysed through composite reliability and Cronbach's alpha. The results presented in Table 2 demonstrate that all indicators of convergent validity and internal reliability exceed the thresholds recommended in the literature, confirming the psychometric robustness of the scales used. For instance, AVE values exceeded 0.50 and composite reliability values exceeded 0.70 (Fornell & Larcker, 1981; Bagozzi & Yi, 1988). Similarly, PLS rho_A values revealed adequate levels of internal consistency. Cronbach's alpha coefficients were also above 0.70, in accordance with Hair et al. (2018).

Table 2: Internal Consistency and Convergent Validity Results.

Construct	Cronbach's Alpha	Composite Reliability	AVE
Innovation	0.940	0.950	0.677
Internal Networking	0.852	0.909	0.770
Knowledge Sharing	0.860	0.892	0.543
Shared Values	0.945	0.960	0.858
Team Cohesion	0.890	0.923	0.713

Source: Authors' own elaboration based on PLS results.

Discriminant validity was analysed using the Fornell-Larcker criterion. The results demonstrate that the square roots of the AVE values are higher than the correlations between constructs, confirming discriminant validity (see Table 3).

Table 3: Discriminant Validity.

	Innovation	Internal Networking	Knowledge Sharing	Shared Values	Team Cohesion
Innovation	0.823				
Internal Networking	0.314	0.877			
Knowledge Sharing	0.408	0.357	0.737		
Shared Values	0.564	0.417	0.482	0.926	
Team Cohesion	0.498	0.591	0.467	0.775	0.844

Source: Authors' own elaboration based on PLS results.

Structural Model Assessment

Next, the hypothesis testing results were examined by evaluating the significance of path coefficients through the bootstrapping procedure with 5,000 subsamples. To analyse the structural model, structural coefficients (β values) and R^2 values of the dependent variables were assessed. According to Chin (1998), relationships between variables with structural coefficients above 0.20 can be considered strong. Regarding R^2 values, they should exceed 0.10, as lower values provide limited explanatory power (Falk & Miller, 1992). This condition was met. The R^2 values obtained for the dependent variables were as follows: knowledge sharing ($R^2 = 0.291$) and innovation ($R^2 = 0.390$). β values indicate the direction and intensity of relationships and, together with t-values, allow hypothesis testing. To confirm the proposed hypotheses, t-values must be equal to or greater than 1.96, corresponding to $p < 0.05$ (two-tailed), adopting a 95% confidence level. Table 4 presents the hypothesis testing results.

Table 4: Hypothesis Testing Results.

Hypothesis	β	t-value	p-value	Status
H1: Internal Networking $\rightarrow$ Knowledge Sharing	0.145	1.553	0.121	Not Supported
H2: Shared Values $\rightarrow$ Knowledge Sharing	0.317	2.539	0.011	Supported
H3: Team Cohesion $\rightarrow$ Knowledge Sharing	0.135	0.885	0.376	Not Supported
H4: Knowledge Sharing $\rightarrow$ Innovation	0.408	6.128	0.000	Supported

Source: Authors' own elaboration based on PLS results.

Of the four hypotheses tested, two were supported and two were not supported. Shared values (H2) positively influence knowledge sharing, which in turn positively affects innovation (H4). Conversely, internal networking (H1) and team cohesion (H3) did not significantly influence knowledge sharing.

DISCUSSION

The findings confirm that shared values constitute a key antecedent of knowledge sharing within academic research groups. This result is consistent with previous studies suggesting that trust, common goals, and collaborative norms encourage individuals to exchange knowledge and expertise (Cabeza-Pullés et al., 2020; Yang & Farn, 2009). In the context of Portuguese higher education institutions, shared values appear to be more influential than structural or relational factors in fostering knowledge-sharing behaviours.

Contrary to expectations, internal networking did not significantly influence knowledge sharing. This finding contrasts with previous research suggesting that internal social networks facilitate access to information and expertise (Henttonen et al., 2013). One possible explanation is that faculty members often face competing demands related to teaching, research, and administrative responsibilities, limiting opportunities for meaningful interaction and collaboration.

Similarly, team cohesion did not significantly affect knowledge sharing. Although prior studies have highlighted the benefits of cohesive teams for collaboration and learning, excessive cohesion may lead to conformity and reduced openness to alternative viewpoints (Sánchez-Navas & Ferràs-Hernández, 2015). This finding suggests that cohesion alone may not be sufficient to stimulate effective knowledge-sharing practices within academic environments.

The positive effect of knowledge sharing on innovation supports previous studies demonstrating that the exchange of experiences, ideas, and expertise enhances organisational learning and innovation capabilities (Al-Husseini & Elbeltagi, 2018; Ode & Ayavoo, 2020). This result reinforces the importance of creating institutional environments that support collaborative learning and knowledge exchange.

CONCLUSION

This study examined the relationships among five key constructs within academic research groups in Portuguese higher education institutions: internal networking, shared values, team cohesion, knowledge sharing, and innovation. Internal networking refers to the relationships established among organisational members, shared values represent common beliefs and goals guiding behaviour, team cohesion reflects the degree of closeness among team members, knowledge sharing involves the exchange of experiences and expertise, and innovation refers to the implementation of new ideas and practices.

The findings reveal that shared values play a decisive role in promoting knowledge sharing, which, in turn, contributes positively to innovation. These results suggest that trust, common goals, and collaborative norms are essential for fostering effective knowledge-sharing behaviours within academic environments. Contrary to expectations, internal networking and team cohesion did not significantly influence knowledge sharing, indicating that relational proximity alone may not guarantee knowledge exchange among academics.

From a theoretical perspective, this study contributes to the knowledge management and innovation literature by demonstrating that cultural factors, particularly shared values, may be more influential determinants of knowledge sharing than structural relational mechanisms in higher education institutions. Furthermore, the findings reinforce the central role of knowledge sharing as a mechanism through which innovation emerges within academic research groups.

From a practical perspective, higher education leaders should promote organisational cultures based on trust, collaboration, and continuous learning. Universities and polytechnic institutes should encourage interdisciplinary interaction, establish communities of practice, and implement recognition systems that value collaborative behaviours and knowledge-sharing activities. At the policy level, evaluation systems should increasingly recognise collective scientific outputs and collaborative research practices to strengthen innovation capabilities within higher education institutions.

Despite its contributions, this study presents limitations related to the use of a non-probability sample and its cross-sectional design. Future research should adopt longitudinal approaches and comparative studies across different institutional and national contexts to further examine the determinants of knowledge sharing and innovation in higher education settings.

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REFERENCES

- Adro, F., Fernandes, C., & Sá, M. J. (2022). Shared leadership and team creativity: A moderated mediation model of team trust and openness to experience. *Journal of Business Research*, 142, 1040–1052. <https://doi.org/10.1016/j.jbusres.2022.01.019>
- Al-Husseini, S., & Elbeltagi, I. (2018). The role of knowledge sharing in enhancing innovation. *Innovations in Education and Teaching International*, 55(1), 23–33. <https://doi.org/10.1080/14703297.2015.1122544>
- Al-Kurdi, O. F., El-Haddadeh, R., & Eldabi, T. (2020). The role of organisational climate in managing knowledge sharing among academics in higher education. *International Journal of Information Management*, 50, 217–227. <https://doi.org/10.1016/j.ijinfomgt.2019.05.018>
- Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74–94. <https://doi.org/10.1007/BF02723327>

- Bertolazo, T., Sartori, R., & Tenório, N. (2020). Knowledge management: An exploratory study for knowledge transfer in a university. *Conhecimento & Diversidade*, 12(28), 70–85.
- Bock, G.-W., Zmud, R. W., Kim, Y.-G., & Lee, J.-N. (2005). Behavioral intention formation in knowledge sharing: Examining the roles of extrinsic motivators, social-psychological forces, and organizational climate. *MIS Quarterly*, 29(1), 87–111. <https://doi.org/10.2307/25148669>
- Cabeza-Pullés, D., Figueroa-Domecq, C., & Segovia-Pérez, M. (2020). Knowledge sharing in academic research groups: The effect of trust and collaborative culture. *Gender in Management*, 35(7/8), 641–656. <https://doi.org/10.1108/GM-03-2019-0037>
- Chin, W. W. (1998). The partial least squares approach for structural equation modeling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295–336). Lawrence Erlbaum Associates.
- Chiu, C.-M., Hsu, M.-H., & Wang, E. T. G. (2006). Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. *Decision Support Systems*, 42(3), 1872–1888. <https://doi.org/10.1016/j.dss.2006.04.001>
- Daft, R. L. (1978). A dual-core model of organizational innovation. *Academy of Management Journal*, 21(2), 193–210. <https://doi.org/10.2307/255754>
- Falk, R. F., & Miller, N. B. (1992). *A primer for soft modeling*. University of Akron Press.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.1177/002224378101800104>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2018). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Sage.
- Henttonen, K., Janhonen, M., & Johanson, J.-E. (2013). Internal social networks in work teams: Structure, knowledge sharing and performance. *International Journal of Manpower*, 34(6), 616–634. <https://doi.org/10.1108/IJM-06-2013-0148>
- Jamshed, S., & Majeed, N. (2019). Relationship between team culture and team performance through lens of knowledge sharing and team emotional intelligence. *Journal of Knowledge Management*, 23(1), 90–109. <https://doi.org/10.1108/JKM-04-2018-0265>
- Jansen, J. J. P., Van den Bosch, F. A. J., & Volberda, H. W. (2006). Exploratory innovation, exploitative innovation, and performance: Effects of organizational antecedents and environmental moderators. *Management Science*, 52(11), 1661–1674. <https://doi.org/10.1287/mnsc.1060.0576>
- Nazem, F. (2012). The role of universities in the development of knowledge sharing. *Procedia - Social and Behavioral Sciences*, 47, 144–148. <https://doi.org/10.1016/j.sbspro.2012.06.623>
- Ode, E., & Ayavoo, R. (2020). The mediating role of knowledge application in the relationship between knowledge management practices and firm innovation. *Journal of Innovation & Knowledge*, 5(3), 210–218. <https://doi.org/10.1016/j.jik.2019.08.002>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Polanyi, M. (1966). *The tacit dimension*. Doubleday.
- Sánchez-Navas, A., & Ferràs-Hernández, X. (2015). Too much trust is death to innovation. *Management Research*, 13(3), 260–287. <https://doi.org/10.1108/MRJIAM-06-2014-0547>
- Schein, E. H. (1985). *Organizational culture and leadership*. Jossey-Bass.

Wendt, H., Euwema, M. C., & Van Emmerik, H. (2009). Leadership and team cohesiveness across cultures. *The Leadership Quarterly*, 20(3), 358–370. <https://doi.org/10.1016/j.leaqua.2009.03.005>

Yang, S.-C., & Farn, C.-K. (2009). Social capital, behavioural control, and tacit knowledge sharing. *International Journal of Information Management*, 29(3), 210–218. <https://doi.org/10.1016/j.ijinfomgt.2008.08.001>

EXPLORING LEADERSHIP STRATEGIES FOR OVERCOMING BARRIERS TO DIGITAL TRANSFORMATION IN PAKISTAN'S FASHION SMEs

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ABSTRACT

This research examines how leadership strategies mitigate infrastructural, cultural, and organisational barriers to digital transformation in Pakistani fashion SMEs. While digital transformation has become central to competitiveness in the global fashion industry, its adoption remains uneven across developing economies where structural, institutional, and socio-cultural constraints shape technology use. Existing frameworks such as the Technology–Organisation–Environment (TOE) model assume stable infrastructure and institutional capacity, limiting their explanatory power in South Asian contexts. Using a positivist, quantitative, cross-sectional design, data were collected from 100 SME managers in Lahore through structured surveys and analysed using SPSS. The findings demonstrate that cultural barriers – particularly resistance to change, attachment to artisanal practices, and fear of job displacement – are the most significant predictors of limited digital transformation. Infrastructural and organisational barriers, while present, do not independently determine outcomes when cultural factors are considered. Leadership plays a critical mediating role. Transformational and hybrid leadership approaches are positively associated with digital adoption, whereas adaptive leadership does not demonstrate statistical significance. These findings suggest that digital transformation in this context is driven not by technological readiness alone but by leadership-driven perception and sense-making processes. The research contributes to theory by challenging technology-centric approaches and demonstrating that digital transformation in emerging SME contexts is fundamentally socio-cultural. It further extends leadership theory through empirical validation of hybrid leadership models in hierarchical and culturally embedded environments. The research concludes that effective digital transformation requires culturally responsive leadership rather than purely technological investment.

Keywords: digital transformation, leadership strategies, fashion SMEs, cultural barriers, Pakistan.

INTRODUCTION

This section provides the contextual foundation for the research by positioning Pakistani fashion SMEs within the broader context of global digital transformation. It outlines the scale and dynamics of the fashion industry, identifies the challenges of digital adoption in developing economies, and defines the research problem through infrastructural, cultural, and organisational constraints specific to Pakistan. It further establishes the rationale and significance of the research, before presenting the research aim, objectives, questions, and hypotheses.

Background and Context

The global fashion industry has undergone a significant transformation over the past decade due to the rapid integration of digital technologies, which have reshaped value chains, consumer behaviour, and sustainability practices (Liu and Liu, 2025). With an estimated value of approximately USD 1.7 trillion in 2023, the sector has become increasingly competitive through the adoption of artificial intelligence (AI), blockchain, and augmented reality (AR) technologies (McKinsey & Company, 2025). For example, firms such as Zara use AI-driven predictive analytics to optimise inventory management, reducing waste and improving responsiveness to consumer demand (SuperAGI, 2025). Similarly, luxury brands including Louis Vuitton and Gucci utilise blockchain technologies to enhance supply chain transparency and mitigate counterfeiting, strengthening consumer trust (Lall, 2023). These developments demonstrate

that digital technologies now play a central role not only in operational efficiency but also in ethical governance and sustainability in the fashion industry.

Despite these advances, the diffusion of digital transformation remains uneven. Developed economies continue to lead technological adoption, whereas developing economies are often marginalised. Existing digital adoption frameworks, including the Technology–Organisation–Environment (TOE) model (Tornatzky and Fleischer, 1990), are largely premised on the presence of stable infrastructure, institutional capacity, and high levels of digital readiness. Such assumptions limit their applicability in South Asian contexts, where fragmented supply chains, infrastructural constraints, and socio-cultural factors significantly influence technology use (Akbari and Hopkins, 2022). This highlights a fundamental gap in literature, namely the need to understand how digital adoption is shaped by context-specific conditions, including cultural traditions, hierarchical organisational structures, and resource limitations.

Pakistan's fashion industry provides a particularly relevant context for examining these dynamics. The sector contributes approximately USD 3 billion annually to GDP and employs over 15 million people, including a significant proportion of artisans engaged in traditional textile and craft production (Hussain et al., 2023). Despite these strengths, the sector faces increasing pressure to modernise and integrate into global digital value chains. Digital adoption among fashion SMEs in Pakistan remains comparatively low, with e-commerce engagement frequently characterised as limited or emerging (Ahmed, 2023). This lag presents a critical challenge, as competitiveness in the global fashion industry is increasingly dependent on digital presence, platform-based trade, and data-driven decision-making. At the same time, domestic consumers - particularly younger demographics, demonstrate a growing preference for digitally enabled shopping experiences (Khalid and Alam, 2020).

Barriers to digital transformation in Pakistan are multifaceted, encompassing infrastructural, cultural, and organisational dimensions. Infrastructural constraints such as limited internet penetration and frequent power disruptions undermine the reliability of digital systems (Kemp, 2025). Cultural barriers are equally significant, as digital technologies are often perceived as threats to traditional craftsmanship and livelihoods, with artisans fearing displacement through automation (Choudhury, 2024). Organisationally, many SMEs operate within family-owned, hierarchical structures that centralise decision-making and limit innovation (Nahar, Karim and Sena, 2025; Mikail, Çora and Çora, 2025). These factors contribute to slower digital adoption compared to regional competitors.

Research Problem

Although global fashion markets are increasingly digitalised, Pakistani fashion SMEs remain at a structural disadvantage. Low levels of digital adoption limit visibility, restrict access to international markets, and constrain the ability of firms to respond to evolving consumer expectations for transparency, sustainability, and responsiveness. Industry evidence suggests that digital adoption within Pakistani SMEs remains underdeveloped, with many firms operating at early stages of e-commerce maturity (Ahmed, 2023).

These challenges are not solely technological but embedded within broader structural and cultural dynamics. Infrastructural limitations, including unreliable connectivity and insufficient digital infrastructure, constrain adoption efforts (Kemp, 2025). Cultural resistance further complicates this process, with digital tools often viewed as threats to identity, tradition, and employment (Choudhury, 2024). Organisational structures characterised by hierarchical decision-making limit the capacity for experimentation and innovation (Mikail, Çora and Çora, 2025).

While these barriers are widely acknowledged, the role of leadership in mediating or overcoming them remains underexplored. Existing research suggests that leadership approaches such as transformational and adaptive leadership can facilitate organisational change (Bass and Riggio, 2006), yet these models are predominantly derived from Western contexts and may not be directly transferable to South Asian SME environments. Emerging evidence indicates that hybrid leadership approaches, combining transformational vision with culturally embedded authority, may be more effective in such contexts (McKearney et al., 2022). However, empirical research examining this relationship remains limited.

Rationale and Justification

This research is justified by its dual theoretical and practical significance. From a theoretical perspective, it addresses a key gap in digital transformation literature by examining how leadership interacts with infrastructural, cultural, and organisational barriers in a developing economy context. It contributes to the adaptation of existing theoretical frameworks - particularly TOE and leadership theory, by embedding them within a socio-cultural setting that differs substantially from those in which they were originally developed.

From a practical perspective, the research responds to pressing economic and policy challenges. Pakistan's Digital Vision 2025 initiative highlights the importance of SME digitalisation for economic growth, yet implementation remains limited and insufficiently aligned with SME realities (MOITT, 2025). Without context-specific insights, such policies risk reinforcing, rather than reducing, existing digital divides.

Furthermore, the integration of digital technologies within Pakistan's fashion SMEs raises broader questions concerning the balance between modernisation and cultural preservation. Resistance to digitalisation is often linked to concerns about cultural erosion (AL-Abrow et al., 2019). Leadership strategies that frame digital technologies as complementary to artisanal traditions may enable SMEs to achieve both economic competitiveness and cultural sustainability. This aligns with wider discussions on sustainable development, which emphasise the integration of economic growth, cultural preservation, and social responsibility (Duxbury, Kangas and Beukelaer, 2019).

Research Aim, Objectives and Questions

Research Aim

To examine how leadership strategies can mitigate infrastructural, cultural, and organisational barriers to digital transformation in Pakistani fashion SMEs.

Research Objectives

To identify key infrastructural, cultural, and organisational barriers to digital transformation
To evaluate the effectiveness of leadership approaches in reducing resistance to digital adoption
To develop context-specific strategies for integrating digital technologies while preserving artisanal value

Research Questions

What barriers influence digital transformation in Pakistani fashion SMEs?
Which leadership strategies are most effective in reducing resistance to digital adoption?
How can digital tools be integrated while preserving craftsmanship and cultural identity?

Hypotheses

H1: Digital adoption is negatively related to infrastructural, cultural, and organisational barriers
H2: Transformational and adaptive leadership reduce resistance to digital adoption
H3: Hybrid leadership positively influences digital adoption in hierarchical SME contexts
H4: Stakeholders perceiving digitalisation as non-threatening to craftsmanship are more likely to support adoption - environments.

LITERATURE REVIEW

Digital transformation has become a defining force within the global fashion industry, enhancing efficiency, transparency, and consumer engagement through technologies such as artificial intelligence (AI), blockchain, and big data analytics (Pereira et al., 2022; Bag et al., 2022). However, the benefits of digital transformation are unevenly distributed, with SMEs in developing economies facing structural and contextual challenges that limit adoption (Sepasgozar et al., 2023).

AI has significantly transformed demand forecasting, inventory management, and customer engagement. For instance, global fashion firms such as Zara have successfully utilised AI to optimise stock levels and reduce waste (Ali, 2025), while luxury brands employ AI-driven systems to personalise consumer experiences (Ellahi, 2025). Despite these advantages, scholars argue that excessive reliance on algorithmic systems risks marginalising the cultural and symbolic dimensions of fashion, particularly in artisanal sectors where heritage and craftsmanship remain central (Garcia, 2021).

Blockchain technology has similarly gained prominence for enhancing supply chain transparency and traceability. Major fashion firms use blockchain to strengthen trust and combat counterfeiting (Choudhury et al., 2025). However, critics question its practical accessibility for SMEs in developing economies due to high implementation costs and infrastructural requirements (Kumar et al., 2023). In Pakistan, limited digital literacy and unstable electricity supply further constrain blockchain adoption (Begum, 2022).

Emerging technologies such as augmented reality (AR) and virtual reality (VR) have improved consumer engagement through immersive retail experiences (Nguyen and Nguyen, 2021). While these technologies have demonstrated positive outcomes in developed markets, their adoption in developing economies remains limited due to resource and infrastructure constraints (Faiz, Le and Maslin, 2024).

Despite technological advancements, a growing body of literature highlights the limitations of technology-centric approaches. Traditional models such as the Technology–Organisation–Environment (TOE) framework assume stable infrastructure, high digital readiness, and formal institutional systems (Tornatzky and Fleischer, 1990). These assumptions do not hold in many developing contexts, including Pakistan, where informal organisational structures, infrastructural gaps, and cultural factors significantly influence digital adoption (Akbari and Hopkins, 2022; Wasi, 2025).

Infrastructural barriers are widely recognised as critical constraints. Limited internet penetration, unreliable connectivity, and frequent power disruptions restrict SME participation in digital ecosystems (Kemp, 2025; Baloch, 2020). However, recent studies challenge the deterministic role of infrastructure, suggesting that firms can achieve partial digital integration despite infrastructural limitations through strategic decision-making and leadership intervention (Khalid and Alam, 2020).

Cultural barriers represent a more deeply embedded constraint in artisanal industries. In Pakistan, digitalisation is often perceived as a threat to traditional craftsmanship and employment (Javaid, 2025). Similar findings are observed in other developing contexts, such as Ghana, where artisans associate digital technologies with erosion of identity and livelihood (Sarpong et al., 2023). However, contrasting evidence from Bangladesh demonstrates that digital platforms can enhance market access when framed as complementary to traditional practices (Fardous et al., 2024). These findings indicate that cultural resistance is not fixed but influenced by the framing of digital technologies.

Organisational constraints further shape digital adoption. Pakistani fashion SMEs are predominantly family-owned and characterised by hierarchical, centralised decision-making structures (Kerbouche and Bouguesri, 2020). These structures limit experimentation, reduce innovation capacity, and restrict the implementation of digital strategies. Resource constraints and lack of formal digital capabilities further exacerbate these challenges (Hernita et al., 2021).

Leadership has emerged as a critical mediating factor in digital transformation. Transformational leadership promotes vision, innovation, and organisational change (Bass and Riggio, 2006) and has been shown to enhance digital adoption in South Asian contexts (Khan et al., 2022). Adaptive leadership supports flexibility and experimentation in uncertain environments (Heifetz, Linsky and Grashow, 2009), although its effectiveness may be constrained in risk-averse organisational cultures (Meyner and Emanuelsson, 2025). Servant leadership emphasises trust and employee engagement but may lack decisiveness in fast-paced digital environments (Claro and Silva, 2025).

Emerging research suggests that hybrid leadership approaches—combining transformational vision with culturally embedded authority—are more effective in hierarchical SME contexts (Hussain, 2022; Nilervall and Hannes, 2024). Empirical evidence indicates that such approaches enable digital adoption while preserving organisational legitimacy and cultural identity (Athar, 2025).

Government policy also plays a role in shaping digital transformation. Pakistan's Digital Vision 2025 reflects national intent to promote digitalisation; however, implementation remains uneven, with limited support for SMEs and rural artisans (Zhong et al., 2022). Comparative studies of India and Bangladesh demonstrate that targeted policy interventions can significantly enhance SME digital integration (Aggarwal and Arora, 2025).

Overall, the literature demonstrates that digital transformation in developing economies is shaped by the interaction of infrastructural constraints, organisational structures, and cultural perceptions. While technological capability is important, cultural resistance and leadership effectiveness emerge as the most significant determinants of adoption. This highlights the need for context-sensitive approaches that integrate technological, organisational, and socio-cultural dimensions.

METHODOLOGY

The research adopts a quantitative, cross-sectional research design grounded in positivist philosophy. A structured questionnaire was distributed to fashion SME managers in Lahore, targeting individuals involved in strategic and operational decision-making. The survey measured perceptions of infrastructural, cultural, and organisational barriers, leadership strategies, and digital transformation outcomes using Likert-scale items. Data were analysed using SPSS through descriptive statistics, correlation analysis, and multiple regression modelling. Several limitations must be acknowledged. The use of purposive sampling limits generalisability beyond the sample, as firms were selected based on accessibility rather than probabilistic criteria. The reliance on self-reported data introduces potential response bias, particularly social desirability bias. The cross-sectional design restricts the ability to observe changes over time and limits causal inference. Additionally, applying standardised constructs in a culturally specific context may introduce measurement limitations. These factors suggest that findings should be interpreted as indicative rather than definitive.

RESULTS AND DISCUSSION

The results integrate statistical findings with theoretical interpretation to evaluate how leadership strategies influence digital transformation within Pakistani fashion SMEs. Reliability testing confirmed acceptable internal consistency (Cronbach's Alpha $\alpha = 0.775$), indicating that the constructs measuring barriers, leadership strategies, and digital transformation outcomes are robust and suitable for further analysis. The respondent profile consisted primarily of mid-career managers with moderate industry experience, suggesting that the data reflects informed perspectives from individuals directly involved in operational and strategic decision-making. Firms represented a range of fashion segments and sizes, with digital adoption levels varying considerably across the sample, indicating an uneven transformation landscape.

Barriers to Digital Transformation

The analysis reveals that respondents perceive all three categories of barriers—cultural, infrastructural, and organisational—as constraints. However, cultural barriers emerge as the most significant. Descriptive statistics indicate that resistance to change, attachment to traditional practices, and fear of job displacement are more pronounced than infrastructural issues such as internet instability or lack of technical support. Correlation analysis demonstrates positive relationships among all barrier types, particularly between infrastructural and cultural barriers. This suggests that poor infrastructure can reinforce cultural scepticism, creating a mutually reinforcing barrier system. In other words, limited exposure to digital tools may intensify perceptions that such technologies are unnecessary or threatening.

However, when examined through multiple regression analysis, only cultural barriers remain statistically significant predictors of digital transformation outcomes. Infrastructural and organisational barriers lose significance when cultural factors are included, indicating that structural constraints alone do not determine digital adoption. These findings challenge dominant interpretations of the Technology–Organisation–Environment (TOE) framework, which assumes that infrastructural readiness is a prerequisite for digital transformation. Instead, the results suggest that digital resistance in Pakistani fashion SMEs is rooted primarily in meaning, identity, and perception, rather than access alone. SMEs operating under similar infrastructural conditions demonstrate different digital outcomes depending on how digital technologies are perceived internally.

Leadership Strategies and Their Influence

The results indicate that leadership plays a differentiated and context-dependent role in digital transformation. Descriptive findings show moderate levels of leadership support, with greater emphasis on vision and uncertainty management than on sustained capability development. Correlation analysis reveals overlap between transformational and adaptive leadership styles, suggesting that leaders who articulate vision are also responsive to changing environments. However, hybrid leadership behaviours—such as balancing authority with employee inclusion—operate more independently, indicating a distinctive leadership pattern within SMEs. Regression analysis demonstrates that transformational leadership and hybrid leadership are statistically significant predictors of digital transformation, whereas adaptive leadership is not.

The significance of transformational leadership aligns with existing literature that emphasises the role of vision, inspiration, and organisational change. However, its effectiveness in this context is conditional. Within hierarchical SME environments, transformational leadership alone may not be sufficient to overcome deeply embedded cultural resistance. The significance of hybrid leadership is particularly important. Hybrid leadership combines authoritative decision-making with employee engagement and consultation. In Pakistani fashion SMEs—where authority structures are often centralised and culturally embedded—purely decentralised leadership approaches may generate uncertainty and resistance.

Hybrid leadership enables leaders to introduce digital initiatives incrementally, framing them as extensions of existing practices rather than disruptive changes. This approach allows organisations to maintain cultural legitimacy while gradually adopting digital tools. In contrast, adaptive leadership, which emphasises experimentation and rapid iteration, appears less effective in risk-averse environments where failure carries significant social and economic consequences.

Digital Transformation Outcomes

The results indicate that digital transformation outcomes remain moderate, reflecting early- to mid-stage digital maturity within Pakistani fashion SMEs. Firms demonstrate greater confidence in their future digital readiness than in current operational performance. Digital adoption is concentrated in front-end functions, including marketing, customer engagement, and design activities, rather than in back-end processes such as supply chain integration or workflow automation. This suggests that SMEs prioritise visible and low-risk applications of digital technology before undertaking more complex transformations.

Correlation analysis highlights a tension between innovation and operational stability. Firms engaging in higher levels of digital experimentation may experience short-term performance disruptions. Additionally, digital transformation is negatively associated with craft preservation, indicating a perceived conflict between technological advancement and artisanal identity. This reflects an innovation–tradition paradox, where SMEs must balance competitiveness with the preservation of heritage practices. While digital tools offer opportunities for growth and efficiency, they may be perceived as undermining authenticity unless carefully integrated.

Integrated Barrier–Leadership Effects

When barrier and leadership variables are combined within the regression model, cultural barriers remain the dominant predictor of digital transformation outcomes. Leadership variables lose direct statistical significance, although hybrid leadership approaches remain close to significance thresholds. This suggests that leadership does not operate independently but is constrained by cultural context. Leadership effectiveness depends on its ability to reshape perceptions and meanings associated with digital transformation. Cultural resistance therefore acts as a structural ceiling that limits the effectiveness of leadership interventions unless actively addressed. Further analysis indicates that smaller SMEs demonstrate greater agility in adopting digital practices, possibly due to less bureaucratic complexity and greater flexibility in decision-making. However, this advantage is still mediated by cultural attitudes toward digitalisation.

Overall Interpretation

Overall, the findings demonstrate that digital transformation in Pakistani fashion SMEs is not primarily determined by infrastructure or organisational structure, but by cultural perception and leadership dynamics. Cultural resistance—particularly the perception that digital tools threaten identity and employment—emerges as the most significant constraint. Leadership plays a critical mediating role, particularly through hybrid approaches that balance innovation with cultural continuity. These results suggest that digital transformation in this context should be understood as a socially embedded process. Successful adoption depends on how technologies are framed, interpreted, and legitimised within existing organisational and cultural systems, rather than on technological readiness alone.

CONCLUSIONS, IMPLICATIONS & RECOMMENDATIONS

This section summarises the key results of the research, explains their theoretical and practical implications, and mentions the consequences of the research on the leadership practice, policymaking, and the competitiveness of SMEs involved in the fashion industry in Pakistan. It also gives the constraints of the research and gives future research directions. In general, the research aim was to investigate how leadership concepts would help reduce infrastructural, cultural, and organizational obstacles and enable the sustainable digital transformation of fashion SMEs in Pakistan.

Summary of Key Findings

Theoretical Implications

There are three aspects where this research adds to theory. It questions the applicability of Western centric models like the Technology Organization Environment (TOE) framework in emerging economies, first. The cultural barriers—dominance of the infrastructural and the organizational barriers show that socio-cultural factors are more influential in digital adoption in South Asian artisanal industries than the structural preparation. This implies that TOE should be re-articulated to incorporate cultural or community level variables when used in emerging economies.

Second, these results contribute to the leadership theory by showing that hybrid leadership performs better than either transformational or adaptive leadership in patriarchal SMEs. This supports the new problem of the culturally specific styles of leadership in the Global South, where power and relationship legitimacy are the key factors to acceptance of change. Third, the research provides empirical data to the discourse of digital transformation and craft preservation. The mentioned clash between digital innovation and the artisanal tradition supports the claims of integrated models that can preserve the equilibrium between modernization and cultural sustainability (Duxbury et al., 2019).

Practical and Managerial Implications

The findings have implications for SME leaders.

- Since the cultural barriers are the strongest predictor of resistance, a leader must address the problem of misunderstanding, concerns, and identity-related stereotypes proactively. This should be coupled with communication efforts that will help to brand digital tools as an addition to craftsmanship and not a threat to it.
- SMEs should enact organized training programmes to acquire digital marketing, supply chain analytics, and e-commerce competencies. The cultural resistance can be mitigated through skill development that heightens familiarity and confidence.
- Incremental adoption, beginning with design, marketing or inventory management, can alleviate fear and provide visible results prior to the implementation of more complex automation technology.
- Open communication, involvement of employees, and presentation of success stories can foster trust and lessen resistance towards digital change.

Policy Implications

The findings reveal that more responsive and SME-specific policy interventions are necessary:

- Digital programmes of the government should be decentralized to involve rural artisans and micro-enterprises as opposed to concentrating on urban clusters only.
- Grant and subsidized digital training would assist SMEs to overcome financial and capability limitations.
- Industry bodies, including the Pakistan Fashion Design Council must create joint platforms between the artisans and specialists in fashion, technology and digital servicing.
- The policies should integrate cultural preservation structures where the digitalization efforts should not harm heritage crafts but instead lead to innovation.

Limitations

The research has several limitations, even though it has contributions:

Data was gathered at one instance in time meaning that it could not be used to establish causality or even monitor change over time. Although suitable in the SME context, it limits generalizability. SMEs in Lahore were also excluded as the sample was limited to the region in comparison with other big centres in textiles like Karachi and Faisalabad. Reactions can be based on insight not behavior creating the possibility of bias.

Recommendations for Future Research

Future studies may:

- Longitudinal research design is used to follow the development of leadership and cultural change within digital transformation initiatives.
- Use a combination of both methods to describe the subtle cultural dynamics that cannot be fully described as quantitative surveys.
- Generalise by increasing the sample size to several cities and artist groups.
- Gendered perspectives, women contribute greatly to craft production, but experience distinctly digital obstacles.
- Identify how particular technologies like AI design software or blockchain traceability affect other parts of the fashion value chain.

Final Thoughts

The research demonstrates that the biggest obstacle to digital transformation in fashion SMEs in Pakistan is cultural rather than infrastructural challenges. Hybrid leadership and leadership is essential in creating digital preparedness, resistance mitigation, and integrating technology in a culturally responsive manner. Though the digital adoption rate is increasing, the tension between innovation and craftsmanship remains high. In response to these, a need to adopt special leadership skills, enabling policy-related frameworks, and an improved perception of the socio-cultural realities that affect organizational behavior exists. As digital tools are adjusted to the cultural identity and strategic leadership, the fashion SMEs in Pakistan will be able to become more competitive, retain their heritage, and participate more efficiently in the global digital economy.

REFERENCES

- Abdul, K., & Sohag, W. (2025). *Integrating AI and sustainable practices in the supply chain of the garment industry in Bangladesh*. University of Vaasa.
https://osuva.uwasa.fi/bitstream/handle/10024/19444/Uwasa_2025_Sohag_Kazi.pdf
- Afrin, N., & Pathak, A. (2023). Blockchain-powered security and transparency in supply chains: Exploring traceability and authenticity through smart contracts. *International Journal of Computer Applications*, 185(49), 5–15.
<https://doi.org/10.5120/ijca2023923318>

- Aggarwal, A., & Arora, G. K. (2025). Assessing the impact of key drivers on SME sustainability: A study of the Make in India framework. *Journal of Business Management and Information Systems*, 12(1), 21–36. <https://doi.org/10.48001/jbmis.1201003>
- Ahamed, T. (2023). *A review of challenges and opportunities for MSMEs in India: A roadmap for success*. ResearchGate. <https://www.researchgate.net/publication/374475246>
- Ali, Y. (2025). *The impact of AI on enhancing supply chain forecasting and demand planning*. Theseus. <http://www.theseus.fi/handle/10024/887713>
- Almohtasib, T., Bergström, N., & Nguyen, V. (2020). *Decentralised environments and employee performance*. DiVA Portal. <https://www.diva-portal.org/smash/get/diva2:1437221/FULLTEXT01.pdf>
- Amjad, A., Ayub, H., & Qureshi, S. S. (2023). An exploratory study on challenges and strategies for finance in Pakistan. *Pakistan Journal of Social Research*, 5(1), 254–266. <https://doi.org/10.52567/pjsr.v5i01.1001>
- Ammann, A. (2024, June 10). SAP Sapphire 2024: The AI-powered future is here. *Forbes*. <https://www.forbes.com/sites/sap/2024/06/10/sapphire-2024-sap-unveils-ai-powered-future/>
- Arimany Serrat, N., Arribas-Ibar, M., & Erdoğan, G. (2025). Fast fashion sector: Business models, supply chains and sustainability standards. *Systems*, 13(6), Article 405. <https://doi.org/10.3390/systems13060405>
- Athar, H. (2025). *Evaluating the impact of digital marketing strategies on consumer behaviour: The case of Khaadi in Pakistan*. Theseus. <http://www.theseus.fi/handle/10024/893246>
- Bag, S., et al. (2022). Understanding the role of artificial intelligence technologies in customer engagement. *Benchmarking: An International Journal*, 29(7), 2074–2098. <https://doi.org/10.1108/BIJ-07-2021-0415>
- Baloch, S. M. (2020, July). Pakistan's great digital divide. *The Diplomat*. <https://thediplomat.com/2020/07/pakistans-great-digital-divide/>
- Banga, K., et al. (2021). *E-commerce in preferential trade agreements*. EconStor. <https://www.econstor.eu/handle/10419/251135>
- Bass, B. M., & Riggio, R. E. (2006). *Transformational leadership* (2nd ed.). Psychology Press. <https://doi.org/10.4324/9781410617095>
- Begum, A. (2022). Employment generation challenges and strategies for Pakistan. *Unisia*, 40(1), 67–102. <https://doi.org/10.20885/unisia.vol40.iss1.art4>
- Bhutto, B. (2021). *Frugal innovation and new product development in Pakistani SMEs*. University of Portsmouth. <https://researchportal.port.ac.uk/>
- Bragger, J. D., et al. (2020). Developing leaders to serve and servants to lead. *Human Resource Development Review*, 20(1), 9–45. <https://doi.org/10.1177/1534484320981198>
- Brummer, U. (2024). *Blockchain technology for agriculture traceability systems*. University of Cape Town. <https://open.uct.ac.za/>
- Buteau, S. (2021). Roadmap for digital technology to foster India's MSME ecosystem. *CSI Transactions on ICT*, 9(4), 233–244. <https://doi.org/10.1007/s40012-021-00345-4>
- Cam, T. (2024). *Development of Vietnam's industrial clusters*. <https://hdl.handle.net/20.500.14247/13885>
- Choudhury, S., et al. (2025). Hardware-based anticounterfeiting technologies. *Applied Sciences*, 15(18), Article 10298. <https://doi.org/10.3390/app151810298>
- Claro, A., & Silva, C. S. (2025). Agile management and servant leadership. *Procedia Computer Science*, 256, 1673–1681. <https://doi.org/10.1016/j.procs.2025.02.305>
- Fashion United. (2022). *Global fashion industry statistics*. <https://fashionunited.com/statistics/global-fashion-industry-statistics>

- Fardous, J., et al. (2024). Women entrepreneurs and social media in Bangladesh. *International Journal for Multidisciplinary Research*, 6(2). <https://doi.org/10.36948/ijfmr.2024.v06i02.17107>
- Friedman, A. (2021). Sapphire textile mills debuts traceable yarn. *Sourcing Journal*. <https://sourcingjournal.com/>
- Friedman, N., & Ormiston, J. (2022). Blockchain as sustainability-oriented innovation? *Technological Forecasting and Social Change*, 175, Article 121403. <https://doi.org/10.1016/j.techfore.2021.121403>
- Garcia, C. C. (2021). Fashion forecasting from material culture to industry. *Journal of Fashion Marketing and Management*, 26(3), 436–451. <https://doi.org/10.1108/JFMM-11-2020-0241>
- Greenleaf, R. (2025). *What is servant leadership?* Greenleaf Center for Servant Leadership. <https://greenleaf.org>
- Heifetz, R., Linsky, M., & Grashow, A. (2009). *The practice of adaptive leadership*. Harvard University Press.
- Hernita, H., et al. (2021). SME productivity and sustainability. *Sustainability*, 13(6), Article 3177. <https://doi.org/10.3390/su13063177>
- Hossain, I. (2023). *Financial inclusion through mobile banking in Bangladesh*. Theseus. <http://www.theseus.fi/handle/10024/813228>
- Hu, L., Olivieri, M., & Rialti, R. (2023). SMEs and social media adoption. *Journal of Business & Industrial Marketing*. <https://doi.org/10.1108/JBIM-01-2022-0052>
- Hussain, M. (2022). *Paternalistic leadership in Pakistan*. Figshare. <https://figshare.com>
- Javaid, H. (2025). *Land commodification and social change in Lahore*. University of Heidelberg. <https://archiv.ub.uni-heidelberg.de/>
- Javornik, A., et al. (2021). Augmented reality deployment by luxury brands. *Journal of Business Research*, 136, 284–292. <https://doi.org/10.1016/j.jbusres.2021.07.040>
- Khalid, R., & Alam, M. (2020). *Sustainability strategies in digital SMEs*. DiVA Portal. <https://www.diva-portal.org>
- Kgakatsi, M., et al. (2024). Big data and SME performance. *Businesses*, 4(4), 632–695.
- Kruze, A. (2019). *Fast fashion and environmental justice*. Utrecht University. <https://studenttheses.uu.nl>
- Naqvi, H. (2020). Over one million textile workers at risk. *Profit by Pakistan Today*. <https://profit.pakistantoday.com.pk>
- Nguyen, E., & Nguyen, A. (2021). *AR/VR applications in fashion retailing*. DiVA Portal. <https://www.diva-portal.org>
- Pereira, A. M., et al. (2022). AI-based decision support in fashion supply chains. *Decision Support Systems*, 158, Article 113795.
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
- Schiuma, G., et al. (2021). The transformative leadership compass. *International Journal of Entrepreneurial Behaviour & Research*, 28(5), 1273–1291.
- Tornatzky, L., & Fleischer, M. (1990). *The process of technology innovation*. Lexington Books.
- Wasi, N. (2025). Beyond infrastructure in South Asia. *Pakistan Horizon*, 78(1), 45–64.
- Zhong, M., et al. (2022). CPEC digital transformation. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.887848>
- Zulu, S. L., et al. (2023). Digital leadership barriers. *Engineering, Construction and Architectural Management*. <https://doi.org/10.1108/ECAM-05-2022-0491>

DIPLOMATIC RELATIONS BETWEEN THE EUROPEAN UNION (EU) AND CHINA: WHERE ARE WE NOW?

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ABSTRACT

In 2025 the European Union (EU) and China reached a significant landmark of 50 years of diplomatic relations. Back in 1975, when formal diplomatic relations were established, the European Community was a 12-member state arrangement, and China was just escaping from the effects of the Cultural Revolution. Both experienced significant changes in these 50 years and both developed from very different starting points. Despite this both have travelled along significantly different paths ultimately both becoming economic and political pillars in the world. This paper will unravel the relationship from its outset in 1975 and pursue the separate journey's which these two state actors have pursued. The early period of the relationship revealed significant cooperation. Since the 2000s, the declining EU economic standing and the rapid rise of China's trade and economy have caused increasing rivalry between them. Nonetheless, the EU and China are both willing to improve the relationship in areas where they complement each other such as green energy and technology as well as finding solutions in areas of conflict.

Keywords: European Union, China, USA, diplomatic relations, Trump, Ursula Von der Leyen.

INTRODUCTION

The European Union (EU), from its initial 6 member Coal and Steel Community in 1951 (comprised of Germany, France, Italy, Belgium, the Netherlands and Luxembourg), has grown in stature, size and importance. Today it has 27 member states providing a multipolarity of presence within the current geo-political framework¹. Recovering from the destruction of World War Two, Europe has restored to a certain degree it's standing to become a key part of the postwar global order. However, this development was within the context of the western global order and almost always as a junior partner of the USA.

Equally China, went from a perpetually occupied and destroyed nation pilloried by foreign powers in the previous centuries to the 1949 victory and creation of the People's Republic of China (PRC). In 1975 China was leaving the ravages of the Cultural Revolution behind and become an industrial powerhouse. Today it is the second biggest economy in the world after the United States.

This paper seeks to examine the 50 years of formal relations between the EU and China and underscore the highs and lows of this relationship. The scale of change and turbulence which has affected this relationship will not subside in the next 50 years. Rather, the next 50 years will see changes in the positioning of these two entities which more than likely will favour China rather than the EU.

¹ In 2016 the UK held its referendum on leaving the European Union which was successful. Since 2020 the UK was no longer a member of the European Union bringing the total number of member states from 28 to 27.

THE EARLY FORMATIVE YEARS OF A RELATIONSHIP: THE EU AND CHINA

In May 2025 the EU and China celebrated their 50 years of diplomatic relations. Politically, the relationship has sometimes been quite distant, with significant ideological differences. Nonetheless the relationship has focused primarily on business and trade. As espoused by one Chinese source, “Over the past five decades, China-EU relations have gradually become a cornerstone of international relations and exercised a profound influence over world politics, security, trade, investment, technological innovation, and the environment” (CEIBS 2025).

Momentum towards a new relationship between western nations and China really developed after former US President Richard Nixon opened up to China after decades of shunning it. Following negotiations led by Nixon’s then Secretary of State, Henry Kissinger, Richard Nixon and Chairman Mao met in early 1972. This led to numerous western nations recognising and establishing diplomatic relations with the PRC including the Netherlands as well as the European Community in 1975. This political recognition of the PRC set the scene for a forward-looking relationship in a developing new world. This was a radical shift from the 1950s and 1960s when the PRC was dismissed as an enemy both of capitalism economically and of the West.

Over 40 years of economic development in China started from its economic reform in 1978, with the Deng Xiaoping ‘open door’ policy (Chung, 2011), which transformed China from an underdeveloped country into the second largest global economy. Moreover, its trade reach has gone from being the largest trade partner in a handful of countries in 2000 to being the largest trade partner with over 150 countries in 2024.

China has advanced economically in seismic ways Deng’s reform and in part because it could only get better after such a low point in history (Mascitelli & Chung 2019). Another China observer noted, “In the extraordinary era from 1978 through the middle of the 1990s, China had the fastest growing economy in the world, perhaps the fastest in world history” (Chang, 2001).

The EU granted China the “most-favoured-nation” status as early as 1985 and since entering the WTO in 2001, EU-China trade relations progressed in a very positive direction, a development acknowledged by both sides. The EU trade deficit with China in the early years remained modest thus avoiding any pressure on EU officials to seek remedies, a sentiment shared by most EU member states.

In the 20 years after its entry into the World Trade Organization (WTO), China’s extraordinary growth began to prompt tensions with the EU. Its relationship with the EU took a distinctly negative turn in March 2019 when the European Commission published in its “EU-China Strategic Outlook”, describing China now as a partner, competitor and systemic rival (European Commission 2019). This was seen as quite a drastic move from a past dominated by engagement and interdependence. The question worth asking is why the EU moved from engagement with China to a much more negative “systemic rival” perspective relationship with China? As one scholar has noted:

“If China continues its impressive economic growth over the next few decades, the US and China are likely to engage in an intense security competition with considerable potential for war. Most of China’s neighbours, to include India, Japan, Singapore, South Korea, Russia and Vietnam, will join with the US to contain China’s power” (Mearsheimer 2005).

The Mearsheimer view, often referred to as “Offensive Realism”, observes that states co-exist in a world without a supreme and higher body which can cause great powers to be aggressive seeking to maximize their power and achieve regional hegemony for survival. This state of play will lead to nations to competition, seeking security, but creating levels of distrust and therefore potential conflict. The theory also notes that states will place emphasis on military capability and anticipate rivals’ hostility rather than exploring opportunities for cooperation (Mearsheimer 2001). While Mearsheimer’s view can be applied to aspects of the rise of China, there are also many other dimensions which simply cannot be explained by this perspective.

CHINA: A THREAT OR A PARTNER?

There is little doubt that the EU and China come from fundamentally diverse historical experiences reflected in different cultures, values, beliefs and political systems. These circumstances can contribute to considerable misunderstanding of each other. After the end of the Second World War, the USA assume a position of dominance amongst western powers, acting as the global leader position managing a global currency, financial system and international political processes. Its trading prowess also provided political and military leadership to its western allies including Europe.

Throughout, the EU has maintained a cautious stance toward China, epitomized by the EU-China Strategic Outlook in 2019 (European Commission 2019). This trilateral approach was later reiterated in the European Council's conclusion on China. This has coincided with the EU, under the leadership of Ursula Von der Leyen, adopting more assertive posturing. This was further reinforced with Von Der Leyen's speech to the EU Parliament in March 2023 which reaffirmed this changed strategic outlook. It raised the stakes on a more assertive stance with China, further strengthened by the release of the European Economic Security Strategy in June 2023 (European Commission 2023). China's position over the recent decades has undergone significant change. It has quietly grown in economic importance, the second largest after the US, to the extent that it has become a key player at almost every level. As such it is inevitable that it will compete with the US and become an alternative especially within the global institutions. This has been reinforced by the emergence of an alternative geo-political world such as BRICS (Brazil, Russia, India, China and South Africa). The Western political leadership, primarily through the US, has set out to ensure that China is not to lead the world. This is a dilemma for many countries throughout the globe who have relied on the US to be the leader in the world and faced with this rivalry might be faced to make a choice. For the moment the EU is placing all its support behind the US and the "rules-based order" – but for how long?

EU-China trade grew substantially from its \$US2.4 billion in 1975 to massive \$US 785.8 billion in 2024 (Lai & Fan, 2025). At the annual conference of the 50-year anniversary round table in July 2025, the former German Ambassador to China, Michael Schaefer, stated in his opening speech that EU and China have some competitive relationships in traditional fields however the new corporation and growth should come from AI, digital tech and clement change (Lai & Fan, 2025). China on the other hand recognises the EU as its second largest trading partner, despite recent tensions, values this relationship which is worth US\$930 billion in two-way trade (Lai & Fan, 2025).

BELT AND ROAD – EUROPE'S UNITED FRONT IN OPPOSITION

The Chinese Belt and Road initiative (BRI) has enlisted around 150 countries across all continents to its initiative. Its intent was to promote global development and interconnectivity through a vast network of transportation, energy, and telecommunications infrastructure projects. According to one report on the BRI:

2024 saw a record year of Chinese BRI engagement with USD70.7 billion in construction contracts and about USD51 billion in investments. Cumulatively, Chinese BRI engagement has reached USD 1.175 trillion since 2013. Preliminary data on Chinese engagement through financial investments and contractual cooperation for 2024 in the 149 countries of the Belt and Road Initiative show about 340 deals worth USD121.8 billion. This compares to USD 92.3 billion BRI engagement in all of 2023—an increase of 31% (Griffith Asia Institute, 2025).

There was both resistance and even opposition to the BRI not only from the US but also from Western Europe. The combined G7 countries sought not only to dismiss the BRI but actively campaign against it. Not one of the European states is a participant of Belt and Road, and the only member state to have adhered to BRI, temporarily, was Italy in 2019. After pressure was exerted on Italy 22, the Meloni far right government withdrew from the BRI in December 2023. When Italy indicated its support for BRI both in Washington and in Europe there was concern from the powerhouses of the west (Mazzocco and Palazzi 2023).

According to Longhi (2025), the withdrawal from the Belt and Road Initiative (BRI) in 2023 signalled a major shift in Italy's China policy – that of a more cautious approach. At the European level however, Europe felt it needed to counter BRI with own version. In 2021 the EU Commission President launched "Global Gateway and

China's Belt and Road Initiative — Fighting the Last War". The Joint Communication launched Global Gateway as a new approach to international cooperation. According to EU researchers:

...the policy was a clear attempt to provide an alternative investment platform to Beijing's Belt and Road Initiative (BRI)... with Global Gateway, "Europe wants to present a higher-quality, more sustainable and more values-driven alternative" (Leffler & Costello 2024).

Prominent EU scholar Tocci (2025), however, asked the question if the EU "can realistically counter China's vast belt and road initiative, or should it reconcile itself to its own 'global gateway' infrastructure initiative being complementary to it?"

MORE RECENT SKIRMISHES AND COUNTER MOVE BETWEEN THE EU AND CHINA

The EU released in 2019 a defining summary of EU-China relations. Under the title of "EU-China Strategic Outlook", it defined:

"... China as a partner, competitor and systemic rival..." indicating China's behaviour has become more assertive, not only in terms of domestic security and economic policies, but also in its posture at international level" (Jochheim 2023).

The document noted "rising domestic authoritarianism" and raised concern about "China's ambiguous position on Russia's war on Ukraine" alongside "the rising EU trade deficit with China" as reasons for the EU to see China as a competitor and systemic rival (Jochheim 2023). Since March 2019, the European Union has referred to China as "a cooperation partner..., a negotiating partner..., an economic competitor..., and a systemic rival". The EU has put an arms embargo and numerous anti-dumping measures against China in place. China's stance on the war is the biggest thorn in Europe-China relations (Tocci, 2025).

What most upset the EU parliament, beginning in 2022, was China maintained its 'neutrality' on the question of Ukraine and Russia. The policy on China took another downward turn at the NATO summit in 2024. As NATO is in effect Europe's defence alliance, with 30 of the 32 members located in Europe, the 2024 annual NATO summit, on releasing its report on its deliberations, made an unprecedented attack against China in relation to Russia and the Ukraine war. It stated:

"The PRC has become a decisive enabler of Russia's war against Ukraine through its so-called 'no limits' partnership and its large-scale support for Russia's defence industrial base" (Iordache 2024).

The commentary was without precedent and went further than was expected. The NATO summit called on Beijing to "cease all material and political support to Russia's war effort" specifically naming the transfer of "dual-use materials, such as weapons components, equipment, and raw materials that serve as inputs for Russia's defence sector" (Iordache 2024). Naturally China denounced these allegations and the hostile tone against China advanced by the summit which only confirmed the tense and unavoidable division that had developed between the west and China through the prism of Russia's war against Ukraine. China immediately undertook pushback and denounced the "unfounded accusations" made by the NATO summit. The Chinese foreign ministry spokesperson said NATO's "hyping up" of China's responsibility towards the Ukraine crisis "comes with malicious intent" (Lee 2024). The relationship between the two had clearly deteriorated, no longer a matter of semantics.

In early July 2025 China's spokesperson indicated that:

"China is not a party to the Ukraine issue...China's position on the Ukraine crisis is objective and consistent, that is, negotiation, ceasefire and peace. A prolonged Ukraine crisis serves no one's interests... China wanted a political settlement as quickly as possible...Together with the international community and in light of the will of the parties concerned, we will continue playing a constructive role towards this end" (Paton Walsh 2025).

At the most recent July 2025 EU-China summit, EU Commission President Von Der Leyen returned to this matter insisting:

"... we also know that China's unyielding support for Russia is creating heightened instability and insecurity here in Europe. We can say that China is de-facto enabling Russia's war economy. We cannot accept this.

And I have always said: how China continues to interact with Putin's war, will be a determining factor for EU-China relations going forward. If China claims to defend the international rules-based order – then it should unequivocally condemn Russia's gross violation of Ukraine's sovereignty, territorial integrity and internationally recognized borders. And act accordingly” (European Commission 2025).

Only a few weeks before the summit, Chinese Foreign Minister Wang Yi, told the European Union's Foreign Policy chief Kaja Kallas that China could not accept Russia losing its war against Ukraine as this would allow the USA to turn its full attention to creating tension with China (Walsh 2025). If there was any confusion previously of where China stood on the war in Ukraine this was clearly countered by the Foreign Minister's response (Walsh 2025).

THE EMERGENCE OF BRICS – THE EAST VERSUS WEST?

The tensions between the West (US-Europe) and China have also emerged around the BRICS conglomeration (Brazil, Russia, India, China and South Africa) and its slow but methodical response to Western dominance in the world. The establishment of BRICS, a body it was designed to represent the world's emerging markets, raised eyebrows in 2006 when it was first mooted. . Indirectly it was also intended to act as a counterweight to the G7 and G20, dominated by rich-world economies. More recently it has taken on greater cohesion and effect to the point that it threatens the existing post war financial and trading norms. It was a movement of nations sidestepping the so-called rules-based order which was prominently that of the US order which had shaped things from the end of the Second World War. According to its official description noted by the BRICS rotating Presidency of Brazil:

“It serves as a political and diplomatic coordination forum for countries from the Global South and for coordination in the most diverse areas. The objectives of BRICS include strengthening economic, political, and social cooperation among its members, as well as increasing the influence of Global South countries in international governance. The group seeks to improve the legitimacy, equity in participation, and efficiency of global institutions such as the UN, IMF, World Bank, and WTO. Moreover, it aims to bolster sustainable social and economic development and promote social inclusion” (BRICS 2025).

The European political establishment seems to be unwilling yet to recognise the global significance of BRICS. More seriously BRICS is also a competitor to the EU and has as much economic and population clout as the G7. As one observer noted:

“Despite the BRICS gaining popularity over the years, the organisation still receives hardly any attention from the European Union (EU).....However, the increased interest in BRICS membership shows that countries in the ‘global south’, a term referring to non-Western countries, are looking for alternatives to existing international organisations such as the United Nations (UN)” (Herder 2024).

The European and Western misunderstanding of the significance of BRICS was underscored by the dismissive and now embarrassing assessment of BRICS by former Dutch Prime Minister and now NATO Secretary General Mark Rutte who in April 2024:

“... who called the BRICS a “very insignificant, messy little club” that we should not take too seriously. He said this is partly because China and India have been embroiled in a border dispute for years” (Herder 2024).

What Rutte defines as a “messy club” has 11 full members and number of associated members especially across the Global South and East. BRICS expands to 56% of world population, 44% of global GDP when Vietnam joins as a partner country (Norton 2025). BRICS has assumed a global role that has gone beyond the initial expectations. China is the key pillar of BRICS and the entity feeling most threatened is Europe. Moreover, the global tariff war and Indian response to the US secondary tariffs, has pushed India and China closer together like they have not been in decades. This truly is a shift in global positioning of major powers in the globe.

“LIGHT ON THE HILL” ON THE QUESTION OF GREEN ENERGY

Despite the strategic stalemate at the EU-China summit in 2025, there was one area of notable cooperation: green energy. The two sides issued a joint statement agreeing to accelerate the development and deployment of green energy technologies and reaffirmed their support for the Paris Climate Agreement (Alexander-Hill 2025). Yao Ling, the head

of International Trade and Economics Corporation Research College, Institute of European Studies, Ministry of Economics, stated “in green energy, although Europe started early, China has grown rapidly in PV, EV and other green energy sectors. It now has 70% of the world market. It clearly added pressure on the EU (Lai & Fan 2025). The EU Green Deal, proposed by Von der Leyen, while diminished in its reach, remained important for Europe’s state-directed green energy transition and in alignment with much that is occurring in China. While China remains the major emissions emitter in the world, it is at the same time, the major manufacturer of mass-produced green technology. As demonstrated through its exports of affordable solar panels and electric vehicles, it will be a key player in green technology which is of considerable interest to the EU. China accounts for 40% of the world’s renewable energy capacity and invested \$818 billion in green energy in 2024, according to data from the World Economic Forum (Alexander-Hill 2025). On the 24th of July 2025, at the 25th China-EU leadership conference, both parties signed the joint announcement “The joint announcement on how to counter climate change by the China-EU leadership”. The memorandum titled “Green Technology Collaboration” signed in April 2024 between the EU and China committed to 15 billion Euro joint investments in the coming three years (Lai & Fan 2025). This is clear further evidence of China-EU green energy collaboration.

CONCLUSION

The EU and China celebrated fifty years of relations in 2025. While this has been a commendable achievement, it is unlikely to be as positive in the next 50 years. The now de facto multi-polar world will require significant readjustments not only at the institutional level but also at the bilateral level. The uni-polar world is disappearing, and the European Union will need to also accept that the “global south” whether it is through the BRICS or other arrangements is demanding acknowledgement and engagement. China, India and dare we say Russia are global powers which cannot be sidelined and the West, which includes the European Union, cannot go on acting as though only the west counts. China is the key component of the global south and the relationship with China will need to progress from one of “competition” (or rivalry) to one of acceptance and cooperation.

Europe and China have come a long way in their 50-year relationship with great obstacles in their path towards a cooperative relationship many of which have been overcome. The changing geo-political shifts in the globe are however presenting greater obstacles and will require greater levels of recognition and historic readjustments. There is still a long way to go before the vision of a common foreign and security policy becomes a reality especially from the European side. This might require a change of European direction which is struggling to shake off its historical legacies and postwar positioning. China will be pursuing its ground based commercial approach and will work with partners interested in the same. Whether these two distinct scenarios from two historically different partners will be able to meet and cooperate into the future is yet to be seen. The next 50 years will certainly be as rocky as the first 50 years were, and China will certainly be one of the global powers at the table of whatever global order there is. Whether the European Union will be there also is less certain.

REFERENCES

- Alexander-Hill, W. (2025, August 4). China and the EU move forward on green energy without the U.S. *Forbes*. <https://www.forbes.com/sites/wesleyhill/2025/08/04/china-and-the-eu-move-forward-on-green-energy-without-the-us/>
- Bourke, L. (2019). Britain warned it must ban Huawei. *The Age*.
- BRICS. (2025). *About BRICS*. BRICS Brasil. <https://brics.br/en/about-the-brics>
- Burwell, F. (2025, July 28). Trump and von der Leyen made a deal. But the US and EU are drifting apart on trade. *New Atlanticist*, Atlantic Council. <https://www.atlanticcouncil.org/blogs/new-atlanticist/trump-and-von-der-leyen-made-a-deal-but-the-us-and-eu-are-drifting-apart-on-trade/>
- CEIBS. (2025, May 9). *China-EU relations 50th anniversary forum*. China Europe International Business School. <https://www.ceibs.edu/media/events/26860>
- Chang, G. (2001). *The coming collapse of China*. Penguin Books.

Chung, M. (2011). *Doing business successfully in China*. Woodhead Publishing.

Euronews. (2024, May 6). EU ready to make full use of trade defence against China, von der Leyen warns Xi. <https://www.euronews.com/my-europe/2024/05/06/eu-ready-to-make-full-use-of-trade-defence-tools-against-china-von-der-leyen-warns-xi>

European Commission. (2019, March 12). *EU-China – A strategic outlook*. <https://commission.europa.eu/system/files/2019-03/communication-eu-china-a-strategic-outlook.pdf>

European Commission. (2023, June 20). *Joint communication to the European Parliament, the European Council and the Council on "European economic security strategy."* <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:52023JC0020>

European Commission. (2025). *Speech by President von der Leyen at the EP plenary joint debate on EU-China relations* [Speech transcript]. https://ec.europa.eu/commission/presscorner-/detail/en/speech_25_1764

European Parliament. (2021, October 14). *EU-China relations in challenging times* (Briefing). Think Tank. [https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI\(2021\)698751](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2021)698751)

Griffith Asia Institute. (2025, February 28). *China Belt and Road Initiative (BRI) investment report 2024*. Griffith University. <https://blogs.griffith.edu.au/asiainsights/china-belt-and-road-initiative-bri-investment-report-2024/>

Hartmann, T. (2025, June 5). Commission reignites push to exclude Huawei from subsea cable networks. *Euractiv*. <https://www.euractiv.com/section/tech/news-/commission-reignites-push-to-exclude-huawei-from-subsea-cable-networks/>

Herder, S. (2024, October 10). The European Union and the BRICS. *Shaping Europe*. <https://shapingeurope.eu/the-european-union-and-the-brics/>

Iordache, R. (2024, July 11). NATO condemns China as a 'decisive enabler' of Russia's war in Ukraine in most serious rebuke to date. *CNBC*. <https://www.cnn.com/2024/07/11/nato-condemns-china-as-a-decisive-enabler-of-russias-war-in-ukraine.html>

Jochheim, U. (2023, December). *EU-China relations: At a glance* (Plenary briefing). European Parliamentary Research Service. [https://www.europarl.europa.eu/RegData/etudes/ATAG/2023/754637/EPRS_ATA\(2023\)754637_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/ATAG/2023/754637/EPRS_ATA(2023)754637_EN.pdf)

Kissinger, H. (2011). *On China*. Penguin Books.

Kroet, C. (2024, August 12). Eleven EU countries took 5G security measures to ban Huawei, ZTE. *Euronews*. <https://www.euronews.com/next/2024/08/12/eleven-eu-countries-took-5g-security-measures-to-ban-huawei-zte>

Lai, Z. R., & Fan, S. Q. (2025, July 30). Sino-EU trade has entered "a two-way fast track." *STCN*. <https://www.stcn.com/article/detail/2812894.html>

Lee, L. (2024, July 12). China says it will never accept 'unfounded accusations' at NATO summit. *Reuters*. <https://www.reuters.com/world/china/china-says-it-will-never-accept-unfounded-accusations-nato-summit-2024-07-12/>

Leffler, C., & Costello, P. (2024, May 13). Global gateway and China's Belt and Road Initiative: Fighting the last war. *European Democracy Hub*. <https://europeandemocracyhub.epd.eu/global-gateway-and-chinas-belt-and-road-initiative-fighting-the-last-war/>

Long, J. (2024). *EU's China policy report*. Centre of EU-China Relations Studies, Fudan University, Shanghai European Study Centre.

Longhi, G. (2025, January 21). From the BRI to the Action Plan: Italy's China strategy under Meloni. *China Observers (CHOICE)*. <https://chinaobservers.eu/from-the-bri-to-the-action-plan-italys-china-strategy-under-meloni/>

- Mascitelli, B., & Chung, M. (2019, December). Hue and cry over Huawei: Cold war tensions, security threats or anti-competitive behaviour? *Research in Globalization*. <https://doi.org/10.1016/j.resglo.2019.100002>
- Mazzocco, I., & Palazzi, A. L. (2023, December 14). Italy withdraws from China's Belt and Road Initiative. *Center for Strategic and International Studies*. <https://www.csis.org/analysis/italy-withdraws-chinas-belt-and-road-initiative>
- Mearsheimer, J. (2005, November 18). The rise of China will not be peaceful at all. *The Australian*. <https://www.mearsheimer.com/wp-content/uploads/2019/06/The-Australian-November-18-2005.pdf>
- Mearsheimer, J. (2001). *The tragedy of great power politics*. W. W. Norton & Company.
- Nicholson, T. (2025, December 7). European industry faces 'life or death,' Macron says — and China needs to help. *Politico*. <https://www.politico.eu/article/europe-china-emmanuel-macron-foreign-investment-trade/>
- Norton, B. (2025, July 4). BRICS expands to 56% of world population, 44% of global GDP: Vietnam joins as partner country. *Geopolitical Economy*. <https://geopoliticeconomy.com/2025/07/04/brics-expansion-population-gdp-vietnam/>
- Patton Walsh, N. (2025, July 4). China tells EU it can't accept Russia losing its war against Ukraine, official says. *CNN*. <https://edition.cnn.com/2025/07/04/europe/china-ukraine-eu-war-intl>
- Shear, M., & Smialek, J. (2025, April 15). Why Europe fears a flood of cheap goods from China. *The New York Times*. <https://www.nytimes.com/2025/04/14/world/europe/-europe-china-dumping-tariffs.html>
- Tocci, N. (2025, September 23). Europe has lost one superpower ally — can it afford to be in the crosshairs of two? *The Guardian*.

CONSTITUTIONALISING MANDATORY MEDIATION UNDER ESTA: A CASE NOTE ON MARAIS NO AND ANOTHER v DANIELS AND OTHERS

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ABSTRACT

South Africa's land reform framework is constitutionally anchored in section 25(6) of the Constitution, which guarantees legally secure tenure or comparable redress to persons whose tenure is insecure due to past racially discriminatory laws. The Extension of Security of Tenure Act 62 of 1997 (ESTA) constitutes a central legislative mechanism through which this constitutional promise is realised.

ESTA was enacted to protect the tenure of vulnerable individuals living on rural and farming land. Historically, ESTA evictions were heavily adversarial and heavily favored landowners. However, the constitutional jurisprudence pioneered in PE Municipality (the necessity of mediation to achieve justice and equity) and Olivia Road (the constitutional duty of meaningful engagement) established that rendering people homeless through adversarial courts without prior dialogue is fundamentally unconstitutional.

The Full Bench decision in Marais NO and Another v Daniels and Others marks a significant development in South African land tenure jurisprudence by clarifying the legal status of mediation under the ESTA, as amended, and the Land Court Act 6 of 2023 (LCA). While mediation has historically been treated as a discretionary alternative dispute resolution mechanism, recent legislative reform and judicial interpretation have repositioned it within a rights-based constitutional framework. Drawing on theories of transformative constitutionalism, procedural justice, and access to justice, this article interrogates whether mediation under ESTA has evolved into a mandatory procedural safeguard integral to the protection of section 25(6) tenure rights.

Using a doctrinal methodology grounded in statutory interpretation and constitutional analysis, the article examines the reasoning of the Land Court in Marais, situating it within broader eviction jurisprudence and comparative international approaches. It argues that the judgment effectively constitutionalises mediation by embedding it as a prerequisite to eviction proceedings and linking it directly to dignity, equality, and tenure security. The article concludes that mandatory mediation represents a substantive shift in eviction law and recommends the development of institutional frameworks to ensure its consistent and effective implementation.

Keywords: adjudication, constitutional, equality, eviction, land, mediation.

INTRODUCTION

South Africa's constitutional commitment to land reform is rooted in the need to redress historical dispossession and structural inequality. Section 25(6) of the Constitution guarantees that persons whose tenure is legally insecure as a result of past racially discriminatory laws are entitled to legally secure tenure or comparable redress. The *Extension of Security of Tenure Act 62 of 1997 (ESTA)* is one of the primary legislative instruments through which this constitutional guarantee is realised.

Despite its protective purpose, eviction proceedings under ESTA have historically been adversarial and formalistic, often reinforcing rather than alleviating power imbalances between landowners and vulnerable occupiers. Courts have attempted to soften this adversarial framework through the development of the principle of "meaningful engagement," particularly in cases such as *Port Elizabeth Municipality v Various Occupiers* (2004) and *Occupiers of 51 Olivia Road v City of Johannesburg* (2008). However, these interventions have remained largely judicial rather than structural.

Port Elizabeth Municipality v Various Occupiers (2004) and *Occupiers of 51 Olivia Road v City of Johannesburg* (2008) laid the constitutional groundwork that eviction is not merely a box-ticking legal exercise, but a human problem requiring dialogue. This jurisprudence made it impossible for the legislature to ignore the lack of mandatory engagement in rural evictions, ultimately leading to the recent ESTA amendments that now legally compel mediation before an occupier can be lawfully evicted.

While both of these cases originally dealt with urban evictions under different statutes (the Prevention of Illegal Eviction from and Unlawful Occupation of Land Act 19 of 1998 (PIE Act) and the National Building Regulations), they birthed the constitutional imperative of pre-eviction dialogue, which has now fundamentally reshaped ESTA.

The decision in *Marais NO and Another v Daniels and Others* (2024) represents a decisive shift from this position. By interpreting recent amendments to ESTA alongside the LCA the Court held that mediation is no longer optional but mandatory in eviction proceedings. This article argues that the judgment does more than clarify procedure—it fundamentally transforms mediation into a constitutional safeguard.

A further dimension of this development lies in the shift from judicially crafted engagement obligations to legislatively entrenched procedural duties. While earlier jurisprudence required courts to infuse eviction proceedings with elements of equity and fairness, the absence of a clearly defined procedural mechanism often resulted in inconsistent application. The formalisation of mediation through statutory amendment resolves this uncertainty by providing a structured and enforceable framework within which engagement must occur. This shift reflects a broader movement in South African constitutional law toward embedding transformative principles within legislative design, thereby reducing reliance on ad hoc judicial intervention.

LEGISLATIVE FRAMEWORK

The *Extension of Security of Tenure Act 62 of 1997*

ESTA regulates the conditions under which occupiers may be evicted from land. Section 9 provides that eviction must be just and equitable, taking into account all relevant circumstances. Sections 10 and 11 set out specific requirements for lawful eviction, including considerations of fairness and the availability of alternative accommodation.

Recent amendments to ESTA introduce explicit references to mediation. In particular, sections 10(1)(e) and 11(2)(b) now require that disputes be referred to mediation or arbitration before eviction orders may be granted. These provisions reflect a legislative intention to prioritise consensual dispute resolution over adversarial litigation.

The integration of mediation into ESTA must also be understood in light of section 39(2) of the Constitution, which requires courts to promote the spirit, purport and objects of the Bill of Rights when interpreting legislation. In this context, the inclusion of mediation provisions cannot be viewed as merely procedural; rather, it constitutes a deliberate legislative attempt to align eviction processes with constitutional values. The requirement that parties engage in mediation prior to eviction introduces a participatory dimension into what has traditionally been a unilateral process, thereby enhancing both procedural and substantive fairness.

The *Land Court Act 6 of 2023*

The LCA establishes a specialised judicial forum for land-related disputes and embeds mediation as a central feature of its procedural framework. The Act promotes the use of alternative dispute resolution mechanisms to facilitate equitable and efficient outcomes in land reform matters. Importantly, it signals a broader policy shift toward integrating mediation into the core of land adjudication.

THEORETICAL FRAMEWORK

This article is grounded in three interrelated theoretical perspectives. Transformative constitutionalism, as articulated by Klare, views the Constitution as a tool for achieving substantive social change. Within this framework, legal processes must actively dismantle structural inequalities rather than merely resolve disputes.

Procedural justice theory emphasises the importance of fairness in legal processes, particularly the opportunity for affected parties to be heard and to participate meaningfully in decision-making. Mediation aligns with this theory by promoting dialogue and mutual understanding.

Access to justice theory highlights the need to remove barriers that prevent vulnerable individuals from engaging effectively with the legal system. By reducing costs and formalities, mediation enhances access to justice and promotes substantive equality.

From a normative perspective, mandatory mediation reflects a convergence between adjudicative justice and participatory justice. Whereas traditional litigation privileges formal legal rights and judicial determination, mediation emphasises dialogue, mutual recognition, and negotiated outcomes. This hybridisation of dispute resolution mechanisms is particularly significant in the context of land reform, where disputes are rarely confined to legal entitlements alone but are deeply embedded in historical, social, and economic realities. By requiring parties to engage in mediation, the law acknowledges that sustainable resolutions often depend on relational repair and contextual sensitivity rather than purely legal adjudication.

CASE ANALYSIS: *MARAIS NO V DANIELS*

The central issue before the Land Court in Marais was whether mediation under ESTA and the *LCA* is mandatory or discretionary. The Court engaged in a purposive interpretation of the statutory provisions, taking into account the constitutional context and the objectives of land reform.

The Court held that mediation is a mandatory prerequisite to eviction proceedings. It reasoned that the language of the amended provisions, read in light of constitutional values, imposes a clear obligation on parties to attempt mediation before approaching the court. (Marais 2024) This interpretation was reinforced by the purpose of the legislation, which seeks to promote equitable and non-adversarial dispute resolution.

The Court further distinguished between formal mediation and informal negotiations. It held that informal engagement between parties does not satisfy the statutory requirement, as mediation must occur within a structured and regulated framework. (Marais 2024) This distinction ensures that mediation is not reduced to a procedural formality but retains its substantive integrity.

In addressing the temporal application of the amendments, the Court held that the mandatory mediation requirement applies prospectively. However, it recognised that courts retain discretion to refer pending matters to mediation where appropriate. (Marais 2024).

The Court's reasoning in Marais is particularly noteworthy for its purposive approach to statutory interpretation. Rather than adopting a narrow textual reading, the Court situated the mediation provisions within the broader constitutional framework governing land rights and eviction. In doing so, it emphasised that statutory interpretation must be responsive to context, purpose, and constitutional values. This approach is consistent with established principles articulated by the Constitutional Court, which require that legislation be interpreted in a manner that advances, rather than undermines, fundamental rights. The judgment therefore represents a coherent application of constitutional interpretive methodology to a developing area of land law.

CONSTITUTIONAL IMPLICATIONS

The judgment in Marais must be understood within the broader context of constitutional jurisprudence on evictions and housing rights. In Port Elizabeth Municipality, the Constitutional Court emphasised the need for courts to infuse

elements of grace and compassion into eviction proceedings (Port Elizabeth Municipality 2004). Similarly, in *Olivia Road*, the Court required meaningful engagement between municipalities and occupiers before eviction could take place (*Olivia Road*, 2008).

The Marais decision builds on this jurisprudence by institutionalising meaningful engagement through mandatory mediation. By doing so, it transforms what was previously a judicially developed principle into a statutory and procedural requirement.

The judgment also reinforces the constitutional values of dignity and equality. In *Daniels v Scribante*, the Constitutional Court recognised that occupiers are entitled to live in conditions consistent with human dignity. (*Daniels v Scribante*, 2017) Mediation provides a forum in which these dignity interests can be articulated and negotiated.

The constitutionalisation of mediation also has important implications for the doctrine of proportionality in eviction cases. By requiring parties to attempt mediation before resorting to litigation, the law introduces an additional layer of scrutiny into the eviction process. Courts are no longer confined to assessing the substantive fairness of an eviction order; they must also consider whether less restrictive means—namely, mediated settlement—were adequately pursued. This aligns eviction law more closely with constitutional standards that demand that limitations on rights be reasonable and justifiable in an open and democratic society.

RELATIONSHIP WITH EXISTING JURISPRUDENCE

The decision in Marais represents a natural progression in South African land law. Earlier cases such as *Baron v Claytile* (Port Elizabeth Municipality, 2004) highlighted the need for fairness in eviction proceedings but did not prescribe specific procedural mechanisms to achieve this. The introduction of mandatory mediation fills this gap by providing a structured process through which fairness can be realised.

At the same time, the judgment departs from the traditional view of mediation as voluntary. By making mediation compulsory, the Court challenges conventional understandings of alternative dispute resolution and redefines its role within the legal system.

COMPARATIVE AND INTERNATIONAL PERSPECTIVES

Internationally, mediation is increasingly used in housing and land disputes. In jurisdictions such as the United Kingdom and the United States, mediation is often encouraged but rarely mandated. South Africa's approach is therefore distinctive in its constitutionalisation of mediation.

This development contributes to global debates on the role of alternative dispute resolution in protecting socio-economic rights. It demonstrates that mediation can function not only as a case-management tool but also as a mechanism for advancing substantive justice.

The South African approach to mandatory mediation can be contrasted with jurisdictions in which mediation remains voluntary or court-directed rather than compulsory. In many common law systems, mediation is encouraged as a means of reducing court congestion and promoting efficiency, but it is rarely framed as a rights-based requirement. The distinctive feature of the South African model is its explicit connection to constitutional values, particularly in the context of socio-economic rights. This positions South Africa at the forefront of an emerging global discourse on the role of alternative dispute resolution in advancing substantive justice.

PRACTICAL AND POLICY IMPLICATIONS

The judgment has significant implications for legal practitioners, courts, and policymakers. Practitioners must now treat mediation as a jurisdictional prerequisite, ensuring that it is properly conducted and documented before initiating eviction proceedings. Failure to do so may result in delays or dismissal of cases.

Courts are required to scrutinise compliance with mediation requirements and to ensure that the process has been meaningful and fair. This may involve a more active judicial role in overseeing dispute resolution. While courts are now required to be more judicially active in overseeing the requirement of mediation before litigation, this is advantageous to the courts as it will assist to alleviate an already overburdened judiciary and ensure that the courts can hear cases sooner rather than later. For policymakers, the judgment highlights the need for institutional support structures, including the training and accreditation of mediators, the development of procedural guidelines, and the integration of municipalities into the mediation process.

In order to give full effect to the mandatory mediation framework, it is necessary to develop clear institutional guidelines governing its implementation. These should include standards for mediator accreditation, procedural rules for conducting mediation, and mechanisms for monitoring compliance. Without such structures, there is a risk that mediation may be applied inconsistently or reduced to a perfunctory step in the eviction process. Effective implementation therefore requires a coordinated effort between the judiciary, legal profession, and relevant state institutions.

CRITICAL EVALUATION

While the constitutionalisation of mediation represents a significant advancement, it is not without challenges. The requirement of mandatory mediation may introduce delays in urgent cases and place additional strain on limited institutional resources. There is also a risk that formalisation may undermine the flexibility that makes mediation effective.

However, these challenges can be addressed through careful implementation and do not detract from the overall benefits of the approach. The judgment represents a necessary step toward a more equitable and humane system of eviction law.

It is also necessary to acknowledge that the success of mandatory mediation depends on the quality and integrity of the process itself. Poorly conducted mediation may entrench existing inequalities or pressure vulnerable parties into accepting unfavourable outcomes. Safeguards must therefore be put in place to ensure that mediation is conducted in a manner that is fair, voluntary in substance (even if mandatory in form), and sensitive to the needs of vulnerable participants. This underscores the importance of skilled mediators and robust procedural oversight.

CONCLUSION

The decision in *Marais NO v Daniels* marks a transformative moment in South African land tenure jurisprudence. By declaring mediation mandatory, the Court has elevated it from a discretionary mechanism to a constitutional safeguard. This development strengthens tenure security, promotes dignity and equality, and advances access to justice.

Ultimately, the judgment reflects a broader shift toward a more participatory and rights-based approach to dispute resolution. If effectively implemented, mandatory mediation has the potential to reshape eviction law in a manner that is both just and transformative.

Ultimately, the constitutionalisation of mediation signals a broader reorientation of South African eviction law toward a more humane and participatory model of justice. By prioritising dialogue over adversarial confrontation, the legal system acknowledges that eviction disputes are not merely legal conflicts but deeply human experiences that require careful and context-sensitive resolution. The Marais judgment therefore represents not only a doctrinal development but also a normative statement about the kind of legal system envisaged by the Constitution.

AI Declaration: I, Mosiuoa Moeketsi Mashiloane, declare that generative artificial intelligence (AI) and AI-assisted technologies were utilised in a limited and supplementary capacity during the preparation of this manuscript. Such technologies were employed exclusively to assist with language refinement, grammatical editing, spelling correction, readability enhancement, and limited analytical support in relation to data interpretation and research organisation. The manuscript, including its substantive intellectual content, legal analysis, arguments, interpretations, conclusions, and scholarly opinions, was independently conceived, developed, verified, and critically reviewed by me in my personal capacity. No portion of the manuscript was wholly generated by artificial intelligence. I accept full

responsibility and accountability for the accuracy, originality, integrity, and final content of the submitted work, including all AI-assisted modifications and outputs incorporated therein.

REFERENCES

Baron & Others v Claytile (Pty) Ltd & Another. (2017). Eviction jurisprudence in South Africa.

Daniels v Scribante. (2017). Constitutional Court of South Africa.

Extension of Security of Tenure Act 62 of 1997. (South Africa).

Klare, K.E. (1998). Legal culture and transformative constitutionalism. *South African Journal on Human Rights*, 14(1), 146–188. <https://doi.org/10.1080/02587203.1998.11834974>

Land Court Act 6 of 2023. (South Africa).

Marais NO and Another v Daniels and Others. (2023). Land Court of South Africa.

Occupiers of 51 Olivia Road v City of Johannesburg. (2008). Constitutional Court of South Africa.

Prevention of Illegal Eviction from and Unlawful Occupation of Land Act 19 of 1998.

Port Elizabeth Municipality v Various Occupiers. (2005). Constitutional Court of South Africa.

Republic of South Africa. (1996). *Constitution of the Republic of South Africa*, 1996.

TOP MANAGEMENT SUPPORT ON ADOPTING INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN THE TOURISM SECTOR OF SMEs IN URBAN-RURAL AREAS IN THE EASTERN CAPE PROVINCE, SOUTH AFRICA

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ABSTRACT

This study investigates the internal organisational and behavioural factors that influence owner-managers' attitudes and intentions to adopt Information and Communication Technology (ICT) in Small and Medium-sized Enterprises (SMEs) operating within the tourism and hospitality sector. Drawing on the Technology Acceptance Model (TAM) and the Theory of Planned Behaviour (TPB), the study examines the role of perceived usefulness, perceived ease of use, behavioural intention, perceived behavioural control, and top management support in shaping ICT adoption decisions. A quantitative research design was used. Primary data were collected from 114 tourism SME owner-managers in the Eastern Cape Province using a structured questionnaire with five-point Likert-scale statements about ICT adoption. The numerical data were coded, keyed, and analysed with the Statistical Package for the Social Sciences (SPSS). Descriptive and component analyses were performed to examine patterns and relationships between the study variables and to assess the challenges associated with ICT adoption.

The findings indicate that positive managerial attitudes, perceived ease of use, perceived usefulness, and strong top management support significantly enhance ICT adoption. Conversely, limited digital competencies, perceived implementation costs, and low technological confidence remain key barriers to effective ICT utilisation. The integrated TAM–TPB framework proved valuable in explaining both cognitive evaluations and behavioural intentions related to ICT adoption. This study adds to the ICT adoption literature by empirically integrating the Technology Acceptance Model and the Theory of Planned Behaviour within the tourism SME context, while providing practical insights for policymakers and SME support agencies aimed at strengthening managerial digital capabilities and strategic ICT utilisation. Overall, the study highlights the importance of fostering managerial commitment and digital confidence to support innovation, competitiveness, and long-term performance in tourism SMEs.

Keywords: top management support, benefits, performance, SMEs.

INTRODUCTION

The tourism industry is one of the most significant contributors to the global economy, and small and medium-sized enterprises (SMEs) are a crucial part of this sector. The adoption of information and communication technology (ICT) can provide SMEs with several benefits, including improved business performance, streamlined operations, and enhanced customer satisfaction (Li, Zhou and Huang 2023). However, there are several internal and external factors that influence the attitude of SMEs towards ICT adoption. This paper will focus exclusively on the internal factors influencing the research variables. One of the critical internal factors that affect SMEs' attitude of top management towards ICT adoption. Organizational culture, availability of resources, perception of risk, and employee attitudes are also important internal factors that influence the adoption process (Yoo et al. 2021). Furthermore, addressing the barriers that can hinder the adoption of ICT in tourism SMEs, such as lack of financial resources, technological expertise, and awareness, is also vital for successful adoption (Kim, Jang and Yang 2017). According to Alam et al. (2022a: 8) organizational culture plays a significant role in the adoption process of digital technology. A positive and open attitude towards ICT can prepare organization better for the adoption process. The usage of ICT also enables

SMEs to acquire access to new geographic markets, providing them with more opportunities to overcome scale disadvantages in particular business areas. E-commerce, powered by digital technologies, has also proven to be a game changer for SMEs, removing obstacles caused by distance from customers (Alam et al., 2022). Kamal (2019) states that the challenges of ICT adoption in SMEs depend on the nature of the enterprise. Enterprises with less than ten employees may require extensive skills to gather business intelligence and solve problems, access networks of resources, and professional services. Lack of information, constant fear of failure, and short-term risk-averse behaviour can also inhibit ICT adoption among SMEs. Organizational, financial, infrastructural, technological, and infrastructural factors are significant inhibitors of ICT adoption among SMEs (Rahayu and Day cited in Okundaye, Fan, and Dwyer, 2019). Innovation in marketing and selling business, using IT, and developing a competitive advantage can help SMEs gain exposure and communicate more effectively with consumers and partners (Chege and Wang 2020). However, innovation comes with costs, and consumers may not always see the value of using new technology.

LITERATURE REVIEW

Theoretical Literature

According to Al Omoush, Al-Qirem and Al Hawatmah (2018) the support of senior management, organizational culture, and staff expertise are all parts of the organizational context. The organizational context of a company significantly influences how it decides to implement and integrate ICT (Premkumar, 2003).

The successful acceptance of an innovation is facilitated by top management backing, ICT skills of the personnel, and organizational innovation orientation (Wang and Shi, 2009). Hence, SMEs in tourism need to be creative and innovative in ICT adoption. It is critical to have top management support to create a healthy organizational climate and to give sufficient resources for SMEs to adopt new technology breakthroughs (Karkonasasi *et al.* 2016). According to Kim, Jang and Yang (2017), senior management support is more crucial than resources or IT capacity when it comes to adoption. As a result, without senior management backing, the decision to embrace IT is unlikely to be successful (Martins, Oliveira and Thomas 2016).

Therefore, tourism owners/managers in Eastern Cape need to have full support from top management on adoption of ICT. According to Fidha and Tarifa, (2009) cited in Mulungula et al. (2022: 863), a key component in describing a lot of organizational behaviour is corporate culture assumed that organizational culture, competitive pressure, the number of customer-supplier partners, and a lack of resources are independent variables. Numerous studies have demonstrated how organizational culture affects how people use technology, particularly ICT Bhat and Gaur (2009) corporate culture supports or sustains innovation and promotes the adoption of ICT (Rave-Habhab, 2011). It conveys how the organization views innovation in general. Innovation-focused organizations typically implement more innovations and gain a competitive advantage. In this regard, corporate culture significantly influences the formation and advancement of ICT within an organization (Rave-Habhab, 2011). Hence, their organizational culture should change and embrace technology for the benefit of the businesses.

Barriers of SMEs on ICT Adoption

In the opinion of Okundaye, Fan and Dwyer (2018) without access to financial resources to counterbalance the expense of quickly changing technology, ICT adoption by SME leaders becomes difficult (Napitupulu et al., 2018; Rahayu and Day, 2017; Tob-Ogu et al., 2018; Zafar and Mustafa, 2017). ICT adoption challenges for SMEs include both internal and external challenges. According to Tarutė and Gatautis (2014) internal hurdles include organizational features, owner/manager characteristics, cost of adoption and implementation, and return on investment. Okundaye, Fan and Dwyer (2018: 38) highlights that for many small businesses, the costs of purchasing software and computers, recruiting trained ICT people, educating current employees, and other expenses related to the use of ICT are prohibitive (Awiagah et al., 2015; Napitupulu et al., 2018; Rahayu and Day, 2017). Hence, in some instances SMEs in Tourism Eastern Cape may not be able to accept ICT due to cost implications.

These factors included a lack of skilled personnel and a coherent ICT strategy, high investment costs, and access to power, internet bandwidth, and reliable internet connections. Technology adoption enables SMEs to achieve

economies of scale and lets them accomplish their objectives (Kumar *et al.* 2022). Therefore, it is crucial to have top management to Tourism SMEs in Eastern Cape to have ICT at top level strategies in place for the businesses to have infrastructure and empower the employees on ICT skills. Kamarudin *et al.* (2022: 99) agree that SMEs faced several challenges, including power shortages, finance constraints, a lack of management skills and competencies, a lack of knowledge, and corruption.

In the opinion of Marulanda, Lopez and Castaño (2022: 4) the usage of ICT makes it easier for businesses to attain efficiency in their processes and hence become more competitive in their industry. Despite all these ground-breaking solutions, the company that placed a high emphasis on employee welfare still had to deal with various welfare-related problems, including staff members' health, the cost of ICT resources, and power supply. To promote a balanced culture of working from home, alternative power sources were made available to the personnel and sensitization activities were conducted.

Benefits of SMEs on ICT Adoption

As reported by Ziemba (2019: 579) that there are benefits when it comes to the utilization of ICT as it enhances the business to be productive, nurtures innovative, cuts down costs, increase the effectiveness of process services, supplements the competence of business decision making, proactive to clientele needs just in time, and in acquiring new clients. In a related study (Calvo 2019) found that ICT businesses will benefit as there will be an increase in revenue and sales although highlighting that it is not easy to introduce it and at the same time extremely crucial for organizations to succeed. According to Rozmi *et al.* (2020) ICT has a significant impact on business performance and profitability. However, the attitude and knowledge of the SME owner in ICT are the key determinants of a business's acceptance of ICT. As organizations increasingly rely on technology-driven solutions to streamline processes, boost productivity, and gain a competitive advantage, the demand for experienced employees with a thorough understanding of ICT has grown.

According to Alam *et al.* (2022) people can be better prepared when organizations think about the adoption process when culture, for instance, shows an open and positive attitude toward digital technology. Clearly, the usage of ICT may also enable SMEs to acquire access to new geographic markets. Additionally, it is clear from existing empirical studies that E-commerce powered by digital technologies gives SMEs more opportunities by removing obstacles brought on by distance from customers. Access to new technology may boost competitiveness, allowing SMEs to overcome scale disadvantages in particular business areas. As reported by Al Omoush, Al-Qireem and Al Hawatmah (2018) elaborate that the success of the e-business depends mostly on the entrepreneur's readiness to be more proactive in adopting. Majumdar, Kundu and Manohar (2019) maintain that the SMEs age and experience have a non-lined effect on technology adoption means.

Transformation of ICT in the SMEs

According to Ocaña *et al.*, 2020 cited in Marulanda, Lopez and Castaño (2022: 4) posit that ICT has caused one of the biggest transformations in any industry and has had a significant impact on generations, culture, and education. The urgent need to master the use of ICT extends beyond just using them; rather, it necessitates having a certain level of digital literacy that can address the new learning that comes along with ICT. In the opinion of Okundaye, Fan and Dwyer (2018) without access to financial resources to counterbalance the expense of quickly changing technology, ICT adoption by SME leaders becomes difficult (Napitupulu *et al.*, 2018; Rahayu and Day, 2017; Tob-Ogu *et al.*, 2018; Zafar and Mustafa, 2017). ICT adoption challenges for SMEs include both internal and external challenges. According to Tarutė and Gatautis (2014) internal hurdles include organizational features, owner/manager characteristics, cost of adoption and implementation, and return on investment. Okundaye, Fan and Dwyer (2018: 38) highlights that for many small businesses, the costs of purchasing software and computers, recruiting trained ICT people, educating current employees, and other expenses related to the use of ICT are prohibitive (Awiagah *et al.*, 2015; Napitupulu *et al.*, 2018; Rahayu and Day, 2017). Hence, in some instances SMEs in Tourism Eastern Cape may not be able to accept ICT due to cost implications.

These factors included a lack of skilled personnel and a coherent ICT strategy, high investment costs, and access to power, internet bandwidth, and reliable internet connections. Technology adoption enables SMEs to achieve economies of scale and lets them accomplish their objectives (Kumar *et al.* 2022). Therefore, it is crucial to have top

management to Tourism SMEs in Eastern Cape to have ICT at top level strategies in place for the businesses to have infrastructure and empower the employees on ICT skills. Kamarudin et al. (2022: 99) agree that SMEs faced several challenges, including power shortages, finance constraints, a lack of management skills and competencies, a lack of knowledge, and corruption

METHODOLOGY

This study used a mixed-method research design. Primary quantitative data were collected using a structured five-point Likert-scale questionnaire measuring ICT adoption-related constructs among tourism SME owner-managers, with numerical data coded and analysed using SPSS.

FINDINGS

The findings are based on data gathered from 114 tourism SMEs in the Eastern Cape Province. The quantitative findings were based on responses to a five-point Likert scale questionnaire that assessed key ICT adoption constructs among SME owner-managers... A component test was performed to analyse the scoring patterns of participants across the Likert-scale statements measuring challenges related to ICT adoption

Table 1: Participant agreement levels on Top Management Support (TMS).

Focus Area statement	Top Management Support (n = 114)					Mean	Std.	P-value
	SA	A	N	D	SD			
I have allocated resources to the top management for ICT	36.8%	39.5%	15.8%	7.9%	0.0%	1.95	0.920	0.000***
I have encouraged management to discuss with employees to support ICT	28.9%	46.5%	19.3%	5.3%	0.0%	2.01	0.836	0.000***
I have made the management to be aware of the benefits of ICT to the company	58.8%	28.1%	10.5%	2.6%	0.0%	1.57	0.787	0.000***
I have encouraged the management to support the use of ICT	62.3%	25.4%	9.6%	1.8%	0.9%	1.54	0.811	0.000***
I have encouraged the management to encourage employees to use ICT	55.3%	28.9%	6.1%	4.4%	5.3%	1.75	1.102	0.000***
P*** <1% Likert scale= Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), Strongly Disagree (SD)								

This section details the scoring pattern of the participants on the statements measuring TMS. As shown in Table 1, there was significant agreement by most participants that they have allocated resources to top management for ICT (76.3 percent), participants have encouraged management to discuss with employees to support ICT (75.4 percent), and participants have made management aware of ICT benefits to the company (86.9 percent). There was also significant agreement by most participants of having encouraged management to support ICT use (87.7 percent), and participants have encouraged management to encourage employees to use ICT (84.2 percent). On average, the mean value suggests the proportion of participants that agreed was higher when compared to those in disagreement. The penultimate statement, “I have encouraged management to support the use of ICT” has the lowest mean value (M=1.54, SD=0.811), this suggests the TMS for this statement was relatively higher than for the other statements.

Rotated Component Matrix

Table 2: Extraction Method: PCA on TMS.

		Comp 2	Comp 3	Comp 4
TMS1	Allocated resources to the top management for ICT	0.523		
TMS2	Encouraged management to discuss with employees to support ICT	0.529		
TMS3	Make the management to be aware of the benefits of ICT to the company		0.653	
TMS4	Encouraged the management to support the use of ICT		0.602	
TMS5	Encouraged the management to encourage employees to use ICT			0.845

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 10 iterations.

These components are an addition to the statistical analysis presented in Table 2. A component test was conducted to assess TMS and SME owner-manager attitudes toward adopting ICT in tourism. The respondents are divided into three categories, based on whether a strong positive significant of 0.845 is shown in the statement regarding management encouraging employees to use ICT. A figure of 0.653 is reflected by respondents who stated they made management aware of the benefits of ICT for the company. On the variables regarding the encouragement of management to support ICT use, a significant 0.602 indicates respondents believe top management in tourism SMEs play a critical role in support of ICT.

LIMITATIONS

The study was limited to only the owners-managers in the tourism and hospitality sector of the Eastern Cape province.

CONCLUSION

Based on the findings, the study concludes that top management support is an important predictor of positive attitudes toward ICT adoption in tourism SMEs. Managerial commitment, particularly through encouraging ICT use and recognizing its organizational benefits, is critical in shaping positive attitudes toward technology adoption. The findings also suggest that when SME owner-managers see ICT as beneficial to business operations, their willingness to support and promote its use increases. In summary, the study confirms that attitudinal outcomes related to ICT adoption are primarily influenced by leadership support and perceived value, which is consistent with the core assumptions of the Technology Acceptance Model and the Theory of Planned Behavior. Increasing top management involvement and emphasizing the strategic importance of ICT are thus critical for facilitating the effective adoption and sustained use of digital technologies within tourism SMEs.

RECOMMENDATIONS

The study recommends that tourism SMEs should prioritise strong and visible top management support by actively promoting ICT initiatives and emphasising their strategic importance to the organisation. Furthermore, policymakers and SME support agencies should implement leadership-focused capacity-building programs aimed at increasing managerial commitment and effective ICT adoption in the tourism industry.

Future research should investigate ICT adoption challenges in tourism SMEs, particularly contextual and structural factors that were not addressed in this study. Longitudinal or comparative studies across regions or SMEs could provide more insight into how managerial attitudes and ICT adoption behaviour change over time.

REFERENCES

- Al Omoush, K. S., Al-Qirem, R. M., & Al Hawatmah, Z. M. (2018). The degree of e-business entrepreneurship and long-term sustainability: An institutional perspective. <https://doi.org/10.1007/s10257-017-0340-4>
- Alam, K., Ali, M. A., Erdiaw-Kwasie, M., Shahiduzzaman, M., Velayutham, E., Murray, P. A., & Wiesner, R. (2022a). Impact of ICTs on innovation and performance of firms: Do start-ups, regional proximity and skills matter? *Sustainability*, 14(10), Article 5801.
- Alam, K., Ali, M. A., Erdiaw-Kwasie, M. O., Murray, P. A., & Wiesner, R. (2022b). Digital transformation among SMEs: Does gender matter? *Sustainability*. <https://www.mdpi.com/2071-1050/14/1/535>
- Berndt, A. E. (2020). Sampling methods. *Journal of Human Lactation*, 36(2), 224–226.
- Calvo, J. S. (2019). *How ICT introduction is changing processes in manufacturing SMEs*. UVaDOC. <https://uvadoc.uva.es/bitstream/handle/10324/38697/TFG-I-1420.pdf?sequence=1&isAllowed=y>
- Chege, S. M., & Wang, D. (2020). The influence of technology innovation on SME performance through environmental sustainability practices in Kenya. *Technology in Society*, 60, Article 101210. <https://doi.org/10.1016/j.techsoc.2019.101210>
- Chua, X. J., Kasim, N., Zainal, R., & Musa, S. M. S. (2022). ICT implementation for improving communication among SME contractors in construction industry. *Research in Management of Technology and Business*, 3(1), 417–430. <https://penerbit.uthm.edu.my/periodicals/index.php/rmtb/article/view/7110>
- Creswell, J. W. (2015). Mapping the developing landscape of mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *SAGE handbook of mixed methods in social & behavioral research* (pp. 45–68). SAGE Publications. <https://dx.doi.org/10.4135/9781506335193>
- Dubé, M.-O., Meziane, R. S., Hudon, A., Cavallo, S., Verduyck, I., & Zidarov, D. (2023). Virtual synchronous qualitative data collection methods used in health and social sciences: A scoping review of benefits, challenges and practical insights. *International Journal of Qualitative Methods*, 22, Article 16094069231214679.
- Eze, S. C., Chinedu-Eze, V. C., Bello, A. O., Inegbedion, H., Nwanji, T., & Asamu, F. (2019). Mobile marketing technology adoption in service SMEs: A multi-perspective framework. *Journal of Science and Technology Policy Management*.
- Gibson, W., & Brown, A. (2009). *Working with qualitative data*. SAGE Publications. <https://methods.sagepub.com/book/working-with-qualitative-data>
- Hennink, M., & Kaiser, B. N. (2022). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social Science & Medicine*, 292, Article 114523.
- Ibert, J., Baumard, P., Donada, C., & Xuereb, J. (2001). *Doing management research*. SAGE Publications. <https://methods.sagepub.com/book/doing-management-research>
- Kamal, M. (2019). ICTs, capabilities, and socio-economic development—Results and implications. In *Proceedings of the Southern Association for Information Systems Conference*. St. Simons Island, GA. <https://aisel.aisnet.org/sais2019/17/>

- Karkonasasi, K., Baharudin, A. S., Esparham, B., Mousavi, S. A., & Suhaimi Baharudin, A. (2016). Adoption of cloud computing among enterprises in Malaysia. *Indian Journal of Science and Technology*, 9(48), 1–7. <https://is scholar.sscldl.in/index.php/indjst/article/view/135900>
- Kim, S. H., Jang, S. Y., & Yang, K. H. (2017). Analysis of the determinants of software-as-a-service adoption in small businesses: Risks, benefits, and organizational and environmental factors. *Journal of Small Business Management*, 55(2), 303–325. <https://www.tandfonline.com/doi/full/10.1111/jsbm.12304>
- Knight, H., Megicks, P., Agarwal, S., & Leenders, M. A. A. M. (2019). Firm resources and the development of environmental sustainability among small and medium-sized enterprises: Evidence from Australian wine industry. *Business Strategy and the Environment*, 28, 25–39. <https://doi.org/10.1002/bse.2178>
- Kumar, R. (2019). *Research methodology: A step-by-step guide for beginners*. SAGE.
- Kumar, V., Verma, P., Mittal, A., Tuesta Panduro, J. A., Singh, S., Paliwal, M., & Sharma, N. K. (2022). Adoption of ICTs as an emergent business strategy during and following COVID-19 crisis: Evidence from Indian MSMEs. *Benchmarking: An International Journal*. <https://doi.org/10.1108/BIJ-11-2021-0685>
- Li, P., Zhou, Y., & Huang, S. (2023). Role of information technology in the development of e-tourism marketing: A contextual suggestion. *Economic Analysis and Policy*, 78, 307–318. <https://www.sciencedirect.com/science/article/pii/S0313592623000309>
- Lutfi, A. (2022). Factors influencing the continuance intention to use accounting information system in Jordanian SMEs from the perspectives of UTAUT: Top management support and self-efficacy as predictor factors. *Economies*, 10(4), 2–17. <https://www.mdpi.com/2227-7099/10/4/75>
- Majumdar, J. P., Kundu, G. K., & Manohar, B. M. (2019). Causes of reluctance of Indian manufacturing SMEs in adopting total quality management. *International Journal of Services and Operations Management*, 32(3), 362–386. <https://www.inderscienceonline.com/doi/abs/10.1504/IJSOM.2019.098355>
- Malhotra, N. K. (2011). *Questionnaire design and scale development: The handbook of marketing research*. SAGE. <https://dx.doi.org/10.4135/9781412973380>
- Martins, R., Oliveira, T., & Thomas, M. A. (2016). An empirical analysis to assess the determinants of SaaS diffusion in firms. *Computers in Human Behavior*, 62, 19–33.
- Marulanda, C. E., Lopez, M., & Castaño, A. (2022). Information technologies and knowledge transfer in tourism SMEs in the department of Caldas. *Ingeniería y Competitividad*, 24(2), 1–12. http://www.scielo.org.co/scielo.php?pid=S0123-30332022000200021&script=sci_arttext
- Okundaye, K., Fan, S. K., & Dwyer, R. J. (2018). Impact of ICT in Nigeria small- to medium-sized [enterprises]. *Journal of Economics, Finance and Administrative Science*, 24(47), 29–46. <https://doi.org/10.1108/JEFAS-08-2018-0086>
- Rozmi, A. N. A., Nohuddin, P. N., Hadi, A., Razak, A., Bakar, A., Izhar, M., & Nordin, A. I. (2020). Factors affecting SME owners in adopting ICT in business using thematic analysis. *International Journal of Advanced Computer Science and Applications*, 11(7). <https://thesai.org/Publications/ViewPaper?Volume=11&Issue=7&Code=IJACSA&SerialNo=27>
- Stuart, K., Maynard, L., & Rouncefield, C. (2015). *Evaluation practice for projects with young people: A guide to creative research*. SAGE. <https://www.torrossa.com/en/resources/an/5019373>

Sukumar, A., Mahdiraji, H. A., & Jafari-Sadeghi, V. (2023). Cyber risk assessment in small and medium-sized enterprises: A multilevel decision-making approach for small e-tailors. *Risk Analysis*. https://pure-oai.bham.ac.uk/ws/portalfiles/portal/193294727/Risk_Analysis_2023_Sukumar_Cyber_risk_assessment_in_small_and_medium_sized_enterprises_A_multilevel_decision_making.pdf

Tarutė, A., & Gatautis, R. (2014). ICT impact on SMEs performance. *Procedia - Social and Behavioral Sciences*, 110, 1218–1225. <https://doi.org/10.1016/j.sbspro.2013.12.968>

Yoo, J., Choi, S., Hwang, Y., & Mun, Y. Y. (2021). The role of user resistance and social influences on the adoption of smartphone: Moderating effect of age. *Journal of Organizational and End User Computing*, 33(2), 36–58.

Ziemba, E. (2019). Exploring levels of ICT adoption and sustainable development—The case of Polish enterprises. In *Proceedings of 2019 Federated Conference on Computer Science and Information Systems (FedCSIS)* (pp. 579–588). IEEE. <https://ieeexplore.ieee.org/abstract/document/8859998>

Hurmelinna-Laukkanen, P., Ritala, P., & Sainio, L. (2013). Protection of radical innovations—Differences in domestic and international markets. *Journal of Global Business and Technology*, 9(1), 1–16.

ORGANIZATIONAL VALUE ADOPTION: EXPERIENCES AMONGST EMPLOYEES IN BED AND BREAKFAST ESTABLISHMENTS IN THE EASTERN CAPE PROVINCE, SOUTH AFRICA

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ABSTRACT

The hospitality Industry is under pressure to adopt a professional approach to implementing value adoption, as Bed and Breakfast employees are experiencing trauma due to not being valued in the workplace. This has been exacerbated by the hospitality industry's inability to implement a value-driven organizational culture. The purpose of this study is to critically review the literature on the importance of value adoption to enhance institutional goals. A qualitative literature review, underpinned by grounded theory, will be conducted to identify themes and trends from published journal articles. Additionally, bed-and-breakfast employees know little about the implications of employees' values. The study will contribute to knowledge by uncovering the different forms of value in the hospitality industry and by providing ways to guard against such acts in Bed and Breakfasts.

Keywords: value adoption, grounded theory, value-culture, management, Bed and Breakfast.

INTRODUCTION

The management and adoption of organisational values have become significant challenges for employers in South Africa, particularly in the hospitality industry. As globalisation and competition intensify, organisations are increasingly expected to articulate, embed, and sustain values that define their identity, guide employee behaviour, and inform decision-making. However, a persistent gap often exists between espoused values and what organisations claim to value, enacted values, and how employees actually behave. This tension has become an important concern for organisational scholars and managers because ineffective value adoption can weaken organisational culture, employee relations, service quality, and long-term sustainability.

Bourne and Jenkins (2023) argue that organisations without effective mechanisms for monitoring their values may gradually drift from their core principles, undermining cultural integrity. This concern is particularly relevant to hospitality, where employees interact directly with customers, and their attitudes and behaviours significantly influence service experiences. Studies have reported incidents of value misalignment in Bed and Breakfast establishments and other hospitality contexts, demonstrating that value adoption is not simply a theoretical issue but a practical organisational necessity (Alshameri & Green, 2020; Akter, 2021). Consequently, business leaders and human resource managers need strategies that translate organisational values into everyday workplace practices.

Values comprise beliefs, attitudes, and behavioural standards that influence how individuals and organisations determine what is important and appropriate. Stanislaw and MacCreary (2023) describe values as an individual's conception of what is important in life. When personal and organisational values are sufficiently aligned, they can create a shared sense of purpose and strengthen organisational cohesion. However, individuals attach different levels of importance to particular values (Gallego et al., 2020; Sagiv et al., 2018; Schwartz & Sortheix, 2018). Personal values are also shaped by childhood experiences, family, social environments, neighbourhoods, and religion, making deeply established values difficult to change (Lipshits-Braizilier et al., 2025). Organisations therefore face the complex task of embedding common values among employees with diverse backgrounds and personal value systems. Despite these challenges, organisations cannot afford to overlook values, as they form an important foundation of organisational identity, culture, policies, and practices. Value adoption is more likely to occur where employees are

encouraged to express their views, participate in decision-making, and operate without fear of victimisation. Such environments can strengthen employee engagement, trust, organisational cohesion, and resilience.

The South African hospitality industry provides an important context for examining these dynamics. A diverse workforce, significant employee turnover, intense customer interaction, and a strong dependence on service quality and customer satisfaction characterise the sector. These characteristics make consistent adoption of value particularly important. Nevertheless, ongoing inconsistencies in value alignment raise questions about the effectiveness of existing organisational strategies and frameworks in embedding values within daily operations.

The need to measure value adoption becomes even more important during organisational growth and transformation. Values are not necessarily static; they may evolve in response to internal restructuring, changing employee expectations, technological developments, and external pressures (Gamage et al., 2021; Zhou et al., 2024; Luhrmann et al., 2025). Management must therefore balance the preservation of core organisational principles with the need to adapt to changing circumstances. Effective value management requires deliberate mechanisms that integrate values into organisational development without allowing growth and transformation to weaken cultural coherence.

Value adoption is also a global concern, although its manifestation differs across cultural, institutional, and sectoral contexts. Mazibuko and Govender (2017) demonstrate that different contexts produce diverse perspectives on value adoption. While common challenges may exist across organisations, the meaning and application of values are influenced by local cultures and institutional environments. This reinforces the importance of context-sensitive analysis when examining how organisational values are understood, adopted, resisted, or transformed.

Against this background, this study undertakes a qualitative literature review of peer-reviewed journal articles to synthesise existing knowledge on organisational value adoption, with particular relevance to the South African hospitality industry. A literature review is appropriate because it enables the consolidation of existing scholarship, identification of recurring patterns, and recognition of gaps requiring further investigation. The review employs thematic analysis to identify and interpret significant themes emerging across the selected literature. Thematic analysis provides a systematic and flexible approach for examining complex qualitative evidence and identifying patterns within diverse sources (Clarke & Braun, 2017).

Thematic analysis is particularly appropriate because organisational value adoption is multidimensional and context-dependent. Fereday and Muir-Cochrane (2006) explain that thematic analysis involves reducing and organising qualitative information while retaining its essential meaning. In this study, coding is used to identify recurring patterns concerning the adoption, resistance, monitoring, and transformation of organisational values. These patterns are subsequently organised into broader themes that provide insight into the dynamics influencing value adoption.

Both inductive and deductive approaches are incorporated. Inductive themes emerge from patterns identified directly within the reviewed literature, while deductive themes are informed by established concepts and theoretical perspectives (Braun & Clarke, 2006). Combining these approaches enables the study to remain open to emerging insights while maintaining theoretical grounding. The approach therefore supports a balanced interpretation of existing research and strengthens the review's analytical depth.

In summary, the adoption of organisational values represents a significant challenge, particularly in the South African hospitality industry, where employee behaviour directly influences service delivery and organisational reputation. The literature demonstrates that differences between personal and organisational values, organisational transformation, workforce diversity, and inadequate monitoring can undermine the effective adoption of values. This study therefore uses a qualitative literature review and thematic analysis to synthesise existing knowledge, identify dominant and emerging themes, and highlight gaps in the literature. The analysis provides a foundation for understanding how organisations can strengthen value adoption and translate stated values into consistent workplace practices, with implications for organisational theory, management practice, and future research.

LITERATURE REVIEW: THEORETICAL AND CONCEPTUAL FOUNDATIONS

Organisational values and culture remain central to the theoretical and conceptual foundations of organisational studies. Contemporary scholarship emphasises that values are not abstract ideals but guiding principles that shape organisational behaviour, decision-making, identity, and legitimacy (Kolomiyets, 2024; Govender & Nematswerani, 2025; HR Portal, 2026). Values therefore function as the normative compass of organisations, influencing leadership, employee engagement, governance, and organisational trajectories. This literature review synthesises contemporary perspectives on organisational values and culture by examining their definitions, types, characteristics, and interrelationships. The conceptual framework positions organisational values as the linchpin of organisational life: they inform culture, sustain identity, guide behaviour, and create a feedback loop that promotes organisational coherence and adaptability.

Understanding Organisational Values

Organisational values are enduring principles that guide organisational conduct. Rokeach's foundational conception of values as "enduring beliefs" remains influential, while contemporary scholarship applies this understanding to organisational settings. Kolomiyets (2024) defines values as collective priorities embedded in organisational mission and vision statements, while Govender and Nematswerani (2025) identify values as important performance drivers in the public sector. Similarly, the UN Values and Behaviours Framework identifies principles such as integrity, inclusion, and accountability, demonstrating how values have become institutionalised within global governance (HR Portal, 2026). These perspectives converge on the understanding that values are simultaneously normative and practical, shaping organisational ethos and everyday practices.

Organisational values may be classified as core, aspirational, and enacted values. Core values define organisational identity, including principles such as integrity and customer focus, while aspirational values reflect strategic transformation priorities, including sustainability and digitalisation (Chen, 2025; Kim, 2025). Enacted values are those demonstrated through daily employee and leadership behaviour. Values may also be ethical, pragmatic, or relational, encompassing fairness and responsibility, efficiency and profitability, and collaboration and respect, respectively (Moyo, 2024; García, 2025). This typology demonstrates that values operate across normative, strategic, and behavioural dimensions.

Values are generally characterised by stability, collective orientation, and prescriptive force. They provide continuity during organisational change (Johnson, 2024), are shared among organisational members, and become embedded in narratives, rituals, and symbols (Adeyemi, 2024). Values also prescribe acceptable behaviour. Importantly, they can be explicit, as in mission statements, or implicit and embedded in organisational practices (Roberts, 2025). This combination of formal and informal dimensions enables values to influence both organisational policies and everyday workplace norms.

Organisational Culture and Value Systems

Organisational culture can be understood as the lived expression of organisational values. Building on Schein's (2010) conceptualisation of culture as shared assumptions, contemporary scholarship suggests that values provide culture with its normative content. Govender and Nematswerani (2025), for example, demonstrate how values underpin performance culture, while Müller (2026) shows that values such as transparency and ethics are incorporated into technological practices within AI-driven organisations. Values and culture are therefore symbiotic: values provide meaning and direction, while culture sustains values through practices, rituals, and shared experiences.

Values are particularly important for cultural integration and organisational **identity** during mergers, restructuring, and organisational change. Brown and Lee (2026) argue that shared values facilitate integration and help sustain identity amid organisational diversity. Organisational identity, understood as what is central and distinctive about an organisation, is constructed partly through values that differentiate one organisation from another (Albert & Whetten, 1985; Singh, 2025). Values consequently operate as both integration mechanisms and identity

markers, enabling organisations to maintain coherence while responding to external pressures. In higher education, values-driven governance can similarly sustain institutional identity despite globalisation (Singh, 2025).

Values also function as behavioural guides, influencing decision-making, leadership, employee conduct, performance evaluation, and ethical judgement. Thompson (2026) demonstrates the importance of trust and accountability in guiding behaviour within hybrid workplaces, while Hassan (2025) shows how collectivism and respect influence leadership styles in emerging markets. Values also shape stakeholder relationships and external legitimacy (Oliveira, 2026; Zhang, 2026), making them both internal governance mechanisms and tools for external legitimacy.

The conceptual framework underpinning this review, therefore, positions values as the linchpin of organisational life. Core, aspirational, and enacted values provide normative direction; culture embeds these values through rituals, narratives, and practices; and, in turn, culture sustains them. Values and culture collectively construct organisational identity by integrating diverse organisational elements and distinguishing the organisation externally. Finally, values guide leadership, decision-making, and employee behaviour. This cyclical relationship demonstrates that values are interconnected forces rather than isolated constructs.

Overall, the literature converges on the view that organisational values are foundational to understanding organisational life. They align individual actions with collective objectives, enable organisations to navigate change while maintaining continuity, and connect abstract ideals with observable behaviours (Oliveira, 2026). Their reciprocal relationship with culture ensures that values become lived organisational realities rather than merely aspirational statements. Values consequently anchor identity, integrate diverse cultures, guide behaviour, and strengthen organisational coherence and legitimacy. Conceptually, they provide a framework for analysing culture, identity, and behaviour; practically, they inform leadership, strategy, governance, and organisational adaptation. Organisational values are therefore indispensable to both the theoretical understanding and effective management of contemporary organisations.

METHODOLOGY

This study employed a desktop literature review to examine theoretical and empirical perspectives on organisational value adoption. The approach was appropriate because it enabled the systematic collection, evaluation, and synthesis of existing scholarly knowledge without generating primary data. The study population comprised literature on organisational values, organisational culture, value congruence, leadership, organisational socialisation, employee behaviour, and values-based management. Purposive sampling was used to select information-rich sources, with priority given to peer-reviewed English-language publications from 2015 to 2026, while seminal studies were retained where necessary to provide theoretical foundations. Relevant literature was sourced from reputable databases, including Google Scholar, Scopus, Web of Science, ScienceDirect, Emerald Insight, SpringerLink, Taylor & Francis Online, and Wiley Online Library. Searches employed predefined keywords such as “organisational values,” “value adoption,” “organisational culture,” “value congruence,” “leadership influence,” and “organisational socialisation,” using Boolean operators to refine results. Data collection involved identifying relevant studies, screening titles and abstracts, reviewing full texts, removing duplicates, and excluding sources that did not meet the inclusion criteria. The selected literature was analysed using thematic content analysis, which involved coding key concepts, grouping related codes into categories, and identifying major themes concerning organisational values, culture, leadership, value congruence, employee socialisation, and strategies for value adoption. The themes were subsequently interpreted and synthesised to establish relationships and develop a coherent understanding of the phenomenon. Methodological rigour was strengthened through the use of reputable peer-reviewed sources, transparent search and selection procedures, clearly defined inclusion criteria, and systematic analytical processes. Credibility, dependability, and confirmability were further enhanced through triangulation of evidence across multiple scholarly sources, ensuring that the findings were grounded in established literature rather than personal assumptions.

FINDINGS AND DISCUSSION

The thematic content analysis identified four major themes concerning organisational value adoption: determinants of value adoption, barriers to adoption, strategies for strengthening adoption, and value adoption within the hospitality

sector. Collectively, the findings demonstrate that organisational values are most effectively internalised when they are consistently modelled, communicated, reinforced, and integrated into everyday organisational practices.

The first theme, determinants of organisational value adoption, revealed that leadership commitment and role modelling are central to successful internalisation of value. Employees are more likely to embrace organisational values when leaders demonstrate behaviours consistent with stated principles. Ethical leadership and clear strategic communication further strengthen employees' understanding of expected behaviours. Organisational culture was also identified as an important determinant. Values are more readily adopted when they are reflected in shared beliefs, norms, workplace practices, and a positive organisational climate. Employee participation and engagement similarly contribute to value adoption by creating a sense of ownership. Employees who participate in decision-making and are empowered to contribute to organisational objectives are more likely to accept and practise organisational values. Recruitment, selection, onboarding, and organisational socialisation were also identified as important mechanisms. Value-based recruitment can improve alignment between individual and organisational values, while induction and continuous socialisation help employees understand and internalise expected behaviours.

The second theme concerned barriers to the adoption of organisational values. Value incongruence emerged as a major challenge, particularly where employees' personal values differ substantially from organisational expectations. Workforce diversity may further complicate value alignment because employees can interpret and prioritise organisational values differently. Leadership inconsistency was another significant barrier. When leaders fail to practise the values they promote, employees may perceive organisational values as symbolic rather than authentic, reducing trust and commitment. Communication gaps also undermine adoption by creating ambiguity about organisational expectations and appropriate workplace conduct. In addition, organisational change, restructuring, rapid growth, and employee turnover can disrupt value internalisation by creating uncertainty and weakening established cultural practices.

The third theme focused on strategies for strengthening organisational value adoption. Values-based and ethical leadership emerged as important mechanisms because leaders establish behavioural standards through their actions. Leadership development can therefore enhance leaders' capacity to consistently model organisational values. Continuous training and development were also identified as essential for reinforcing employees' understanding of organisational values and translating them into workplace behaviour. Furthermore, performance management and reward systems can strengthen adoption by recognising and reinforcing behaviours that reflect organisational values. Regular performance assessments and recognition programmes provide employees with clear signals regarding which behaviours are valued. Monitoring and evaluation mechanisms, including value audits, employee perception surveys, and organisational culture assessments, further enable organisations to determine whether values are genuinely embedded in workplace practices and to identify areas requiring intervention.

The fourth theme examined the adoption of organisational values within the hospitality sector. The literature indicates that value adoption is particularly significant in hospitality because employee behaviour directly influences customer experiences and perceptions of service quality. Employees who internalise organisational values are more likely to demonstrate behaviours that support professional service delivery, customer satisfaction, and positive workplace interactions. Strong value alignment was also associated with employee commitment, organisational identification, reputation, competitiveness, and stakeholder relationships.

Overall, the findings suggest that organisational value adoption is not achieved through written value statements alone. It requires leadership credibility, cultural alignment, employee participation, effective socialisation, continuous development, appropriate rewards, and systematic monitoring. The hospitality context particularly demonstrates that when organisational values are translated into observable employee behaviours, they can contribute to improved service quality and organisational performance. Conversely, inconsistencies between stated values and actual practices can weaken employee trust and undermine organisational effectiveness. The findings therefore support an integrated approach in which values are embedded throughout recruitment, leadership, communication, performance management, employee development, and organisational culture rather than treated as isolated organisational statements.

CONCLUSION

This review examined the determinants of organisational value adoption and demonstrated that the process is complex, multidimensional, and systemic rather than the outcome of a single organisational intervention. The findings show that organisational values are most effectively adopted when they move beyond formal statements and become embedded in leadership practices, organisational culture, communication systems, human resource management processes, and employee behaviour. Leadership commitment emerged as the most influential determinant, particularly through ethical conduct, role modelling, accountability, and strategic communication. Leaders who consistently demonstrate organisational values strengthen their credibility and create conditions in which employees are more likely to understand, accept, and internalise those values. Organisational culture was similarly identified as an important enabling environment, as shared norms, beliefs, and behavioural expectations provide the foundation on which values become part of everyday organisational practice. Communication, employee participation, recruitment, socialisation, training, performance management, and reward systems further reinforce this process. The review, therefore, concludes that sustainable value adoption depends on coherence between what organisations say, what leaders do, and what organisational systems reward and reinforce. The study contributes to knowledge by synthesising fragmented literature and proposing an Organisational Value Adoption Model that integrates leadership commitment, organisational culture, communication, human resource practices, and employee engagement. The model provides a holistic explanation of how organisational values can translate into formal organisational principles and, ultimately, into internalised and observable workplace behaviours. It also extends scholarship on hospitality organisations by demonstrating the importance of values in service-oriented environments where employee conduct directly influences customer experiences, service quality, organisational reputation, and performance. However, the findings should be interpreted in light of several limitations. The review relied primarily on published scholarly literature and may therefore be affected by publication bias.

Differences in methodological approaches, conceptual definitions, organisational contexts, and geographical settings also limited direct comparison across studies. Furthermore, the relatively limited number of studies that focus specifically on hospitality organisations and developing-country contexts limits the generalisability of some conclusions. These limitations highlight the need for further empirical investigation. Future research should test and validate the proposed Organisational Value Adoption Model across different industries, cultures, and organisational settings. Longitudinal research would be particularly valuable in examining how values evolve, become institutionalised, and are sustained over time. Greater attention should also be given to developing countries and the hospitality sector, where contextual factors may influence value adoption differently from developed-country environments. In addition, emerging issues such as digital transformation, remote and hybrid work, artificial intelligence, and changing employment relationships warrant further investigation because they are reshaping how organisational values are communicated and experienced. Future studies should also examine the relationship between value adoption and outcomes such as employee engagement, organisational commitment, ethical behaviour, innovation, service quality, and organisational performance. Overall, the review establishes that the adoption of organisational values should be treated as a strategic, continuous organisational process rather than a symbolic exercise. Organisations that align leadership behaviour, culture, communication, human resource practices, governance, and employee engagement around clearly defined values are better positioned to build ethical and cohesive workplaces, strengthen employee commitment, improve service delivery, and achieve sustainable organisational performance. Effective value adoption ultimately depends on closing the gap between espoused values and lived organisational experience, thereby transforming organisational values from written statements into everyday practices that shape behaviour and organisational outcomes.

REFERENCES

- Kolomiyets, T. (2024). *Organizational culture and its mission, vision, and values*. UNECE Statswiki.
- Govender, K.K., & Nematswerani, N. (2025). *A conceptual model of organisational culture and organisational performance in the public sector in South Africa*. *Holistica Journal of Business and Public Administration*, 16(1), 103–118.
- HR Portal. (2026). *UN Values and Behaviours Framework*. United Nations Secretariat.
- Smith, J., & Patel, R. (2024). *Values-based leadership in digital organisations*. *Journal of Organisational Studies*, 32(4), 455–472.
- Chen, L. (2025). *Sustainability as an organisational value: Integrating ESG into culture*. *International Journal of Management*, 41(2), 210–229.
- Moyo, T. (2024). *Ethical values and organisational resilience in African enterprises*. *African Business Review*, 12(3), 145–162.
- Brown, A., & Lee, H. (2026). *Organisational identity and cultural integration in mergers*. *Global Management Review*, 18(1), 77–95.
- García, P. (2025). *Relational values and employee engagement*. *European Journal of Work and Organisational Psychology*, 34(2), 189–205.
- Naidoo, S. (2024). *Public sector values and service delivery*. *South African Journal of Public Administration*, 59(1), 33–52.
- Thompson, R. (2026). *Values as behavioural guides in hybrid workplaces*. *Journal of Business Ethics*, 175(3), 421–439.
- Kim, Y. (2025). *Digital transformation and aspirational values*. *Asia-Pacific Journal of Management*, 42(1), 99–118.
- Johnson, M. (2024). *Core values and organisational identity*. *Academy of Management Perspectives*, 38(2), 210–228.
- Singh, P. (2025). *Values-driven governance in higher education institutions*. *Higher Education Policy Review*, 29(4), 312

DIGITAL TRANSFORMATION READINESS AND INNOVATION AMONG TOURISM SMMEs IN EMERGING ECONOMIES: EVIDENCE FROM MBOMBELA LOCAL MUNICIPALITY, SOUTH AFRICA

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ABSTRACT

The rapid advancement of digital technologies is transforming the global tourism industry, compelling small, medium, and micro enterprises (SMMEs) to adopt innovative digital solutions to remain competitive. Despite the growing significance of digital transformation, tourism SMMEs operating in emerging economies continue to face structural, financial, and technological challenges that hinder digital readiness. This study investigates the factors influencing digital transformation, the barriers to technology adoption, the influence of socio-cultural and regional dynamics, and the utilisation of digital tools among tourism SMMEs in Mbombela Local Municipality, South Africa. A quantitative research approach was employed using a structured questionnaire administered to tourism SMMEs operating within Mbombela Municipality. Data were analysed using descriptive statistics, correlation analysis, regression analysis, and one-way ANOVA to examine relationships among the study variables and determine the predictors of digital transformation. The findings reveal that digital tool utilisation, external collaborative networks, and favourable socio-cultural conditions positively influence digital transformation among tourism SMMEs. Conversely, inadequate financial resources, limited digital infrastructure, organisational resistance to change, and insufficient technical capabilities remain significant constraints to technology adoption. The study further demonstrates that education level, age, and business orientation significantly influence digital readiness, while gender and frequency of tourism activities exhibit no statistically significant effects. The study contributes to the growing body of knowledge on digital transformation in tourism by extending the application of the Technology–Organisation–Environment (TOE) framework within the context of tourism SMMEs operating in a developing economy. The findings provide practical insights for policymakers, tourism development agencies, and business support organisations seeking to strengthen digital capabilities, improve technological resilience, and enhance the long-term competitiveness of tourism enterprises in South Africa and comparable emerging markets.

Keywords: digital transformation, tourism SMMEs, digital readiness, innovation, emerging economies.

INTRODUCTION

Digital transformation has become a key driver of organisational competitiveness, enabling businesses to improve efficiency, enhance customer experiences, and strengthen long-term sustainability through technologies such as cloud computing, artificial intelligence, mobile applications, big data, and digital platforms (Vial, 2019; Kraus et al., 2021). In the tourism industry, digital technologies play a critical role throughout the customer journey, including destination search, online bookings, digital payments, customer reviews, and post-travel engagement (Buhalis & Law, 2008; Leung et al., 2015). Consequently, tourism enterprises that effectively adopt digital technologies are better positioned to improve service delivery, expand market reach, and maintain a competitive advantage.

Tourism Small, Medium and Micro Enterprises (SMMEs) are important contributors to employment creation, entrepreneurship, and regional economic development. However, many face challenges in adopting digital technologies due to financial constraints, limited technological infrastructure, inadequate digital skills, and restricted access to technical expertise (Boateng, 2021; Chatterjee et al., 2022). These challenges are particularly evident in developing countries such as South Africa, where digital inequalities and infrastructure limitations continue to hinder

technology adoption (Gillwald & Mothobi, 2018; ITU, 2021). Although Mbombela Local Municipality is one of South Africa's leading tourism destinations, supported by attractions such as the Kruger National Park and the Panorama Route, tourism SMMEs within the municipality display varying levels of digital readiness, suggesting that organisational and environmental factors continue to influence digital transformation.

Existing research on digital transformation has largely focused on manufacturing industries, large organisations, or developed economies, with limited attention given to tourism SMMEs in developing countries (Kraus et al., 2021; Chatterjee et al., 2022). Furthermore, previous studies often examine technological adoption in isolation, overlooking the combined influence of technological, organisational, environmental, and socio-cultural factors. This study addresses this gap by investigating the factors influencing digital transformation among tourism SMMEs in Mbombela Local Municipality. Guided by the Technology–Organisation–Environment (TOE) framework and Dynamic Capabilities Theory, the study examines the determinants, barriers, and utilisation of digital technologies, as well as the role of collaborative networks in supporting digital innovation. The findings contribute to theory by extending the application of the TOE framework within tourism SMMEs and provide practical recommendations for policymakers, tourism authorities, business support organisations, higher education institutions, and entrepreneurs seeking to strengthen digital capabilities and enhance the competitiveness of the tourism sector.

THEORETICAL FRAMEWORK

This study is underpinned by the Technology–Organisation–Environment (TOE) Framework (Tornatzky & Fleischer, 1990) and supported by Dynamic Capabilities Theory (Teece et al., 1997). The TOE framework explains that an organisation's adoption of digital technologies is influenced by three interrelated contexts: the technological context, which includes the availability and compatibility of digital technologies; the organisational context, which encompasses leadership support, financial resources, organisational readiness, and employee competencies; and the environmental context, which considers external factors such as competitive pressure, customer expectations, government support, and industry networks (Baker, 2012; Ifinedo, 2011; Chatterjee et al., 2022). While the TOE framework explains the factors influencing technology adoption, Dynamic Capabilities Theory complements it by emphasising an organisation's ability to continuously develop, integrate, and reconfigure resources to respond to technological and market changes (Teece, 2007; Warner & Wäger, 2019). The integration of these theories provides a comprehensive lens for understanding digital transformation among tourism SMMEs by recognising that successful technology adoption depends not only on favourable technological, organisational, and environmental conditions but also on the development of adaptive capabilities that enable organisations to sustain innovation and remain competitive in a rapidly evolving digital environment (Kraus et al., 2021; Vial, 2019).

LITERATURE REVIEW

Digital transformation has emerged as a strategic imperative for organisations seeking to enhance competitiveness, improve operational efficiency, and create sustainable value in an increasingly technology-driven business environment (Vial, 2019; Kraus et al., 2021). Within the tourism industry, digital technologies have fundamentally transformed the manner in which businesses communicate with customers, market destinations, manage reservations, deliver services, and optimise internal operations (Buhalis & Law, 2008; Leung et al., 2015). Technologies such as cloud computing, artificial intelligence (AI), social media, online booking systems, mobile applications, and digital payment platforms have enabled tourism enterprises to improve customer experiences while expanding their market reach beyond traditional geographical boundaries (Matarazzo et al., 2021; González-Varona et al., 2024).

Tourism SMMEs play a significant role in economic development through employment creation, entrepreneurship, and local economic growth. Despite their importance, these enterprises often experience considerable challenges in adopting digital technologies because of limited financial resources, inadequate technological infrastructure, and shortages of digital competencies (Boateng, 2021; Chatterjee et al., 2022). Compared to larger organisations, SMMEs generally possess fewer organisational resources required to implement comprehensive digital transformation initiatives, making technology adoption more complex and gradual (Leso et al., 2022).

Recent literature argues that digital transformation should not be viewed solely as technological implementation but rather as an organisational process involving strategic change, innovation, organisational learning, and business model transformation (Vial, 2019; Díaz-Arancibia et al., 2024). Organisations that successfully integrate digital technologies into their strategic and operational activities are more likely to improve organisational resilience, customer satisfaction, and long-term competitiveness (Kraus et al., 2021).

Within developing economies, digital transformation presents both opportunities and challenges. Although digital technologies provide tourism enterprises with access to international markets and improved customer engagement, persistent infrastructure limitations, financial constraints, and digital skills shortages continue to hinder technology adoption (Mbatha & Nzewi, 2020; Mtengwane, 2024). These challenges are particularly evident among tourism SMMEs operating in rural and semi-urban regions where internet connectivity and digital support services remain limited (Gillwald & Mothobi, 2018; International Telecommunication Union [ITU], 2021).

Factors Influencing Digital Transformation

Digital transformation is influenced by technological, organisational, and environmental factors that collectively determine an enterprise's readiness to adopt digital innovation (Baker, 2012; Nawayseh, 2020). Technological readiness includes the availability of digital infrastructure, internet connectivity, system compatibility, and the perceived usefulness of digital technologies (Ifinedo, 2011). Organisations possessing adequate technological resources are generally better positioned to implement digital innovation successfully (Awa & Ojiabo, 2020).

Organisational factors equally influence digital transformation. Leadership commitment, organisational culture, employee competencies, financial resources, and strategic planning determine whether organisations are willing and capable of adopting digital technologies (Kraus et al., 2021; Leso et al., 2022). Leaders who actively support innovation create environments that encourage experimentation, continuous learning, and investment in technological capabilities (Matarazzo et al., 2021).

External environmental conditions further shape technology adoption. Competitive market pressure, evolving customer expectations, government policies, industry regulations, technology providers, and business support institutions influence organisational decisions regarding digital transformation (Boateng, 2021; Chatterjee et al., 2022). Tourism enterprises that actively participate in collaborative innovation ecosystems often gain access to technical expertise, funding opportunities, and knowledge-sharing networks that accelerate digital capability development (Nucharee & Charoensukmongkol, 2022).

Barriers to Digital Transformation

Despite increasing recognition of the strategic importance of digital technologies, tourism SMMEs continue to experience numerous barriers to effective technology adoption. Financial constraints remain one of the most significant challenges because many enterprises lack sufficient resources to invest in software, hardware, employee training, cybersecurity, and system maintenance (Mbatha & Nzewi, 2020; Mtengwane, 2024).

Limited digital competencies also constrain organisational transformation. Many tourism entrepreneurs possess extensive industry knowledge but relatively limited expertise in digital marketing, artificial intelligence, cybersecurity, data analytics, and digital business strategy (Marsh et al., 2020). Without appropriate human capital, organisations frequently struggle to maximise the benefits associated with digital technologies.

Infrastructure deficiencies further limit digital transformation. Unreliable internet connectivity, inconsistent electricity supply, inadequate broadband infrastructure, and limited technical support reduce the effectiveness of digital technologies, particularly within rural tourism destinations (Gillwald & Mothobi, 2018; ITU, 2021). Organisational resistance to change similarly affects technology adoption, as employees and managers may perceive digital innovation as complex, risky, or disruptive to established work practices (Li et al., 2020).

Digital Technologies and Tourism Competitiveness

Digital technologies have become essential instruments for enhancing customer engagement and improving organisational competitiveness within the tourism sector. Social media platforms, online booking systems, customer relationship management software, digital payment platforms, and mobile applications enable tourism enterprises to strengthen customer relationships, increase operational efficiency, and expand market visibility (Kaplan & Haenlein, 2020; Leung et al., 2015).

Emerging technologies, including artificial intelligence, predictive analytics, automation, and business intelligence systems, are expected to transform tourism service delivery further by enabling personalised customer experiences and data-driven decision-making (Díaz-Arancibia et al., 2024; González-Varona et al., 2024). However, adoption of these advanced technologies remains relatively limited among tourism SMMEs because of financial and technical constraints (Chatterjee et al., 2022).

METHODOLOGY

This study employed a positivist research paradigm, which is grounded in the assumption that reality is objective and can be examined through empirical measurement. Consistent with this paradigm, a quantitative research approach was adopted to investigate the determinants of digital transformation and innovation among tourism SMMEs in Mbombela Municipality, Mpumalanga. Primary data were collected using a structured questionnaire comprising closed-ended and five-point Likert-scale questions administered to a randomly selected sample of 340 SMME owners and managers. The instrument captured information relating to digital adoption drivers, barriers to transformation, socio-cultural influences, the use of digital technologies for customer engagement, and the contribution of external support networks. The collected data were analysed using descriptive statistics, including frequencies, percentages, means, and standard deviations, to describe respondent characteristics and patterns of digital adoption. Inferential statistical techniques, including correlation analysis, multiple regression, t-tests, and F-tests, were employed to examine the relationships between key variables and determine the extent to which factors such as digital literacy, financial capacity, internet accessibility, business age, and external support influence digital transformation. The reliability of the measurement scales was evaluated using Cronbach's Alpha, while construct validity was assessed to ensure that the research instrument accurately measured the intended theoretical constructs. Overall, the methodology provided a rigorous and objective framework for producing reliable empirical evidence on the digital transformation and innovation practices of tourism SMMEs in the study area.

FINDINGS

Descriptive statistics were used to evaluate the respondents' decisions. Descriptive statistics analysis data by the use of mean, lower bound, upper bound, minimum, maximum, and standard deviation

Objective 1: Results on factors influencing digital transformation and innovation in SMME's

Table 1: Results on factors influencing digital transformation and innovation in SMME's.

Statement	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree	MEAN	STAND DEVIAT ION
SMME has access to affordable digital technologies	5(3.6%)	9(7.1%)	32(25.0%)	30(23.2%)	53(41.1%)	3.73	1.018
Poor internet or infrastructure limits our ability to adopt technology	22(1.8%)	9(7.1%)	18(14.3%)	48(37.5%)	53(39.3%)	4.05	0.999

SMMEs collaborate with other businesses or networks to learn about technology.	-	5(3.6%)	18(14.3%)	62(48.2%)	43(33.9%)	4.27	0.842
Personal development skills and knowledge are needed to adopt digital tools.	5(3.6%)	22(1.8%)	23(17.9%)	49(35.7%)	53(41.1%)	4.11	0.947

Table 1 presents the factors influencing digital transformation and innovation among tourism SMMEs in Mbombela Municipality. The findings indicate that respondents perceive organisational readiness, collaboration, digital competencies, and leadership support as important enablers of digital transformation, although infrastructural challenges continue to constrain technology adoption.

Collaboration with other businesses and industry networks emerged as the strongest enabling factor ($M = 4.27$, $SD = 0.842$), suggesting that knowledge sharing and external partnerships play a critical role in enhancing digital capabilities. Respondents also strongly agreed that personal digital skills and continuous learning are essential for successful technology adoption ($M = 4.11$, $SD = 0.947$), highlighting the importance of investing in employee capacity development. Furthermore, poor internet connectivity and inadequate digital infrastructure were identified as significant constraints ($M = 4.05$, $SD = 0.999$), indicating that external infrastructural limitations continue to impede digital transformation despite organisational willingness to adopt new technologies. Access to affordable digital technologies was viewed positively ($M = 3.73$, $SD = 1.018$), although the relatively higher standard deviation suggests some variation in respondents' experiences. Collectively, these findings indicate that while tourism SMMEs demonstrate strong internal readiness for digital transformation through leadership support, skills development, and collaboration, improvements in digital infrastructure remain essential to accelerate technology adoption and innovation within the sector.

Objective 2: To investigate the extent to which tourism SMMEs in Mbombela use digital tools to improve customer engagement and service efficiency.

Table 2: Results on usage of digital tools for customer engagement and service efficiency.

Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree	MEAN	STAND ARD DEVI ATION
The tourism business in Mbombela uses online booking and reservation systems to improve customer convenience	99(7.1%)	11(8.9%)	23(17.9%)	30(23.2%)	55(42.9%)	3.96	1.103
SMME's communicates with customers via email or messaging apps.	5(3.6%)	18(14.3%)	23(17.9%)	49(35.7%)	37(28.6%)	3.43	1.059
Digital tools help us personalize services based on customer preferences and behavior	5(3.6%)	99(7.1%)	25(19.6%)	55(42.9%)	32(25.0%)	3.64	1.052
We use customer feedback tools (e.g., online surveys, reviews) to improve our services.	22(1.8%)	77(5.4%)	27(21.4%)	62(48.2%)	30(23.2%)	3.79	0.986
We use digital analytics to monitor customer engagement and make business decisions.	22(1.8%)	14(10.7%)	27(21.4%)	37(28.6%)	48(37.5%)	3.66	0.996

The findings indicate that tourism SMMEs in Mbombela Municipality generally adopt digital technologies to enhance customer engagement, with mean scores ranging from 3.43 to 3.96, reflecting overall positive perceptions. The use of online booking and reservation systems recorded the highest mean ($M = 3.96$; $SD = 1.103$), suggesting that

these platforms are widely utilised to improve customer convenience. The use of customer feedback tools also showed strong adoption ($M = 3.79$; $SD = 0.986$), indicating that businesses increasingly rely on digital feedback to enhance service quality. Similarly, respondents agreed that digital analytics ($M = 3.66$; $SD = 0.996$) and digital tools for service personalisation ($M = 3.64$; $SD = 1.052$) support customer engagement and business decision-making. In contrast, communication through email and messaging applications recorded the lowest mean ($M = 3.43$; $SD = 1.059$), suggesting that while commonly used, digital communication remains less established than other digital customer engagement practices. The results suggest a moderate to high level of digital adoption among tourism SMMEs, although there is still scope to strengthen the use of communication and data-driven technologies.

Objective 3: To identify the main barriers that hinder digital transformation among tourism SMME's in Mbombela.

Table 3: Results on barriers to Digital Transformation on SMMEs.

Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree	MEAN	STAND ARD DEVIAT ION
Resistance to change within the organization slows down technology implementation	7(5.4%)	7(5.4%)	18(14.3%)	66(51.8%)	30(23.2%)	3.09	0.900
Limited support from government hinders digital transformation.	99(7.1%)	32(25%)	43(33.9%)	32(25.0%)	11(8.9%)	3.04	1.078
Lack of sufficient financial resources limits our ability to adopt digital technology.	-	99(7.1%)	16(12.5%)	64(50.0%)	39(30.4%)	3.48	0.809
Lack of awareness about the benefits of digital transformation limits adoption.	99(7.1%)	18(14.3%)	50(39.3%)	31(23.2%)	19(16.1%)	2.73	1.120
Concerns about data privacy and Cybersecurity prevents us from adopting digital solutions.	7(5.4%)	13(10.7%)	21(17.9%)	65(44.6%)	29(21.4%)	3.07	1.024

The findings reveal that tourism SMMEs experience moderate barriers to digital transformation, with mean scores ranging from 2.73 to 3.48. The lack of sufficient financial resources emerged as the most significant challenge ($M = 3.48$; $SD = 0.809$), indicating that financial constraints remain a major obstacle to adopting digital technologies. Resistance to organisational change ($M = 3.09$; $SD = 0.900$) and concerns about data privacy and cybersecurity ($M = 3.07$; $SD = 1.024$) were also identified as notable barriers, suggesting that both organisational culture and security concerns influence digital adoption. Respondents moderately agreed that limited government support hinders digital transformation ($M = 3.04$; $SD = 1.078$), reflecting mixed perceptions regarding the effectiveness of external support mechanisms. In contrast, lack of awareness of the benefits of digital transformation recorded the lowest mean ($M = 2.73$; $SD = 1.120$), indicating that most respondents are generally aware of the potential advantages of digital technologies. The findings suggest that financial limitations, organisational resistance, and cybersecurity concerns are the primary barriers to digital transformation among tourism SMMEs in Mbombela Municipality.

Objective 4: To investigate the role of socio-cultural and regional dynamics in shaping the digital readiness and innovation capabilities of local tourism SMMEs.

Table 4: Impact of socio-cultural and regional factors on digital readiness.

Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree	MEAN	SAND DEVIAT ION
Cultural attitudes in Mbombela encourage the use of digital technology in business.	11(8.9%)	11(8.9%)	28(21.4%)	46(35.7%)	34(25.0%)	3.52	1.191
Language barriers in the region affect our ability to adopt	22(1.8%)	5(3.6%)	18(14.3%)	37(28.6%)	66(51.8%)	3.73	0.820

Social norms and networks in Mbombela provide support for digital adoption in tourism SMME's	5(3.6%)	99(7.1%)	11(8.9%)	34(26.8%)	55(3.6%)	2.93	1.126
Local consumer preferences encourage us to use digital channels for marketing and sales	5(3.6%)	14(10.7%)	20(16.1%)	53(41.1%)	37(28.6%)	3.93	1.003
Language barriers in the region affect our ability to adopt digital tools and platforms	11(8.9%)	14(10.7%)	43(33.9%)	32(25.0%)	27(21.4%)	2.93	1.126

The findings indicate that socio-cultural factors have a moderate influence on digital transformation among tourism SMMEs in Mbombela Municipality, with mean scores ranging from 2.93 to 3.93. Local consumer preferences encouraging the use of digital channels for marketing and sales recorded the highest mean ($M = 3.93$; $SD = 1.003$), suggesting that customer demand is a key driver of digital adoption. Respondents also agreed that language barriers affect the adoption of digital technologies ($M = 3.73$; $SD = 0.820$), highlighting language as an important challenge in the digital transformation process. Cultural attitudes supporting the use of digital technology in business received a positive mean score ($M = 3.52$; $SD = 1.191$), indicating that the local business environment is generally receptive to digital innovation. In contrast, social norms and networks supporting digital adoption ($M = 2.93$; $SD = 1.126$) and the second statement on language barriers affecting the adoption of digital tools and platforms ($M = 2.93$; $SD = 1.126$) recorded the lowest mean scores, reflecting mixed perceptions regarding the influence of these socio-cultural factors. The findings suggest that consumer preferences and cultural attitudes facilitate digital transformation, while language-related challenges and limited social support networks continue to constrain digital adoption among tourism SMMEs.

Inferential Statistics

1. Correlation

Table 5: The correlation analysis reveals significant relationships among the key factors influencing digital transformation and innovation in tourism SMMEs within Mbombela Municipality.

Variable	Adoption of digital transformation	Barriers to digital transformation	Social cultural factors	Digital tool usage	External network
Adoption of digital transformation	1.00	-0.45	0.38	0.62	0.58
Barriers to digital transformation	-0.45	1.000	-0.25	-0.31	-0.29
Social cultural factors	0.38	-0.25	1.000	0.40	0.43
Digital tool usage	0.62	-0.31	0.40	1.000	0.56
External network	0.58	-0.29	0.43	0.56	1.000

The correlation analysis shows significant relationships between the variables influencing digital transformation among tourism SMMEs in Mbombela Municipality. Adoption of digital transformation is positively correlated with digital tool usage ($r = 0.62$), indicating a strong relationship where increased use of digital tools is associated with higher levels of digital transformation. It is also positively related to external networks ($r = 0.58$) and socio-cultural factors ($r = 0.38$), suggesting that supportive networks and favourable socio-cultural conditions facilitate digital adoption. Conversely, barriers to digital transformation are negatively correlated with digital transformation adoption ($r = -0.45$), implying that as barriers increase, the level of digital transformation decreases. Barriers also show negative relationships with digital tool usage ($r = -0.31$), external networks ($r = -0.29$), and socio-cultural factors ($r = -0.25$), indicating that these factors may help reduce the impact of digital transformation challenges. Additionally, digital tool usage is positively associated with external networks ($r = 0.56$) and socio-cultural factors ($r = 0.40$), while external networks and socio-cultural factors are moderately positively correlated ($r = 0.43$). The findings suggest that digital tool usage and external networks are the strongest drivers of digital transformation, whereas organisational and resource-related barriers hinder its adoption.

2. Regression

Table 6: Regression.

Independent Variable	R	R- Square	Adjusted R Square	Beta	T	Sig
		0.812	0.659	-	6.563	0.000
Barriers to digital transformation				-0.284	-4.803	0.000
Socio-cultural and regional factors				0.265	4.11	0.001
Use of digital tools				0.406	6.898	0.000
External network				0.219	4.103	0.002
Constant	0.842	0.066	-	0.265	4.111	0.001

Multiple regression analysis was performed to determine the combined influence of barriers to digital transformation, socio-cultural and regional factors, the use of digital tools, and external networks on digital transformation among tourism SMMEs. As presented in Table 6, the regression model was statistically significant ($R = 0.812$, $R^2 = 0.659$, $F = 32.489$, $p < 0.001$), indicating that approximately 65.9% of the variation in digital transformation is explained by the variables included in the model. This demonstrates that the selected predictors provide a strong explanation of digital transformation within the study context. Among the predictor variables, the use of digital tools emerged as the strongest positive predictor of digital transformation ($\beta = 0.406$, $p < 0.001$), followed by socio-cultural and regional factors ($\beta = 0.265$, $p = 0.001$) and external networks ($\beta = 0.219$, $p = 0.002$). These findings indicate that organisations with greater digital capability, supportive socio-cultural environments, and stronger collaborative networks are more likely to achieve successful digital transformation. In contrast, barriers to digital transformation had a significant negative effect ($\beta = -0.284$, $p < 0.001$), confirming that financial limitations, inadequate infrastructure, and organisational resistance substantially hinder digital adoption. Collectively, these findings emphasise that strengthening digital competencies, promoting collaboration, and addressing structural barriers are critical to enhancing innovation and competitiveness among tourism SMMEs.

3. Anova

Table 7: Anova.

Demographic Variable	F	P-value
Gender	1.214	0.273
Age group	3.276	0.023
Education level	3.814	0.012
Frequency of tourism activity	1.542	0.207
Purpose of visit	3.027	0.032

The ANOVA results indicate that age, education level, and purpose of visit significantly influence respondents' perceptions of barriers to digital transformation, socio-cultural factors, drivers of digital transformation, and the use of digital tools ($p < 0.05$). These findings suggest that respondents with higher educational attainment and greater professional exposure are more aware of the challenges and enablers of digital transformation and are more likely to utilise digital technologies for business operations and customer engagement. In contrast, gender and frequency of tourism activity did not have a statistically significant influence ($p > 0.05$), indicating that these demographic characteristics have little effect on perceptions and adoption of digital transformation among tourism SMMEs.

DISCUSSION

The findings of this study demonstrate that digital transformation among tourism SMMEs is shaped by a combination of technological, organisational, and environmental factors, consistent with the Technology–Organisation–Environment (TOE) framework (Tornatzky & Fleischer, 1990). Collaboration with industry networks, leadership support, and digital competencies emerged as the strongest enablers of digital transformation, highlighting that organisations with stronger internal capabilities and external partnerships are more likely to integrate digital technologies into their operations. These findings support Kraus et al. (2021) and Nucharee and Charoensukmongkol (2022), who argue that leadership commitment, organisational learning, and collaborative networks are essential for strengthening digital innovation and organisational competitiveness. Although respondents generally viewed digital technologies as affordable, persistent infrastructural challenges, particularly unreliable internet connectivity, continue to limit the effective implementation of digital solutions. This finding reinforces previous studies that identify inadequate digital infrastructure as one of the principal barriers to digital transformation in developing economies (Gillwald & Mothobi, 2018).

The study further revealed that financial constraints, limited digital competencies, organisational resistance to change, and inadequate strategic planning remain significant barriers to digital transformation. These findings suggest that while tourism SMMEs recognise the strategic value of digital technologies, many lack the financial and technical capacity required to implement and sustain digital innovation. Similar observations have been reported by Marsh et al. (2020), and Vial (2019), who identify financial limitations, digital skills shortages, and organisational inertia as common challenges affecting technology adoption among small businesses. The significant negative relationship between barriers and digital transformation further demonstrates that reducing structural constraints is essential for improving digital readiness and enhancing organisational competitiveness.

Socio-cultural and regional factors also influenced digital transformation among tourism SMMEs. Younger and more highly educated respondents demonstrated greater levels of digital readiness, while enterprises operating in areas with stronger digital infrastructure and institutional support were more likely to adopt digital technologies. These findings highlight the importance of human capital and contextual factors in shaping technology adoption and are consistent with studies by Hinson et al. (2019), Mtebe and Raisamo (2021), and Davis and Addo (2020), which emphasise that education, digital exposure, and regional disparities influence digital innovation in developing economies. The ANOVA results further confirmed that age, education level, and business purpose significantly affect perceptions of digital transformation, whereas gender showed no statistically significant influence.

The findings also indicate that tourism SMMEs primarily utilise digital technologies to support marketing, customer communication, online bookings, and service delivery. Social media platforms remain the most widely adopted digital tools because they are relatively affordable, accessible, and effective in reaching customers. However, the limited adoption of advanced digital technologies, including artificial intelligence and business analytics, suggests that digital transformation remains at an early stage for many enterprises. This observation supports Kaplan and Haenlein (2020), who argue that social media has become an essential marketing platform for small businesses, while more sophisticated digital technologies often remain beyond the reach of resource-constrained enterprises.

The findings extend existing knowledge by demonstrating that successful digital transformation depends not only on access to technology but also on organisational capabilities, collaborative networks, and a supportive business environment. The integration of the TOE framework with Dynamic Capabilities Theory provides additional insight by illustrating that tourism SMMEs require both favorable external conditions and the ability to continuously develop digital skills, organizational learning, and innovation capabilities to sustain long-term competitiveness. The study therefore contributes to the growing body of literature on digital transformation in emerging economies while providing practical evidence to inform policies and initiatives aimed at strengthening the digital competitiveness of tourism SMMEs.

CONCLUSION

This study examined the factors influencing digital transformation among tourism SMMEs in Mbombela Local Municipality using the Technology–Organisation–Environment (TOE) framework and Dynamic Capabilities Theory. The findings demonstrate that leadership support, digital competencies, collaboration, and access to digital technologies positively influence digital transformation, while financial constraints, inadequate infrastructure, limited digital skills, and organisational resistance remain significant barriers. Furthermore, socio-cultural and demographic factors, particularly age and education, significantly influence digital readiness and technology adoption.

The study contributes to the literature by extending the application of the TOE framework within the context of tourism SMMEs in an emerging economy and highlighting the importance of organisational capabilities in sustaining digital transformation. The findings further suggest that strengthening digital infrastructure, improving digital skills, expanding collaborative networks, and increasing institutional support are critical to enhancing the competitiveness and long-term sustainability of tourism enterprises. These insights provide practical implications for policymakers, business support organisations, and tourism practitioners seeking to accelerate digital transformation within the tourism sector.

RECOMMENDATIONS

To accelerate digital transformation among tourism SMMEs, investment in reliable and affordable digital infrastructure should be prioritised through stronger collaboration between government, the private sector, and telecommunications providers. Improving internet connectivity, particularly in rural and semi-urban areas, will create an enabling environment for technology adoption and digital service delivery (Gillwald & Mothobi, 2018).

Digital skills development should also receive greater attention through continuous training programmes focusing on digital marketing, cybersecurity, e-commerce, customer relationship management, and data analytics. Strengthening digital competencies among business owners and employees will improve organisational readiness and increase the effective utilisation of digital technologies.

Finally, targeted financial support mechanisms, including grants, innovation vouchers, subsidised digital technologies, and low-interest financing, should be expanded to enable tourism SMMEs to invest in digital transformation. In addition, stronger partnerships with higher education institutions, tourism associations, and technology providers can facilitate knowledge sharing, mentorship, and innovation, thereby improving the long-term digital competitiveness of tourism SMMEs.

REFERENCES

- Awa, H. O., & Ojiabo, O. U. (2020). A model of adoption determinants of emerging technologies among small and medium enterprises. *Journal of Science and Technology Policy Management*, 11(2), 191–214.
- Baker, J. (2012). The technology–organization–environment framework. In Y. K. Dwivedi, M. R. Wade, & S. L. Schneberger (Eds.), *Information systems theory: Explaining and predicting our digital society* (Vol. 1, pp. 231–245). Springer.
- Boateng, R. (2021). Digital transformation in African small and medium enterprises: Challenges and opportunities. *African Journal of Management*, 7(3), 247–266.
- Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: Twenty years on and ten years after the Internet—The state of eTourism research. *Tourism Management*, 29(4), 609–623.
- Chatterjee, S., Chaudhuri, R., Vrontis, D., & Thrassou, A. (2022). Digital transformation and organisational performance: The role of digital innovation in small and medium enterprises. *Technological Forecasting and Social Change*, 182, 121–138.
- Davis, F., & Addo, A. (2020). Digital entrepreneurship and technology adoption among young entrepreneurs in Africa. *Journal of African Business*, 21(4), 457–474.

- Díaz-Arancibia, E., Muñoz-Pascual, L., Galende, J., & Curado, C. (2024). Digital transformation and innovation capabilities in tourism organisations: A systematic review. *Tourism Management Perspectives*, 49, 101188.
- Gillwald, A., & Mothobi, O. (2018). *After access 2017: The state of ICT in South Africa*. Research ICT Africa.
- González-Varona, J. M., Villafañez, F., Acebes, F., & López-Paredes, A. (2024). Digital transformation technologies in tourism: Current trends and future research directions. *Journal of Hospitality and Tourism Technology*, 15(1), 45–63.
- Hinson, R. E., Boateng, R., Renner, A., & Kosiba, J. P. (2019). Digital transformation and innovation in African businesses. *African Journal of Economic and Management Studies*, 10(3), 289–304.
- Iñedo, P. (2011). An empirical analysis of factors influencing internet/e-business technologies adoption by SMEs in Canada. *International Journal of Information Technology & Decision Making*, 10(4), 731–766.
- International Telecommunication Union. (2021). *Measuring digital development: Facts and figures 2021*. International Telecommunication Union.
- Kaplan, A. M., & Haenlein, M. (2020). Rulers of the world, unite! The challenges and opportunities of artificial intelligence. *Business Horizons*, 63(1), 37–50.
- Kraus, S., Durst, S., Ferreira, J. J., Veiga, P., Kailer, N., & Weinmann, A. (2021). Digital transformation in business and management research: An overview of the current status quo. *International Journal of Information Management*, 63, 102466.
- Leso, B. H., Cortimiglia, M. N., & Ghezzi, A. (2022). The contribution of organisational capabilities to digital transformation: A systematic literature review. *Technological Forecasting and Social Change*, 174, 121–139.
- Leung, D., Law, R., Van Hoof, H., & Buhalis, D. (2015). Social media in tourism and hospitality: A literature review. *Journal of Travel & Tourism Marketing*, 30(1–2), 3–22.
- Li, F., Su, L., Zhang, W., & Mao, J. (2020). Digital transformation by SME entrepreneurs: A capability perspective. *Information Systems Journal*, 30(6), 1129–1157.
- Marsh, S., Vallejos, E. P., & Spence, A. (2020). The digital skills gap and SME digital transformation. *Information Systems Management*, 37(4), 301–315.
- Matarazzo, M., Penco, L., Profumo, G., & Quaglia, R. (2021). Digital transformation and customer value creation in tourism. *Tourism Review*, 76(4), 862–878.
- Mbatha, B., & Nzewi, O. (2020). Digital transformation challenges facing small and medium enterprises in South Africa. *South African Journal of Information Management*, 22(1), 1–10.
- Moyo, M. (2020). Digital transformation among South African SMEs: Challenges and opportunities. *Journal of Contemporary Management*, 17(2), 245–263.
- Mtebe, J. S., & Raisamo, R. (2021). Investigating the digital divide between rural and urban enterprises in developing countries. *Electronic Journal of Information Systems in Developing Countries*, 87(5), e12169.
- Nawayseh, M. K. (2020). The role of the technology–organisation–environment framework in explaining digital innovation adoption. *International Journal of Business Information Systems*, 34(3), 321–340.
- Nucharee, K., & Charoensukmongkol, P. (2022). Network collaboration and digital capability development among tourism SMEs. *Journal of Hospitality and Tourism Management*, 52, 206–216.
- Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of sustainable enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350.
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533.
- Tornatzky, L. G., & Fleischer, M. (1990). *The processes of technological innovation*. Lexington Books.

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144.

Warner, K. S. R., & Wäger, M. (2019). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long Range Planning*, 52(3), 326–349.

SMART CITIES FOR PARTICIPATORY GOVERNANCE IN SOUTH AFRICAN MUNICIPALITIES

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ABSTRACT

Rapid urbanisation and persistent challenges in municipal service delivery have intensified interest in smart city development, particularly in South Africa. This study presents a systematic literature review of studies published between 2016 and 2026 to examine the role of smart technologies in participatory governance and municipal service delivery. The findings are discussed across four themes: digital transformation in urban governance, smart technologies and public service delivery, GIS in municipal management, and blockchain technology for transparency and accountability. The review indicates that IoT-enabled systems, GIS platforms, and blockchain technologies may improve service efficiency, citizen participation, and promote municipal accountability.

Keywords: smart cities, participatory governance, service delivery, South Africa, urban governance.

INTRODUCTION

Smart city development has increasingly become an effective mechanism for improving urban governance, municipal service delivery, and citizen participation worldwide (Jagatheesaperumal et al., 2024; Maatallah et al., 2026). Smart city systems can be implemented to monitor responsive public services, report service failures, and co-create solutions with local authorities. By integrating Internet of Things (IoT) enabled communication and real-time monitoring, municipalities can empower residents to report service failures and collaborate on localised solutions (van Hoang, 2024). The adoption of smart technologies within government systems presents a significant opportunity to enhance service delivery (Paudel et al., 2025).

Smart technologies have proven to foster inclusion, address education and infrastructure challenges, streamline procedures, and increase public engagement in both developed and developing countries (Milakovich, 2021; Nosike, 2024; Sadik-Zada, 2024; Ojo & Olugbade, 2025). Additionally, they foster accountability, improve transparency, and strengthen public trust in urban governance (Bhanye & Shayamunda, 2025; Sarifudin & Damanik, 2024). Technologies such as the Internet of Things (IoT), Geographic Information Systems (GIS), Artificial Intelligence (AI), blockchain, and smart communication networks are increasingly being adopted to improve urban management and support more responsive governance systems (Sibanda et al., 2024; Zindi, 2024).

In South Africa, the growing demand for efficient municipal services, coupled with persistent governance and infrastructure challenges, has intensified discussions around smart city development. Many municipalities continue to face challenges related to service delivery backlogs, infrastructure deterioration, public dissatisfaction, and limited citizen participation in governance processes (Hofisi & Chigova, 2023; Scheba et al., 2021). These conditions have highlighted the need for innovative governance approaches that improve municipal efficiency while strengthening relationships between local government and communities.

Participatory governance has therefore emerged as an important dimension of smart city development within the South African context. Smart governance systems can support citizen participation by enabling residents to report service delivery failures, access municipal information, monitor public services, and engage directly with local authorities through digital platforms (Mokoena et al., 2019). Despite the growing trend, research on smart cities for participatory governance within South African municipalities remains limited. Existing literature focuses on infrastructure modernisation and advanced urban technology, with less attention to how smart technologies can

strengthen inclusive governance in developing nations. In response, this paper examines the role of smart technologies in promoting participatory governance and improving municipal service delivery in South Africa.

METHODOLOGY

The systematic literature review (SLR) adopts a rigorous methodology, combining a comprehensive literature search with a thematic analysis of identified studies to examine the role of smart city technologies in participatory governance and municipal service delivery within South African municipalities (Ntanda & Carolissen, 2025). This approach reveals the latest trends and details of other authors' findings, ensuring a thorough examination of existing research on smart city development, participatory governance, service delivery and community engagement in South Africa (Beaulieu et al., 2021; Ritterbusch & Teichmann, 2023). The review methodology follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure methodological transparency, consistency, and replicability. Systematic literature reviews are widely recognised for synthesising existing knowledge, identifying research gaps, and generating evidence-based insights across interdisciplinary fields (Aruleba & Jere, 2022; Barbosa et al., 2020).

Search Strategy

The literature search was conducted using the Scopus and Google Scholar databases due to their broad coverage of interdisciplinary research related to smart cities, governance, urban development, and digital transformation. The search strategy utilised the following keywords and phrases: “smart cities”, “community engagement”, “township economy”, “participatory governance”, “service delivery”, and “urban governance”. Additional searches incorporated terms related to smart technologies, including “Internet of Things (IoT)”, “Artificial Intelligence (AI)”, “Geographic Information Systems (GIS)”, and “digital governance”. Keyword and subject searches were conducted across all databases, then combined using the keyword clustering technique and advanced database filtering to refine search results and improve relevance. Examples of search combinations included: “Smart Cities” AND “participatory governance”; “smart city development” AND “service delivery”; and “urban governance” AND “community engagement” AND “South Africa”. The search focused on studies published between 2019 and 2026 to capture recent developments and contemporary debates on smart governance and municipal digital transformation.

The research strategy identifies, evaluates, and synthesises all relevant studies to provide evidence-based insights into the strategies, implications, and opportunities associated with smart cities, governance and urban development. The review will employ a multi-stage screening process to identify relevant peer-reviewed articles, grey literature, and policy documents, utilising established systematic protocols (Barbosa et al., 2020). To ensure a thorough, comprehensive review of interdisciplinary research on the adoption of smart technologies in governance, the search sample and process will use the Scopus and Google Scholar databases (Aruleba & Jere, 2022).

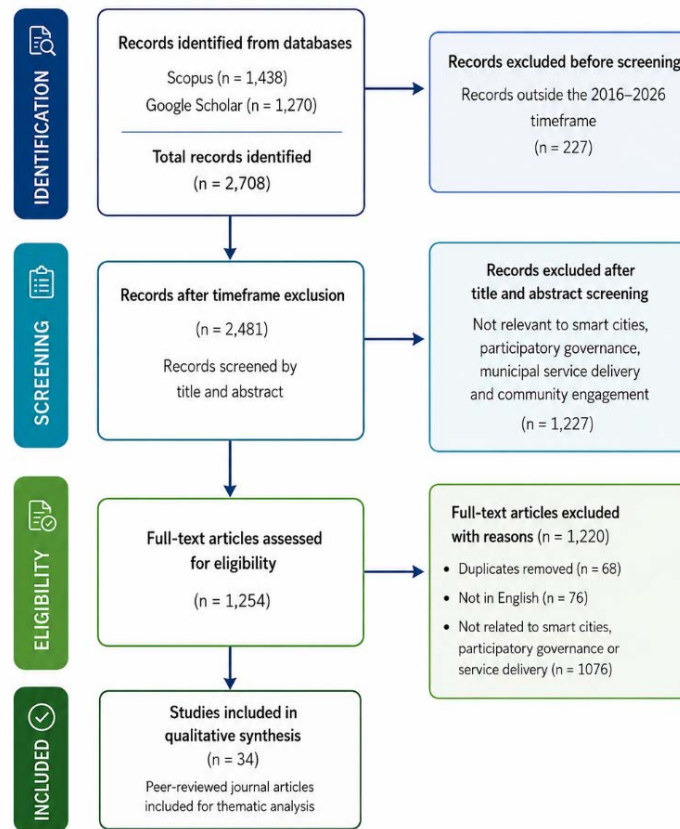
Selection Process, Inclusion and Exclusion

The articles analysed in the study were obtained from Scopus and Google Scholar, two of the most frequently used databases among researchers across multiple disciplines. Studies were selected based on their relevance to participatory governance, community engagement, township economies and smart city development in South Africa. These included empirical literature offering insights into the implications and opportunities of implementing digital transformation in the public sector. The study included English open-access articles published between 2016 and 2026, making the analysed articles the most recent articles. Studies published outside the selected timeframe or that lacked direct relevance to the study's objectives were also excluded. Working papers and conference proceedings were included in the study.

The initial database search identified 2,708 records, comprising 1,438 articles from Scopus and 1,270 articles from Google Scholar. A total of 227 records were excluded for falling outside the 2019 to 2026 publication period, leaving 2,481 records for title and abstract screening. Following the screening process, 1,227 records were excluded because they did not align with the study's focus on smart cities, participatory governance, and municipal service delivery. The remaining 54 articles underwent a full-text eligibility assessment using the inclusion and exclusion criteria. During this phase, duplicate studies, non-English publications, and articles lacking direct relevance to the

study objectives were removed. Following the final screening process, 34 peer-reviewed studies were retained for thematic analysis and synthesis. Figure 1 below demonstrates the PRISMA selection process.

Figure 1: PRISMA flow diagram with summary of literature.



Data Analysis

Thematic analysis was used to identify recurring patterns, concepts, and emerging themes within the selected literature. The analysis focused on smart governance systems, digital transformation in municipalities, public service delivery, transparency, accountability, citizen participation, and the application of technologies such as IoT, GIS, blockchain, and AI in local governance systems. This approach enabled the study to critically examine how smart city technologies can support participatory governance and improve municipal responsiveness within South African municipalities.

RESULTS AND DISCUSSIONS

The findings are discussed according to four major themes identified from the reviewed literature. Theme 1 discusses smart cities and digital transformation in urban governance. Theme 2 focuses on the global view of smart technologies and public service delivery. Theme 3 examines the application of Geographic Information Systems (GIS) in municipal management, while Theme 4 explores the role of blockchain technology in promoting transparency and accountability in governance.

Smart Cities and Digital Transformation in Urban Governance

The reviewed studies in Table 1 show that smart city technologies primarily affect urban government by strengthening public services, increasing transparency, and enabling participatory governance. Across the literature, digital tools, including IoT, AI, ICT, and big data, are portrayed as governance enablers, as they support real-time data collection

and administrative efficiency. Echendu and Okafor (2021) emphasise that smart city systems can help African cities respond to rapid urbanisation by strengthening governance in transport, health, education, and service planning. Chatti and Majeed (2022) demonstrate that ICT-supported urbanisation can also produce environmental benefits, indicating that digital tools can support more efficient and accountable urban management. Veloso et al. (2024) further show that smart-city initiatives are most effective when aligned with sustainability goals and governance systems that prioritise resilience, adaptability, and public value. Similarly, Gracias et al. (2023) and Jagatheesaperumal et al. (2024) indicate that digital technologies improve quality of life and public safety when embedded in participatory, data-driven governance structures. Oluokun et al. (2024) and Purnamasari et al. (2025) confirm that cloud computing, big data, and digital innovation can enhance policy implementation, energy optimisation, and public-sector performance. However, the studies also caution that these gains are uneven and require adequate infrastructure, financial resources, privacy protection, and strong institutional frameworks. Overall, the literature suggests that smart-city digital transformation is most valuable when it strengthens governance capacity, improves responsiveness, and enables more inclusive and sustainable urban management.

Table 1: Summary of studies on smart cities and digital transformation.

Author(s) & Year	Study Focus	Context	Technology/Concept	Key Findings
Echendu & Okafor (2021)	Smart cities and urban challenges	Global	Smart city systems	Smart cities address urbanisation challenges
Chatti & Majeed (2022)	ICT and environmental quality	Developed & developing countries	ICT	ICT contributes to carbon emissions
Veloso et al. (2024)	Urban digitalisation	Global	Smart urban systems	Smart technologies improve resilience
Gracia et al. (2023)	Smart technologies and quality of life	Global	Digital technologies	Smart systems improve quality of life
Jagatheesaperumal et al. (2024)	Citizen-centred governance	Global	Smart governance	Technology enhances governance participation
Oluokun et al. (2024)	Sustainable development	Global	Smart city initiatives	Smart cities support sustainability goals
Purnamasari et al. (2025)	AI, IoT and big data	Global	AI, IoT, Big Data	Digital integration improves efficiency

Global Review of the Adoption of Smart Technologies and Public Service Delivery

Various studies suggest that adopting smart technologies enhances and optimises the sustainability of urban and rural life, thereby improving the quality of life (Kumar et al., 2025). The local government can collect community data on waste management, smart water meters, smart energy grids, and streetlight poles, which can be used in conjunction with surveillance to enhance safety (Batic et al., 2024). This can be implemented to deliver the best service and gradually transform traditional townships into smart townships. Not all of South Africa’s local municipalities use the term “smart city”; however, when examining the services they provide to their community members, some systems are indeed smart digital solutions that align with the concept of a smart city. There's increased interest in using smart technologies, which is enhancing efficiency and innovation across sectors of the economy. South Korea, Sweden and the United States leverage smart technologies, including AI, cloud computing and mobile applications, to enhance transparency within government and strengthen community engagement in public administration and service delivery (Sadykova & Galy, 2024). In other developed nations, smart technologies have improved service delivery by increasing productivity through economies of scale and technological advancements in the finance, healthcare, and retail sectors, where automation, data analytics, and online systems improve operations and customer interactions (Wagan & Sidra, 2025). A summary of these studies is presented in Table 2 below.

Table 2: Summary of studies on smart technologies and public service delivery.

Author(s) & Year	Focus Area	Country/Region	Technology Used	Key Findings
Kumar et al. (2025)	Sustainable urban living	Global	Smart technologies	Improved quality of life
Batic et al. (2024)	Smart surveillance and governance	Local government	Smart monitoring systems	Enhanced safety and service delivery
Sadykova & Galy (2024)	Government transparency	South Korea, Sweden, USA	AI, cloud computing, mobile apps	Improved public participation
Wagan & Sidra (2025)	ICT productivity	176 economies	ICT systems	Developed countries gained higher productivity
Vyas-Doorgapersad (2009)	E-government services	South Africa	Gateway Portal	Reduced bureaucracy
Saldanha & Silva (2020)	Electronic voting systems	Brazil	E-voting systems	Enhanced democratic transparency
Mthiyane & Ndevu (2025)	Community engagement	Africa	ICT and AI	Increased digital opportunities
Ahenkorah & Kumar (2025)	Smart governance	Africa	GIS and digital twins	Improved governance systems
Mofokeng et al. (2025)	Municipal innovation	Africa	Smart technologies	Enhanced efficiency and participation

On the one hand, Wagan and Didra (2025) examined the productivity of 176 economies in adopting ICT. The results indicate that smart technologies experienced higher productivity growth of 8.8% in developed countries compared to developing and underdeveloped countries. The difference is that developed countries have access to advanced technologies and the benefit of robust environmental regulations. However, on the other hand, when Chatti and Majeed (2022) examined the importance of adopting smart technologies, such as ICT, to improve environmental quality across 34 developed and 60 developing countries. The study revealed that ICT contributes to increased carbon emissions, both directly and indirectly, by elevating consumption associated with transportation measures, which negatively impacts environmental quality in both developed and developing countries. The study's key finding indicates that ICTs increase carbon emissions and that urbanisation contributes to environmental harm.

Geographic Information Systems and Data-Driven Municipal Management

Numerous South African local governments, including Ekurhuleni, eThekweni (Durban), Jozini, Nelson Mandela Bay, City of Johannesburg (CoJ), Knysna, Stellenbosch and Emalahleni, have implemented digital systems such as the GIS (City of Ekurhuleni, 2023; eThekweni Municipality, 2017; City of Johannesburg, n.d; Stellenbosch Municipality, n.d; Knysna Municipality, n.d; Kakembo & van Niekerk, 2024; Jozini Local Municipality, 2023; Cudjoe et al., 2024). GIS is an integrated computer-based system that captures, stores, analyses and visualises geographic data related to the positions of Earth's surface, enabling users to understand spatial patterns and relationships through interactive mapping and analysis (Chan et al., 2022; Rogers et al., 2025). In South Africa, GIS is used to facilitate urban planning, infrastructure development, and access to geographic information.

Over the years, the South African population has increased, and some municipalities still use outdated data that does not provide sufficient information to enable local authorities to deliver services and allocate resources effectively in communities, leading to the current poor service delivery. Utilising technological systems such as GIS has proven to contribute positively to the delivery of effective services between the government and its citizens. The Knysna Municipality GIS offers an online mapping tool for publicly accessible spatial data, enabling users to query available spatial layers from the municipal spatial database, view and import geographical data. Some information includes access to property information, heritage inventory structures, scenic routes, the 2022 Garden Route District threat of wildfires and Avian Influenza (Hale, 2023). This offers significant benefits to surrounding communities and townships in terms of safety, awareness, and preparedness, as well as supporting researchers, improving public health, and enhancing emergency responses. Additionally, farmers can protect their livestock from avian flu by avoiding infected zones. Public access to GIS fosters community engagement, trust and collaboration between the government and citizens. A study by Cudjoe et al. (2024) found that utilising technological systems, such as GIS, benefited the Emalahleni municipality in understanding changes in the land for mining, water, and vegetation. In Asian countries, GIS has been used to assess flood vulnerability, which has claimed lives and damaged infrastructure in their

communities (Chan et al., 2022). The literature supports the idea that usage is beneficial to the environment, as it helps to understand the land.

Table 3: Summary of studies on GIS and data-driven municipal management.

Author(s) & Year	GIS Application	Context	Purpose	Key Findings
Chan et al. (2022)	Flood vulnerability mapping	Asia	Disaster management	GIS improves preparedness
Rogers et al. (2025)	Geographic data management	Global	Spatial analysis	GIS supports decision-making
Cudjoe et al. (2024)	Mining and environmental monitoring	Emalahleni Municipality	Land-use analysis	GIS improves environmental understanding
Hale (2023)	Public GIS access	Knysna Municipality	Public information sharing	Increased awareness and preparedness
Kakembo & van Niekerk (2024)	Municipal GIS systems	South Africa	Urban planning	GIS enhances planning efficiency
City of Ekurhuleni (2023)	GIS implementation	South Africa	Municipal management	Improved spatial planning
eThekweni Municipality (2017)	GIS services	Durban	Geographic services	Better service delivery
Jozini Local Municipality (2023)	GIS systems	South Africa	Spatial information systems	Improved information accessibility

Blockchain Technology and Transparent Governance

Blockchain technology is a decentralised, immutable digital ledger that securely records transactions across a peer-to-peer network, enabling transparent data sharing and management without a central authority (Yli-Huumo et al., 2016; Zheng et al., 2017; Dong et al., 2023). Blockchain can be utilised to enhance the integrity and efficiency of urban services and governance within municipalities for public management. The system can address the shortcomings of traditional municipal finance, allowing for more efficient allocation of resources. Transparency mitigates the risk of corruption, as all actions are traceable and cannot be altered once recorded (Yaga et al., 2019). Blockchain is primarily used in the supply chain, healthcare, education, and financial sectors. Various countries like Estonia, Sierra Leone, Sweden, Singapore, the United States, United Arab Emirates (UAE), Australia, and countries in Europe and central Asia have implemented blockchain systems in their public governance sectors such as healthcare, public procurement, transparent land registry and digital identity (Tan et al., 2022). More countries are increasingly adopting blockchain technology to enhance transparency, security, efficiency and trust in government (Kim, 2019; Olalekan, 2024). Applications include secure digital identity in the UAE, transparent land registries in Estonia, Georgia and Ukraine, smooth cross-border trade in Australia and Singapore, and better service delivery in Sweden (World Bank, 2018). Such implementations demonstrate blockchain's potential to enhance governance and public trust by making government operations more secure, accountable, and efficient in practical ways.

Several African governments have piloted blockchain technology for public services. Guinea-Bissau uses blockchain to manage and track public wage bill (International Monetary Fund, 2024). Ghana digitises government operations to secure public data, enhancing accountability and reducing corruption (Gyimah et al., 2023; Ayebofo et al., 2025). Kenya implemented it across the land registry, supply chain, and identity management to increase transparency and accountability in public administration and enable efficient digital public governance (Ondiek & Onyango, 2024). Scholars are actively proposing blockchain tools to reduce corruption in public procurement and improve auditability in administrative processes (Balogun & Olorunmade, 2024; Sibanda et al., 2024; Zindi, 2024). In other African contexts, continent-level reviews indicate that pilots and feasibility studies have been conducted concerning taxation records, supply chain traceability, healthcare, education and proposed blockchain e-voting systems.

The growing global interest in blockchain prompts the South African government to consider its implementation. The City of Cape Town collaborated with the Centre for Affordable Housing Finance (CAHF) and Seso Global to initiate a pilot blockchain property register project in the Khayelitsha and Makhaza communities. The project was designed to provide a secure and transparent property transaction (71point, 2019; Faku & Amandi-

Echendu, 2026). A study by Zuma (2023) indicates that staff at Msundzi Local Municipality in KwaZulu-Natal identified blockchain as a viable solution to enhance transparency, security, and privacy in the auditing process. Blockchain has the potential to address the existing governance challenges within the South African public sector (Sibanda et al., 2024). However, these initiatives remain predominantly at the pilot or proposal stages rather than being implemented as widespread national rollouts.

Table 4: Summary of studies on blockchain technology and transparent governance.

Author(s) & Year	Blockchain Application	Country/Region	Governance Area	Key Findings
Yli-Huumo et al. (2016)	Blockchain systems	Global	Digital transactions	Improved transparency and security
Faku & Amandi-Echendu, 2026	Land registry	South Africa	Land administration	Improved transparency
Yaga et al. (2019)	Municipal finance	Global	Financial governance	Reduced corruption risks
Kim (2019)	Blockchain governance	Global	Public administration	Enhanced public trust
Tan et al. (2022)	Public sector blockchain	Europe, UAE, USA	Digital governance	Improved accountability
Gyimah et al. (2023)	Digital public systems	Ghana	Public data security	Reduced corruption
Ondiek & Onyango (2024)	Land registry and identity management	Kenya	Public administration	Increased transparency
Balogun & Olorunmade (2024)	Public procurement systems	Africa	Anti-corruption	Improved auditability
Zindi (2024)	Blockchain governance tools	South Africa	Transparency systems	Improve accountability
Sibanda et al., (2024)	South African governance	South Africa	Public sector reform	Blockchain can address governance challenges
Zuma (2023)	Municipal auditing systems	Msunduzi Municipality	Auditing and records	Blockchain improves transparency and privacy

CONCLUSION

This study synthesised existing literature on smart cities and participatory governance within South African municipalities to examine how digital technologies can strengthen municipal service delivery, transparency, accountability, and citizen participation. Collectively, the findings suggest that smart city development should not be understood merely as a technological transformation agenda, but rather as a governance-centred framework capable of reshaping the relationship between municipalities and citizens. Across the four themes identified in the review, namely digital transformation in urban governance, smart technologies and public service delivery, GIS in municipal management, and blockchain technology for accountability and transparency, the reviewed literature indicates that smart technologies can support more responsive, data-driven, and citizen-centred governance systems. The review further suggests that technologies such as IoT-enabled systems, GIS platforms, AI applications, and blockchain tools have the potential to improve real-time monitoring, strengthen public participation, and enhance municipal decision-making processes.

The study contributes theoretically to the growing smart city discourse in the Global South by repositioning smart cities beyond infrastructure modernisation towards participatory and inclusive governance systems. Practically, the findings highlight the need for municipalities to integrate smart governance principles into policy planning, institutional development, and public service delivery frameworks. This includes strengthening digital infrastructure, expanding digital inclusion initiatives, improving institutional capacity, and creating accessible digital participation platforms that enable citizens to engage meaningfully with local government processes.

Limitations and Future Research

Despite these contributions, the study is not without limitations. The review relied primarily on peer-reviewed English-language publications indexed in Scopus and Google Scholar, potentially excluding relevant studies published in other languages or institutional reports outside the selected databases. Additionally, as a systematic literature review, the study synthesises existing knowledge rather than providing empirical evidence from specific municipalities or communities. Consequently, the findings may not fully capture the practical complexities associated with implementing smart governance systems across diverse municipal contexts. Building on these findings and acknowledging these limitations, future research should focus on empirical municipal case studies that evaluate the implementation and effectiveness of smart governance systems in practice. Comparative studies between metropolitan municipalities, secondary cities, and historically marginalised communities may further provide insight into how digital governance interventions operate across uneven socio-economic environments. Additional research is also needed on digital exclusion, citizen trust, data governance, and the long-term sustainability of smart city initiatives in developing countries. Ultimately, the success of smart cities in South Africa will depend not on technological sophistication alone, but on their ability to advance democratic participation, strengthen public accountability, and improve citizens' lived realities.

REFERENCES

- Ahenkorah, C. K., & Kumar, V. (2025). Implementing information systems in local government service: A case study in the Republic of Ghana. *International Journal of Education and Development using ICT*
- Aruleba, K., & Jere, N. (2022). Exploring digital transforming challenges in rural areas of South Africa through a systematic review of empirical studies. *Scientific African*, 16, e01190.
- Ayebofo, B., Anomah, S. & Amofah, K. (2025). Leveraging blockchain technology adoption in the fight against corruption: An evaluation of Ghana's readiness. *Journal of Economic Criminology*, 8, p.100158.
- Balogun, A.A. & Olorunmade, G. (2024). Blockchain technology adoption against corruption in emerging economies. In *Digital currency assets and challenges to financial system stability* (pp. 22-36). IGI Global Scientific Publishing.
- Barbosa, C., Dowd, W. N., & Zarkin, G. (2020). Economic evaluation of interventions to address opioid misuse: a systematic review of methods used in simulation modeling studies. *Value in Health*, 23(8), 1096-1108.
- Batic, D., Stankovic, L., & Stankovic, V. (2024). Analysis of Smart Meter Data for Energy Waste Management. In *Artificial Intelligence for Sustainability: Innovations in Business and Financial Services* (pp. 153-173). Cham: Springer Nature Switzerland.
- Beaulieu, E., DiGennaro, C., Stringfellow, E., Connolly, A., Hamilton, A., Hyder, A., Cerdá, M., Keyes, K.M., & Jalali, M.S. (2021). Economic evaluation in opioid modeling: systematic review. *Value in Health*, 24(2), 158-173.
- Bhanye, J., & Shayamunda, R. (2025). The promise of civic-tech: digital technologies and transparent, accountable governance. In *Digitalisation and Public Policy in Africa: GovTech and CivicTech Innovations* (pp. 93-122). Cham: Springer Nature Switzerland.
- Chan, S.W., Abid, S.K., Sulaiman, N., Nazir, U. and Azam, K., (2022). A systematic review of the flood vulnerability using geographic information system. *Heliyon*, 8(3).
- Chatti, W., & Majeed, M. T. (2022). Information communication technology (ICT), smart urbanization, and environmental quality: Evidence from a panel of developing and developed economies. *Journal of Cleaner Production*, 366, 132925.
- City of Ekurhuleni, 2023. *City of Ekurhuleni Geographic Information website*. <https://gis.ekurhuleni.gov.za>
- City of Johannesburg. (n.d). *Corporate Geo-Informatics: Online Maps*. <https://eservices.joburg.org.za/onlinemaps>
- Cudjoe, M.N.M., Kwarteng, E.V.S., Anning, E., Bodunrin, I.R. and Andam-Akorful, S.A., (2024). Application of Remote Sensing and Geographic Information System Technologies to Assess the Impact of Mining: A Case Study at Emalahleni. *Applied Sciences*, 14(5), p.1739.

- Dong, S., Abbas, K., Li, M. and Kamruzzaman, J., (2023). Blockchain technology and application: an overview. *PeerJ Computer Science*, 9, p.e1705.
- Echendu, A. J., & Okafor, P. C. C. (2021). Smart city technology: a potential solution to Africa's growing population and rapid urbanization? *Development Studies Research*, 8(1), 82-93.
- eThekweni Municipality. (2017). Corporate GIS: GIS Strategy. https://gis.durban.gov.za/GIS_Website/GISStrategy/GISStrategyVersion2.pdf
- Faku, N., & Amadi-Echendu, A. (2026). The economic benefit of blockchain-based land registry for South Africa: A systematic literature review. *South African Journal of Information Management*, 28(1), 2002.
- Gracias, J. S., Parnell, G. S., Specking, E., Pohl, E. A., & Buchanan, R. (2023). Smart cities—a structured literature review. *Smart Cities*, 6(4), 1719-1743.
- Gyimah, K.N., Asiedu, E. & Antwi, F. (2023). Adoption of blockchain technology in the banking sector of Ghana: Opportunities and challenges. *African Journal of Business Management*, 17(2), pp.32-42.
- Hale, M. (2023). Map of Garden Route District Municipality in the Western Cape, South Africa, and the land use implications. [online]. ResearchGate. Available at [https://www.researchgate.net/figure/Map-of-Garden-Route-District-Municipality-in-the-Western-Cape-South-Africa-and-the-land_fig1_383498489#:~:text=The%20increasing%20frequency%20and%20intensity,\)%2C%20focusing%20on](https://www.researchgate.net/figure/Map-of-Garden-Route-District-Municipality-in-the-Western-Cape-South-Africa-and-the-land_fig1_383498489#:~:text=The%20increasing%20frequency%20and%20intensity,)%2C%20focusing%20on)
- Hofisi, C., & Chigova, L. E. (2023). Rethinking the Role of Local Government in Service Delivery in South Africa: Towards Digital Transformation. *E-Journal of Humanities Arts and Social Sciences*, 64-76.
- International Monetary Fund (IMF). (2024). Guinea-Bissau is using blockchain to boost fiscal transparency. <https://www.imf.org/en/News/Articles/2024/10/02/cf-guinea-bissau-is-using-blockchain-to-boost-fiscal-transparency>
- Jagatheesaperumal, S. K., Bibri, S. E., Huang, J., Rajapandian, J., & Parthiban, B. (2024). Artificial intelligence of things for smart cities: advanced solutions for enhancing transportation safety. *Computational Urban Science*, 4(1), 10.
- Jozini Local Municipality. (2023). *Geographical Information Systems (GIS) Strategy for Jozini LM 2023-2024*. <https://www.jozini.gov.za/wp-content/uploads/pdfs/Policies/2023/Final%20Reviewed%202023-2024%20Geographical%20Information%20Systems%20%28GIS%29%20Strategy%20For%20Jozini%20LM%20-%2030%20May%202023.pdf>
- Kakembo, V. & van Niekerk, S. (2024). The integration of GIS into demographic surveying of informal settlements: The case of Nelson Mandela Bay Municipality, South Africa. *Habitat International*, 44, pp.451-460.
- Kim, S.K. (2019). Blockchain governance game. *Computers & Industrial Engineering*, 136, pp.373-380.
- Knysna Municipality. (n.d.). Knysna Public GIS Viewer. <https://experience.arcgis.com/experience/2d6ee772d93740abbba2d016ef8ec670>
- Kumar, N., Kumar, K., Aeron, A., & Verre, F. (2025). Blockchain technology in supply chain management: Innovations, applications, and challenges. *Telematics and Informatics Reports*, 100204.
- Maatallah, R., Abdessamad, A., & Khatori, Y. (2026). Smart cities in Africa: a systematic literature review of challenges and development strategies. *City and Environment Interactions*, 100365.
- Milakovich, M. E. (2021). *Digital governance: Applying advanced technologies to improve public service*. Routledge.
- Mofokeng, S., Ramolobe, K. S., & Bogopa, D. L. (2025). Assessing the impact of digital technologies on service delivery in local government. *Journal of Local Government Research and Innovation*, 6, 234.
- Mokoena, B.T., Moyo, T., Makoni, E.N. and Musakwa, W., 2019. Spatio-temporal modelling & the new urban agenda in post-apartheid South Africa. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 42, pp.1327-1332.

- Mthiyane, D. B., & Ndevu, Z. (2025). Assessing the impact of digital technologies on service delivery in local government. *Journal of Local Government Research and Innovation*.
- Nosike, C. J. (2024). Digitalization in developing countries: Opportunities and challenges. *Niger. J. Arts Humanit*, 4(1), 2955-0343.
- Ntanda, A. & Carolissen, R. (2025). Technology's dual role in smart cities and social equality: A systematic literature. *Journal of Local Government Research and Innovation*, 6, p.238.
- Ojo, O. A., & Olugbade, D. (2025). Promoting inclusive education in developing countries: Innovations and technological frontiers. In *Reimagining Transformative Educational Spaces: Technological Synergy for Future Education* (pp. 317-331). Singapore: Springer Nature Singapore.
- Olalekan, O.A., 2024. Blockchain Technology and Anti-Corruption Measures In The Setting Of Public Administration In Nigeria. *African Journal of Law, Political Research and Administration*, 7(3), pp.69-79.
- Oluokun, O. A., Akinsooto, O., Ogundipe, O. B., & Ikemba, S. (2024). Leveraging cloud computing and big data analytics for policy-driven energy optimization in smart cities. *Journal Name Missing*.
- Ondiek, J.O., & Onyango, G. (2024). Blockchain technologies in digital governance: The Kenyan experience with promoting public accountability. In *The Routledge International Handbook of Public Administration and Digital Governance* (pp. 112-124). Routledge.
- Paudel, S., Poudel, A., & Paudel, S. (2025). Enhancing electoral integrity and accessibility: A blockchain and facial recognition-based electronic voting system. *Inf. Dyn. Appl*, 4(2), 85-94.
- Purnamasari, R., Hasanudin, A. I., Zulfikar, R., & Yazid, H. (2025). Technological infrastructure and financial resource availability in enhancing public services and government performance: The role of digital innovation adoption in Indonesia. *Social Sciences & Humanities Open*, 11, 101621.
- Ritterbusch, G. D., & Teichmann, M. R. (2023). Defining the metaverse: A systematic literature review. *Ieee Access*, 11, 12368-12377.
- Rogers, S.R., Foust, B.G. and Nelson, J.R., (2025). Standard use of Geographic Information System (GIS) techniques in honey bee research 2.0. *Journal of Apicultural Research*, 64(2), pp.443-532.
- Sadik-Zada, E. R., Gatto, A., & Niftiyev, I. (2024). E-government and petty corruption in public sector service delivery. *Technology Analysis & Strategic Management*, 36(12), 3987-4003.
- Sadykova, K., & Galy, A. (2024). Oecd countries' experience in transformation of public service delivery systems. *H. Dosmuhamedov Atyndağy Atyrau Memlekettik Universitetinın Habarşysy*, 195–208
- Saldanha, D. M. F., & SILVA, M. B. D. (2020). Transparency and accountability of government algorithms: the case of the Brazilian electronic voting system. *Cadernos EBAPE. BR*, 18, 697-712.
- Sarifudin, R., & Damanik, F. H. S. (2024). Enhancing transparency and accountability in public administration through information technology utilization. *Gema Wiralodra*, 15(1), 32-40.
- Scheba, A., Turok, I., & Visagie, J. (2021). Inequality and urban density: socio-economic drivers of uneven densification in Cape Town. *Environment and Urbanization ASIA*, 12(1_suppl), S107-S126.
- Sibanda, B., Basheka, B., & Van Romburgh, J. (2024). Assessing the Readiness of the South African Public Sector to Embrace Blockchain Technology: Factors for Successful Adoption. *The Journal of The British Blockchain Association*.
- Sibanda, B., Basheka, B., & van Romburgh, J. (2024). Enhancing governance through blockchain technology in the South African public sector. *Africa's Public Service Delivery and Performance Review*, 12(1), 734.
- Stellenbosch Municipality, n.d. Geographic Information Systems (GIS). <https://stellenbosch.gov.za/geographic-information-systems-gis/#:~:text=The%20GIS%20Section%20is%20responsible,into%20spatial%20relationships%20and%20pattern>

- Tan, E., Mahula, S. & Cromptvoets, J. (2022). Blockchain governance in the public sector: A conceptual framework for public management. *Government Information Quarterly*, 39(1), p.101625.
- van Hoang, T. (2024). Impact of integrated artificial intelligence and internet of things technologies on smart city transformation. *Journal of technical education science*, 19(Special Issue 01), 64-73.
- Veloso, Á., Fonseca, F., & Ramos, R. (2024). Insights from smart city initiatives for urban sustainability and contemporary urbanism. *Smart Cities*, 7(6), 3188-3209.
- Vyas-Doorgapersad, S. (2009). The Application of e-Government for Increased Service Delivery in South Africa. *The International Journal of Interdisciplinary Social Sciences: Annual Review*, 4(1), 455–466.
- Wagan, S. M., & Sidra, S. (2025). Digital Technology's Impact on Service Sector Productivity and Modernization. *Regionologiâ*, 33(3), 386–405.
- World Bank. (2018, May 8). Countries in Europe and Central Asia can provide better opportunities and services for citizens by leveraging blockchain technologies. <https://www.worldbank.org/en/news/press-release/2018/05/08/countries-in-europe-and-central-asia-can-provide-better-opportunities-and-services-for-citizens-by-leveraging-blockchain-technologies>
- Yaga, D., Mell, P., Roby, N. & Scarfone, K. (2019). Blockchain technology overview. *arXiv preprint arXiv:1906.11078*.
- Yli-Huumo, J., Ko, D., Choi, S., Park, S. & Smolander, K. (2016). Where is current research on blockchain technology? — A systematic review. *PLOS ONE*, 11(10), p.e0163477.
- Zheng, Z., Xie, S., Dai, H., Chen, X. & Wang, H. (2017, June). An overview of blockchain technology: Architecture, consensus, and future trends. In *2017, the IEEE International Congress on Big Data (BigData Congress)* (pp. 557-564). IEEE.
- Zindi, B. (2024). The Role of Blockchain in Enhancing Public Trust and Accountability in South African Municipalities. *Mankind Quarterly*, 65(1), pp.92-110.
- Zuma, K.P. (2023). *Blockchain-Based Digital Records Management for Auditing Process: A Case Study of Msunduzi Local Municipality* [Doctoral dissertation, University of South Africa].

AN EXAMINATION OF STAKEHOLDER INVOLVEMENT IN THE PLANNING AND IMPLEMENTATION OF CORPORATE SOCIAL INVESTMENT INITIATIVES IN THE CASINO INDUSTRY

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ABSTRACT

South Africa legalised casino gambling as part of a broader national strategy to stimulate economic growth, enhance tourism development, and create employment opportunities. Over the years, the sector has reportedly invested billions in various community development initiatives, often in partnership with other organisations. Central to the success and sustainability of empowerment initiatives is meaningful stakeholder involvement both internally, through key organisational role-players and staff members, and externally, through beneficiaries and community leaders. This study seeks to determine the extent to which relevant stakeholders are engaged in the planning and decision-making processes of the sector's CSI initiatives, as well as how casinos maintain relationships with stakeholders across all levels. The study employed a qualitative approach where managers involved in CSI portfolios within the different casino operators in South Africa were interviewed, together with beneficiaries who directly benefited from casino CSI initiatives since 2020. The study contributes to the limited literature on the South African casino industry by highlighting the critical role of stakeholder involvement in the design and implementation of effective and empowering CSI initiatives.

Keywords: corporate social investment, casino, community involvement, stakeholders.

INTRODUCTION

In South Africa the casino sector has been instrumental in driving economic growth and development as the sector's contributions extend beyond gambling entertainment and job creation (Rogerson, 2022). Through revenue development from their tax contributions, strengthening local economies and infrastructure development (Ndhlovu, 2011; Lee, 2022), the sector has been instrumental in addressing major socio-economic challenges which are endemic to the South African context. Institutional reforms, including the Broad-Based Black Economic Empowerment Act and regulatory frameworks such as the National Gambling Act, 2004 (Act No. 7 of 2004), have significantly influenced the casino sector's role in being responsible corporate citizens. Through legal licensing requirements, casinos are mandated to allocate at least 1% of their net profits towards initiatives aimed at addressing socio-economic challenges within host communities and mitigating the adverse social impacts associated with gambling. Despite the National Gambling Act's enforcement on various national regulatory frameworks that the casino sector must adhere to in order to be granted and maintain its gambling licences. The Act however, does not explicitly mention Corporate Social Investment (CSI) as part of the licensing conditions, though, the framework creates a foundation and sets the tone for the implementation of CSI practices.

Over time, the casino sector has reportedly invested billions of rand in community development initiatives, often implemented in collaboration with partner organisations. The effectiveness and long-term sustainability of these empowerment initiatives are, however, largely dependent on meaningful stakeholder involvement, both internally through key organisational role-players and employees and externally through beneficiaries, community representatives, and local leaders. This paper emphasises the significance of stakeholder involvement in ensuring the success and sustainability of CSI initiatives aimed at promoting empowerment within

the host communities of South African casinos. It is imperative that casino CSI programmes are strategically structured to address the multifaceted socio-economic challenges faced by communities, particularly within developing contexts such as South Africa. Given the complexity of these challenges, meaningful engagement of all relevant stakeholders throughout the planning, implementation and evaluation phases of CSI initiatives are essential to enhance their effectiveness, relevance and long-term impact. This study is guided by a combination of Stakeholder Exchange Theory, Social Exchange Theory, and the Triple Bottom Line framework. This multi-approach theoretical approach allows for a comprehensive overview and understanding of the casino's CSI initiatives and their effectiveness in promoting and addressing women's empowerment and impacting communities.

CSR/CSI in Casinos

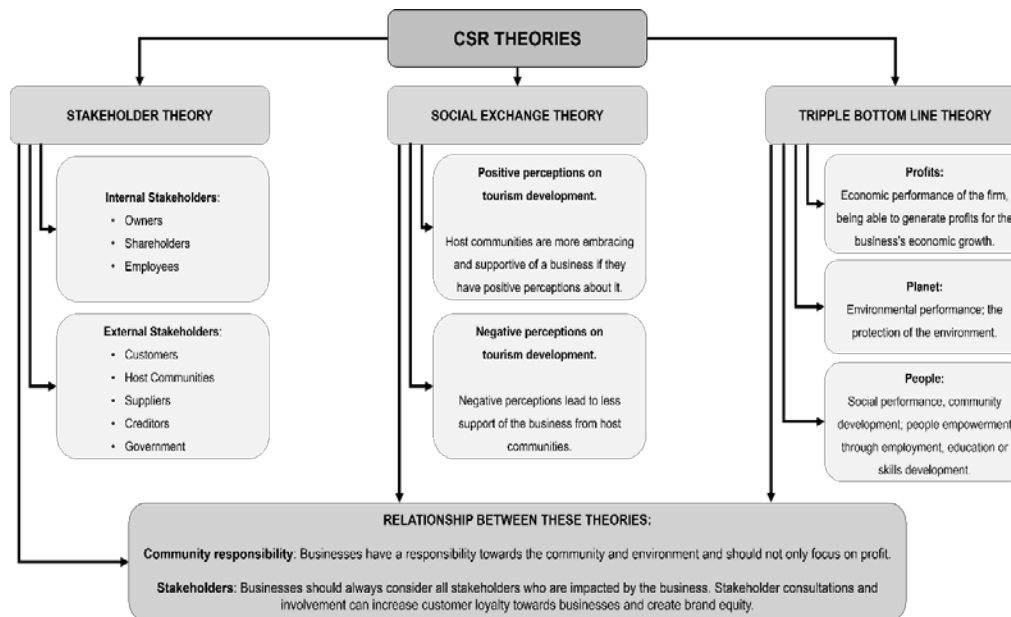
Corporate Social Investment (CSR) and CSI are concepts used to evaluate the role and impact of business activities within the communities in which organisations operate (Ndhlovu, 2011). Whilst CSR is corporate philanthropy, CSI is strategic and focuses on social investment where an investment suggests that “a return is expected; a return in terms of social uplifting for the broad transformation agenda” (Hinson & Ndhlovu, 2011). The concept of CSI originates from the broader CSR framework, which is a distinctly South African phenomenon that has been legalised and institutionalised to address the socio-economic inequalities created by apartheid, particularly among previously disadvantaged communities (Ndhlovu, 2011). CSR analysis is crucial for all organisations, it is especially important for casino operators because the industry is rife with societal concerns such as gambling addiction, domestic abuse, theft and other crimes (Lee, Zhai, Lee & Luo, 2021).

Casinos are seen as one of the contributors that have aided in the advancement of economic growth and have also been criticised for causing social issues related to gambling addiction (Marsudi & Soetanto, 2020). Despite their considerable CSR efforts, casinos typically have a reputation misfit as their CSR initiatives often do not align with their core business (Yang, Ren & Lau, 2020), however, this assertion is not universally applicable as some casinos have CSR initiatives that have positive impacts on their communities (Lau *et al.*, 2021:375). Nyuur, Ofori and Debrah (2012:93) classify nine crucial elements that are both vital and adverse to CSR for initiatives in South Africa; these include “policy frameworks, leadership and governance, staff engagement, external stakeholder engagement, government, project management, monitoring, evaluation and reporting, funding and beneficiation”, these elements can be adapted by the casino sector when establishing CSR initiatives. Through aligning their CSR initiatives with these key elements, the casino sector can effectively address some of the socio-economic challenges faced by their host communities, strengthen their stakeholder relations and meet their organisational objectives through economic growth and brand development.

CSI Theories at a Glance

The theories presented in Figure 1 provide a foundational framework for applying CSI to conceptualise and analyse stakeholders' perceptions of CSR initiatives within the casino sector and are instrumental in developing a CSR framework for the casino sector, which have been studied to better understand CSR in business (Carrol, 1999; Parmar, Freeman; Gibson, 2000; Buchholz & Rosenthal, 2005; Parmar, Freeman, Harrison, Wicks, Purnell, & De Colle, 2010; Lee, Kim & Kim, 2018).

Figure 1: Theoretical framework for CSI.



Stakeholder Theory

The underpinnings of the stakeholder theory stem from the idea that value is a crucial and an explicit constituent of conducting business (Gibson, 2000). Stakeholder theory focuses on two core questions: what the organisation's goal is, which helps managers align stakeholders around shared value and drive strong performance, and what obligations management has to stakeholders, which guides the relationships needed to achieve organisational objectives (Freeman et al., 2004:364). The theory is utilised to comprehend CSR in its possibly most widely acknowledged sense of business, namely taking on societal responsibilities beyond those owed to shareholders (Kaler, 2006). Managers are encouraged to describe the shared value amongst their primary stakeholders, they are also encouraged to be explicit about their objectives and the types of relationships that must be developed and maintained with the stakeholders to achieve those objectives. While also being clear about their company's goals and the types of relationships they need to build with stakeholders to achieve those objectives.

Social Exchange Theory

In the context of tourism, this theory has been used to assess residents' perceptions of changes brought about by tourism development (Lee, Kim & Kim, 2018). The social exchange theory has also been applied to gambling research since gambling related activities such as casinos are considered as an alternative tourism development (Lee *et al.*, 2018). The social exchange theory also offers a framework for understanding how citizens' perceptions of the advantages and quality of life they receive from a gaming company's CSR initiatives affect their support from their host communities (Lee *et al.*, 2018). It is hypothesised that the casino's relationship with its host community is based on the social exchange theory which is based on subjective assessments of costs and benefits, residents will perceive the casino either negatively or positively depending on the expected benefits and costs experienced post the consumption of the casino's services (Shai, Kleynhans & Roberson, 2020). As a result, it is essential for casinos to provide positive outcomes to the communities they serve.

Triple Bottom Line

The TBL approach examines how businesses manage and balance all three obligations (economic, environmental and social) and tries to resolve these interconnected fields of endeavour for a more balanced picture of total company performance (Jamali, 2006). TBL urges businesses to assess not only the economic value they create but also the social and environmental impacts that can be enhanced or diminished through their operations and efforts (Zak, 2015).

TBL theory is one of the cornerstones of CSR, TBL which is a by-product of the sustainable development paradigm and is centred on the pursuit of harmony between the three dimensions of economics, ecology and ethics (Zak, 2015). When businesses commit to their communities, the environment, and their profits in a balanced manner, sustainable management is achieved.

These frameworks collectively prioritise one aspect of a business, its orientation towards society as a whole, or social responsibility over other responsibilities. The principle of the stakeholder theory suggests that business is primarily about building relationships and delivering value to all stakeholders. As a measure of CSR and environmental impact over time, as TBL is used by corporations to assess their commitment to corporate social responsibility. According to these theories, businesses are interconnected with their customers, suppliers, employees, investors, communities, and others that have an interest in them and rather than focusing solely on shareholders, as organisations should create value for all stakeholders.

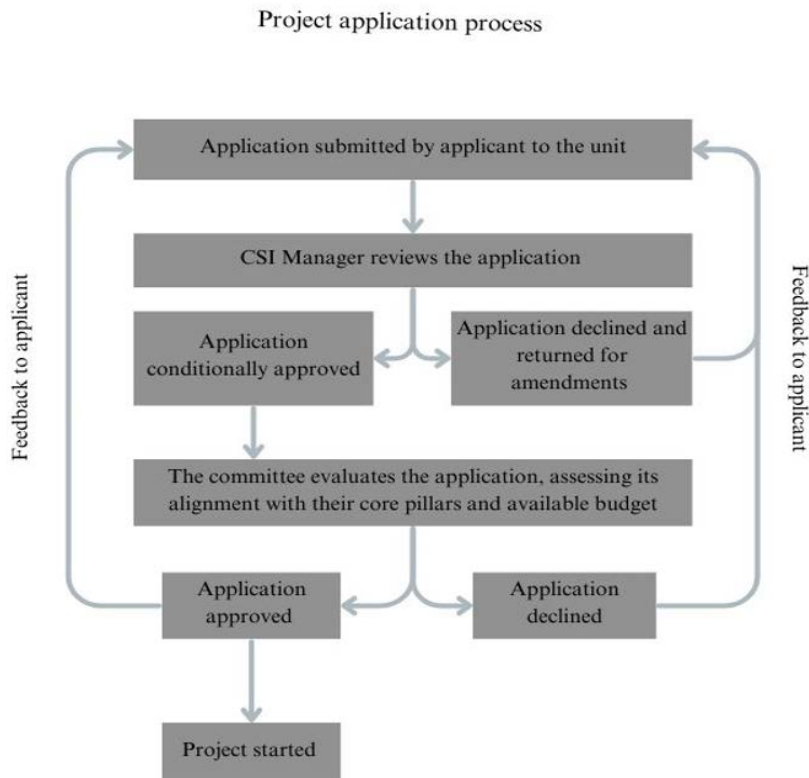
METHODOLOGY

Data for the study was collected across seven of South Africa's nine provinces, selected based on the distribution of casino gambling licences in each region. A total of 37 respondents participated, including CSI managers, Executive HR managers, and beneficiaries of CSI-funded initiatives. A qualitative approach was employed to gain an in-depth understanding of the research phenomenon from a humanistic and interpretive perspective (Pathak, Jena & Kalra, 2013). Data collection involved a combination of individual interviews, conducted both face-to-face and via Microsoft Teams, as well as focus group discussions with selected beneficiaries. A multi-phase qualitative design was implemented, utilising purposive and snowball sampling to identify participants with relevant expertise and experience. CSI and Executive HR managers were purposively selected for their knowledge of CSI operations, while snowball sampling enabled the identification of beneficiaries through the managers' networks. All data were transcribed verbatim and analysed using thematic content analysis, whereby descriptive codes were generated from the textual data and subsequently organised into overarching themes. Thematic content analysis facilitates the identification of key ideas and patterns by systematically labelling segments of text, which are then synthesised into themes representing the core findings of the study (Creswell & Creswell, 2018).

RESULTS AND DISCUSSION

The participants from the casino operators were requested to provide an overview of their project section and application process. The findings revealed that communities or organisations that need financial assistance for a project would need to follow a specific application process and undergo a rigorous review process conducted by the unit to ascertain the extent of the project, its impacts, alignment to their cores and anticipated cost projections. In some cases, CSI units may fund projects outside their strategic focus due to unforeseen societal needs, subject to regulatory approval. The traditional approach is funding projects that fall within their strategy and whose plans were submitted to their respective regulator at the beginning of each quarter. Figure 2 illustrates the traditional application and review processes followed within the casino sector. Applicants submit completed applications to the relevant unit, where the CSI manager together with a committee that consists of other departmental heads within the unit would review the documentation against their compliance, and eligibility criteria in order to assess its suitability into their scope. Applications may either get declined and returned to the applicant for amendments due to incomplete files or outstanding documents or it receives preliminary approval. If preliminarily approved the application is submitted for further review. Salvioni and Gennari (2019) are of the view this approach mitigates risk for the company and creates long-term sustainable conditions associated with socially responsible corporate behaviour within the company. This approach brings in unique perspectives and promotes inclusive CSI practices that can be effective in achieving the intention of CSI projects for host communities.

Figure 2: The casino CSI application process.



Following the suitability of the application the internal committee members involved will deliberate on the application received and all the projected benefits of the application are assessed and deliberated on. The application will either get recommended by the committee for approval or rejection. The general manager will make the final decision and either approve or decline the application. The applicant will be informed of the outcome of the application and for approved applications the procurement processes will be initiated by the unit.

CSI Portfolio Governance and its Impact on Employee Morale and Brand Equity

For all three casino operators CSI is managed at the group level where various strategies and implementation plans are developed and passed down to the units to implement. Whilst for some units such as those from casino operator 1, the roles of staff involved in the CSI portfolio is limited to the financial aspects of CSI and that the head office is responsible for the strategy and approval of projects. For this operator CSI is handled at the group level where the strategy and framework for the year would be developed and passed down to the units for implementation. Casino Operator1 is the only company out of the three who were part of the study that indicated that as units, their involvement was only limited to the financial aspect of the CSI projects. As a unit they do not receive project applications, they only deal with processing payments based on the projects approved by the head office for their unit. Participants from casino operators 2 and 3 indicated that they have strategies and key focus areas identified and approved at the head office which are their pillars of CSI. Organisations and individuals can make applications directly with the unit where these applications will undergo their stringent review process at the unit. For these operators a committee is responsible for reviewing the applications. Furthermore, some units have a trust designated for their CSI portfolio and this trust consists of stakeholders ranging from shareholders, internal members of staff, departmental heads within the unit, local municipalities and representatives from the mayor's office. The trust ensures that the approved projects aligns with their strategy and focus areas as a group and also ensures that the projects are correctly managed. The data also revealed that the involvement of employees leads to positive employee morale. As such Casino Operator 2 has

developed a staff volunteer programme which consists of members of staff who volunteer for their various CSI outreaches.

Culturally and Traditionally Cognisant CSI Approaches to Addressing Community Needs

Companies that intend to introduce CSI projects in communities need to build mutually beneficial partnerships with them. The aforementioned strategy was evident from the data as the participants alluded the success of projects to this. When it comes to the reviewing of projects or applications the first course of action for units especially located within rural and traditional communities would be to consult with the traditional authority where the projects would be deliberated and its merits discussed in detail. This approach will ensure that the traditional authorities are proponents of the project and will ensure its success. Excluding traditional communities when implementing gender-specific initiatives, particularly those aimed at women or minority groups within the community, can undermine the success of such projects. It is therefore essential to secure buy-in from traditional authorities, especially in patriarchal contexts. Engaging a male advocate with a feminist perspective may help influence acceptance of the project among other men in the community, especially for projects aimed at women.

Casino CSI Exposure Within the Host Communities

The findings reveal low community awareness of casino CSI initiatives, with most participants unable to identify projects funded through casino support. Awareness was largely limited to individuals involved in social development organisations, indicating an information and access gap between formal organisations and the broader community. Even among those aware of funding opportunities, experiences of limited feedback and support point to weak stakeholder engagement processes. Participants perceived local casinos as lacking meaningful community engagement and effective collaboration with local stakeholders, contributing to mistrust and perceptions of limited transparency. Although some infrastructure projects, such as sports facilities, were recognised, inconsistent management and maintenance undermined their sustainability and community ownership. Overall, these findings suggest that communication gaps, weak partnerships, and governance challenges constrain the effectiveness and developmental impact of CSI initiatives.

DISCUSSIONS

The literature underscores stakeholder engagement as a key success factor for any project development, highlighting that collaborative processes enhance project effectiveness and sustainability. Effective casino CSI implementation requires the inclusion of both internal and external stakeholders. Internally, these are employees who are employed under the CSI portfolio, management, experts and those who might be interested in the portfolio and externally being. Externally, stakeholders include local leadership structures, community members, and project beneficiaries. Internally the findings suggest that employee involvement within CSI portfolios exists in some units, however, such participation appears to be largely voluntary and ad hoc in nature. This involvement is primarily associated with once-off initiatives, such as sanitary product donation drives for local schools and activities linked to commemorative events like Mandela Day, rather than sustained or structured engagement.

Externally, the CSI managers alluded poor stakeholder involvement which often heightens community-related challenges which frequently hinder or delay project success. A primary issue is limited community buy-in, particularly during the introduction of new initiatives. In traditional communities with divided leadership structures, securing support can be especially difficult, resulting in delays in project acceptance and implementation. These dynamics often lead to minimal community participation during both the planning and execution stages, undermining the effectiveness and sustainability of the projects.

The data indicated that while community members are sometimes included in project planning, overall exposure to CSI-funded initiatives remains limited. Awareness is largely confined to participants whose organisations receive regular monthly support from the casino in the form of monetary donations or otherwise grocery parcels. For example, in a North West community where a sports complex was constructed through collaborations between a casino resort and other businesses, residents were uncertain about the casino's role in the project, thus During local

community protests, the facility was damaged as an act of retaliation against the local government, despite the fact that the centre had been funded and constructed by non-governmental entities. This suggests that insufficient visibility and engagement limits community understanding of the casino's contributions, highlighting a gap in effective communication and participatory involvement. The poor planning and transparency when it comes to casino CSI departments, which often do not involve community members from the early stages of the projects or when it comes to the project handover, leads to misalignment of community needs and project intentions.

The data also reveal a significant gap in the monitoring and evaluation of initiatives, with CSI managers and teams rarely following up with communities after project rollout. This suggests that projects may be implemented primarily to meet regulatory requirements and provincial scorecards, rather than to ensure sustained community impact or effectiveness.

CONCLUSIONS

To maximise the benefits of CSI initiatives, the sector must prioritise comprehensive stakeholder engagement throughout all project phases. Engagement should begin prior to project inception, including consultations with potential beneficiaries to ensure that initiatives address real community needs. Such consultations should continue during implementation phase with ongoing monitoring and evaluation by relevant stakeholders. Finally, post-project evaluations are essential to assess whether objectives have been met in order to enhance accountability and long-term community impacts. From the findings several managerial implications can be deduced for casino CSI initiatives. Managers should align CSR activities with organisational objectives to generate both social value and organisational impact, rather than merely meeting compliance requirements. Effective stakeholder engagement is essential through involving internal and external stakeholders throughout project planning, implementation, and evaluation, with transparent communication to build trust and legitimacy. There is a need for a holistic performance approach, guided by the TBL to assess social, environmental, and economic outcomes of their CSI initiatives. Initiatives should prioritise empowerment and capacity building to provide lasting skills and economic opportunities for host communities and their beneficiaries. Lastly, continuous monitoring, evaluation, and incorporation of stakeholder feedback is critical to address communities' challenges and to refine future projects in order to achieve the intended objectives.

REFERENCES

- Abbas, J. (2020). Impact of total quality management on corporate green performance through the mediating role of corporate social responsibility. *Journal of Cleaner Production*, 242, 1–12.
- Buchholz, R. A., & Rosenthal, S. B. (2005). Toward a contemporary conceptual framework for stakeholder theory. *Journal of Business Ethics*, 58, 137–148.
- Carroll, A. B. (1999). Corporate social responsibility: Evolution of a definitional construct. *Business & Society*, 38(3), 268–295.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage.
- Gibson, K. (2000). The moral basis of stakeholder theory. *Journal of Business Ethics*, 26, 245–257.
- Hinson, R. E., & Ndhlovu, T. P. (2011). Conceptualising corporate social responsibility (CSR) and corporate social investment (CSI): The South African context. *Social Responsibility Journal*, 7(3), 332–346.
- Kaler, J. (2006). Evaluating stakeholder theory. *Journal of Business Ethics*, 69, 249–268.
- Lau, V. M. C., Ren, L., & Yang, F. X. (2021). CSR and casino hotel branding: The joint moderation of CSR misfit and corporate awareness. *Journal of Hospitality and Tourism Management*, 49, 375–384.
- Lee, C. K., Kim, J., & Kim, J. S. (2018). Impact of a gaming company's CSR on residents' perceived benefits, quality of life, and support. *Tourism Management*, 64, 281–290.

- Lee, S., Zhai, X., Lee, M., & Luo, Q. (2021). Current status of CSR practices in the casino industry: A comparison between the U.S. and Macau. *Journal of Hospitality & Tourism Management*, 48, 331–343.
- Marsudi, A. S., & Soetanto, G. P. (2020). The effect of good corporate governance (GCG) on disclosure of corporate social responsibility (CSR) and its implications on firm value. In *Proceedings of the International Conference on Management, Accounting and Economy* (pp. 95–98).
- Naudé, R., Kruger, S., & Saayman, M. (2015). The effect of casino employees' demographic variables on quality of work-life domains. *African Journal of Hospitality, Tourism and Leisure*, 4(2), 1–30.
- Ndhlovu, T. P. (2011). Corporate social responsibility and corporate social investment: The South African case. *Journal of African Business*, 12, 72–92.
- Nyuur, R. B. Be Isan, Ofori, D. F., & Debrah, Y. (2014). Corporate social responsibility in Sub-Saharan Africa: Hindering and supporting factors. *African Journal of Economic and Management Studies*, 5(1), 93–113.
- Parmar, B. L., Freeman, R. E., Harrison, J. S., Wicks, A. C., Purnell, L., & de Colle, S. (2010). Stakeholder theory: The state of the art. *Academy of Management Annals*, 4(1), 403–445.
- Pathak, V., Jena, B., & Kalra, S. (2013). Qualitative research. *Perspectives in Clinical Research*, 4(3), 192.
- Rogerson, C. M. (2022). Tourism evolution in rural South Africa: From native reserve to apartheid Bantustans, c. 1920–1994. *GeoJournal of Tourism and Leisure*, 40(1), 120–128.
- Salvioni, D. M., & Gennari, F. (2019). Stakeholder perspective of corporate governance and CSR committees. *Emerging Issues in Management*, 1, 28–39.
- Shai, M. P., Kleynhans, I. C., & Roberson, J. R. (2020). Community perceptions on corporate social responsibility (CSR) initiatives of casinos around Gauteng. *GBATA Readings Book*, 91–103.
- Shim, J., Moon, J., Lee, W. S., & Chung, N. (2021). The impact of CSR on corporate value of restaurant businesses using triple bottom line theory. *Sustainability (Switzerland)*, 13(4), 1–14.
- South Africa. (1996b). *National Gambling Act, No. 33 of 1996*. Government Printer.
- Yang, F. X., Ren, L., & Lau, V. M. C. (2020). An original sin of casino hotels? Consequences of CSR misfit and the remedies. *International Journal of Hospitality Management*, 87, 1–9.
- Zak, A. (2015). Triple bottom line concept in theory and practice. *Prace Naukowe Uniwersytetu Ekonomicznego We Wrocławiu*, 87, 251–264.

EPIDEMIOLOGICAL EFFECTS AND COST OF CONTAMINATED WATER CONSUMPTION AFTER LIMPOPO AND MPUMALANGA PROVINCES' JANUARY 2026 FLOODS: A SYSTEMATIC REVIEW

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ABSTRACT

This systematic review examined the epidemiological and economic impacts of contaminated water consumption following the January 2026 floods in Limpopo and Mpumalanga Provinces, South Africa. Using the PRISMA framework, peer-reviewed studies, government reports, and institutional publications were systematically reviewed. Findings showed increased incidences of diarrhoeal diseases, cholera, typhoid fever, and other enteric infections linked to damaged water and sanitation infrastructure, sewage overflows, and reliance on untreated water sources. Vulnerable groups included children, older adults, and displaced households. The floods also caused substantial healthcare costs, productivity losses, and infrastructure rehabilitation expenses. The review highlights the need for climate-resilient water systems and improved disaster preparedness strategies.

Keywords: floods, water contamination, epidemiology, economic cost, waterborne diseases.

INTRODUCTION

Flooding events pose major public health risks because they contaminate drinking water sources and disrupt sanitation systems. Globally, floods are among the most frequent and destructive climate-related disasters, particularly affecting low- and middle-income countries with vulnerable water and sanitation infrastructure (WHO, 2018a; IPCC, 2022). In January 2026, prolonged heavy rainfall caused severe flooding across Limpopo and Mpumalanga Provinces in South Africa. Both rural and urban communities experienced widespread damage to roads, healthcare facilities, water treatment plants, and sanitation infrastructure. Thousands of households were displaced, leading to the declaration of a national state of disaster due to the significant human, environmental, and economic losses recorded in the affected regions (Government of South Africa, 2026).

Flooding contributes significantly to the contamination of water sources and the spread of waterborne diseases. During flood events, wastewater treatment facilities can become overwhelmed, sewer systems may fail, and pit latrines or septic tanks often overflow, resulting in faecal contamination of surface and groundwater supplies (Howard et al., 2020). Floodwaters also transport agricultural runoff, industrial pollutants, and solid waste into rivers, dams, and boreholes used for drinking water. These processes reduce water quality by introducing harmful microorganisms such as bacteria, viruses, and protozoa, as well as hazardous chemical contaminants (Fewtrell & Kay, 2015). In response to these challenges, South Africa continues to prioritise safe drinking water access, sanitation improvement, water resource management, and pollution prevention in line with Sustainable Development Goal (SDG) 6.

Communities with limited access to reliable water and sanitation services are especially vulnerable during flood disasters. In Limpopo and Mpumalanga, many households rely on communal taps, boreholes, and untreated surface water sources, which are highly susceptible to contamination during flooding (Statistics South Africa, 2023). Damage to water treatment and distribution systems often forces communities to depend on untreated or poorly treated water, increasing the likelihood of disease outbreaks and placing additional strain on already constrained healthcare systems (WHO, 2018a).

Consumption of contaminated water following floods is strongly associated with outbreaks of diarrhoeal diseases, cholera, typhoid fever, hepatitis A, and other gastrointestinal infections, particularly in emergency settings (Connolly et al., 2004; Cann et al., 2013). Vulnerable groups, including children, older adults, and immunocompromised individuals, are at greater risk of severe illness and mortality from waterborne diseases (Prüss-Ustün et al., 2019a). This challenge is closely linked to Sustainable Development Goal (SDG) 3, which promotes good health and well-being through improved disease prevention and stronger disaster-related health responses.

Beyond health impacts, contaminated water consumption after floods also creates substantial economic burdens. Direct costs include medical treatment, hospitalisation, medication, and emergency outbreak response measures. Indirect costs involve reduced productivity, income loss, school absenteeism, caregiving responsibilities, and increased household spending on alternative water supplies (Fewtrell et al., 2017). Governments also face significant expenses related to emergency water provision, rehabilitation of damaged infrastructure, and long-term recovery programmes (Hallegatte et al., 2020).

Despite the recognised relationship between flooding, water contamination, and disease outbreaks, evidence from post-disaster settings in South Africa remains fragmented. Limited disease surveillance data and insufficient research on the economic impacts of waterborne illnesses restrict a comprehensive understanding of the true burden associated with flood-related water contamination. Therefore, this systematic review aims to synthesise evidence on the epidemiological impacts and economic costs linked to contaminated water consumption following the January 2026 floods in Limpopo and Mpumalanga Provinces, South Africa, in order to inform disaster preparedness, water safety planning, and public health policy development in flood-prone settings.

METHODS

Review Design and Protocol

This study adopted a systematic review design guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework to ensure transparency, consistency, and methodological rigour in the review process. The PRISMA framework provides a structured approach for identifying, screening, assessing eligibility, and including relevant studies in systematic reviews (Page et al., 2021). Although the review protocol was not formally registered with the International Prospective Register of Systematic Reviews (PROSPERO), the review objectives, eligibility criteria, search strategy, and analytical procedures were predefined and applied consistently throughout the study to minimise bias and improve reliability.

Eligibility Criteria

The eligibility criteria were developed using the Population, Exposure, Outcomes, and Study Design (PEOS) framework. The population of interest included communities affected by flooding events, particularly in South Africa and other low- and middle-income countries with similar environmental and socio-economic conditions. Studies were included if they examined flood-related contamination of drinking water and associated epidemiological or economic outcomes. Eligible epidemiological outcomes included waterborne diseases such as diarrhoeal diseases, cholera, typhoid fever, dysentery, gastroenteritis, and other enteric infections. Economic outcomes included direct healthcare costs, household expenditure, infrastructure damage, productivity losses, and broader socioeconomic impacts associated with flooding and contaminated water exposure. Observational studies, including cohort, case-control, and cross-sectional studies, as well as systematic reviews and authoritative institutional reports, were considered eligible.

Only studies published in English between 2000 and 2026 were included to ensure the inclusion of contemporary evidence relevant to recent flood events and climate-related public health challenges. Studies were excluded if they did not focus on flooding, water contamination, epidemiological outcomes, or economic impacts. Conference abstracts without full-text availability, duplicate publications, and studies with insufficient methodological information were also excluded.

Information Sources and Search Strategy

A comprehensive electronic literature search was conducted using multiple databases, including PubMed, Scopus, Web of Science, and Google Scholar. These databases were selected because they provide extensive coverage of environmental health, epidemiology, public health, and economic research literature (Snyder, 2019). The search strategy combined keywords and Boolean operators to identify relevant studies. Keywords included “floods,” “flooding,” “water contamination,” “drinking water pollution,” “waterborne disease,” “economic cost,” and “South Africa.” An example of the search string used was: (“floods” OR “flooding”) AND (“water contamination” OR “drinking water pollution”) AND (“waterborne disease”) AND (“economic cost”) AND (“South Africa”). Search terms were adjusted according to the indexing requirements of each database. Additional studies were identified through manual screening of reference lists from included articles and grey literature obtained from government departments and international organisations such as the World Health Organization (WHO) and the United Nations (UN).

Study Selection and Data Extraction

The study selection process followed the PRISMA guidelines. A total of 1,245 records were identified through database searches and grey literature sources. After removing 245 duplicate records, 1,000 articles remained for title and abstract screening. During this stage, 780 studies were excluded because they did not meet the inclusion criteria. The remaining 220 full-text articles were assessed for eligibility. Following full-text screening, 165 studies were excluded due to irrelevance to flood-related water contamination, absence of epidemiological or economic outcomes, inadequate methodological quality, or insufficient data reporting. Ultimately, 55 studies met the inclusion criteria and were included in the final review. A standardised data extraction form was used to ensure consistency during the extraction process. Extracted data included author details, publication year, study location, study design, population characteristics, flood type, indicators of water contamination, epidemiological outcomes, economic cost estimates, key findings, and reported limitations.

Quality and Risk-of-Bias Assessment

The methodological quality of the included studies was assessed using the Critical Appraisal Skills Programme (CASP) checklists appropriate to each study design. The appraisal focused on study validity, sampling procedures, exposure and outcome measurements, appropriateness of analytical methods, and potential sources of bias (Long et al., 2020). Based on the assessment outcomes, studies were categorised as high, moderate, or low quality. The quality appraisal findings informed the interpretation of the review findings; however, no studies were excluded solely based on methodological quality because of the limited availability of post-disaster epidemiological and economic studies in low-resource settings.

Data Analysis and Synthesis

Due to substantial heterogeneity in study designs, outcome measures, and economic costing approaches, a narrative qualitative synthesis was conducted instead of a quantitative meta-analysis. Narrative synthesis is considered appropriate where studies are methodologically diverse and statistical pooling is not feasible (Popay et al., 2006). The included studies were compared using variables such as geographical location, flood characteristics, water contamination indicators, reported waterborne diseases, affected population groups, healthcare costs, household economic impacts, productivity losses, and mitigation measures. The findings were organised into thematic categories to identify patterns, similarities, differences, and research gaps across the literature. The synthesis further explored the relationship between flood-related water contamination, disease outbreaks, and associated economic burdens in vulnerable communities. This approach enabled a comprehensive understanding of the epidemiological and economic impacts of flooding on drinking water quality in South Africa and comparable settings.

RESULTS

Flood Event and Water System Disruption

The January 2026 floods in Limpopo and Mpumalanga Provinces caused widespread environmental damage and severe disruption to water and sanitation infrastructure due to prolonged heavy rainfall, overflowing rivers and dams, and extensive surface runoff. Flooding affected districts and municipalities including Mopani, Vhembe, Greater Giyani, Greater Tzaneen, Bushbuckridge, Mbombela, and Nkomazi, resulting in damaged roads, bridges, water treatment plants, sewage systems, and sanitation facilities. Several water treatment works and wastewater systems experienced operational failure due to physical damage, power outages, and excessive turbidity, while overflowing dams and flooded pit latrines contributed to faecal contamination of water sources (Department of Water and Sanitation, South Africa; Municipal Infrastructure Reports, 2024–2026; UNICEF, 2019; WHO, 2018b). Consequently, many communities experienced interruptions to piped water supply and increasingly relied on rivers, streams, and boreholes. Water quality assessments reported elevated levels of microbial contaminants, including *Escherichia coli*, faecal coliforms, and Enterococci, indicating increased risks of diarrhoea, cholera, and typhoid fever (WHO, 2017; South African National Standards: SANS 241). The findings highlight the importance of resilient water and sanitation systems in reducing public health risks during flood disasters (Sphere Association, 2018; WHO, 2018b).

Mechanisms of Water Contamination

The review findings show that when it happens, flooding can make drinking water dirty in various ways. Floods can make it easy for bad things to get into the water we drink. When floods happen, the water that runs off the surface of the ground is a part of the problem. Floodwaters pick up stuff like poop, trash and chemicals from farms and factories, and then they carry all that bad stuff into the rivers, dams and underground water that we use for drinking water. Floods are really good at moving all sorts of contaminants, and that is how flooding events create problems for our drinking water sources. In both rural and peri-urban settings, unprotected boreholes and surface water sources were particularly vulnerable to contamination during periods of intense flooding (Fewtrell and Kay, 2015). Sewage overflow is a problem, see Table 1, as highlighted in studies conducted in informal settlements such as Diepsloot.

Table 1: Summary of Mechanisms and Contaminants Associated with Flood-Related Water Contamination

Mechanism of contamination	Source or pathway	Contaminants of concern	Public health implication
Surface runoff	Floodwater transport of waste and pollutions	<i>E. coli</i> , viruses, pesticides, heavy metals	Increased risk of diarrhoeal and enteric disease
Sewage overflow	Overloaded sewer networks and wastewater plants	Faecal bacteria, cholera pathogens	Outbreaks of waterborne diseases
Sanitation system flooding	Inundation of pit latrines and septic tanks	Faecal coliforms, nitrates	Widespread contamination of groundwater
Treatment system failure	High turbidity, power outages, and infrastructure damage	Poorly treated water, residual pathogens	Reduced water safety and increased exposure

The review findings showed that flooding significantly increased water contamination through sewage overflows, flooded sanitation systems, and the transport of pollutants from agricultural and industrial areas into drinking water sources (Howard et al., 2020). Overflowing wastewater treatment plants, pit latrines, and septic tanks released faecal matter and harmful microorganisms such as *Escherichia coli* into rivers, dams, and groundwater, increasing the risk of diseases including cholera and typhoid fever. High turbidity levels further reduced the effectiveness of water treatment processes, allowing pathogens to persist in drinking water supplies. In addition to microbial contamination, floods introduced chemical pollutants such as nitrates, pesticides, and heavy metals into water sources (Cann et al., 2013). Damage to water treatment infrastructure, power outages, and operational failures also compromised treatment efficiency, resulting in the distribution of inadequately treated water and increased population exposure to contaminated water.

EPIDEMIOLOGICAL EFFECTS

Waterborne Diseases

The review findings consistently showed increased incidences of waterborne diseases following flood-related contamination of drinking water sources (WHO, 2018a; Cann et al., 2013). Flood damage to water supply and sanitation systems resulted in the consumption of untreated or poorly treated water, leading to higher rates of diarrhoeal diseases, cholera, shigellosis, *Escherichia coli* infections, typhoid fever, and viral hepatitis A and E (Hunter, 2003; WHO, 2017). Children under five years of age were particularly vulnerable due to their increased risk of dehydration and severe disease outcomes (Prüss-Ustün et al., 2019a). Disease outbreaks were more common in overcrowded areas with inadequate sanitation and delayed restoration of clean water supplies, especially among displaced populations living in temporary shelters (Watson, Gayer & Connolly, 2007; De Magny et al., 2008). These findings highlight the significant public health risks associated with flood-related water contamination and inadequate sanitation infrastructure (Connolly et al., 2004).

Patterns and Trends

When we look at what has been written about diseases, we can see that they happen more often after floods. Usually, people get diarrhoea and other diseases one to three weeks after the flood starts (Ahern et al., 2005; Watson, Gayer & Connolly, 2007). This is because the flood damages the systems that make water clean and the services that deal with waste. The number of people getting sick usually goes up before the water supply systems are fully working again (Cann et al., 2013; WHO, 2018a). This shows that the time just after the flood is when people are most likely to get diseases. The World Health Organisation (2018a) found that some people got really sick after floods. Children, adults and people with weak immune systems were the worst affected. They had a chance of getting infected, and their illnesses were more serious. People who had to leave their homes and those who got water from rivers or trucks had more diseases than people who had clean water quickly. It seems that how rich or poor you are and how good your community's services are can make a difference in how healthy you stay after a flood.

Other Health Impacts

Floods can cause a lot of health problems. We are not just talking about the waterborne diseases. Flood water can also cause skin infections and other health issues. People who met contaminated flood water got skin infections like dermatitis and wound infections (Ahern et al., 2005; Du et al., 2010). This happened a lot to people who got hurt during evacuation or when they were cleaning up. It was even worse because these people did not have access to water to keep themselves clean and take care of their wounds. Floodwater contamination is a problem. It can cause a lot of health issues, including skin and soft tissue infections, like dermatitis and wound infections, which are commonly reported among people who were exposed to contaminated flood water (WHO, 2018a; Alderman, Turner & Tong, 2012). The review also identified increased risks of vector-borne diseases following flooding (Watson, Gayer & Connolly, 2007; Cann et al., 2013). Standing water created by floods provided favourable breeding conditions for mosquitoes, increasing the potential transmission of malaria and other vector-borne infections in endemic areas (Kovats, Campbell-Lendrum & Matthies, 2005; WHO, 2020). While the direct link between contaminated water consumption and vector-borne disease is indirect, the combined effects of flooding, environmental disruption, and weakened public health services contributed to heightened disease risk in affected communities (IPCC, 2022).

RISK FACTORS AND VULNERABLE POPULATIONS

The review identified several social, environmental, and healthcare-related factors that increased vulnerability to flood-related water contamination and disease outbreaks. Communities living in overcrowded areas with poor sanitation infrastructure were disproportionately affected, as floodwaters damaged sewage systems and contaminated water sources. Displacement to crowded shelters further limited access to safe water and sanitation, increasing disease transmission risks (WHO, 2018a). Vulnerable groups, including children under five years, older adults, pregnant women, immunocompromised individuals, and people with chronic illnesses, experienced more severe health outcomes due to increased susceptibility to infection and limited access to healthcare services (Prüss-Ustün, 2019b).

Flood-damaged roads, bridges, and healthcare facilities further restricted access to medical care, placing additional pressure on already strained health systems.

SURVEILLANCE AND PUBLIC HEALTH RESPONSE

The review showed that systems to check water quality and watch for diseases were very important for finding and dealing with health problems after a flood. The ability to do this kind of watching varied a lot from one place to another. In some cases, the usual checks on water quality were stopped because the infrastructure was damaged and the laboratories did not have capacity, which meant it took longer to find out if the water was contaminated with microbes. The systems to watch for diseases had problems too, such as not reporting all the cases and being slow to collect data when people were responding to the emergency (Howard et al., 2020).

The government and other organisations did a lot of things to help people's health during this time. They gave people water in emergency situations, handed out chemicals to make the water safe to drink, and told people how to stay healthy and get ready for outbreaks. The Limpopo government said they need R10 billion to fix the damage (SABC News, 2026). These things helped people in some areas. It was hard to do everything because it was difficult to get to some places, and they did not have enough money. The government and other organisations had a time working together, and they did not have enough resources. This made it hard for them to help people's health during the flood. The flood made it hard for people to stay healthy, and the government and other organisations are still having trouble helping people because they do not have money, and they have trouble working together.

ECONOMIC COSTS

Direct Health Costs

The cost of getting sick from contaminated water is extremely high. Individuals who consume unsafe water often require medical attention and, in severe cases, hospitalisation due to diarrhoeal disease. Patients in several studies incurred direct healthcare costs, including doctor consultation fees (approximately R350.00 – R500.00 per visit), hospital stays (approximately R1,500.00 – R3,500.00 per night in public regional hospitals), as well as laboratory tests and medication for treatment of waterborne infections (estimated R800.00 – R1,500.00 per episode) (Riewpaiboon et al., 2008; Chola et al., 2015; South African National Department of Health Tariff Guidelines). There are also substantial public sector costs associated with large outbreaks linked to contaminated water supplies. Government expenditure may include emergency water purification interventions, intensified disease surveillance, laboratory testing, community health outreach, and deployment of outbreak response teams. Such outbreak response and water safety interventions can cost several million rand, often exceeding R10–R50 million depending on outbreak scale and infrastructure damage (WHO, 2018b). The financial burden of contaminated water, therefore, extends beyond individual healthcare expenses to include significant public health and environmental response costs. These cumulative expenditures highlight the economic impact of waterborne disease and the importance of investing in safe water infrastructure and preventative public health measures.

Indirect Economic Costs

The economic costs of floods were high and often more than the costs of going to the doctor. When people got sick, they could not get to the doctor.

Table 2: Summary of Economic Costs Associated with Flood-Related Water Contamination

Cost category	Description	Examples of impacts
Direct health costs	Medical treatment and outbreak response	Hospitalisation, medicines, emergency interventions
Indirect household costs	Income and productivity losses	Lost wages, caregiving time, travel expenses
Infrastructure costs	Repair and rehabilitation	Water treatment plants, sanitation systems
Broader economic impacts	Long-term socioeconomic effects	Reduced agricultural output, increased poverty

People had to take care of each other, which meant they did not have as much money. Kids also missed school, which affected the family's income and how well the economy did. Families had to pay money to go to the hospital, buy clean water, and wait for help to arrive. In the places where floods happened, farming and small businesses were affected. People did not have jobs, which made the economy even more unstable in those areas, as the World Bank said in 2020.

Broader Socioeconomic Impacts

Beyond immediate health-related costs, the floods resulted in significant broader socioeconomic impacts. Displacement and temporary sheltering generated additional costs for households and local authorities. Substantial financial resources were required for the rehabilitation of damaged water supply systems, sanitation infrastructure, and health facilities. The long-term economic implications included delayed development, increased poverty risk, and reduced resilience to future climate-related shocks.

QUALITY ASSESSMENT OF INCLUDED STUDIES

The quality assessment indicated that approximately 70% of the included studies were of moderate quality based on the Critical Appraisal Skills Programme checklists (Critical Appraisal Skills Programme, 2018). Most studies clearly defined their research aims, described flood-affected populations appropriately, and reported findings consistently (Alderman, Turner & Tong, 2012; Ahern et al., 2005). However, several limitations were identified, including selection bias in hospital- and clinic-based studies that may have excluded severely affected populations unable to access healthcare services during floods. Information bias was also evident due to reliance on self-reported illness and limited laboratory confirmation of waterborne diseases. Additionally, many studies inadequately controlled for confounding factors such as baseline sanitation conditions, socioeconomic status, and seasonal disease patterns (Fewtrell & Kay, 2015). Considerable heterogeneity in study designs, exposure definitions, health outcomes, and economic measures prevented quantitative meta-analysis, necessitating a narrative synthesis approach. Despite these limitations, the overall evidence consistently demonstrated strong associations between flood-related water contamination and adverse health and economic outcomes (WHO, 2018a).

DISCUSSION

This review looked at what happens when people drink contaminated water after floods. It focused on the floods that happened in January 2026 in Limpopo and Mpumalanga Provinces. The review found that when floods damage water and sanitation systems, people are more likely to get sick from diseases. These diseases include things like diarrhoea, cholera, typhoid fever and viral hepatitis. Floods can really mess up our water and sanitation systems. That is why people get these waterborne diseases, especially diarrhoeal illnesses, cholera, typhoid fever and viral hepatitis after floods. The problems after the flood were bad at first. This was when people did not have water to drink, and they had to use water from other places that was not safe. As we saw in disasters, the flood affected children, older people and people with weak immune systems the most. This is because these people are more likely to get sick, and they are also more likely to be exposed to water and bad living conditions. The people who are most vulnerable, like children and older people, were the ones who suffered the most from the flood and the dirty water.

The review also talks about the financial problems that happen when people drink contaminated water after floods. The cost of going to the doctor, staying in the hospital and dealing with outbreaks is a burden on health systems that are already struggling. When people get sick from water, they often must spend a lot of money on things like medical bills and finding other sources of clean water. This means they have money to live on and are not as productive, which is a big problem. In some cases, the cost of dealing with contaminated water is even higher than the cost of medical treatment for the people who get sick from it. The review shows that contaminated water consumption following floods has economic consequences, including direct health costs and indirect costs like productivity losses and reduced household income, from contaminated water consumption. The things we found out are like evidence that shows the economic burden of health problems caused by floods goes far beyond the health sector. It affects people's livelihoods, local economies and how things develop over time. This is what Hallegatte et al found out in the year 2020 (Hallegatte et al, 2020).

The evidence about flooding and health is strong in some ways and weak in others. One good thing about the studies that were looked at is that they all say much the same thing, no matter where they were done or how they were done. This means that the connections between flooding, dirty water, and people getting sick are probably real. Flooding and dirty water are clearly linked to health outcomes. However, the evidence about flooding and health is not perfect. Some studies were done differently from others, which makes it hard to compare them. Also, not all cases of sickness were. Most of the studies only looked at what happened over a short period of time. Flooding and health outcomes are still an area of study. In particular, the limited availability of post-disaster surveillance data and inconsistent economic costing methods constrain comprehensive impact assessment and comparability across studies (WHO, 2018a).

POLICY AND PRACTICE IMPLICATIONS

The results of this study are important for people who make decisions and for people who live in areas that get flooded a lot. We need to make sure that the water is safe to drink in these areas. This means we must protect the water from getting dirty, make the systems that clean and move the water stronger and get the water working again quickly after a flood. We should also think about how the weather might change and how that will affect the water and the systems that clean it, so we can be better prepared for what might happen to flood regions and the water safety planning in those areas. Flood-prone regions need water safety planning to reduce health risks from flood events. When we have a flood, there are some important things we need to do to keep people safe. We should get emergency water treatment supplies ready and in place before the flood happens. We also need to watch out for diseases that can spread after a flood and tell people who're most at risk what they can do to stay safe.

The people in charge of water, health and disaster management need to work well so they can respond quickly. Do a good job. If we invest in things like buildings and teach communities how to get ready for floods, we can reduce the bad effects that floods have on our health and money. Floods can make our water contaminated, and that is why we need to be prepared, as the people who wrote about this, Howard and others, said in the year 2020.

KNOWLEDGE GAPS AND FUTURE RESEARCH

We know that flood water can make people sick. There is still a lot we do not know about the health problems it can cause. Most of the time, people only look at what happens after a flood, not at what happens later. Floods can have effects on people's health and money, but we do not have a lot of information about this. We especially need to know more about how floods affect people in countries. Floods are a deal, and we need to understand the long-term health and economic impacts of floodwater. Future research should prioritise longitudinal studies to assess sustained health impacts and recovery trajectories following flood events. Improved integration of epidemiological, environmental, and economic data would enhance understanding of causal pathways and inform more effective interventions. Additionally, research focusing on the effectiveness and cost-effectiveness of preventive measures, such as resilient water infrastructure and early warning systems, is essential to support evidence-based policy and resource allocation (Fewtrell and Kay, 2015).

CONCLUSION

Flooding is a problem when it comes to the water we drink. It can make people very sick. That is a threat to everyone's health. When floods happen, people often get sick from contaminated water. They get things like diarrhoea, cholera and typhoid fever. Sometimes they even get hepatitis. This usually happens after the flood, but sometimes it keeps happening for months. This is because the flood can mess up our water and sewage systems for a time. Flooding affects our drinking water. That is why it is such a big deal. Vulnerable people, like children and older adults, and people who have been forced to leave their homes, got sick a lot more than others. This shows that the world around us and the kind of life we lead play a role in whether we get sick and how healthy we are. The people who are vulnerable, including children, older adults and displaced communities, have a lot of health problems. This is because of the world around us and the kind of life we lead, which affects how likely we are to get sick and how healthy we are, as shown by Prüss-Ustün and others in the year 2019b.

The floodwater contamination is not just bad for our health. It also costs a lot of money. When people get sick from the water, it costs money to figure out what is wrong with them to make them better and to stop others from getting sick. This is a problem for hospitals and clinics, especially in places that do not have a lot of money. When people are sick, they cannot. That means they do not get paid. They must spend money to get clean water from somewhere else. Flood water contamination costs people a lot of money more money than the money they spend on doctors and medicine. The economic consequences of this situation went beyond the people directly involved. It affected the community and even the region. This had an impact on the jobs that people had. The food that farmers were able to grow. It also changed the way that the community and region would grow and develop over time. The economic consequences influenced labour markets and agricultural productivity, and what the future held for the community and region (Hallegatte et al., 2020). The findings have an impact on how we do things in public health. We need to get ready for floods, make sure our water is safe and build systems that can withstand floods. This is very important to reduce the risk of people getting sick and to reduce the cost of floods. We need to watch out for problems, work together with groups and help the people who are most likely to be affected by floods. This can help reduce the effects of floods in the future. Floods are a deal and we need to be prepared for them so we can reduce the risks from floods. As climate change is expected to increase the frequency and severity of flooding, proactive and evidence-informed strategies will be essential to protect community health and promote sustainable development (WHO, 2018b).

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REFERENCES

- Ahern, M., Kovats, R. S., Wilkinson, P., Few, R., & Matthies, F. (2005). Global health impacts of floods: Epidemiologic evidence. *Epidemiologic Reviews*, 27(1), 36–46. <https://doi.org/10.1093/epirev/mxi004>
- Alderman, K., Turner, L. R., & Tong, S. (2012). Floods and human health: A systematic review. *Environment International*, 47, 37–47. <https://doi.org/10.1016/j.envint.2012.06.003>
- Cann, K. F., Thomas, D. R., Salmon, R. L., Wyn-Jones, A. P., & Kay, D. (2013). Extreme water-related weather events and waterborne disease. *Epidemiology and Infection*, 141(4), 671–686. <https://doi.org/10.1017/S0950268812001653>
- Chola, L., Michalow, J., Tugendhaft, A., & Hofman, K. (2015). Reducing diarrhoea deaths in South Africa: Costs and effects of scaling up essential interventions. *BMC Public Health*, 15(1), 1–9. <https://doi.org/10.1186/s12889-015-1689-2>
- Connolly, M. A., Gayer, M., Ryan, M. J., Salama, P., Spiegel, P., & Heymann, D. L. (2004). Communicable diseases in complex emergencies: Impact and challenges. *The Lancet*, 364(9449), 1974–1983. [https://doi.org/10.1016/S0140-6736\(04\)17481-3](https://doi.org/10.1016/S0140-6736(04)17481-3)
- Critical Appraisal Skills Programme. (2018). *CASP checklists*. <https://casp-uk.net/casp-tools-checklists/>
- De Magny, G. C., Murtugudde, R., Sapiano, M. R. P., Nizam, A., Brown, C. W., Busalacchi, A. J., Yunus, M., Nair, G. B., Gil, A. I., Lanata, C. F., & Huq, A. (2008). Environmental signatures associated with cholera epidemics. *Proceedings of the National Academy of Sciences*, 105(46), 17676–17681. <https://doi.org/10.1073/pnas.0809654105>

- Du, W., FitzGerald, G. J., Clark, M., & Hou, X. Y. (2010). Health impacts of floods. *Prehospital and Disaster Medicine*, 25(3), 265–272. <https://doi.org/10.1017/S1049023X00008141>
- Fewtrell, L., & Kay, D. (2015). *Flooding and health: Risks and responses*. Earthscan.
- Fewtrell, L., Kaufmann, R. B., Kay, D., Enanoria, W., Haller, L., & Colford, J. M. (2017). Water, sanitation, and hygiene interventions to reduce diarrhoea in less developed countries: A systematic review and meta-analysis. *The Lancet Infectious Diseases*, 5(1), 42–52. [https://doi.org/10.1016/S1473-3099\(04\)01253-8](https://doi.org/10.1016/S1473-3099(04)01253-8)
- Government of South Africa. (2026). *Declaration of a national state of disaster following widespread flooding*. Government Printer.
- Hallegatte, S., Rentschler, J., & Rozenberg, J. (2020). *Lifelines: The resilient infrastructure opportunity*. World Bank. <https://doi.org/10.1596/978-1-4648-1430-3>
- Howard, G., Calow, R., Macdonald, A., & Bartram, J. (2020). Climate change and water and sanitation: Likely impacts and emerging trends. *Journal of Water and Climate Change*, 7(1), 1–20. <https://doi.org/10.2166/wcc.2015.055>
- Hunter, P. R. (2003). Climate change and waterborne and vector-borne disease. *Journal of Applied Microbiology*, 94, 37–46. <https://doi.org/10.1046/j.1365-2672.94.s1.5.x>
- Intergovernmental Panel on Climate Change. (2022). *Climate change 2022: Impacts, adaptation and vulnerability*. Cambridge University Press. <https://doi.org/10.1017/9781009325844>
- Kovats, R. S., Campbell-Lendrum, D. H., & Matthies, F. (2005). Climate change and human health: Estimating avoidable deaths and disease. *Risk Analysis*, 25(6), 1409–1418. <https://doi.org/10.1111/j.1539-6924.2005.00685.x>
- Long, H. A., French, D. P., & Brooks, J. M. (2020). Optimising the value of the Critical Appraisal Skills Programme (CASP) tool for quality appraisal in qualitative evidence synthesis. *Research Methods in Medicine & Health Sciences*, 1(1), 31–42. <https://doi.org/10.1177/2632084320947559>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>
- Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., Britten, N., Roen, K., & Duffy, S. (2006). *Guidance on the conduct of narrative synthesis in systematic reviews*. Lancaster University.
- Prüss-Ustün, A., Wolf, J., Bartram, J., Clasen, T., Cumming, O., Freeman, M. C., Gordon, B., Hunter, P. R., Medlicott, K., & Johnston, R. (2019a). Burden of disease from inadequate water, sanitation and hygiene. *Tropical Medicine & International Health*, 24(1), 1–14. <https://doi.org/10.1111/tmi.13170>
- Prüss-Ustün, A., Wolf, J., Bartram, J., Clasen, T., Cumming, O., Freeman, M. C., Gordon, B., Hunter, P. R., Medlicott, K., & Johnston, R. (2019b). Burden of disease from inadequate water, sanitation and hygiene for selected adverse health outcomes. *International Journal of Hygiene and Environmental Health*, 222(5), 765–777. <https://doi.org/10.1016/j.ijheh.2019.05.004>
- Riewpaiboon, A., Malaroje, S., & Kongsawatt, S. (2008). Effect of diarrhoeal disease on household economic burden. *Southeast Asian Journal of Tropical Medicine and Public Health*, 39(4), 744–753.
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333–339. <https://doi.org/10.1016/j.jbusres.2019.07.039>
- South African Department of Water and Sanitation. (2023). *Emergency water services and disaster response reports*. Department of Water and Sanitation.
- South African National Department of Health. (2024). *Uniform patient fee schedule (UPFS) tariffs*. National Department of Health.
- Statistics South Africa. (2023). *General household survey 2022*. <https://www.statssa.gov.za>

Watson, J. T., Gayer, M., & Connolly, M. A. (2007). Epidemics after natural disasters. *Emerging Infectious Diseases*, 13(1), 1–5. <https://doi.org/10.3201/eid1301.060779>

World Bank. (2020). *The economic impacts of natural disasters*. <https://www.worldbank.org>

World Health Organization. (2017). *Guidelines for drinking-water quality* (4th ed.). World Health Organization.

World Health Organization. (2018a). *Managing epidemics: Key facts about major deadly diseases*. World Health Organization.

World Health Organization. (2018b). *Managing water, sanitation and hygiene in emergencies*. <https://www.who.int>

World Health Organization. (2020). *World malaria report 2020*. World Health Organization.

World Health Organization. (2022). *Flooding and communicable diseases fact sheet*. World Health Organization.

KNOWLEDGE, ATTITUDES, AND IMPLEMENTATION OF FOOD SAFETY PRACTICES IN PUBLIC DISTRICT HOSPITAL FOODSERVICE UNITS IN TSHWANE

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ABSTRACT

Ensuring food safety in hospital foodservice units is essential, as patients are particularly vulnerable to foodborne illnesses. This study explored the knowledge, attitudes, and practices of food handlers in public district hospitals in Tshwane. Using a quantitative approach, data were gathered through structured questionnaires and observation checklists from 159 foodservice staff, with a response rate of 56.79%. Descriptive statistics and ANOVA were used to analyze compliance with food safety standards. While most participants showed a basic understanding of hygiene, there were notable weaknesses in key areas such as preventing cross-contamination, managing food temperatures, and applying HACCP principles. Although 94.3% of respondents had heard of HACCP, proper implementation was often lacking due to limited training, resource constraints, and poor enforcement of policies. The findings highlight the urgent need for targeted food safety training, ongoing supervision, and stronger policy enforcement to help protect patients and improve food handling practices in hospital settings.

Keywords: HACCP, food safety, hospital foodservice.

INTRODUCTION

Food safety is a critical concern in healthcare environments, particularly where immuno-compromised patients are more susceptible to foodborne illnesses. Effective food safety management systems, such as Hazard Analysis and Critical Control Point (HACCP), are essential in healthcare settings to maintain safe food handling, reduce cross-contamination, and uphold hygiene standards (Al-Kandari et al., 2019). Despite their importance, implementation of such systems remains inconsistent, especially in developing country contexts where organizational and infrastructural limitations prevail.

Multiple studies have documented that food handlers in hospital settings often exhibit variable levels of knowledge, attitudes, and practices (KAP) concerning food safety. These discrepancies are frequently linked to inadequate training, poor supervision, and a lack of awareness of critical hygiene protocols (Hasan et al., 2022). The KAP model underlines the role of personal understanding and behavior in preventing foodborne diseases. Poor hygiene among food handlers, particularly in hospital kitchens, has been associated with bacterial contamination, notably with pathogens like *Staphylococcus aureus*, *Salmonella spp.*, and *Escherichia coli*, which may be carried on the hands or in the nasal cavities of handlers (Aycicek et al., 2022).

In many developing countries, including South Africa, foodservice units in hospitals cater to a wide demographic patient, healthcare workers, and visitors through bulk preparation of ready-to-eat meals. Such environments inherently increase the risk of contamination if safe food handling procedures are not rigorously followed. Food poisoning outbreaks in hospitals not only compromise patient safety but also lead to reputational damage and economic losses (Hasan et al., 2022; Aycicek et al., 2022).

While hygiene training initiatives are necessary, evidence suggests that knowledge alone does not translate into improved practice. Continuous education, regular monitoring, and systemic reinforcement of protocols are required to foster behavioral change and reduce the risk of contamination. For instance, in Indonesia, the absence of

a formal HACCP mandate in hospital foodservices illustrates the broader issue of insufficient policy enforcement in healthcare food safety (Hasan et al., 2022).

Given the lack of context-specific studies on food safety practices within South African public hospitals, this study aims to evaluate the KAP levels of food handlers in Tshwane's district hospital foodservice units. The findings will provide a basis for targeted interventions to strengthen food safety practices and policy implementation in healthcare settings.

LITERATURE REVIEW

Food Safety Knowledge and Cross-Contamination

Food handlers' knowledge forms the foundation of safe food handling and contamination prevention. In hospital settings, where immunocompromised patients are at higher risk, limited knowledge of food safety exacerbates health threats. Research has shown that although most food handlers understand basic hygiene principles, critical gaps remain in areas such as cross-contamination, temperature control, and food storage (Al-Kandari et al., 2019; Hasan et al., 2022). Many food handlers are unfamiliar with critical control points (CCPs) and corrective actions essential for hazard management (Njoagwuani et al., 2023). Cross-contamination defined as the transfer of harmful microorganisms from one substance or object to another remains a significant concern. It is often facilitated by poor hand hygiene, inadequate separation of raw and cooked food, and unclean surfaces (Tuglo et al., 2021). Improper storage and cooling of perishables further create environments conducive to microbial growth and foodborne outbreaks (Oniye, 2024).

Food Safety Attitudes and Hygiene Practices

Food safety knowledge encompasses an understanding of the procedures and conditions required to ensure food remains safe and free from contaminants throughout the supply chain (Werkneh et al., 2023; Chen et al., 2021). It is especially vital in healthcare settings where compromised patient health demands stricter food safety controls. Studies have emphasized that improving food handlers' knowledge and routine practices contributes significantly to the prevention of foodborne pathogens (Futrell, 2021).

Poor food safety attitudes and non-compliance with hygiene practices are among the major causes of food poisoning. Unsafe behaviors include incorrect storage, inadequate sanitation, and failure to follow handwashing protocols (Teffo, 2017). Personal hygiene lapses such as untrimmed nails, uncovered hair, and talking while handling food are also common (WHO, 2020; Alemayehu et al., 2021). Training is frequently proposed as a remedy, yet studies suggest that training alone may not lead to sustained behaviour change without ongoing reinforcement (Abdul-Rashid et al., 2022).

Behaviour of Food Handlers

Understanding behavioural patterns among food handlers is critical to implementing effective food safety interventions. Human error and poor compliance with hygiene standards remain persistent challenges in foodservice operations (Masngut & Azman, 2021). Numerous studies have found that even when food handlers receive training, personal attitudes and workplace culture often determine their day-to-day practices (Tarannum, 2021). Research in hospital kitchens revealed time constraints often lead workers to compromise safety standards by preparing food in bulk or a day in advance (Hashanuzzaman et al., 2020). Misuse of cleaning cloths and neglect of utensil hygiene further contribute to cross-contamination. The absence of dedicated supervisors or food safety officers exacerbates these challenges, particularly in under-resourced hospital units (Norshaidi et al., 2019).

Food Hygiene and Safety Practices of Food Handlers

Food hygiene involves maintaining cleanliness in all processes of food production, from sourcing and preparation to storage and distribution. It is particularly significant in hospital foodservice where lapses may result in hospital-acquired infections (Mgqibandaba et al., 2020; Asnawi Othman, 2022). Studies confirm that improper food handling

and environmental sanitation are linked to outbreaks of FBDs in hospital settings (Tan et al., 2023). Sanitary management must be comprehensive, extending beyond surface cleanliness to include utensil hygiene, proper waste disposal, and strict separation of high-risk foods. Regular audits and adherence to set protocols are essential for minimizing risks in hospital kitchens (Moghnia et al., 2021). Current surveillance data indicate that despite awareness, unsafe practices such as poor thawing methods and temperature mismanagement are common (Tan et al., 2023).

Implementation of HACCP in Public Hospital Foodservice Units

HACCP is an internationally recognized preventive food safety system that identifies and controls potential hazards at critical points. In public hospitals, where the safety of meals directly impacts patient recovery, HACCP is essential (Sunil et al., 2022). Its effective implementation requires regular monitoring, documentation, and corrective actions where necessary. Despite its importance, HACCP is inconsistently applied in healthcare settings due to challenges such as inadequate staff training, limited resources, and weak institutional support (Limon, 2021; Chaidoutis et al., 2023). Studies report that food handlers often lack awareness of HACCP principles, including CCP monitoring and verification (Kamboj et al., 2020). Additionally, improper documentation and insufficient oversight undermine system effectiveness (Kwol et al., 2020).

For HACCP to be successfully adopted, hospital management must prioritize food safety through investment in infrastructure, recruitment of trained personnel, and continuous education programs. Employing qualified staff familiar with food hygiene, chemical hazards, and pathogen control is central to this strategy (Al Banna et al., 2022).

Challenges and Barriers to Effective Food Safety Management

Public hospital foodservice units face several challenges that impede the effective implementation of food safety measures. These include limited budgets, inadequate infrastructure, and lack of training (Lee et al., 2021). Hospitals in low-resource settings often operate under financial constraints that prevent investment in updated kitchen equipment or training programs (Mousavi & Gholami-Borujeni, 2021).

Communication gaps between kitchen staff and management further hinder food safety policy enforcement. Without structured supervision or a designated food safety officer, many food handlers revert to unsafe practices (Kwol et al., 2020; Okpala & Korzeniowska, 2023). Overburdened staff may prioritize meal quantity over quality, increasing the risk of contamination. Addressing these challenges requires a systems-based approach involving multi-level coordination, policy enforcement, staff engagement, and investments in training and facilities. Only through sustained effort can food safety become an integral and reliable component of hospital foodservice operations.

METHODS

The methodological framework for this study was structured using the research onion model, encompassing six layers: research philosophy, research approach, strategy, research choice, time horizon, and data collection techniques.

Research Design and Approach

This study adopted a positivist research philosophy, which emphasizes observable and measurable facts. A deductive approach guided the hypothesis testing process, enabling the study to test relationships between food safety knowledge, attitudes, and practices. The research employed a quantitative survey strategy, utilizing structured questionnaires and an observation checklist to collect numerical data from participants. A cross-sectional time horizon was applied, capturing data at a specific point in time to assess the state of food safety practices in public district hospital foodservice units within the City of Tshwane.

Population, Sampling and Response Rate

The target population comprised 320 foodservice employees across selected public district hospitals in the City of Tshwane. A census sampling method was used to include all staff involved in food preparation. Of the 280 distributed questionnaires, 158 were completed and returned, yielding a response rate of 56.79%, which is considered acceptable

for quantitative research. The sample size was justified using guidelines for determining sufficient participant numbers in survey research.

Table 1: Determining the sample size.

Population	Percentage suggested	Number of respondents
20	100%	20
30	80%	2
50	64%	32
100	45%	45
200	32%	64
500	20%	100
1 000	14%	140
10 000	4.5%	450
100 000	2%	2 000
200 000	1%	200 000

Source: Rahman (2023).

Data Collection Instruments

Data were collected using a structured questionnaire. The questionnaire assessed food handlers' socio-biographical data, food safety knowledge, attitudes, and implementation of food safety programs such as HACCP. It was hand-delivered by the researcher, and assistance was provided for participants requiring help. A pilot test was conducted at Steve Biko Academic Hospital to ensure clarity and reliability of the instrument.

Data Analysis

Collected data were analysed using descriptive statistics and Analysis of Variance (ANOVA) to assess differences in food safety knowledge and practices across various hospitals. This approach facilitated the evaluation of compliance with food safety regulations.

Validity and Reliability

The validity of the instruments was ensured through multiple forms: construct, external, internal, and conclusion validity. The instruments were adapted from previously validated tools and reviewed by subject-matter experts. To ensure reliability, Cronbach's alpha was used to determine the internal consistency of questionnaire responses.

Ethical Considerations

Ethical approval was obtained from the Gauteng Department of Health and the Tshwane University of Technology. Informed consent was obtained from all participants, and strict guidelines were followed.

RESULTS

A total of 158 food handlers from public hospital food service units in the City of Tshwane participated in the study. Table 2 presents a demographic breakdown of respondents, which is crucial for contextualising findings related to food safety compliance, training, and knowledge.

Table 2: Respondent characteristics.

Variable	Category	Frequency	Percentage (%)
Length of Service	<2 years	24	15.09
	2 – 5 years	60	37.74
	6 – 9 years	47	29.56
	10 – 14 years	19	11.95
	15+ years	9	5.66
Educational level	Grade 12	55	34.59
	Higher Certificates	25	15.70
	Diploma	39	24.53
	Bachelor's Degree	28	17.61
	Honour's Degree	7	4.40
	Master's Degree	4	2.52
	Doctorate	1	0.63
Employment type	Full-time	85	53.80
	Contract	44	27.80
	Part-time	21	13.29
	Volunteer	7	4.43
Position	Foodservice Aid	69	44.03
	Supervisor	54	33.96
	Manager	35	22.01
Training completion	With certificates	85	53.46
	Without certificates	52	32.70
	No training	21	13.21

Most respondents had 2–5 years of experience (37.74%), with a considerable proportion (29.56%) having 6–9 years of tenure. The high concentration of mid-career employees aligns with findings by Jeong and Jang (2011), who observed that food safety knowledge stabilises during mid-tenure periods but may plateau without ongoing training. Educational attainment varied: while 34.59% held only Grade 12, nearly 45% had higher qualifications, indicating a potentially strong baseline for professional development. Employment status showed most were full-time (53.8%), although a significant portion (27.8%) were contract workers, raising questions about consistency in training and accountability, as also suggested by Clayton et al. (2002). Training gaps were evident, with 13.21% having received no training and 32.7% without certification, mirroring international concerns on inadequate formal training in healthcare foodservice contexts (Ngemdjo Domche, 2021).

Knowledge on Food Handling and Cross Contamination

Three questions were included in the questionnaire to assess participants' knowledge on food handling and cross-contamination. The results are summarised in Table 3 below:

Table 3: Results of questionnaire.

Knowledge Questions and Answers on Food Handling and Cross Contamination	Frequency	Percentage
Which of the following is the best way to safely thaw frozen meat?		
1. At room temperature	36	22.78
2. In the refrigerator	83	52.53
3. Under cold water	29	18.35
4. Using the microwave oven	10	6.33
Which of the following are potential consequences of not cleaning and sanitizing a food preparation table between uses?		
1. Cross-contamination	103	65.19
2. Off-flavours in food	25	15.82
3. Toxic-metal poisoning	15	9.49
4. Time-temperature	13	8.23
Which of the following sections of serving plate should food handlers avoid touching when serving?		
1. Bottom	40	25.32
2. Edge	33	20.89
3. Side	50	31.65
4. Top	34	21.52

Findings show that 52.53% correctly identified thawing meat in the refrigerator as the best method. Additionally, 65.19% recognised the risk of cross-contamination due to unsanitised surfaces, while only 21.52% correctly indicated that the top of the plate should be avoided during serving. These results align with similar studies and highlight ongoing educational needs.

Safety Food Handling Attitudes

Participants responded to five attitude-based food safety questions using 'yes', 'no', or 'no idea' options. Their responses are presented in Table 4.

Table 4: Responses related to food safety.

Safety Food Handling Attitudes of Respondents	Frequency	Percentage
Do you believe that food stored at incorrect temperature must always be discarded?	Yes:121 No:27 No idea: 10	76.58 17.09 6.29
Do you check the temperature of refrigerators at least once per day?	Yes:138 No: 20	87.34 12.66
Will you always separate raw and cooked food during storage?	Yes:137 No:19 No idea: 2	86.71 12.03 1.27
Will you still go to work when you have diarrhoea?	Yes:57 No:94 No idea: 7	36.08 59.49 4.43
Will you continue to wash your hands during food preparation, even if others do not?	Yes:133 No:22 No idea: 3	84.18 13.92 4.43

Most participants indicated strong food safety attitudes, including discarding food at incorrect temperatures (76.58%), checking refrigeration daily (87.34%), and separating raw and cooked food (86.71%). However, 36.08% would still work while experiencing diarrhoea, which poses significant health risks.

Existence of an In-house Food Safety Program

Participants were asked to indicate whether a food safety program (such as HACCP) existed in their establishment, and to what extent it was implemented. The results are presented in Table 5.

Table 5: Food safety program results.

Existence of HACCP Program and Barriers	Frequency	Percentage
Are you aware of prerequisite programs for implementing HACCP?	Yes:142 No:9 No idea: 7	89.87 5.70 4.43
Do you use the HACCP program in your establishment?	Yes:149 No:5 No idea: 4	94.30 3.16 2.53
Do you think HACCP is important for food safety?	Yes:145 No:5 No idea: 4	91.77 5.06 3.16
Do you record daily food safety measures in operations?	Yes:136 No:19 No idea: 3	86.08 12.03 1.90
Are prerequisite programs relevant for HACCP?	Yes:133 No:16 No idea: 9	84.18 10.13 5.70

The data revealed high awareness (89.87%) and use (94.3%) of HACCP programs. Most participants (91.77%) agreed that HACCP is vital for food safety, and daily safety records were reported by 86.08%. These findings suggest strong institutional support and a positive food safety culture among food handlers.

Expanded Narrative of Results

Most respondents (37.74%) had 2–5 years of experience, followed by 29.56% who had worked for 6–9 years. This indicates a concentration of mid-career employees in public hospital food services, aligning with findings by Jeong and Jang, who reported that food safety knowledge tends to stabilise during mid-tenure but may plateau without regular training interventions (Asnawi Othman, 2022).

Educational qualifications showed variation, with 34.59% possessing only Grade 12, while 44.86% had attained higher education, such as diplomas or degrees. This indicates a promising baseline for upskilling and professional development initiatives.

Employment status revealed that more than half of the respondents (53.80%) were employed full-time, while a significant portion (27.80%) were on contract. This raises concerns about consistent food safety accountability and training, as highlighted in the study by El-Wehedy et al. (2019), who found that contractual and part-time employment can reduce compliance due to lower investment in training.

Training gaps were evident: 13.21% of participants had received no training, and 32.70% had no formal certification. These findings echo global trends, where healthcare foodservice workers often lack comprehensive food safety training (Norshaidi et al., 2019). Seaman and Eves noted that in many institutional foodservice settings, lack of certification is directly associated with gaps in food safety practices (Hakwenye, 2019).

Three questions were included in the questionnaire to assess participants' knowledge on food handling and cross-contamination. Results showed that 52.53% correctly selected refrigerator thawing as the safest method. This aligns with findings by Al-Kandari et al. (2019), who reported 54% accuracy on the same. Cross-contamination was identified by 65.19% as a major consequence of failing to sanitize surfaces, comparable to Ngemdjo Domche (2021). However, only 21.52% of respondents correctly identified that the top section of a plate should not be touched,

consistent with results from Kuo and Hsiao (2020). These figures highlight knowledge gaps that need to be addressed through targeted training.

Attitudes towards food safety were generally positive, with 76.58% agreeing that food stored at incorrect temperatures should be discarded and 87.34% checking refrigerator temperatures daily. Additionally, 86.71% reported separating raw and cooked foods during storage. However, 36.08% admitted they would still work while experiencing diarrhoea, a serious risk in healthcare foodservice. Similar findings were reported by Mgqibandaba et al. (2020) and Asnawi Othman (2022), confirming this behavioural trend. While most handlers understood the importance of hygiene, gaps in behaviour and application were evident, particularly in hand hygiene and personal health responsibilities.

Regarding HACCP awareness and implementation, results revealed high institutional compliance. A total of 89.87% were aware of prerequisite programs, and 94.3% confirmed HACCP use in their establishments. Additionally, 91.77% recognised its importance for food safety. These findings correspond with those of Okpala and Korzeniowska (2023) and Lee et al. (2021), who linked HACCP adherence with reduced foodborne disease (FBD) outbreaks. A strong culture of food safety was observed through consistent recordkeeping (86.08%) and understanding of prerequisite relevance (84.18%). This echoes conclusions by Al Banna et al. (2022) and Kwol et al. (2020), who highlighted monitoring and sanitation as key enablers of successful HACCP systems in institutional foodservice settings.

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REFERENCES

- Abdul-Rashid, S., Fatimah, S., & Azira, A. (2022). HACCP knowledge in Malaysian healthcare. *J. Food Saf. Hyg.*, 38, 732–741.
- Al Banna, H., Alhammad, M., & Alqahtani, R. (2022). Hospital food contamination and risks. *Saudi J. Nutr.*, 13, 2–10.
- Alemayehu, T. G., Dagne, H., & Dagne, B. (2021). Food safety attitudes in Ethiopian hospitals. *J. Environ. Public Health*, 2021, 1155–1160.
- Al-Kandari, D., Al-Abkari, H., & Ali, A. (2019). Food safety knowledge and practices of food handlers in hospitals. *J. Food Prot.*, 82, 121–127.
- Asnawi Othman, M. (2022). Personal hygiene practices in hospital kitchens. *Asia Pac. J. Public Health*, 34, 13–21.
- Aycicek, H., Oguz, U., & Karci, K. (2022). Contamination of ready-to-eat foods by staphylococci and their enterotoxins. *Food Control*, 120, 98–106.
- Budiningsari, D., Wahyuningsih, N. E., & Rahmawati, M. (2023). Barriers to food safety in public hospitals. *Ind. J. Health Policy*, 18, 98–105.
- Chaidoutis, E., Mastrogianis, D., & Patelarou, E. (2023). Food hygiene in institutional settings. *Int. J. Public Health Res.*, 17, 108–110.
- Chen, J., Li, M., & Yang, S. (2021). Cross-contamination risks in food service. *J. Hosp. Food Serv.*, 29, 110–118.

- El-Wehedy, R., El-Gilany, A. H., & Ibrahim, A. A. (2019). HACCP control in hospital catering. *Egypt. J. Hosp. Health*, 57, 62–69.
- Futrell, A. (2021). Cold food storage and bacterial risks. *J. Food Sci. Nutr.*, 17, 83–90.
- Hakwenye, M. (2019). Preventative food safety via HACCP. *Namib. J. Public Health*, 5, 20–25.
- Hasan, H. A., Ibrahim, S. N., & Rahman, N. A. (2022). Challenges in food safety enforcement among hospital food handlers. *Malays. J. Public Health Med.*, 22, 117–123.
- Hashanuzzaman, M., Hashem, M. A., & Mahmud, T. (2020). Poor hygiene and foodborne illness among hospital food handlers. *Int. J. Hyg. Environ. Health*, 227, 113516.
- Jayadipraja, E. A., Sutrisno, B., & Wibowo, R. (2022). HACCP training for hospital food safety. *Ind. J. Nutr.*, 43, 184–186.
- Juliet, A. A., & Okechi, E. (2024). The need for food safety officers in hospitals. *Niger. J. Health Adm.*, 16, 19–24.
- Kamboj, S., Goyal, P., & Arora, A. (2020). Hospital foodservice hygiene systems. *Ind. J. Public Health*, 64, 358–362.
- Kuo, Y. H., & Hsiao, P. C. (2020). Food hygiene knowledge for HACCP. *Taiwan J. Hosp. Manage.*, 11, 3–6.
- Kwol, S. V., Adebayo, O., & Femi, A. (2020). Sanitary management in food safety. *Afr. J. Clin. Nutr.*, 15, 2–7.
- Lee, J., Park, H., & Choi, M. (2021). HACCP in patient foodservice units. *Korean J. Diet.*, 24, 91–100.
- Limon, M. (2021). Improving food handler behaviour in hospitals. *J. Health Behav.*, 6, 64–72.
- Masngut, N., & Azman, N. (2021). Risky food handling practices in hospitals. *Malays. J. Nutr.*, 27, 38–45.
- Mgqibandaba, V., Mdluli, B., & Zuma, T. (2020). Food handlers' behaviour and hygiene. *South Afr. J. Clin. Nutr.*, 33, 3–9.
- Moghnia, H., Rotimi, V., & Al-Sweih, N. (2021). Hygiene practices and bacterial contamination. *Kuwait Med. J.*, 53, 2–9.
- Mousavi, S. M., & Gholami-Borujeni, F. (2021). HACCP knowledge deficits in hospitals. *Iranian J. Hyg.*, 8, 35–42.
- Mphasha, M., Mahlangu, S., & Tshabalala, T. (2024). Staff shortages and food safety risks. *South Afr. Hosp. Rev.*, 31, 55–63.
- Ngemdjo Domche, H. (2021). HACCP system approach in healthcare. *Afr. J. Food Saf.*, 10, 40–47.
- Njoagwuani, E. A., Dike, U. N., & Okafor, E. C. (2023). Knowledge and hygienic practices of food handlers in hospitals. *Afr. J. Health Sci.*, 33, 144–152.
- Norshaidi, N., Yusof, N., & Abdullah, A. (2019). Training effectiveness in food safety. *J. Nutr. Health Saf.*, 4, 2–8.
- Okpala, C. O. R., & Korzeniowska, M. (2023). HACCP effectiveness in healthcare foodservice. *Int. J. Environ. Res. Public Health*, 20, 1940.
- Oniye, A. (2024). Understanding critical control points in food safety. *J. Food Saf. Educ.*, 5, 33–41.
- Radu, G. D., Simion, S., & Albu, D. (2023). HACCP and funding gaps in hospital kitchens. *Eur. J. Nutr. Health*, 12, 77–84.
- Rahman, A. (2023). Sampling techniques in health surveys. *Int. J. Quant. Res.*, 12, 57–63.
- Sunil, M., Reddy, B., & Thomas, A. (2022). Food safety SOP adherence in foodservice. *J. Food Control*, 134, 4909.
- Tan, S., Trupp, K., & Tan, C. (2023). Non-compliance with food prep SOPs. *Malays. Health Bull.*, 28, 708–715.

- Tarannum, A. (2021). Foodborne disease outbreaks due to poor hygiene. *Int. J. Food Saf.*, 11, 7–10.
- Teffo, M. E. (2017). Food safety training effectiveness in hospitals. *Health Care Stud.*, 2, 1–10.
- Todd, E. C. D. (2020). Implementing HACCP in institutional kitchens. *J. Food Saf.*, 40, e12729.
- Tuglo, L. S., Kugbey, N., & Dogbe, J. A. (2021). Food safety awareness among healthcare food handlers. *Int. J. Environ. Health Res.*, 31, 293–302.
- Vukman, R., Horvat, M., & Novak, T. (2021). Linking hospital outbreaks to HACCP failures. *Eur. J. Hosp. Saf.*, 9, 2–9.
- Werkneh, A. A., Mengesha, A., & Hailu, M. (2023). Gaps in food storage and hygiene among hospital foodservice staff. *Ethiop. J. Public Health Nutr.*, 3, 11–18.
- WHO. (2020). Five keys to safer food manual. *World Health Organization*.

SUPPLY CHAIN TACTICS OF SMALL AND MEDIUM-SCALE ENTERPRISE INTEGRATION IN GAUTENG PROVINCE OF SOUTH AFRICA

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ABSTRACT

Small and medium enterprises (SMEs) are finding supply chain management to be increasingly complicated. Hence supply chain tactics appears to be crucial which include supply chain information adoption, supply chain responsiveness and supply chain integration. Information technology in conjunction with supply chain responsiveness are crucial tactics for improving supply chain integration if SMEs are to improve just-in-time delivery, minimize supply chain disruptions, and guarantee resource availability. Thus, this research considers information technology, responsiveness, and supply chain integration to be important elements impacting the performance of SMEs. In view of this, special consideration was given to ethical respects such as the right to privacy, confidentiality and anonymity of research respondents. A convenience sampling method without regard to probability was used to choose the respondents. This approach is necessitated by the fact that there was no sample frame from which all respondents could be drawn. In addition, it was difficult to locate the respondents at the same place and time since they were drawn from different companies. The study collected, analysed, and interpreted the data using a quantitative approach. Measurement tools were created with the South African setting in mind. Supply chain information technology, supply chain integration, and supply chain responsiveness. Data were collected using a structured questionnaire. Additionally, the selected sample of small and medium-sized businesses in the southern region of Gauteng were targeted. 151 self-administered questionnaires were distributed. SMART PLS 4.0 was used to test the relationships and analyse the quantitative data that was gathered. The path analysis methodology was used to test the accuracy of the measurement scales. Positive correlations between the research variables, which are supply chain information technology adoption, supply chain integration, supply chain responsiveness were demonstrated by the study's findings. In the SMEs this suggests that improved supply and demand alignment may result from ongoing improvements in information technology use.

Keywords: Dynamic Capabilities Theory (DCT), supply chain information technology adoption, supply chain integration, supply chain responsiveness, SME performance.

INTRODUCTION

Globally, the concept of small to medium enterprises (SMEs) continues to gain momentum, with consensus among policymakers, economists and business experts that enterprises are drivers of economic growth (Mahembe, 2011). Fatoki and Chiliya (2012) share that the SME sector is widely regarded as the driving force in economic growth and job creation in both developed and developing countries. A healthy SME sector contributes prominently to the economy by creating more employment opportunities, generating higher production volumes, increasing exports and introducing innovation and entrepreneurship skills). SMEs are the first step towards development in economies towards industrialisation, and in most countries, they are positioned as engines through which the growth objectives of developing countries can be achieved (Fatoki & Chiliya, 2012). Enterprises (SMEs) make up the majority of businesses in most countries and contribute significantly to the GDP. Contemporary findings piloted by Abor and Quartey (2010) and Aigbavboa (2014) projected that 91% of formal business units in South Africa are SMEs and that they inject between 52 to 57% into GDP and make available about 61% to employment opportunities. The government encourages and endorses countless methods of backing up for business start-ups and small businesses. Thousands of business start-ups are being established every year as governments continue to promote small businesses and various forms of support to new enterprises. However, despite that SMEs are regarded as drivers of the economy, most of

them die at an infant stage due to challenges such as a lack of finances, failure to sail through and swim in global changes such as technological changes, a lack of support from relevant stakeholders, a lack of business skills and a lack of experience to the venture (Chimucheka & Mandipaka, 2015).

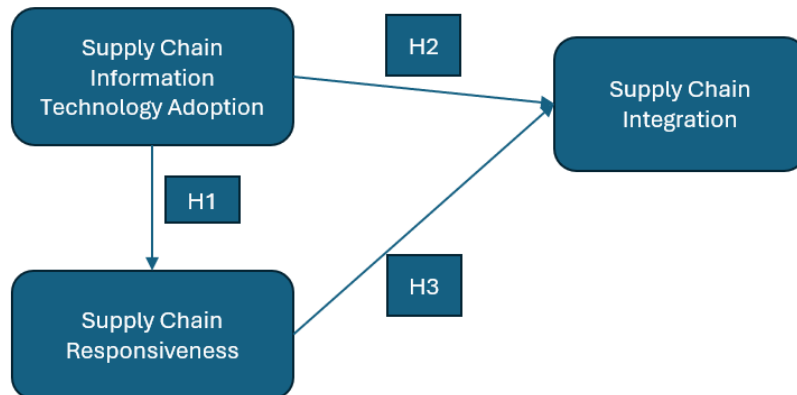
However, SMEs in South Africa continue to fail making it difficult for the country to consolidate the economic paybacks expected from their investments (Watson, Ladzani & Seeletse, 2012). Pellissier and Nenzhelele (2013) asserted that extensive debates and controversies surround the reasons why numerous SMEs continue to fail. They add that it is difficult to underestimate the influence of internal business practices as precursors to either business success or failure within the SME sector. In South Africa, though SMEs have featured in many government plans, such as the Reconstruction and Development Programme (RDP), Growth Employment and Redistribution (GEAR), Accelerated and Shared Growth Initiative for South Africa (ASGISA), and New Growth Path (NGP), in reality, the SME sector continues to confront a difficult economic and labour environment, including policies that favour large corporations, financial constraints and burdensome labour legislation (Akang, 2023). Furthermore, many SMEs fail because of their negligence to either adopt or implement both recent and well-established business practices. Without adapting to both recent and conventional practices in business, such as Supply Chain Management, many SMEs succumb to economic and competitive pressures, leading to their demise.

PROBLEM STATEMENT

According to Abor and Quartey (2010), SMEs play a crucial role in the South African economy, contributing between 52% and 57% to GDP and providing approximately 61% of employment opportunities. However, the survival rate of SMEs is relatively low, with fewer than half of newly established businesses surviving beyond five years. This is noted by several scholars, who regret that despite the significant role played by SMEs in the economy and the support they receive, more than 70 percent of these ventures still fail within three years after being established (Biyase, 2009; Fatoki & Smit, 2011). Olawale and Garwe (2010) also divulge that despite the notable contributions of new SMEs, their failure rate in South Africa is one of the highest in the world. Olawale and Garwe (2010) further point out that about 75 percent of new SMEs in South Africa do not become established firms.

The high failure rate of SMEs in South Africa can be attributed to the challenges faced by these small businesses and also the lack of support from key stakeholders (Leboea, 2017). Other challenges identified include a lack of access to finances, high competition from established businesses, a lack of experience in the venture, a lack of facilities, access to international markets, and scarcity of management talent (Olawale & Garwe, 2010; Abor & Quartey, 2010; Mazanai & Fatoki, 2012). Besides, Barron (2000) and Brink (1997) added the lack of business skills as another challenge. They insinuate that surveys of small business failure maintain that entrepreneurs often have good ideas and are competent, but they do not have a clue on how to run a business and have no underlying appreciation of business fundamentals. There is a need for solutions to reduce the failure and underperformance rates in the SME sector, as the country can reap some of the benefits that come with having an effective SME sector (Chimucheka & Mandipaka, 2015). One of the remedies to this course is the adoption of Supply Chain Management practices. Therefore, this study proposed that the effective implementation of supply chain information technology adoption, supply chain integration, and supply chain responsiveness will lead to better supply chain performance and will help boost enterprise chances of survival and sustenance and contribute to economic growth. Thus, it will serve as a cure for the failure of SMEs.

CONCEPTUAL MODEL



Source: Own compilation.

OBJECTIVES OF THE STUDY

The study is characterised by primary and secondary objectives. The secondary objectives were divided into theoretical and empirical objectives.

Primary Objectives

The primary objective of this study was to investigate the relationship between supply chain information technology adoption, supply chain responsiveness and supply chain integration of SMEs in Gauteng province.

Secondary Objective

The secondary objectives were divided into theoretical and empirical objectives as follows:

Theoretical objectives

To achieve the primary objective, the following theoretical objectives were formulated for the study:

1. To analyse literature on SMEs in Gauteng province.
2. To explore literature on supply chain information technology in SMEs in Gauteng Province.
3. To review literature on supply chain integration in SMEs in Gauteng Province.

Empirical objectives

The objectives below were formulated in support of the primary and theoretical objectives:

1. To determine the influence of supply chain information technology adoption on supply chain integration.
2. To investigate the influence of supply chain information technology adoption on supply chain responsiveness on SMEs in Gauteng province.
3. To scrutinise the influence of supply chain responsiveness on supply chain integration on SMEs in Gauteng province.

LITERATURE REVIEW

This study reviews literature on Dynamic Capabilities Theory (DCT); Supply chain information technology adoption; supply chain integration and supply chain responsiveness.

Dynamic Capabilities Theory

According to Teece, Pisano, and Shuen, (1992) “dynamic capability” refers to a company's capacity to integrate, develop, and rearrange its internal and external resource capacities in response to environmental shifts. Processes to integrate, reconfigure, acquire, and release resources in order to modify the market environment or a firm's actions in response to changes in the market are known as dynamic capabilities. In fact, it is widely acknowledged that DCs that facilitate corresponding strategy change are necessary. Several researchers (Eisenhardt & Martin 2000) have examined how corporations handle the challenges of today's business settings using the dynamic capabilities view (DCV). A firm's achievement of valuable, rare, unique, and non-substitutable (VRIN) resources is the foundation of sustainable competitive advantage, but DC theory goes beyond this notion. The ability to integrate, mobilise, and reconfigure resources and capabilities in order to adjust to quickly changing environments is a result of dynamic capabilities. Researchers looking into how DCs can help corporations survive and grow in the face of adversity define DCs as the capacity to recover, maintain, or enhance performance through the strategic creation, expansion, and/or modification of resources (Eisenhardt & Martin 2000).

Supply Chain Information Technology Adoption

According to Nguyen, Newby and Macaulay (2015), information technology (IT) adoption is the phase whereby a conclusion to adopt a certain kind of technological software is reached, and comprises several activities such as managerial, professional and technical staff decision-making in both the internal and external environment of the organisation. Information technology is defined as an automatic means of capturing, processing, storing, and circulating material. IT is commonly known as the utmost imperative structure for most organisations to survive and compete with other organisations. It is also regarded as one of the most established tools and is extensively viewed as being proficient in delivering generous, calculated, and active value to organisations. Despite the benefits mentioned above, which relate to the adoption of IT, Afolayan, Plant, White, Jones and Davies (2015) argue that there are also barriers to the adoption of IT in SMEs. The attitude of management in SMEs plays a crucial role in the adoption of IT. If the management is not disposed to its adoption and utilisation, then SMEs cannot use IT (Modimogale & Kroeze, 2011). Security and reliability issues also significantly inhibit its adoption and range, from the fear of computer viruses to the theft of money during electronic transactions and data theft. For instance, the presence of hackers gaining access to people's information and the level of fraud are among the major barriers to IT adoption. The majority of people do not believe that their information is safe online. Therefore, SMEs might be reluctant to perform transactions online that require the exchange of personal information.

Supply Chain Integration

According to Zhao, Huo, Flynn and Yeung (2008), supply chain integration refers to the degree to which an organisation strategically collaborates with its supply chain partners and manages intra- and inter-organisational processes to achieve effective and efficient flow of products, services, information and decisions with the aim of providing maximum value to customers. Supply chain integration is a management practice that includes both internal and external integration. Cao, Huo, Li, and Zhao (2015), refers to the external integration as the establishment of linkages with customers and suppliers. On the other hand, it is characterised by overall systems visibility across organisational functions such as procurement, production logistics, sales, marketing and distribution. The supply chain can bring positive outcomes to SMEs such as a reduction in transactional cost, enhanced efficiency and competitiveness, as well as improvements in financial performance (Ralston, 2014; Cao, Huo, Li, & Zhao., 2015). Also, by developing a high level of supply chain integration, SMEs can identify and eliminate non-value-added activities and subsequently strengthen product quality and delivery, providing a foundation for sales growth (Rosenzweig, 2003). In supply chain integration (SCI), some studies (Cao et al., 2015) show a similar understanding that SCI level has a positive impact on SMEs' performance outcomes.

Supply Chain Responsiveness

Responsiveness can be defined as the ability to react purposefully and within an appropriate timescale to customer demand or changes in the marketplace, to bring about or maintain competitive advantage (Holweg, 2005). The responsiveness of supply chains to changing market requirements and their overall efficiency are important issues in supply chain design and management, and therefore currently receive wide attention in the scientific community as well as in practice. In contrast, a supply chain is considered efficient when the focus is on cost reduction and no resources are wasted on non-value-added activities (Gurahoo, 2015). In an efficient supply chain, suppliers, manufacturers, and retailers have to manage their activities to meet predictable demand at the lowest cost. In general, the cost resulting from investments in responsiveness needs to be compared to the opportunity cost of lost sales resulting from stockouts (Thonemann, Behrenbeck, Küpper & Magnus, 2005), which are most likely to occur with products that are subject to demand fluctuations. Responsive supply chains aim to avoid such stockouts and therefore prioritise the ability to react to changing customer requirements (Alicke, & Govorun, 2013).

RESEARCH DESIGNS AND METHODOLOGY

All scientific research must be conducted using some relevant methodology (Neuman, 2014). This section discusses how the study was conducted, and outlined the research design, sampling design, data collection procedures, methods of data analysis and ethical considerations.

Research Design

Research design can be defined as the logic or master plan of a study that throws a spotlight on how the study is to be conducted (Tripathy & Tripathy, 2015). According to Creswell (2013), a research design can be in the form of qualitative, quantitative or mixed methods approaches in nature. This study adopted a quantitative approach, which is essentially about collecting numerical data to explain a particular phenomenon. The rationale for adopting a quantitative approach was that the study was conducted on a particular segment rather than on a vague range within the industry. The research design included both a review of the literature and an empirical study (Creswell, 2013).

Target Population

A target population, according to Neil (2015), refers to the entire group or set of individuals from which the research data is to be collected. In this study, the target population consisted of owner-managers of SMEs in Southern Gauteng Province.

Sampling Frame

The process of selecting a sample with the intention of making inferences about the population chosen is known as sampling. Probability sampling and non-probability sampling are the two methods used for sampling. Using the convenience sampling technique, which selects participants in non-random ways, non-probability sampling was employed in this study. Convenience sampling is a non-probability sampling technique that gathers data from members of the population who are easily accessible to take part in a study. Each subject is invited to participate, making the chosen subjects available for testing and making this sampling technique convenient. Based on this, the research population was limited to SMEs within Emfuleni Local Municipality, which included additional smaller towns, such as Evaton, Sharpville, Sebokeng, Bophelong, Polokong, Vereeniging, and Vanderbijlpark.

Research Sample Size

Singh and Masuku (2014) define sample size as the determination by the researcher of the number of participants that can be feasibly included in a statistical sample. The sample size of this study was determined by referring to the sample sizes used in previous studies related to the current one. These studies included Adams et al. (2012), Mafini and Omoruyi (2013), and Jain, Khalil, Johnston (2014), who focused their studies on the challenges encountered in supply chains. The proposed sample size for this study is set at $n=151$. Respondents were selected using a non-probability convenience sampling technique. This approach is necessitated by the fact that there is no single sample frame from

which all respondents can be drawn. In addition, it was envisaged that it would be difficult to locate the respondents at the same place and time since they were drawn from different companies.

Method of Data Collection and Measuring Instrument

Data collection, as defined by Sani (2014), is a research process that informs how relevant information to address the research problem will be gathered. In this research, data was collected through a survey questionnaire.

Data Analysis

In this study, data analysis was conducted using the Statistical Packages for the Social Sciences (SPSS Version 3.0) and SMART PLS 4.0 software. Simple descriptive statistics, such as percentages, frequency tables and graphs, were used as preliminary statistical techniques in the analysis of the demographic profile of the sample as well as perceptions towards the individual items on the scale. The structural equation modelling technique was applied in testing the hypothesised relationships between the variables. This involved performing the psychometric tests using Confirmatory Factor Analysis and testing the hypotheses using the path analysis procedure.

Table 1: Hypotheses Testing Results.

Path	Hypothesis	Path coefficients (β)	P-Values	T-Statistics	Decision on hypotheses
ST -> SR	H1	0.542	0.000	5.967	Supported and significant
ST -> S1	H2	0.309	0.000	3.995	Supported and significant
SR-> S1	H3	0.201	0.000	2.235	Supported and significant
ST = Supply Chain Information Technology Adoption; SR = Supply Chain Responsiveness; SI = Supply Chain Integration.					

Source: Own compilation.

DISCUSSION OF RESULTS

This section presents a discussion of the results obtained from hypothesis testing. The hypothesized relationships were assessed through path analysis using SmartPLS 4. Each hypothesis was evaluated based on its path coefficient (β), t-statistic (t), and p-value. A t-value greater than 1.96 and a p-value less than 0.05 indicate a statistically significant relationship.

H1: Supply Chain Information Technology Adoption (ST)→ Supply Chain Responsiveness (SR)

The relationship between Supply Chain Information Technology Adoption and Supply Chain responsiveness was examined. The results revealed a positive and statistically significant effect ($\beta = 0.542$; $t = 5.967$; $p = 0.000$). This implies that improved supply chain information technology significantly enhances supply chain responsiveness for SMEs in Gauteng province. Having real-time and accurate information enables an organisation to manage responsiveness effectively; thereby, enhancing faster cash flow for smooth business operation (Cao,Huo, Li, & Zhao., 2015). The hypothesis is therefore supported and significant.

H2: Supply Chain Information Technology Adoption (ST)→ Supply Chain Integration (SI)

The analysis found a strong, positive, and significant relationship between Supply Chain Information Technology Adoption and Supply Chain Integration ($\beta = 0.309$; $t = 3.995$; $p = 0.000$). This suggests that enhanced coordination and alignment among supply chain partners through information technology adoption improve an SME's ability to respond swiftly to customer needs and integration. According to Sani, (2014), SMEs supply chain information technology adoption is characterised by the effective exchange of responsive and valid information, which is widely regarded as resourceful in achieving quality supply chain integration.The hypothesis is statistically supported and significant.

H3: Supply Chain Responsiveness (SR) → Supply Chain Integration (SI)

The results showed a positive and statistically significant influence of Supply Chain Responsiveness on Supply Chain Integration ($\beta = 0.201$; $t = 2.235$; $p = 0.006$). This indicates that the ability of SMEs to adjust quickly to changing

demands contributes meaningfully to their overall supply chain integration. While some research indicates that supplier integration has no discernible effect on the financial and operational performance of businesses, the majority of studies demonstrate that supplier integration can enhance information resource sharing between businesses and suppliers, enhance the production process, lower production costs, and increase the flexibility of business production (Chinomona & Chinomona, 2013). The hypothesis is therefore supported and significant.

Ethical Considerations

In scientific research, all stakeholders have ethical issues which should be considered (Quinlan, 2011). In view of this, special consideration was given to ethical respects, such as the right to privacy, confidentiality and anonymity of research respondents. Furthermore, the respondents' right to equality, justice, freedom of choice, expression and access to information, as well as the right to human dignity and life and protection against harm, was ensured. Since this study used people as respondents, the principle of informed consent was adhered to. The study was conducted after permission was granted by the companies involved. In addition to the aspects above, all sources from which the information was obtained were acknowledged accordingly, as stated by Cooper and Schindler (2011). Ethical clearance to conduct the study was obtained from the Vaal University of Technology (VUT) Faculty Research Ethics Committee (FREC), reference number: FRECMS- 15052024-178.

RECOMMENDATIONS FOR SME MANAGERS AND GOVERNMENT

Practical recommendations are made to the managers in the SME sector to adopt professional codes of conduct at their workplace. Given the important contribution that SMEs make to a nation's economic growth and the role that they play in the reduction of poverty, it is important that these enterprises are provided with some suggestions to assist in improving their supply chain integration. It is recommended that policymakers and academics assist SME owners/managers through education programs that will equip them to draft plans and strategic policies to position themselves for competitive advantage in the business world. Owners/managers of SMEs seeking to improve their performance, therefore, need to constantly monitor and evaluate the progress in goal achievement. SMEs should prioritize IT investments that enable seamless integration and responsiveness within their supply chains. Managers must focus on building collaborative relationships and agile processes to fully leverage IT capabilities. Policymakers should provide incentives and training programs to support SMEs in adopting advanced supply chain technologies.

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

This study makes significant contributions, and even though due care was taken to achieve rigor, there are some limitations that open up avenues for further research. Subsequent research could replicate this study in broader sampling contexts that include all the SMEs in Zimbabwean cities or a comparative analysis between Zimbabwe and other countries such as South Africa, Malawi, and Tanzania. The other limitation is that the data were cross-sectional. There is no best theory that is applicable to this study. Future research should try to include other theories for this same model, such as the Dependency theory and the Game theory, in order to evaluate the outcomes.

CONCLUSION

This study contributes to the understanding of how IT adoption impacts SME performance through integration and responsiveness. By grounding the framework in RBV and Dynamic Capabilities Theory, it offers theoretical and practical insights for SMEs seeking to enhance competitiveness in an increasingly digitalized business environment.

REFERENCES

- Abor, J. & Quartey, A. (2010), Issues in SME development in Ghana and South Africa, *International Research Journal of Finance and Economics*, 39(6): 215–228.
- Adams, J.H., Khoja, F.M. & Kauffman, R. (2012). An empirical study of buyer-supplier relationships within small business organisations. *Journal of Small Business Management*, 50 (1): 20-40.
- Afolayan, A., Plant, E., Gareth R.T., White, P.J., & Paul B.D. (2015). *Information Technology Usage in SMEs in a Developing Economy. details*
- Aigbavboa, C., Tshikhudo, L. & Thwala, W. (2014). Identification of critical success factors for the survival of small, medium and micro enterprise contracting firms in the greater Johannesburg metropolitan area, *Details*, 349-356.
- Alicke, M. & Govorum, O. (2005). *The Better-Than-Average Effect*. In: M.D. Alicke, M. ed., *The self in social judgment*. Philadelphia: Psychology Press.
- Barron, C. (2000). Brilliant ideas but spectacular flops. *Sunday Times Business Times*. April, 9(1).
- Biyase, L. (2009). DTI to look at how crisis hurts small enterprises. [Online]. Available: www.busrep.co.za/index.php?fSectionId=561&fArticleId=4947848 Accessed: 12/03/2018.
- Brink, A. (1997). *The Marketing Perception of Grocery Store Retailers Belonging to Black Business Associations in Gauteng*. Pretoria: University of South Africa.
- Cao, M., Vonderembse, M., Zhang, Q. & Ragu-Nathan, T.S. (2010). Supply chain collaboration: conceptualization and instrument development. *International Journal of Production Research*, 48(22): 6613-6635.
- Cao, M. & Zhang, Q. (2011). Supply chain collaboration: Impact on collaborative advantage and firm performance. *Journal of Operations Management*, 29:163–180. [http:// dx.doi.org/10.1016/j.jom.2010.12.008](http://dx.doi.org/10.1016/j.jom.2010.12.008)
- Chimucheka, T & Mandipaka, F. (2015). Challenges faced by small, medium and micro enterprises in the Nkonkobe municipality, *International Business and Economics Research Journal*, 14(2).
- Chinomona, R. & Chinomona, E. (2013). The influence of employees' perceptions of organisational politics on turnover intentions in Zimbabwe's SME sector. *Southern African Journal of Business Management*, 44(2): 57-66.
- Cooper, D.R., & Schindler, P.S. (2011). *Business Research Method*. 11th ed. New York: Mc Graw Hill/Irwin.
- Creswell, J.W. (2013). *Research Design: Qualitative, Quantitative, And Mixed Methods Approaches*. 4th ed. Thousand Oaks, CA: Sage.
- Eisenhardt, K. M., & Martin, J. A. (2017). *Dynamic Capabilities: What Are They?* The SMS Blackwell handbook of organisational capabilities, 341-363.
- Fatoki, O. O. & Smit, A. (2011). Constraints to credit assess by new SMEs in South Africa: A supply-side analysis. *African Journal of Business Management (AJBM)*, 5(4):1413-1425.
- Fatoki, O. & Chiliya, W. (2012). An investigation into the attitudes toward business ethics and corporate social responsibility by local and immigrant SME owners in South Africa. *Journal of Social Science*, 32:13-21.
- Gourova, E. (2010). Knowledge management strategy for small and medium enterprises. *Proceedings of the International Conference on Applied Computer Science*, 639-648.
- Holweg, M. (2005). An investigation into supplier responsiveness. *International Journal of Logistics Management*, 16(1) 96-119.
- Leboea, S.T. (2017). *The Factors Influencing SME Failure In South Africa*. Details, USA.

- Mafini, C. & Omoruyi, O. (2013). Logistics benefits and challenges: the case of SMEs in a South African local municipality. *Southern African Journal of Entrepreneurship and Small Business Management*, 6(166): 145-167.
- Mahembe, E. (2011). Literature review on enterprises' access to credit and support in South Africa. Retrieved from. http://www.ncr.org.za/pdfs/Literature%20Review%20on%20SME%20Access%20to%20Credit%20in%20South%20Africa_Final%20Report_NCR_Dec%202011.pdf
- Mazanai, M. & Fatoki, O. (2012). Access to finance in the SME Sector: A South African perspective. *Asian Journal of Business Management*, 4(1):58-67.
- Modimogale L. & Kroeze, J. (2011). The role of ICT within small and medium enterprises in Gauteng. *Communications of the IBIMA*, 2011: 1–13.
- Neil, J. (2015). *Quantitative Design Sampling Measurement*. [Online]. Available: [http://www.wilderdom.com/OEcourses/PROFLIT/Class5QuantitativeResearchDesignSampling Measurement.htm](http://www.wilderdom.com/OEcourses/PROFLIT/Class5QuantitativeResearchDesignSampling%20Measurement.htm) Accessed: 15 March 2018.
- Neuman, W.L. (2014). *Understanding research*. Boston: Pearson.
- Nguyen, T. H., Newby, M., & Macaulay, M. J. (2015). Information technology adoption in small businesses: Confirmation of a proposed framework. *Journal of Small Business Management*, 53, 207-227.
- Olawale, F. & Garwe, D. (2010). Obstacles to the growth of new SMEs in South Africa: A principal component analysis approach, *African Journal of Business Management*; 4(5):729-738.
- Pellissier, R. & Nenzhelele, T.E. (2013). The impact of work experience of –sized enterprises owners or managers on their competitive intelligence awareness and practices. *South African Journal of Information Management*, 15(1): 1-6.
- Quinlan, C. (2011). *Business Research Methods*. United Kingdom: Cengage Learning EMEA.
- Ralston, P. (2014). Supply chain collaboration: a literature review and empirical analysis to investigate uncertainty and collaborative benefits regarding their practical impact on collaboration and performance. [Online]. *Graduate Theses and Dissertations*. IOWA University. Available <http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=4805&context=etd> Accessed: 13 March 2018.
- Rosenzweig, M.L. (2003). *Win-Win Ecology: How the Earth's Species Can Survive in the Midst of Human Enterprise*. New York: Oxford University Press.
- Sani Mu, Davison, B.A. & Cotter, G. (2014). Renal dysfunction in African patients with acute heart failure. *European Journal of Heart Failure*, 16(7):718-728.
- Singh, A.S. & Masuku, M.B. 2014. Sampling techniques & determination of sample size in applied statistics research: an overview. *International Journal of Economics, Commerce and Management United Kingdom*, 2(11): 1-22.
- Teece, D. J., Pisano, G. P., & Shuen, A. (1992). *Dynamic Capabilities and Strategic Management*. Center for Research in Management, University of California, Berkeley.
- Thonemann, U., Behrenbeck, K., Küpper, J. & Magnus, K.H. (2005). *Supply chain excellence in Handel*. Wiesbaden: Gabler.
- Tripathy, P. & Tripathy, P.K. (2017). *Fundamentals Of Research. A Dissected View*. UK: Anchor Academic Publishing.
- Zhao, X., Huo, B., Flynn, B. & Yeung, J. (2008). The impact of power and relationship commitment on the integration between manufacturers and customers in a supply chain. *Journal of Operations Management*, 26(3): 368-388.

DRIVERS OF WRIST-WORN WEARABLE ADOPTION AMONG SOUTH AFRICAN YOUTH: A COMPARATIVE ANALYSIS OF USER EXPERIENCE AND BRAND PREFERENCE

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ABSTRACT

Wrist-worn activity trackers (WATs) dominate a fitness-tracking market projected to exceed USD 290 billion by 2032, yet South African penetration sits near 10%. This study examines drivers of WAT adoption intentions among South African young adults (18–34), comparing how user experience and brand preference shape these drivers. Anchored in an extended Technology Acceptance Model (TAM) integrating social image, brand name, information availability, perceived cost, and perceived performance risk, the model was tested on 292 valid responses collected at three Parkrun events. Construct validity was confirmed via exploratory factor analysis, collinearity diagnostics, internal-consistency reliability, and Harman's single-factor test. Two umbrella hypotheses were tested through theory-justified split-sample multiple regressions stratified by user experience (users vs. non-users) and brand preference (Apple, Fitbit, Garmin, Polar, Samsung), with gender, age, and exercise frequency as controls. Non-users' intentions are driven primarily by perceived usefulness, where experienced users respond more strongly to information availability and perceived cost, and attitude was significant for both. Brand preference produced markedly different profiles, namely Apple loyalists by usefulness, Garmin by usefulness/brand-name/information, and Samsung by ease of use. Additionally, cost mattered for Fitbit, Garmin, and Samsung, but not for premium Apple and Polar. The study contributes a context-tailored extended-TAM application in an under-researched emerging market and an empirically grounded, brand-specific playbook for converting non-users and deepening loyalty.

Keywords: wrist-worn wearable adoption, brand preference, user experience, extended TAM, South Africa.

INTRODUCTION AND PROBLEM STATEMENT

The wrist-worn activity tracker (WAT) category has matured into the dominant segment of a global fitness-tracker market forecast to grow from USD 72 billion in 2025 to USD 290 billion by 2032 (Rawal, 2025). Adoption is concentrated in mature economies, where emerging markets remain comparatively underserved. South Africa is illustrative, with penetration sitting near 10% of the population aged 16 to 64 and projected to climb only marginally by 2029 (Statista, 2025). The country is characterized by a rapidly evolving technological landscape and a growing interest in prioritizing digital health innovations (National Department of Health, 2020). As a developing nation with significant economic disparities, it presents a unique context for examining the adoption of wearable activity trackers. With an estimated 80% of the local market still untapped (Pangarkar, 2025), the strategic question for manufacturers is no longer whether to enter the market, but how to design segment-specific propositions that convert non-users and deepen loyalty.

Two practical realities frame the problem. First, South African young adults (18–34) are digitally engaged, brand-conscious, and increasingly health-aware, but navigate the category under tight budgets and limited prior exposure (Azionya & Overton-de Klerk, 2021; Muller, 2022). Second, brand differentiation in WATs is built into the product experience itself, as exemplified by Apple's ecosystem integration, Garmin's tracking precision, Samsung's interface design, Fitbit's mass-market positioning, and Polar's premium training credentials, which each cultivate distinct loyalty profiles (Thomas et al., 2025). Adoption is therefore unlikely to be driven by a single, brand-agnostic set of perceptions. Instead, drivers should differ systematically with both prior usage experience and brand preference.

The South African case is theoretically informative beyond its own borders. Comparable emerging-market WAT studies in Romania (Felea et al., 2021), Malaysia (Chuah et al., 2016), Hong Kong (Cheung et al., 2020), India (Dutta et al., 2024) and South America (Bianchi et al., 2022) report broadly similar TAM-extension structures but disagree systematically on which extension dominates with social image in some, perceived cost in others, brand cues in a third group. None of these studies satisfy brand-preference subgroups, and only Bianchi et al. (2022) examine a developing-economy population at all. Literature therefore offers strong evidence that moderation exists, but limited evidence on where within the model the coefficient asymmetries lie. A study that tests user-experience and brand-preference moderation jointly, in a single specification, in a comparable emerging-market youth sample, addresses a gap visible across the international wearable-adoption literature.

This study therefore departs from prior work in three respects that justify it as more than a replication. First, it tests two boundary conditions (user experience and brand preference) in the same specification with identical predictors and controls. This is a design that no prior WAT study using TAM has implemented. Second, it integrates brand-equity theory (Aaker, 1991; Keller, 1993; Chaudhuri & Holbrook, 2001) directly into the TAM extension structure rather than treating brand as an external moderator, addressing Niknejad et al.'s (2020) call for theoretical bridges between technology-acceptance and brand-equity literatures. Third, it produces a brand-by-driver matrix that converts coefficient evidence into managerially actionable, brand-specific marketing prescriptions. These data-driven recommendations extend the typical contribution boundary of TAM-based wearable studies, which usually stop at aggregate driver rankings.

The study addresses one overarching research question: how do the behavioral drivers of WAT adoption intentions among South African young adults differ as a function of (a) user experience and (b) brand preference? The contribution is fourfold. Conceptually, the study extends Davis's (1989) TAM by incorporating five context-relevant constructs (social image, brand name, information availability, perceived cost, perceived performance risk) and demonstrates how driver strength and direction shift across user-experience and brand-preference subgroups. Theoretically, it integrates brand-equity logic with TAM in a single specification, treating brand identity as a substantive boundary condition on the technology-adoption process. Methodologically, it operationalizes moderation through theory-justified split-sample multiple regressions with covariate controls (gender, age, exercise frequency), supplemented by exploratory factor analysis (EFA), reliability, collinearity diagnostics, and Harman's test, with explicit assumption-diagnostic reporting. Practically, it produces a brand-by-driver matrix translating directly into segmentation, positioning, message strategy, and pricing recommendations for the five most preferred brands in this sample.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Choice of Theoretical Lens: Extended TAM Versus Alternatives

Davis's (1989) TAM posits that behavioral intention and actual usage are determined by attitude (ATT), which is shaped in turn by perceived usefulness (PU) and perceived ease of use (PEOU). TAM aligns with the present hypotheses on three specific grounds. First, both H1 and H2 are framed as differences in the strength of perception-to-intention paths across subgroups; TAM's limitation, namely including only four constructs with directly observable parameters, keeps this within tractable degrees of freedom in subgroup regressions (Niknejad et al., 2020). Second, the dependent variable here is adoption intention rather than continued or habitual use, which sits in TAM's tightest predictive window (Lunney et al., 2016). Third, the WAT category is the most TAM-tested wearable category in the empirical literature (Cheung et al., 2020; Chuah et al., 2016; Felea et al., 2021; Gao et al., 2016; Muller, 2022; Wang et al., 2023), permitting direct comparison of the present results with a substantial prior literature.

Four alternative theoretical lenses were considered and not adopted, each for theory-aligned reasons. UTAUT2 (Venkatesh et al., 2012) adds performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit, and reports up to 74% variance explained in behavioral intention (Wu & Lim, 2024). It was not adopted because several UTAUT2 constructs are conceptually mirrored by the TAM extensions used here, such as price value and perceived cost, social influence and social image, where hedonic motivation is partly absorbed into attitude. Moreover, facilitating conditions and habit are most informative for continuance, which is not this study's scope or aim, and the additional constructs would have crowded the eight-predictor specification beyond what split-sample regression can stably estimate. Diffusion of Innovations (Rogers,

2003) frames adoption as a stagewise innovativeness process and is best applied to category-level adoption curves rather than within-subgroup driver attribution. That is, its constructs (relative advantage, compatibility, complexity, trialability, observability) overlap substantially with PU, PEOU, and IA already in the present model. The TPB (Ajzen, 1991) adds subjective norms and perceived behavioral control to attitude, where subjective norms are operationalized in this current study through social image, while perceived behavioral control overlaps PEOU and is less informative for a category in which physical handling is uniform across products. SDT (Ryan & Deci, 2000) frames adoption through autonomy, competence, and relatedness, and while informative for sustained engagement, it does not predict differential coefficient profiles across brand-preference subgroups, which is the present study's analytic goal. The present extended TAM is therefore selected on the principle of parsimony plus alignment, rather than on the assumption that it is the only defensible lens.

Asymmetry of Adoption Intention: Users Versus Non-Users

Behavioral intention is conventionally defined as a planned commitment to perform a behavior grounded in a favorable inclination (Ajzen, 1991). For non-users, this maps cleanly onto first-time adoption intention. For current users, the construct is conceptually closer to continuance or upgrade intention. This study retains a single adoption-intention measure for both groups so that the regression coefficients are directly comparable, but interprets the effects asymmetrically. That is, a significant driver among non-users signals what triggers initial purchase, while a significant driver among users signals what sustains category attachment (Bhattacharjee, 2001). This asymmetry is treated as a substantive feature of the model rather than a measurement flaw and is therefore revisited under both the discussion and the limitations.

Core TAM Constructs and Context-Specific Extensions

The core TAM constructs operate as follows. ATT reflects the positive or negative valence a consumer attaches to a device (Choi & Kim, 2016; Gao et al., 2016) and is consistently linked to adoption intentions in wearable contexts (Kim & Shin, 2015; Lunney et al., 2016; Muller, 2022). PU captures beliefs about the device's contribution to health or performance goals, where PEOU measures the cognitive and physical effort required to operate it (Davis, 1989). Both have repeatedly predicted attitude and intention, although their relative weights vary with cultural and demographic context (Cheung et al., 2020; Chuah et al., 2016; Felea et al., 2021).

Five context-specific constructs were added. Social image (SI), denoted as peer-derived respect from device use (Yang et al., 2016), has been linked to youth adoption (Adapa et al., 2018; Bianchi et al., 2022; Jeong et al., 2017; Rauschnabel & Ro, 2016), though Gowin et al. (2019) document the opposite in some subcultures. Brand name (BN) operates as a heuristic for quality, identity, and social signaling, which draws on Aaker's (1991) brand-equity framework and Keller's (1993) customer-based brand-equity model. Brand cues shape perceived risk, attitude, and purchase intention, particularly in high-involvement technology categories (Dutta et al., 2024; Morton, 2002; Yang et al., 2016). Information availability (IA), reflected by the convenience and immediacy of data access (Huang et al., 2017), is among the most valued WAT features (Adapa et al., 2018; Shin, 2009) and influences both initial and continued use (Edo et al., 2023; Shin, 2007, 2012). Perceived cost (PC) is the monetary outlay (Phonthanukitithaworn et al., 2015), which, in price-sensitive emerging markets, tends to consistently decrease intentions (Muller, 2022; Shin, 2009; Yang et al., 2016). Perceived performance risk (PPR) captures concerns about device reliability (Nasir & Yurder, 2015; Wu & Wang, 2005), compounded by high prices among the unfamiliar (Hwang, 2016).

Niknejad et al.'s (2020) systematic review of wearable-technology acceptance studies and Kalantari's (2017) framework synthesis converge on three observations relevant to this study. First, ATT and PU emerge as the most consistently significant TAM drivers across wearable studies, but their relative strength varies by context. This pattern that the present user-versus-non-user stratification in this study is designed to interrogate. Second, SI and BN effects are both measured frequently but reported with conflicting signs across studies, such as being positive in mature-market youth samples, but negative or null in some emerging-market and athletic samples (Gowin et al., 2019; Muller, 2019; Yang et al., 2016). Third, no published WAT study has yet tested how the TAM extension structure varies systematically across consumer subgroups defined by brand preference, which is a gap the present brand-preference stratification fill. These three observations directly motivate the two umbrella hypotheses.

User Experience and Brand Preference as Boundary Conditions

The same adoption model can yield different coefficient profiles across consumer groups. Venkatesh et al. (2003) treat experience as a moderator of UTAUT relationships, and Bhattacharjee's (2001) post-acceptance model shows that drivers of continuance differ from drivers of first-time adoption. In wearables, prior ownership is associated with greater sensitivity to data and cost considerations and lower sensitivity to functional benefits already realized (Chuah et al., 2016; Muller, 2022). Brand preference, and by extension loyalty, operates similarly, where Aaker (1991) and Chaudhuri and Holbrook (2001) argue that loyal consumers process brand-related information differently, weighting brand-consistent cues more heavily. In a category where five major brands occupy distinct positioning slots, drivers of adoption intention should therefore differ predictably across loyalty subgroups. These two boundary conditions (user experience and brand preference) form the basis of the study's two umbrella hypotheses.

Hypotheses

Following the literature and treating both stratifications as boundary conditions, the study tests two umbrella hypotheses, each specifying alternative differences across subgroups for the eight drivers identified above:

H1: South African young adults' WAT adoption intentions differ between users and non-users in the strength of the relationships between adoption intention and (a) attitude, (b) perceived usefulness, (c) perceived ease of use, (d) social image, (e) brand name, (f) information availability, (g) perceived cost and (h) perceived performance risk.

H2: South African young adults' WAT adoption intentions differ across brand-preference subgroups (Apple, Fitbit, Garmin, Polar, Samsung) in the strength of the relationships between adoption intention and (a) attitude, (b) perceived usefulness, (c) perceived ease of use, (d) social image, (e) brand name, (f) information availability, (g) perceived cost and (h) perceived performance risk.

METHODOLOGY

Research Design, Sampling, Instrument, and Ethics

A quantitative, cross-sectional, descriptive design was adopted. The target population was South African young adults aged 18–34 with sufficient health engagement to be conceivably responsive to WAT messaging. Parkrun events, which are free, weekly 5 km community runs operating across 226 South African locations (Parkrun, 2025), provided a sampling frame meeting this criterion. Three events were selected through non-probability convenience sampling (two in the Free State, one in Gauteng), and 150 self-administered questionnaires were distributed at each, totalling 450. After event-organizer approval and informed consent, respondents completed and returned the survey on-site. Following Mahalanobis-distance outlier screening (Tabachnick & Fidell, 2013) and listwise deletion of incomplete cases, 292 usable responses were retained. This translates to a 64.8% effective response rate. The Parkrun sampling frame was selected over the student-sample convention common in comparable WAT studies (Felea et al., 2021; Muller, 2019) because it captures the target population, namely health-engaged South African young adults aged 18–34, with greater external validity than university-bound samples. Also, Parkrun participation correlates with discretionary income and health-tech receptivity in ways that student status does not (Parkrun, 2025). The trade-off might signal the over-representation of health-engaged respondents, which is acknowledged as a limitation to generalizability to inactive segments.

The questionnaire comprised four sections, namely the cover letter and consent, demographics (Section A), behavioral background, including current ownership and brand preference (Section B), and the nine-construct, 37-item perceptual battery on a six-point Likert scale (1 = strongly disagree; 6 = strongly agree). Items were adapted from previously validated scales, namely attitude and adoption intentions (Kim & Shin, 2015; Venkatesh et al., 2003), perceived usefulness (Park & Chen, 2007; Shin, 2007), perceived ease of use (Kim & Shin, 2015; Kuo & Yen, 2009), social image (Yang et al., 2016), brand name (Muller, 2019), information availability (Shin, 2007; Shin, 2012), perceived cost (Kim & Shin, 2015; Shin, 2009), perceived performance risk (Yang et al., 2016). The full item list per construct is provided in Appendix A. Brand loyalty was operationalized as the brand the respondent identified as their single preferred brand, irrespective of current ownership, which captures affective and cognitive loyalty components

(Chaudhuri & Holbrook, 2001) without conflating loyalty with installed-base ownership. Two items were dropped following alpha-improvement diagnostics (IA3, raising α from 0.844 to 0.851; PC2, raising α from 0.784 to 0.799).

The questionnaire was approved by the university's Research Ethics Committee, and data collection commenced only after obtaining the clearance certificate and written consent from the Parkrun organizers at the three selected locations. No personal information was gathered, completion was voluntary, informed consent was required, and no attendee was coerced into participating.

Data Analysis Strategy and Justification of Split-Sample Regression

Analyses were conducted in IBM SPSS v28, comprising frequency analysis of demographic and behavioral variables, construct validation through EFA with varimax rotation, descriptive statistics and one-sample t-tests, Cronbach's alpha, bivariate correlations and collinearity diagnostics for nomological validity, Harman's single-factor test for common method bias, and hypothesis testing through multiple linear regression. EFA was used rather than confirmatory factor analysis (CFA) because the extended-TAM nine-factor structure has not been validated in the South African WAT context, and the smallest brand subsample (Polar, $n = 35$) sits below the case-to-parameter ratio recommended for credible CFA (Hair et al., 2019).

H1 and H2 each specify subgroup differences in the regression coefficients of eight drivers on AI. Three strategies were considered, namely (a) independent-samples t-tests / one-way ANOVA on construct means, (b) a single regression with interaction terms, and (c) split-sample multiple regressions estimated separately for each subgroup. Strategy (a) was rejected because mean-comparison tests reveal only whether subgroups differ in average construct levels, not whether constructs predict AI with different strengths within each subgroup; the latter being the substantive question and the source of strategic insight (Hair et al., 2019). Strategy (b) is statistically efficient when interaction effects are the primary inferential target, but with eight predictors crossed with five brand subgroups, it would generate up to 40 interaction terms in a single equation, severely inflating multicollinearity and producing coefficients difficult to translate into actionable, brand-specific guidance. Strategy (c), namely, split-sample regression, is endorsed by Aiken and West (1991) when the moderator is categorical and the analytic goal is to characterize the full driver profile within each group because it yields per-subgroup R^2 , standardized betas, and significance levels that map directly onto brand-segment managerial decision-making.

Each subgroup regression entered the eight drivers simultaneously and included three controls, namely gender, age group, and exercise frequency, to address residual demographic confounding. Linear regression assumptions (linearity, independence of residuals via Durbin-Watson 1.76–2.34, homoscedasticity inspected via standardized residual plots, multivariate normality) were checked within each subgroup; no subgroup violated these to a degree warranting transformation. Both R^2 and adjusted R^2 are reported. Brand-preference subgroups were limited to the five most prevalent brands (Apple, Fitbit, Garmin, Polar, Samsung), accounting for 100% of expressed preference in this sample; smaller brands (Suunto, TomTom, Xiaomi) were not represented sufficiently to support stable estimation, and a residual "Other brands" stratum was therefore not modelled, which is a sample-driven limitation. Subgroup sizes (Apple $n = 59$, Fitbit $n = 55$, Garmin $n = 77$, Polar $n = 35$, Samsung $n = 66$) all exceeded the 30-case threshold for stable beta estimation, although Polar should be interpreted with appropriate caution (Hair et al., 2019). In keeping with practice for moderation/subgroup analyses where power is split across multiple smaller samples (Cohen, 1988; Hair et al., 2019), effects are reported at three tiers, namely $p < 0.01$, $p < 0.05$, and $p < 0.10$, with effects at $p < 0.10$ interpreted as marginally significant and treated as suggestive rather than conclusive.

RESULTS AND DISCUSSION

Sample Profile and Descriptive Findings

The 292 respondents are gender-balanced with a slight majority in the 25–34 bracket (53.4%). Device owners (47.9%) and non-owners (52.1%) form a near-equal split, providing the variance required for the user-experience comparison. Brand preference is distributed across Garmin (26.4%), Samsung (22.6%), Apple (20.2%), Fitbit (18.8%), and Polar (12.0%). The sample is highly health-engaged since 86.6% exercise at least weekly, and 49.3% cite a healthier lifestyle as their primary motivation to attend Parkruns. Economically, 54.1% of target devices are priced R1,001–R5,000 ($\approx$

USD 59–294). Among non-owners, 69.7% cite cost as the principal barrier, ahead of complexity (9.9%) and the perception of WATs as a fad (6.6%). Nonetheless, 77.6% would consider future ownership, signaling sizeable conversion potential.

Measurement Validation

EFA with varimax rotation reproduced the nine expected factors, jointly explaining 74.97% of item variance. Loadings ranged from 0.470 to 0.878, and communalities exceeded the 0.50 threshold (Hair et al., 2019). Sampling adequacy was strong (KMO = 0.934; Bartlett's $\chi^2 = 7310.636$, $df = 595$, $p < 0.001$). One-sample t-tests against a 3.5 midpoint on the six-point scale confirmed that all constructs differed significantly from the scale midpoint ($p < 0.01$). Construct means, standard deviations, factor loadings, and communalities are summarized in Table 1.

Table 1: EFA loadings, communalities, descriptive statistics, and one-sample t-test.

Variable	Loadings	Communalities	Mean	Std. dev.	t-value	p
Attitude (ATT)	0.744–0.776	0.694–0.781	4.96	0.846	29.48	<0.01
Perceived usefulness (PU)	0.499–0.727	0.595–0.769	4.80	0.829	26.75	<0.01
Perceived ease of use (PEOU)	0.493–0.778	0.678–0.775	4.87	0.789	29.61	<0.01
Adoption intentions (AI)	0.634–0.683	0.781–0.811	4.90	0.977	24.52	<0.01
Social image (SI)	0.794–0.878	0.778–0.844	3.92	1.269	5.72	<0.01
Brand name (BN)	0.724–0.828	0.693–0.817	4.59	1.002	18.63	<0.01
Information availability (IA)	0.470–0.689	0.715–0.815	4.81	0.862	25.94	<0.01
Perceived cost (PC)	0.509–0.744	0.680–0.777	2.43	1.000	−18.30	<0.01
Performance risk (PPR)	0.798–0.876	0.760–0.821	2.82	1.157	−10.09	<0.01

Test value = 3.5 (mid-point of 6-point Likert). All construct means are significantly different from 3.5 at $p < 0.01$.

All nine Cronbach's alpha values exceeded 0.70 (Malhotra et al., 2012), ranging from 0.799 to 0.914. The two highest alphas (AI = 0.900; SI = 0.914) prompt a check for redundancy; however, given that AI and SI use only three and four items, respectively, and no inter-item correlation exceeded 0.85, the higher alphas are interpretable as strong consistency rather than tautology, and all items were retained on theoretical grounds (Streiner, 2003). Bivariate correlations were all significant in the expected direction ($r = 0.258$ – 0.789 , $p < 0.01$), confirming nomological validity. Tolerance values exceeded 0.10, and the average variance inflation factor (VIF = 2.50) was well below 10, ruling out problematic multicollinearity (Pallant, 2020). To address common method bias, Harman's single-factor test was performed on all 35 retained items: the first unrotated factor explained 38.8% of the variance, well below the 50% threshold (Podsakoff et al., 2003), suggesting that common method bias is unlikely to materially distort the findings. Table 2 summarizes the correlation, reliability, and collinearity diagnostics.

Table 2: Bivariate correlations, reliability, and collinearity diagnostics.

Var.	ATT	PU	PEOU	AI	SI	BN	IA	PC	Tol.	VIF	α
ATT	—								0.294	3.41	0.876
PU	0.789	—							0.265	3.77	0.877
PEOU	0.638	0.672	—						0.461	2.17	0.865
AI	0.749	0.720	0.588	—					0.350	2.85	0.900
SI	0.273	0.429	0.279	0.290	—				0.699	1.43	0.914
BN	0.383	0.477	0.389	0.403	0.478	—			0.511	1.96	0.817
IA	0.550	0.610	0.586	0.602	0.383	0.651	—		0.375	2.66	0.851
PC	−0.554	−0.577	−0.436	−0.584	−0.276	−0.376	−0.550	—	0.409	2.44	0.799
PPR	−0.363	−0.400	−0.392	−0.356	−0.258	−0.275	−0.423	0.642	0.556	1.80	0.896

All correlations significant at $p < 0.01$. ATT: Attitude; PU: Perceived usefulness; PEOU: Perceived ease of use; AI: Adoption intentions; SI: Social image; BN: Brand name; IA: Information availability; PC: Perceived cost; PPR: Perceived performance risk.

Hypothesis 1: Differences Across User-Experience Subgroups

Two parallel multiple regressions were estimated, namely one for current users ($n = 140$) and one for non-users ($n = 152$), with the eight drivers and three controls predicting adoption intention. Both models were highly significant. The user model explained $R^2 = 0.575$ (adjusted $R^2 = 0.549$) of the variance in AI. The non-user model explained $R^2 = 0.657$ (adjusted $R^2 = 0.638$). Standardized coefficients are reported in Table 3.

Table 3: Split-sample regression results by user experience (DV = adoption intention).

H	Sample	Path	Std. β	t	p	Decision
H1a	Users	ATT $\rightarrow$ AI	0.369	4.212	0.001***	Diff. n.s.
	Non-users		0.340	3.717	0.001***	
H1b	Users	PU $\rightarrow$ AI	0.162	1.620	0.108	Supported
	Non-users		0.329	3.279	0.001***	
H1c	Users	PEOU $\rightarrow$ AI	0.059	0.772	0.442	Diff. n.s.
	Non-users		0.011	0.152	0.879	
H1d	Users	SI $\rightarrow$ AI	0.024	0.363	0.717	Diff. n.s.
	Non-users		-0.035	-0.522	0.603	
H1e	Users	BN $\rightarrow$ AI	-0.129	-1.866	0.067*	Supported
	Non-users		0.051	0.652	0.515	
H1f	Users	IA $\rightarrow$ AI	0.141	1.817	0.072*	Supported
	Non-users		0.122	1.397	0.165	
H1g	Users	PC $\rightarrow$ AI	-0.271	-3.224	0.002***	Diff. n.s.
	Non-users		-0.140	-1.917	0.057*	
H1h	Users	PPR $\rightarrow$ AI	0.110	1.344	0.181	Diff. n.s.
	Non-users		0.061	0.919	0.360	
Users $R^2 = 0.575$ (adj. $R^2 = 0.549$); Non-users $R^2 = 0.657$ (adj. $R^2 = 0.638$). Controls (gender, age group, exercise frequency) included but not shown. "Diff. n.s." = subgroup difference not significant; "Supported" = sub-hypothesis supported on theoretical pattern of significance asymmetry. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Marginally significant effects ($p < 0.10$) are interpreted as suggestive and require replication.						

In summary, H1 is partially supported, where the two groups differ meaningfully on PU, BN, and IA (H1b, H1e, H1f), ATT and PC operate similarly across both (H1a, H1g), and PEOU, SI, and PPR are non-differentiating in this stratification (H1c, H1d, H1h). These conclusions are unpacked accordingly.

Attitude Is the Universal Driver Regardless of Usage

Attitude predicts WAT AI similarly and strongly for both groups ($\beta = 0.369$ for users, 0.340 for non-users; both $p < 0.01$). In practical terms, a one-standard-deviation increase in attitude is associated with roughly a one-third-standard-deviation increase in adoption intention regardless of prior experience. This confirms the TAM's central principle (Davis, 1989; Kim & Shin, 2015) and signals that brand and category sentiment remains the highest-leverage perception to manage across the customer life cycle.

PU drives intention only for non-users ($\beta = 0.329$, $p < 0.01$) and is non-significant for users ($\beta = 0.162$, $p = 0.108$). This asymmetry mirrors Bhattacharjee's (2001) post-acceptance logic. That is, according to this author, usefulness is a discovery cue for first-time consideration but is taken for granted by users whose continuance reflects already-realized effectiveness. This pattern aligns with Bianchi et al. (2022), Chuah et al. (2016), and Park et al. (2016), and qualifies Muller's (2019) earlier non-significant PU finding by showing the effect is conditional on

experience. PC is the only driver to discourage AI for both groups, but with a much stronger effect for users ($\beta = -0.271$, $p < 0.01$) than for non-users ($\beta = -0.140$, $p = 0.057$, marginal). Potentially, experienced users have already calibrated a reference point for accessory costs, subscriptions, and replacement cycles that non-users have not yet developed (Muller, 2022; Shin, 2009; Yang et al., 2016). IA shows a marginal effect for users only ($\beta = 0.141$, $p = 0.072$), suggesting, but not confirming without repeated measures, that hands-on experience sensitizes consumers to the value of richer data access (Edo et al., 2023; Shin, 2007, 2012). BN shows a marginal negative effect for users ($\beta = -0.129$, $p = 0.067$) and is non-significant for non-users. Consistent with Aaker (1991) and Chaudhuri and Holbrook (2001), the brand label appears to lose heuristic value once users have direct product experience to fall back on.

PEOU, SI, and PPR were non-significant for both groups in this stratification, indicating these are not differentiating drivers between users and non-users. Notably, several resurface decisively under brand-preference stratification, suggesting that their effects are conditioned by brand identity rather than by user experience.

Substantively, the model identifies different points of leverage for converting non-users (functional usefulness above all) and retaining users (cost management, brand-experience integration, and richer data access).

Hypothesis 2: Differences Across Brand-Preference Subgroups

Five parallel multiple regressions were estimated, one for each brand preference subgroup (Apple $n = 59$, Fitbit $n = 55$, Garmin $n = 77$, Polar $n = 35$, Samsung $n = 66$). All five models were highly significant ($p < 0.001$). Variance explained ranged from $R^2 = 0.691$ (adjusted $R^2 = 0.617$) for Apple to $R^2 = 0.799$ (adjusted $R^2 = 0.747$) for Fitbit, where corresponding values for Polar, Garmin, and Samsung were 0.734/0.601, 0.757/0.715, and 0.739/0.685, respectively. Standardized coefficients are summarized in Table 4.

Table 4: Split-sample regression results by brand preference (DV = adoption intention).

H	Brand	Path	Std. β	t	p	Pattern
H2a	Apple	ATT $\rightarrow$ AI	0.261	1.783	0.081*	Not differentiating
	Fitbit		0.581	4.475	0.001***	
	Garmin		0.349	5.987	0.004***	
	Polar		0.513	2.276	0.033**	
	Samsung		0.604	5.051	0.001***	
H2b	Apple	PU $\rightarrow$ AI	0.626	4.030	0.001***	Diff. across brands
	Fitbit		-0.014	-0.110	0.913	
	Garmin		0.212	1.599	0.115	
	Polar		0.112	0.421	0.678	
	Samsung		-0.069	-0.443	0.660	
H2c	Apple	PEOU $\rightarrow$ AI	0.082	0.593	0.556	Diff. across brands
	Fitbit		-0.003	-0.034	0.973	
	Garmin		-0.059	-0.586	0.560	
	Polar		-0.220	-0.986	0.335	
	Samsung		0.232	2.195	0.033**	
H2d	Apple	SI $\rightarrow$ AI	-0.049	-0.430	0.669	Not differentiating
	Fitbit		-0.100	-0.904	0.371	
	Garmin		0.085	1.013	0.315	
	Polar		0.168	1.175	0.252	
	Samsung		-0.118	-1.410	0.164	
H2e	Apple	BN $\rightarrow$ AI	-0.067	-0.516	0.608	Diff. across brands
	Fitbit		0.133	1.265	0.213	
	Garmin		-0.235	-2.661	0.010**	
	Polar		0.124	0.663	0.515	

	Samsung		0.108	1.007	0.318	
H2f	Apple	IA → AI	−0.080	−0.528	0.600	Diff. across brands
	Fitbit		−0.039	−0.347	0.730	
	Garmin		0.450	4.325	0.001***	
	Polar		0.267	1.328	0.198	
	Samsung		0.058	0.512	0.611	
H2g	Apple	PC → AI	−0.098	−0.718	0.476	Diff. across brands
	Fitbit		−0.319	−2.846	0.007***	
	Garmin		−0.274	−2.632	0.011**	
	Polar		−0.092	−0.429	0.672	
	Samsung		−0.206	−1.841	0.071*	
H2h	Apple	PPR → AI	0.049	0.404	0.688	Diff. across brands
	Fitbit		−0.084	−0.998	0.324	
	Garmin		0.233	2.284	0.026**	
	Polar		0.008	0.048	0.962	
	Samsung		0.045	0.432	0.667	
Apple R ² = 0.691 (adj. R ² = 0.617); Fitbit R ² = 0.799 (adj. R ² = 0.747); Garmin R ² = 0.757 (adj. R ² = 0.715); Polar R ² = 0.734 (adj. R ² = 0.601); Samsung R ² = 0.739 (adj. R ² = 0.685). Controls (gender, age group, exercise frequency) included but not shown. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Marginally significant effects ($p < 0.10$) are interpreted as suggestive and require replication.						

In summary, six of eight drivers vary meaningfully across brand-preference subgroups (H2b, H2c, H2e, H2f, H2g, H2h supported). Attitude (H2a) and social image (H2d) operate non-differentially.

Attitude is a significant or marginally significant driver for all five brands (Apple $\beta = 0.261$, $p = 0.081$ (marginal); Fitbit 0.581, $p < 0.001$; Garmin 0.349, $p < 0.01$; Polar 0.513, $p < 0.05$; Samsung 0.604, $p < 0.001$). The Samsung and Fitbit attitude coefficients are the largest single-driver effects in either stratification. These findings reaffirm TAM's central proposition across brand contexts and signal attitude as the universal advertising leverage point. PU (the largest single-driver effect in this study) drives adoption strongly for Apple loyalists ($\beta = 0.626$, $p < 0.001$) and is non-significant for the other four brands. Thomas et al. (2025) trace this to Apple's technology-based differentiation strategy, specifically AI-enabled health monitoring and ecosystem integration, which translates directly into perceived functional value, consistent with Krause's (2024) account of ecosystem-driven habituation. PEOU is significant only for Samsung ($\beta = 0.232$, $p < 0.05$). The brand's Galaxy Watch combines cross-platform compatibility with a familiar mobile-style interface, supporting Kim and Shin's (2015) and Kuo and Yen's (2009) finding that interface-driven adoption is most pronounced where the device borrows interaction logic from a known mass-market platform. IA is a strong positive driver only for Garmin loyalists ($\beta = 0.450$, $p < 0.001$), which can be interpreted alongside Garmin's negative BN coefficient below as a "data over label" pattern. BN yields a significant negative coefficient for Garmin ($\beta = -0.235$, $p < 0.05$), is non-significant for Apple, Polar, and Samsung, and approaches a positive effect for Fitbit ($\beta = 0.133$, $p = 0.213$). The negative Garmin sign, which is counterintuitive against the broader brand-equity literature (Aaker, 1991; Dutta et al., 2024; Keller, 1993), can be reconciled. That is, Garmin's identity is built around technical performance rather than lifestyle prestige, and loyal Garmin consumers may discount the brand label precisely because their commitment is anchored in functional precision (captured by IA, $\beta = 0.450$, $p < 0.001$) rather than symbolic brand value.

PPR produces an unexpected positive marginal effect for Garmin loyalists ($\beta = 0.233$, $p < 0.05$). In this regard, higher perceived performance risk is associated with stronger AI rather than weaker AI in this segment. The most plausible interpretation is that Garmin's product positioning, namely performance-grade tools for serious athletes, primes loyal consumers to view 'risk' as a marker of advanced functionality (push-the-limits training, longer battery cycles, sensor-intensive features) rather than as a defect to be avoided. PPR remains non-significant for the other four brands. PC discourages AI for Fitbit ($\beta = -0.319$, $p < 0.01$) and Garmin ($\beta = -0.274$, $p < 0.05$) loyalists and is non-significant for Apple, Polar, and Samsung. The price-insensitivity of premium-positioned Apple and Polar segments (Thomas et al., 2025) is consistent with Aaker's (1991) and Chaudhuri and Holbrook's (2001) prediction that brand

commitment translates into willingness to pay a premium, effectively neutralizing cost as a barrier within these loyal segments. SI is non-significant for every brand, echoing Gowin et al. (2019) and contradicting Yang et al.'s (2016) reported indirect SI–value effect. As such, South African young adults, at least within this Parkrun-engaged sample, do not appear to treat WAT use as a vehicle for peer signaling. WAT brands should accordingly underweight aspirational lifestyle imagery relative to functional capability claims.

IMPLICATIONS AND RECOMMENDATIONS

Theoretical Implications

The study advances the WAT-adoption literature in four ways. First, it shows that an extended TAM yields substantively different driver profiles across user-experience and brand-preference subgroups even after demographic and behavioral controls. The dominant driver of first-time adoption (PU for non-users) is not a significant driver of continued category attachment (where PC and, marginally, IA and BN take over), and the dominant pattern among Apple loyalists (PU-led) differs sharply from Garmin loyalists (IA-led with brand-name discounting) and Samsung loyalists (PEOU-led). This refines the moderation claims often made but rarely tested in the wearable literature (Bhattacharjee, 2001; Venkatesh et al., 2003) by showing precisely where within the model the coefficient asymmetries lie. Second, by integrating brand-equity logic (Aaker, 1991; Keller, 1993; Chaudhuri & Holbrook, 2001) directly into the TAM extension structure, the study bridges two literatures that have largely developed in parallel and demonstrates that brand identity operates as a substantive boundary condition on the technology-adoption process. This includes the counter-intuitive case of brand-name discounting among performance-anchored segments. It also responds to Niknejad et al.'s (2020) call for theoretical bridges between technology-acceptance and brand-equity scholarship.

Third, the study extends prior brand-equity theorizing, which has typically distinguished symbolic from instrumental brand benefits at a category-aggregate level, by showing that within a single product category, different brand identities activate qualitatively different TAM-extension drivers. Notably, Apple's ecosystem identity activates PU, Samsung's interface identity activates PEOU, and Garmin's performance identity activates IA while deactivating the brand-name heuristic. This is an empirical refinement that brand-equity theory in its current form does not predict. Fourth, the non-significance of social image across all brand subgroups in this emerging-market sample qualifies the generalizability of the SI construct and prompts caution against importing it uncritically from mature-market wearable research.

Managerial Implications and Recommendations

The findings translate into a brand-specific and experience-specific playbook around four decision domains routinely owned by advertising and marketing managers, namely positioning, message strategy, channel and partnership, and pricing and promotion. First, brand identity should be reinforced. Apple, Polar, and Samsung loyalists do not respond to brand-name cues (BN n.s.) but respond strongly to functional or experiential drivers. Thus, positioning efforts for these brands are best spent on what the brand does (capability, ecosystem, ease) rather than on brand-equity reinforcement. Garmin's negative BN coefficient is a concrete signal. That is, among Garmin loyalists, brand-label rhetoric appears to be actively counter-productive, and positioning should anchor on data, training precision, and athletic credibility. Second, each brand's advertising creative should emphasize its largest significant driver, informed by Table 5. For example, PU-led functional benefits messaging for Apple ("the watch that closes your rings, monitors your heart, integrates your day") and PEOU-led ease cues for Samsung ("works with your phone, your routine, your life"). Information availability-led data dashboards ("your training, in numbers, every day") will be important for Garmin to communicate, whereas ATT-led emotional brand affinity is best suited for Polar and Fitbit. Social-image and aspirational lifestyle cues like peer admiration and status signaling should be avoided across all brands in this market.

Third, with 86.6% of the sample exercising weekly and 49.3% citing health as their primary motivation, partnership channels with health-engaged communities are the highest-leverage acquisition route. Concrete options include considering Parkrun co-branding, with milestone-based device sponsorship at the 50th, 150th, or 250th run completion, which anchors on Parkrun's existing run-tracking infrastructure. Moreover, medical-aid wellness

programmes analogous to Discovery Vitality with Apple Watch (Discovery, 2025), extended to non-Apple brands, can drive adoption. Additional considerations include gym-chain partnerships in the urban Gauteng/Western Cape catchments where the sample is concentrated and leveraging corporate-wellness B2B contracts that bundle devices with existing health-screening programmes. The 69.7% cost-citation among non-users argues for partnerships that subsidize or instalment-finance the device rather than discount it outright. Last, the cost coefficient pattern provides a defensible per-brand pricing posture. Apple and Polar loyalists are price-insensitive (PC n.s.), meaning both brands can hold premium price ladders and avoid promotional discounting that would erode equity. On the other hand, Fitbit and Garmin loyalists are price-sensitive (PC significant negative), resulting in both brands having to compete on transparent value-for-money. Fitbit can achieve this through promotional ladders and trade-in mechanisms, whereas Garmin can do so through tiered feature bundles that clearly differentiate price points. Samsung's marginal cost-sensitivity argues for occasional promotional support (e.g., Galaxy launch-window bundles with the device and phone) rather than systematic discounting. Brand-specific imperatives, derived directly from the regression evidence, are summarized in Table 5.

Table 5: Brand-specific strategic imperatives derived from regression evidence.

Brand	Significant drivers (β)	Positioning anchor	Message strategy & sample creative cue	Channel & partnership priority	Pricing posture
Apple	PU (0.626***); ATT (0.261*)	Tech-forward health-AI ecosystem.	"Your health, in one tap. Watch + iPhone + Vitality, working as one."	Expand on Discovery Vitality-style health-incentive and iPhone-bundle channels	Hold premium pricing and resist promotional discounting
Garmin	ATT (0.349**); IA (0.450***); BN (-0.235**); PC (-0.274**); PPR (0.233**)	Performance-grade data tools for serious athletes.	"Your training, in numbers, every day." Foreground GPS precision, training-load metrics, longitudinal exports. Avoid logo-led brand creative.	Partner with Parkrun milestone programmes, cycling/triathlon clubs, and endorse coach programmes	Tiered feature bundles, maintain a transparent value ladder, and avoid blanket discounting
Samsung	ATT (0.604***); PEOU (0.232*)	Frictionless interface continuity.	"Works with your phone, your routine, your life." Lead with onboarding ease and Galaxy-ecosystem zero-friction.	Offer Galaxy launch-window bundles, partner with mobile networks, and corporate wellness B2B	Occasional launch-window promotional support
Fitbit	ATT (0.581***); PU (n.s.); PC (-0.319**)	Mass-market value-for-money fitness.	"Track more. Pay less. Trade in your old device."	Demonstrate range in retailers, develop trade-in programmes, and enter into entry-level health partnerships	Active promotional ladders, facilitate trade-in mechanisms, and payment-plan support
Polar	ATT (0.513**)	Premium training credibility.	Athlete and coach-endorsed creative; HR-science narratives. Resist feature-list combat.	Partner with Sport Federations and endorse coaches and HR-science	Hold premium positioning and resist downward price competition
* $p < 0.05$; ** $p < 0.01$. n.s. = non-significant. Drivers included only where significant or theoretically notable.					

Three findings are likely to generalize to other emerging markets with comparable young-adult, health-engaged segments. This includes the PU asymmetry between users and non-users, the universality of attitude as the cross-brand driver, and the brand-identity-conditional activation of TAM extensions, since the underlying brand positioning differences (Apple ecosystem, Garmin performance, etc.) are global. Two findings are plausibly more SA-specific and warrant replication before transfer. The first entails the dominance of perceived cost among value-tier users, which reflects SA's currency-volatility and discretionary-spend constraints (Muller, 2022). The second

comprises the universal non-significance of social image, which may reflect the Parkrun sample's intrinsic-motivation orientation rather than a cultural fact. Comparable replications in Romania (Felea et al., 2021), Malaysia (Chuah et al., 2016), Hong Kong (Cheung et al., 2020), India (Dutta et al., 2024), and South America (Bianchi et al., 2022) (by using the same split-sample architecture and brand subgroups) would clarify which patterns are emerging-market-general and which are SA-particular.

LIMITATIONS AND FUTURE RESEARCH

Five limitations are acknowledged. First, the convenience sample of 292 Parkrun attendees over-represents health-engaged South African youth, and replication with probability-sampled, multi-province samples is warranted. Second, the cross-sectional design captures intention rather than realized behavior, where longitudinal designs could test whether the user-experience asymmetry persists once non-users transition to ownership. Third, retaining a single adoption intention measure across users and non-users introduces conceptual asymmetry (initial adoption versus continuance), treated substantively here but warranting parallel continuance-intention items in future work. Fourth, anchoring on TAM restricts the determinant set, whereas a UTAUT2 specification adding facilitating conditions, hedonic motivation, and habit, and a competing-model nested-statistic comparison, would extend the framework. Fifth, the EFA-based measurement validation should be followed by CFA and full multi-group measurement-invariance testing with sufficient case counts per brand subgroup, especially for Polar ($n = 35$). Sixth, several effects emerged at marginal significance ($p < 0.10$) within subgroups, reflecting the power constraints of split-sample estimation, which warrants replication with larger per-subgroup samples. Future work could expand the brand set to include Amazfit, Coros, Huawei, Xiaomi, Whoop, and Google Pixel.

APPENDIX A: MEASUREMENT ITEMS PER CONSTRUCT

Construct	Items exactly as used in the questionnaire	Source
Attitude (ATT)	Using a wrist-based fitness tracker is a good idea. / I have a generally favorable attitude towards using wrist-based fitness trackers. / I like the idea of using a wrist-based fitness tracker. / Overall, I think using a wrist-based fitness tracker is beneficial.	Kim & Shin (2015); Venkatesh et al. (2003)
Perceived usefulness (PU)	Wrist-based fitness trackers make tracking your activity and training more effective. / Wrist-based fitness trackers help you organize your daily activity and training better. / Wrist-based fitness trackers could increase your productivity. / Using a wrist-based fitness tracker is useful for your general life. / Using a wrist-based fitness tracker helps to improve your physical performance in general. / Using a wrist-based fitness tracker provides useful activity-related information.	Park & Chen (2007); Shin (2007)
Perceived ease of use (PEOU)	Learning to use wrist-based fitness trackers is very simple. / It is extremely easy to be familiarized with the use of wrist-based fitness trackers. / Using wrist-based fitness trackers to measure your activity is easy. / Wrist-based fitness trackers can easily measure your activity. / Using a wrist-based fitness tracker does not require a lot of mental effort.	Kim & Shin (2015); Kuo & Yen (2009)
Adoption intentions (AI)	I will use a wrist-based fitness tracker in the future. / I intend to use a wrist-based fitness tracker as much as possible. / I will strongly recommend others to use a wrist-based fitness tracker.	Kim & Shin (2015); Venkatesh et al. (2003)
Social image (SI)	Wearing a wrist-based fitness tracker makes a good impression on your peers and friends. / Wearing a wrist-based fitness tracker improves one's social image amongst peers and friends. / Wearing a wrist-based fitness tracker gives you social approval. / Wearing a wrist-based fitness tracker helps you feel accepted amongst your peers and friends.	Yang et al. (2016)
Brand name (BN)	A reliable brand name is one of the key factors when choosing a wrist-based fitness tracker. / A reliable brand name reflects the quality of a wrist-based fitness tracker. / There is less risk of being disappointed if you buy a wrist-based fitness tracker with a reliable brand name.	Muller (2019)

Information availability (IA)	Specific information can be accessed directly from a wrist-based fitness tracker at any given time. / Wrist-based fitness trackers can be used to obtain specific activity-related data at any given time. / Wrist-based fitness trackers offer you a sense of real-time connectedness. / Wrist-based fitness trackers offer immediate, timely access to activity-related information.	Shin (2007, 2012)
Perceived cost (PC)	Wrist-based fitness trackers are a waste of money. / Wrist-based fitness trackers are too expensive. / Wrist-based fitness trackers do not offer good value for money. / Wrist-based fitness trackers are just an expensive gimmick.	Kim & Shin (2015); Shin (2009)
Performance risk (PPR)	I am concerned that wrist-based fitness trackers do not perform as well as expected. / I am concerned that wrist-based fitness trackers do not provide the level of benefits expected. / I am concerned about the accuracy of wrist-based fitness trackers. / I am concerned that wrist-based fitness trackers do not perform as promised (measuring steps, sleep patterns, heart rate, etc.).	Yang et al. (2016)

Note: All items were rated on a six-point Likert scale (1 = strongly disagree; 6 = strongly agree). Two items (one IA3, one PC2) were removed following Cronbach's alpha-improvement diagnostics.

REFERENCES

- Aaker, D. A. (1991). Managing brand equity: Capitalizing on the value of a brand name. Free Press.
- Adapa, A., Hall, R. H., Smith, S. N., Nah, F. H., & Siau, K. (2018). Factors influencing the adoption of smart wearable devices. *International Journal of Human-Computer Interaction*, 34(5), 399–409. <https://doi.org/10.1080/10447318.2017.1357902>
- Aiken, L. S., & West, S. G. (1991). Multiple regression: Testing and interpreting interactions. Sage.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.
- Azionya, C. M., & Overton-de Klerk, N. (2021). The development of a brand perception instrument for South African youth. *Journal for Community Communications and Information Impact*, 26, 33–52. <https://dx.doi.org/10.18820/24150525/Comm.v26.3>
- Bhattacharjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly*, 25(3), 351–370.
- Bianchi, C., Tuzovic, S., & Kuppelwieser, V. (2022). Investigating the drivers of wearable technology adoption for healthcare in South America. *Information Technology and People*, 36(2), 916–939. <https://doi.org/10.1108/ITP-01-2021-0049>
- Chaudhuri, A., & Holbrook, M. B. (2001). The chain of effects from brand trust and brand affect to brand performance: The role of brand loyalty. *Journal of Marketing*, 65(2), 81–93.
- Cheung, M. L., Leung, W. K., & Chan, H. (2020). Driving healthcare wearable technology adoption for Generation Z consumers in Hong Kong. *Young Consumers*, 22(1), 10–27. <https://doi.org/10.1108/yc-04-2020-1123>
- Choi, J., & Kim, S. (2016). Is the smartwatch an IT product or a fashion product? A study on factors affecting the intention to use smartwatches. *Computers in Human Behavior*, 63, 777–786. <https://doi.org/10.1016/j.chb.2016.06.007>
- Chuah, S. H.-W., Rauschnabel, P. A., Krey, N., Nguyen, B., Ramayah, T., & Lade, S. (2016). Wearable technologies: The role of usefulness and visibility in smartwatch adoption. *Computers in Human Behavior*, 65, 276–284. <https://doi.org/10.1016/j.chb.2016.07.047>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum.

- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Discovery. (2025). Vitality Active Rewards with Apple Watch. <https://www.discovery.co.za/vitality/apple-watch>
- Dutta, A., Kovid, R., Drave, V. A., & Bhatia, M. S. (2024). Internet of Things adoption: Unpacking the role of perceived brand credibility. *Global Knowledge, Memory and Communication*, 1–18. <https://doi.org/10.1108/GKMC-05-2023-0160>
- Edo, O. C., Ang, D., Etu, E., Tenebe, I., Edo, S., & Diekola, O. A. (2023). Why do healthcare workers adopt digital health technologies? *International Journal of Information Management Data Insights*, 3(2), 100186. <https://doi.org/10.1016/j.jjimei.2023.100186>
- Felea, M., Bucur, M., Negruțiu, C., Nițu, M., & Stoica, D. A. (2021). Wearable technology adoption among Romanian students: A structural model based on TAM. *Amfiteatru Economic*, 23(57), 376–391. <https://doi.org/10.24818/EA/2021/57/376>
- Field, A. (2018). *Discovering statistics using IBM SPSS Statistics* (5th ed.). Sage.
- Gao, S., Zhang, X., & Peng, S. (2016). Understanding the adoption of smart wearable devices to assist healthcare in China. In Y. K. Dwivedi et al. (Eds.), *Social media: The good, the bad, and the ugly*. I3E 2016 (Vol. 9844, pp. 280–291). Springer. https://doi.org/10.1007/978-3-319-45234-0_26
- Gowin, M., Wilkerson, A., Maness, S., Larson, D. J., Crowson, M., Smith, M., & Cheney, M. K. (2019). Wearable activity tracker use in young adults through the lens of social cognitive theory. *American Journal of Health Education*, 50, 40–51. <https://doi.org/10.1080/19325037.2018.1548314>
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning.
- Huang, S.-C., Liao, S.-H., Wang, Y.-N., & Lin, J.-J. (2017). Information availability and adoption of digital health services. *Telematics and Informatics*, 34(7), 1213–1222.
- Hwang, C. G. (2016). Consumers' acceptance of wearable technology: Antecedents in a technology acceptance model. *International Textile and Apparel Association*, 72(1), 1–2.
- Jeong, S. C., Kim, S. H., Park, J. Y., & Choi, B. (2017). Domain-specific innovativeness and new product adoption: A case of wearable devices. *Telematics and Informatics*, 34(5), 399–412. <https://doi.org/10.1016/j.tele.2016.09.001>
- Kalantari, M. (2017). Consumers' adoption of wearable technologies: Literature review, synthesis, and future research agenda. *International Journal of Technology Marketing*, 12(3), 274–307. <https://doi.org/10.1504/IJTMKT.2017.10008634>
- Keller, K. L. (1993). Conceptualizing, measuring, and managing customer-based brand equity. *Journal of Marketing*, 57(1), 1–22.
- Kim, K. J., & Shin, D. H. (2015). An acceptance model for smart watches. *Internet Research*, 25(4), 527–541. <http://dx.doi.org/10.1108/IntR-05-2014-0126>
- Krause, C. (2024). Case study: Apple's ecosystem strategy. The CDO Times. <https://cdotimes.com/2024/11/21/case-study-apples-ecosystem-strategy/>
- Kuo, Y. F., & Yen, S. N. (2009). Towards understanding of the behavioural intention to use 3G mobile value-added services. *Computers in Human Behavior*, 25(1), 103–110. <https://doi.org/10.1016/j.chb.2008.07.007>

- Lunney, A., Cunningham, N. R., & Eastin, M. S. (2016). Wearable fitness technology: A structural investigation into acceptance and perceived fitness outcomes. *Computers in Human Behavior*, 65, 114–120. <https://doi.org/10.1016/j.chb.2016.08.007>
- Malhotra, N. K., Birks, D. F., & Wills, P. (2012). *Marketing research: An applied approach* (4th ed.). Pearson Education.
- Morton, L. P. (2002). Targeting Generation Y. *Public Relations Quarterly*, 47(2), 46–48.
- Muller, C. (2019). Generation Y students' attitude towards and intention to use activity-tracking devices [PhD dissertation]. North-West University, South Africa.
- Muller, C. (2022). South African millennial consumers' adoption of wearable activity trackers: Extending the technology acceptance model. *African Journal for Physical Activity and Health Sciences*, 28(4), 275–298. <https://doi.org/10.37597/ajphes.2022.28.4.1>
- Nasir, S., & Yurder, Y. (2015). Consumers' and physicians' perceptions about high-tech wearable health products. *Procedia — Social and Behavioral Sciences*, 195, 1261–1267. <https://doi.org/10.1016/j.sbspro.2015.06.279>
- National Department of Health. (2020). *National Digital Health Strategy for South Africa 2019 – 2024*. <https://www.health.gov.za/wp-content/uploads/2020/11/national-digital-strategy-for-south-africa-2019-2024-b.pdf> p. 22.
- Niknejad, N., Ismail, W. B., Mardani, A., Liao, H., & Ghani, I. (2020). A comprehensive overview of smart wearables: The state of the art literature, recent advances, and future challenges. *Engineering Applications of Artificial Intelligence*, 90, 103529. <https://doi.org/10.1016/j.engappai.2020.103529>
- Pallant, J. (2020). *SPSS survival manual* (7th ed.). McGraw-Hill Education.
- Pangarkar, T. (2025). Fitness tracker statistics 2025. Market US. <https://www.news.market.us/fitness-tracker-statistics/>
- Park, Y., & Chen, J. V. (2007). Acceptance and adoption of the innovative use of smartphone. *Industrial Management & Data Systems*, 107(9), 1349–1365. <https://doi.org/10.1108/02635570710834009>
- Park, E., Kim, K. J., & Kwon, S. J. (2016). Understanding the emergence of wearable devices as next-generation tools for health communication. *Information Technology & People*, 29, 717–732. <https://doi.org/10.1108/ITP-04-2015-0096>
- Parkrun. (2025). Home page. <https://www.parkrun.co.za/>
- Phonthanukitithaworn, C., Sellitto, C., & Fong, M. W. L. (2015). A study of mobile payment (M-Payment) services adoption in Thailand. *Encyclopedia of Information Science and Technology*, (3), 731–741. <https://doi.org/10.4018/978-1-4666-5888-2.ch070>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research. *Journal of Applied Psychology*, 88(5), 879–903.
- Rauschnabel, P. A., & Ro, Y. (2016). Augmented reality smart glasses: An investigation of technology acceptance drivers. *International Journal of Technology Marketing*, 11(2), 123–148. <https://dx.doi.org/10.1504/IJTMKT.2016.075690>
- Rawal, J. (2025). Fitness tracker market: Key insights. Fortune Business Insights. <https://www.fortunebusinessinsights.com/fitness-tracker-market-103358>
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.

- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037//0003-066x.55.1.68>
- Shin, D. (2007). User acceptance of mobile internet. *Interacting with Computers*, 19(4), 472–483. <https://doi.org/10.1016/j.intcom.2007.04.001>
- Shin, D. (2009). Determinants of customer acceptance of multi-service network. *Information & Management*, 46(1), 16–22. <https://doi.org/10.1016/j.im.2008.05.004>
- Shin, D. (2012). What makes consumers use VoIP over mobile phones? *Telecommunications Policy*, 36, 311–323. <https://doi.org/10.1016/j.telpol.2012.01.004>
- Statista. (2025). Fitness trackers — South Africa. <https://www.statista.com/outlook/hmo/digital-health/digital-fitness-well-being/fitness-trackers/south-africa>
- Streiner, D. L. (2003). Starting at the beginning: An introduction to coefficient alpha and internal consistency. *Journal of Personality Assessment*, 80(1), 99–103.
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Pearson.
- Thomas, R., Singh, L., & Prajapati, S. (2025). Market strategies for fitness trackers: A comparative study. *International Journal for Research Trends and Innovation*, 10(3), 386–396. <https://www.doi.org/10.56726/IRJMETS71032>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>
- Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory. *MIS Quarterly*, 36(1), 157–178. <https://doi.org/10.2307/41410412>
- Wang, Z., Fang, D., Liu, X., Zhang, L., Duan, H., Wang, C., & Guo, K. (2023). Consumer acceptance of sports wearables: The role of product attributes. *SAGE Open*, 13(3). <https://doi.org/10.1177/21582440231182653>
- Wu, C., & Lim, G. G. (2024). Investigating older adults' willingness to adopt wearable devices: Integrating UTAUT2 and Technology Readiness Index. *Frontiers in Public Health*, 12, 1449594.
- Wu, J. H., & Wang, S. C. (2005). What drives mobile commerce? *Information and Management*, 42(5), 719–729. <https://doi.org/10.1016/j.im.2004.07.001>
- Yang, H., Yu, J., Zo, H., & Choi, M. (2016). User acceptance of wearable devices: An extended perspective of perceived value. *Telematics and Informatics*, 33(2), 256–269. <https://doi.org/10.1016/j.tele.2015.08.007>

XR SPORTS AND FITNESS GAMING IN THE WORKPLACE: THE STRATEGIC IMPORTANCE OF DIRECT EXPERIENCE IN SHAPING PERCEPTIONS

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ABSTRACT

Workplace wellness initiatives have traditionally focused on mental health, with physical wellness remaining underdeveloped despite robust evidence linking regular physical activity to improved employee outcomes. Extended reality sports and fitness (XR S/F) gaming offers an immersive, gamified solution to bridge this gap, but its workplace implementation lacks empirical validation, particularly regarding how direct experience shapes user perceptions. Grounded in an integrative theoretical lens combining the Technology Acceptance Model, Unified Theory of Acceptance and Use of Technology, Experiential Learning Theory, Self-Determination Theory, and Social Cognitive Theory, this study examined whether and to what extent university employees differ across 11 wellness- and adoption-related variables based on direct experience playing XR S/F games. A quantitative, descriptive design was applied, with data collected from 104 employees (n = 54 experienced; n = 50 non-experienced) at two South African universities using a 43-item structured survey administered at organized XR gaming events and the online employee portal. Independent samples t-tests with Cohen's d revealed statistically significant differences favoring the experienced group on nine of ten retained variables, with the largest effects on gaming intentions (d = 0.677), entertainment value (d = 0.593), employee wellness index (d = 0.541), and perceived technology availability (d = 0.509). Perceived usefulness emerged as the sole non-significant differentiator (p = 0.194). These findings position XR S/F gaming as an experience-dependent technology where affective and behavioral responses drive adoption and not cognitive evaluations alone. Adoption barriers stem primarily from infrastructure access constraints rather than employee skepticism, with critical implications for organizational investment, wellness programme design, and emerging-market workplace innovation.

Keywords: extended reality (XR), sports and fitness gaming, employee well-being, experience, perceptions.

INTRODUCTION AND PROBLEM STATEMENT

Growing global awareness of mental health has prompted organizations to implement workplace interventions such as workshops, campaigns, and counselling services, which have been linked to improved productivity, engagement, and reduced absenteeism and turnover (Dhanpat et al., 2025). As the concept of holistic well-being gains traction, it is increasingly recognized that employee wellness extends beyond mental health to include emotional and physical dimensions. Despite strong evidence linking physical activity to improved mental health outcomes, many organizations continue to underinvest in accessible, workplace-based physical wellness solutions (World Health Organization, 2024).

This gap is particularly concerning given that employees spend a substantial portion of their time at work, limiting opportunities for regular exercise. While traditional initiatives exist, they are often infrequent and insufficient to drive sustained behavioral change, contributing to persistently high levels of physical inactivity and declining workplace well-being. Several sources emphasize that regular movement at work can improve mood, sleep, and overall quality of life, while reducing stress, anxiety, depression, and non-communicable diseases (Conn et al., 2009; Mahindru et al., 2023; Dhanpat et al., 2025). Whether companies are cognizant of the value proposition of regular movement at work or not, many do not provide on-site facilities, have on-site facilities undermined by poor organizational culture, or offer activity-based outings only once per quarter or annually.

Beyond the well-documented benefits of physical activity for mental health (Pascoe et al., 2020; Singh et al., 2023; Mahindru et al., 2023), accumulating evidence demonstrates a direct link between workplace physical activity interventions and measurable productivity gains. In this regard, industry reporting (e.g., the TELUS Mental Health Index) suggests that physically active workers lose substantially fewer productivity days annually than their sedentary counterparts (Allen, 2025). Despite this clear value proposition, traditional workplace physical activity interventions face persistent challenges, including low sustained participation, limited scalability, and dependence on dedicated facilities or scheduled time away from work (Garne-Dalgaard et al., 2019). These barriers are particularly acute in emerging markets, where resource constraints often limit the feasibility of conventional wellness infrastructure.

Recent technological advancements, particularly in extended reality (XR), present a novel opportunity to address these challenges through immersive and gamified sports and fitness (S/F) experiences (Muller & Bonnema, 2025; Litesport, 2024). For context, XR S/F gaming is defined as: "virtual video-based gaming, requiring respondents to use full-body movements to compete in recreational and competitive virtual and digital environments integrated with an application/game and specialized equipment (active play technologies (APT)) while simultaneously being able to track their progress and interact with respondents worldwide" (Muller & Bonnema, 2025). Figure 1 illustrates this gaming format with respective examples of simulated cycling (e.g., Zwift, MyWhoosh, Rouvy), virtual running (e.g., MyWhoosh, Zwift, Kinomap), and sports played using virtual reality (VR) headsets (e.g., available on Meta Horizon, PICO Store, Apple Vision via Apple App Store). However, the scope goes beyond these three formats. It includes strength training solutions like SymGym, virtual rowing (EXR, Row XR, MyWhoosh, Kinomap), and various VR sports/fitness games across multiple disciplines, such as combat sports (Virtual Taekwondo, Creed Ride to Glory, and Thrill of the Fight boxing), circuit training (Les Mills Body Combat, Tae Bo X-Fitness), dancing (Just Dance, Synth Riders) and most traditional sports (i.e., tennis, golf, basketball, baseball, football, track & field).

Figure 1: XR Sports and Fitness gaming visualized.



Source: Image generation via ChatGPT. ©POWERHub; School of Management Sciences, NWU. Access the prompt and original visuals [here](#).

These XR platforms have the potential to enhance employees' engagement, accessibility, and motivation. However, their implementation in workplace settings remains largely unexplored and lacks empirical validation. Importantly, technology adoption research demonstrates that user perceptions, particularly perceived ease of use, usefulness, and behavioral intention, are significantly shaped by direct interaction with the technology rather than pre-use assumptions (Davis, 1989; Venkatesh et al., 2003). For organizations, especially in resource-constrained and emerging-market contexts, investment in XR technologies requires robust, evidence-based justification rather than reliance on speculative benefits. Understanding perceptual differences between employees with and without direct XR S/F gaming experience is, therefore, critical, as it enables stakeholders to determine whether adoption barriers stem from misperceptions, lack of exposure, or structural constraints such as limited access. By providing empirical insight into these differences, this study supports informed decision-making regarding technology investment, optimizes implementation strategies, and reduces uncertainty in adopting XR-based workplace interventions.

To the authors' knowledge, this investigation is among the first to systematically examine perceptual variance between experienced and non-experienced users in the specific context of workplace wellness, directly addressing a significant gap in both the XR adoption and occupational health literatures.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Workplace Wellness and Technology-Facilitated Physical Activity Interventions

Prior research has consistently shown that workplace physical activity interventions improve mood, productivity, and engagement while reducing absenteeism (Conn et al., 2009; Mahindru et al., 2023). Then again, conventional interventions face limitations of scale, engagement, sustained participation, and infrastructure dependence. Emerging research on technology-facilitated wellness in the workplace suggests that Immersive Virtual Reality Exercise Training Systems (Touloudi et al., 2022) and VR Game Studios (Yoo et al., 2020) are favored by office workers, who achieved valuable levels of physical activity and mood benefits with increased intention for future use. VR-based mindfulness and relaxation interventions have likewise demonstrated significant improvements in employee affective states, including stress/tension reduction, enhanced emotions, and mental clarity, following direct in-workplace exposure (Michinov et al., 2024; Trusculescu et al., 2026). Yet these studies have largely focused on isolated physiological or psychological outcomes using smaller qualitative samples, rather than examining a broader, theoretically integrated set of perceptual constructs simultaneously, with insights from a quantitative sample. The present study addresses this gap by deploying an unexplored eleven-factor framework that integrates technology acceptance, motivational, and outcome-expectation constructs in a single analytical structure.

Theoretical Underpinnings

Given the novelty of this investigation, the study adopts an integrative theoretical lens, combining the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) with Experiential Learning Theory, Self-Determination Theory, and Social Cognitive Theory to explain how direct experience with XR S/F gaming shapes user perceptions, motivations, and behavioral intentions in workplace contexts.

TAM, originally developed by Davis (1989), posits that perceived ease of use (PEOU) and perceived usefulness (PU) are the main drivers of users' attitudes toward a technology and, consequently, their behavioral intentions to use it. In the present context, PEOU captures employees' assessments of how effortlessly they can engage with the necessary hardware and software (e.g., put on a headset, navigate menus, select games), while PU reflects beliefs about the technology's effectiveness in improving physical health and overall well-being. Conversely, Venkatesh et al.'s (2003) UTAUT extends the TAM by integrating additional determinants, including social influence and facilitating conditions, and moderators such as age, gender, and experience. UTAUT's emphasis on experience as a moderating variable is particularly relevant to this investigation, as it directly supports the core premise that users with direct exposure to a technology will exhibit systematically different perceptions and usage intentions compared to those without such exposure. The Experiential Learning Theory (ELT) (Kolb, 1984) posits that learning occurs through a cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation. In this study, this implies that direct experience with XR S/F gaming enables employees to progress through this cycle, thereby moving from merely understanding the concept of immersive physical activity to forming authentic attitudes and intentions based on lived experience. Thus, perceptions ought to differ based on user experience.

Deci and Ryan (1985), who developed the Self-Determination Theory (SDT), posit that intrinsic motivation is sustained when three basic psychological needs are met, namely autonomy, competence, and relatedness. Contextually, XR S/F gaming inherently addresses these needs by offering employees autonomy in selecting applications or games, opportunities to develop competence through progressive challenges and performance feedback, and capacity for relatedness based on physical or mental wellness needs. The inclusion of constructs such as entertainment value, diversion (escapism), and the employee wellness index in the present study is directly informed by SDT's emphasis on enjoyable, need-satisfying experiences as drivers of volitional engagement. The Social Cognitive Theory (SCT) (Bandura, 1986) underscores the importance of self-efficacy, which in this study's context implies that employees who have successfully played XR sports games (enactive mastery) develop stronger beliefs in

their ability to use the technology effectively, which in turn fosters more positive attitudes and stronger intentions to engage regularly. The removal of the technology self-efficacy construct from this study's final analysis due to unsatisfactory reliability ($\alpha = 0.519$) is an important methodological consideration discussed in the limitations section but does not diminish the theoretical relevance of this construct. SCT also supports the inclusion of expected physiological changes (EPHC) and expected exercise endurance improvement (EEEE) as cognitive outcome expectations that drive motivated behavior.

Conceptual Framework: An Integrated Eleven-Factor Framework

The integration of these five theoretical frameworks culminates in an eleven-factor conceptual framework uniquely applied to the workplace wellness context. The 11 variables measured in the model include attitude towards XR S/F gaming (TAM/UTAUT), gaming intentions (behavioral intention; TAM/UTAUT), perceived ease of using XR technologies to play sports (PEOU; TAM/UTAUT), perceived usefulness of XR S/F gaming for enhancing physical activity and health (PU; TAM/UTAUT), users' self-efficacy of using XR technology to play XR S/F games (self-efficacy; SCT), entertainment value of playing these games (intrinsic motivation; SDT), escapism probability when engaging with XR S/F games (diversion/relatedness; SDT and SCT), perceived availability of XR technology in the workplace (facilitating conditions; UTAUT), the employee wellness index (outcome expectation; SCT), expected physiological changes (outcome expectation; SCT), and expected exercise endurance improvement (outcome expectation; SCT). Measurement items for each construct were adapted from validated scales in prior technology acceptance and exercise psychology literature (Davis, 1989; Venkatesh et al., 2003), although it is important to note that this specific configuration of constructs has not been previously validated for XR-based workplace wellness interventions.

Research Gap and Primary Objective

To the authors' knowledge, no prior study has systematically measured these eleven perceptual variables in direct comparison between employees with and without direct XR S/F gaming experience within a workplace wellness context. While isolated studies have examined technology acceptance of VR exergames in recreational or office settings (Touloudi et al., 2022; Sun & Ke, 2024) or workplace VR-based mindfulness interventions (Michinov et al., 2024; Trusculescu et al., 2026), none of these studies have integrated TAM, UTAUT, and, to some extent, ELT, SDT, and SCT into a unified framework applied specifically to employee wellness programming. This investigation thus represents a novel empirical contribution by providing baseline evidence on how direct experience shapes perceptions of XR S/F gaming as a viable workplace wellness tool, which is a measurement seldom, if ever, undertaken in either the workplace wellness or XR gaming literature. Accordingly, the primary objective of this study was to determine whether university employees' perceptions, in terms of the mean scores for the 11 variables, differ significantly based on direct experience playing XR S/F gaming or not.

The core objective of this study was to determine whether university employees' perceptions, in terms of the mean scores for the 11 variables, differ significantly based on direct experience playing XR Sports and Fitness Gaming or not

METHODOLOGY

Research Approach and Design

A quantitative approach and descriptive research design guided this study, supporting the comparative analysis of perceptual mean scores across two independent groups (employees with and without direct XR S/F gaming experience).

Population and Sampling

Data were collected from a non-probability purposive sample of 104 employees, aged between 18 and 65 years, affiliated with a Traditional University and a University of Technology spread across four campuses in two provinces, namely the Gauteng and North-West provinces of South Africa.

Measurement Instrument

Respondents completed a structured digital survey (MS Forms) that captured demographic and background information, followed by the perception measurement instrument. The latter section comprised the 11 variables in the conceptual model, where respondents had to note their degree of agreement for 43 items, measured on a six-point Likert scale (strongly disagree - strongly agree). The survey had a cover letter explaining the scope and purpose of the study and had a visual depiction of XR S/F gaming and its definition to ensure informed responses. Conditions of completion were the acknowledgment of the informed consent statement, the assurance that no personally identifiable information was collected, thereby ensuring anonymity, and that the respondent could withdraw at any stage.

Data Collection Procedure

The author leads a sports and fitness gaming research hub that hosts sessions for staff across universities in South Africa. For this study, several events were hosted starting in March 2025, which consisted of gaming stations illustrated in Figure 1. These events were integrated into wellness days, strategic sessions, functions or offered on an ad-hoc basis, for which staff typically registered in advance. The author liaised with the two universities' wellness specialists on each campus, who served as participant recruitment tools and mediators. Events comprised interaction with staff across these four campuses, where staff could voluntarily participate in XR games on a walk-in basis. Following each interaction, the participant received a printout with the study brief and a QR code to the survey, thereby requesting them to complete it when convenient, without coercion. Additionally, the author requested that the organizers distribute the digitized version of the printout to all registered staff, who would then, as the mediator, request them to complete the survey regardless of participation (experience). This approach ensured the collection of data not only from staff who had played XR games. Data were only collected once the questionnaire was approved by the university's Ethics Committee of the Faculty of Economic and Management Sciences (EMS-REC).

Data Analysis

The MS Form questionnaire allows for the automated data extraction in Excel format, which was imported to SPSS v31 following the coding and cleaning process. The data were analyzed using this statistical package, starting with outlier removal (Mahalanobis distance test), frequency analysis, exploratory factor analysis, reliability analysis, descriptive statistics, and an independent-samples t-test with Cohen's d to report the outcomes and effect sizes. Following Hair et al. (2019), effects are reported at three tiers, namely $p < 0.01$, $p < 0.05$, and $p < 0.10$, with effects at $p < 0.10$ interpreted as marginally significant and treated as suggestive rather than conclusive.

RESULTS AND DISCUSSION

Sample Profile and Demographic Characteristics

At the time of this analysis, the study obtained 127 valid responses, and following outlier removal, the study concluded with 104. In terms of demographics, the sample comprised more females (76.9%) than males (23.1%), with varied representation across age groups, most being in their 30s and 40s. There was an almost equal split between roles, namely, 44.2% are academic staff, whereas 55.8% are support staff. Understanding the potential positioning of XR S/F gaming in the employee wellness context required reporting staff's motives for attending wellness days to begin with. In this regard, a combined two-thirds of the sample reported attending wellness days to improve their physical health (34.6%) or to reduce stress and relax (29.8%). These findings not only substantiate the inclusion of specific variables in the model (i.e., escapism, employee wellness index, expected physiological changes, and expected exercise endurance improvement) but also validate the positioning of XR S/F gaming as a novel introduction into

wellness programmes. This is particularly relevant when considered alongside industry evidence linking physical inactivity to substantial productivity losses (Allen, 2025). Crucially, the sample achieved near-equal distribution between employees with direct XR S/F Gaming experience (n = 54) and those without (n = 50), supporting independent samples t-test analysis. Group sizes exceeding 30 support stable estimation under the Central Limit Theorem (Kwak & Kim, 2017), and a post hoc power analysis indicated sufficient statistical power (≥ 0.80) to detect medium effect sizes where $d = 0.5$ (Cohen, 1988).

Factor Structure and Reliability

The 43-item dataset was reduced to 38 items following the removal of an entire construct and two items, namely ATT2 (attitude) and PTA5 (perceived technology availability), since these two items adversely affected construct validity and reliability. Technology self-efficacy returned an unsatisfactory Cronbach's alpha value of $\alpha = 0.519$ (< 0.70) and was excluded from further analysis. The ten remaining variables returned alpha values between $\alpha = 0.878$ and 0.966 , indicating strong internal consistency. The exclusion of self-efficacy, originally drawn from SCT (Bandura, 1986), warrants methodological reflection. For instance, the items employed may not have adequately captured the construct as experienced by this population, possibly due to phrasing or alignment with respondents' mental models of "using XR technology to play sports." This is taken up in the limitations.

Independent Samples T-Test Findings

As Table 1 outlines, the group with direct experience reports mean values ($\bar{x}$) above 5.0 for all factors except for perceived technology availability ($\bar{x} = 3.39$). The mean values for the other nine variables range between 5.17 for perceived ease of use, with the highest mean score assigned to entertainment value ($\bar{x} = 5.62$). For the non-experienced group (n = 50), mean scores were consistently lower, ranging from 2.68 (perceived technology availability) to 5.25 (attitude).

Table 1: Independent samples t-test findings.

Factor	Full sample n=104		Experienced n=54		Not experienced N=50		E→N.E Difference	Sig. p-value	Effect size Cohen's d
	Mean	SD	Mean	SD	Mean	SD	Mean		
ATT	5.42	0.76	5.59	0.58	5.25	0.89	0.34	0.022**	0.458
GI	5.01	1.06	5.33	0.71	4.65	1.25	0.68	0.001***	0.677
PEOU	5.00	0.78	5.18	0.64	4.81	0.87	0.37	0.016**	0.480
PU	5.16	0.75	5.25	0.69	5.06	0.81	0.19	0.194	0.257
EV	5.42	0.78	5.63	0.56	5.19	0.91	0.44	0.003***	0.593
DIV	5.30	0.74	5.42	0.63	5.16	0.82	0.26	0.070*	0.359
TA	3.05	1.44	3.39	1.41	2.68	1.40	0.71	0.011**	0.509
EWI	5.23	0.80	5.43	0.65	5.01	0.89	0.42	0.007***	0.541
CPH	5.33	0.73	5.41	0.65	5.25	0.80	0.16	0.244	0.230
CEEA	4.40	1.12	4.58	1.12	4.20	1.09	0.38	0.083*	0.344
EPHC	5.12	0.82	5.29	0.68	4.93	0.91	0.36	0.022**	0.457
EEEI	5.04	0.79	5.20	0.67	4.85	0.86	0.35	0.023**	0.451

Statistically significance: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Of particular note, even respondents without prior gaming experience exhibited relatively positive attitudes ($\bar{x} = 5.25$) and perceived usefulness ($\bar{x} = 5.06$), suggesting that baseline skepticism towards XR S/F gaming is not rooted in fundamental rejection of its potential benefits. Prior research on workplace exergame acceptance has similarly documented favorable pre-exposure attitudes, though typically with lower baseline scores than those observed in the current study (Chu et al., 2018; Touloudi et al., 2022). Significant differences were observed for all variables in favor of the group with direct experience, except for the perceived usefulness of XR S/F gaming ($p = 0.194$; $p > 0.05$). This finding carries important theoretical implications, such as that employees, regardless of direct experience, already recognize the utility of XR S/F gaming for enhancing physical activity and health. The cognitive, utilitarian evaluation of XR S/F gaming therefore does not appear to depend on direct exposure. This aligns with Davis's (1989) original demonstration that PU often predicts intentions even without hands-on experience, and with

Sun and Ke (2024), who report that VR exergames are widely perceived as useful for health promotion regardless of prior exposure. The practical implication is that messaging campaigns emphasizing the health benefits of XR S/F gaming are likely to be effective even before employees have tried the technology.

The largest and most statistically robust differences emerged for gaming intentions (GI: $\bar{x}_{\text{exp}} = 5.33$ vs. $\bar{x}_{\text{non-exp}} = 4.65$; $p = 0.001$; $d = 0.677$), entertainment value (EV: 5.63 vs. 5.19; $p = 0.003$; $d = 0.593$), employee wellness index (EWI: 5.43 vs. 5.01; $p = 0.007$; $d = 0.541$), and perceived technology availability (TA: 3.39 vs. 2.68; $p = 0.011$; $d = 0.509$). The medium-to-strong effect on GI directly supports UTAUT's proposition that experience moderates the relationship between attitudes and behavioral intention (Venkatesh et al., 2003). The EV finding underscores that direct experience uncovers affective, enjoyment-based dimensions of XR engagement that are not fully appreciated through passive observation, consistent with SDT's emphasis on intrinsic motivation and enjoyment as drivers of sustained engagement (Deci & Ryan, 1985; Edmunds et al., 2006). The EWI finding indicates that experiencing XR S/F gaming first-hand strengthens beliefs about its capacity to improve emotional well-being, paralleling the affective improvements observed in workplace VR-based mindfulness and relaxation interventions (Michino et al., 2024; Trusculescu et al., 2026). While both groups rated availability (TA) below the scale midpoint, the significant difference suggests direct exposure heightens awareness of, and by extension, the demand for XR resources. The consistently low absolute ratings ($\bar{x}$ 2.68–3.39) signal a structural barrier irrespective of experience. For instance, employees do not perceive XR S/F gaming as readily accessible in their workplace, which aligns with the broader UTAUT literature on facilitating conditions as critical adoption determinants (Venkatesh et al., 2003).

A second tier of effects of medium practical importance was observed for perceived ease of use (PEOU: 5.18 vs. 4.81; $d = 0.480$), attitude (ATT: 5.59 vs. 5.25; $d = 0.458$), expected physiological changes (EPHC: 5.29 vs. 4.93; $d = 0.457$), and expected exercise endurance improvement (EEEI: 5.20 vs. 4.85; $d = 0.451$). The PEOU result suggests that while direct experience enhances perceptions of usability, baseline expectations about XR ergonomics are already reasonably favorable. This possibly reflects growing consumer familiarity with VR/AR devices in non-work contexts and contrasts with earlier TAM studies in which PEOU exhibited stronger experience-dependent shifts (Venkatesh et al., 2003). The ATT finding confirms that direct experience consolidates and strengthens positive attitudes, consistent with Kolb's (1984) premise that concrete experience transforms abstract beliefs into affective commitments. EPHC and EEEI both speak to the role of direct experience in calibrating outcome expectations, which is a core mechanism in SCT (Bandura, 1986), where enactive mastery strengthens beliefs about the positive consequences of a behavior. Finally, diversion (DIV: 5.42 vs. 5.16; $p = 0.070$; $d = 0.359$) was marginally significant, suggesting that the psychological need for escape and mental detachment from work appears to be recognized both with and without direct experience, although exposure modestly enhances it.

It is important to position these findings against prior studies that have predominantly relied on regression and structural modelling techniques to predict adoption, such as Huang et al. (2021) and Sun and Ke (2024). The present analysis is deliberately confined to t-test mean comparisons, which trade predictive complexity for clarity in detecting whether direct experience yields measurably different perceptions across groups. While regression-based studies provide insight into the relative weight of individual antecedents, the comparative t-test design adopted here offers a more precise estimate of the experience dividend, particularly the uplift in favorable perceptions attributable to direct hands-on engagement, which is more actionable for wellness programme design.

The Strategic Importance of Direct Experience

Collectively, this study's findings provide robust evidence for the strategic importance of direct experience in shaping perceptions of XR S/F gaming in the workplace wellness context. While employees broadly recognize the usefulness of XR-based physical activity interventions, direct experience is necessary to realize the technology's full experiential and motivational potential. Significant medium-to-strong effects on gaming intentions, entertainment value, employee wellness, and attitudes indicate that adoption decisions based solely on informational campaigns or vicarious observation would systematically undervalue the immersive, engaging, and affectively rich properties of XR S/F gaming. Experiential access transforms XR S/F gaming from a rationally acknowledged wellness option ("this seems useful") into a personally valued and behaviorally intended wellness practice ("I want to do this"). This outcome is consistent with the integrative theoretical lens employed in this study and largely uninvestigated in this configuration in prior workplace wellness research.

IMPLICATIONS AND RECOMMENDATIONS

Theoretical Implications

The findings yield several theoretical contributions. First, by deploying an eleven-factor framework that integrates TAM, UTAUT, ELT, SDT, and SCT in a single workplace XR study, the research advances a unified conceptualization of experience-driven adoption that has not, to the authors' knowledge, been previously tested in this configuration. Second, the significant differences across nine of ten variables retained in the final measurement empirically corroborate UTAUT's proposition that experience moderates technology adoption-related perceptions (Venkatesh et al., 2003), while the non-significance of PU offers a nuanced qualification. That is, cognitive evaluations of utility may be largely experience-independent, whereas affective and behavioral evaluations are experience-dependent. This reframes XR S/F gaming as an experience-dependent technology, where adoption is driven less by rational utility judgements than by hedonic, motivational, and outcome-expectation responses uncovered through direct play. Third, the moderate-to-strong effect on entertainment value supports SDT's emphasis on enjoyment as a driver of sustained engagement (Deci & Ryan, 1985), while effects on EPHC, EEEL, and EWI substantiate SCT's outcome-expectation construct (Bandura, 1986). Fourth, the unsatisfactory reliability of the technology self-efficacy scale signals that domain-specific item development, which, following Bandura's (1986) graduated, context-anchored guidelines, is required for XR exergaming research, thus opening a refinement agenda for future scale validation. Collectively, these contributions extend the theoretical conversation on technology acceptance into the underexplored intersection of XR, exergaming, and workplace wellness in an emerging-market context.

Managerial Implications and Recommendations

From a managerial and policy perspective, the findings indicate that XR S/F gaming adoption is not constrained by employee skepticism around usefulness but rather by limited direct experiential access. The consistently low ratings for perceived technology availability across both groups ($\bar{x}$ 3.39 and 2.68) highlight a critical structural barrier. Strong effects on entertainment value and employee wellness simultaneously reinforce the dual role of XR S/F gaming as both a hedonic engagement tool and a functional wellness intervention. This positions XR S/F gaming as a strategic organizational resource capable of advancing employee engagement, well-being, and workplace innovation, especially in emerging-market contexts where exposure remains limited. The launch of XR-focused service businesses in markets such as South Africa thus represents a credible niche opportunity, with XR providers well-placed to support corporate wellness through outsourced solutions where in-house infrastructure is constrained. Accordingly, several recommendations stem from the study's findings, as outlined below.

1. Infrastructure must be prioritized, even if supplying fundamental equipment such as the VR headset, walking pad, and cycling simulator connected to tablets with the MyWhoosh (free) application in a location central to all employees. Institutions facing capital constraints should explore external funding from the government, partner with device brands (Meta, Garmin, Wahoo, Samsung, Apple, etc.) to offer sponsorships in a mutual partnership, or leverage inter-departmental equipment exchange programmes.

2. Simplify onboarding through structured, pre-recorded tutorials and digital manuals to benefit first-time users. Appointing a wellness champion across departments can be useful, whereby this person will volunteer their time to onboard their peers and encourage participation.

3. Formal wellness, employee assistance programmes, and HR initiatives must integrate XR S/F gaming by embedding sessions into scheduled events. Incentivizing participation, such as free coffee for 15 minutes of gaming, a reduced health club membership (emphasizing cultivating partnerships with surrounding health clubs/gyms) during the months when the employee played at least once per week, or branded items, will support sustained engagement with long-term benefits for employees and the employer (productivity, job satisfaction, turnover, etc.).

4. Capitalize on gamified social features, which will boost engagement through the strong entertainment value and hedonic appeal, which is particularly relevant when events are geared towards competitiveness and performance outcomes (leaderboards, team challenges, etc.).

5. Leadership must actively engage and endorse gaming at work. Senior management should actively participate in XR sessions to set an example for their team. They should insist on designating XR sessions as a legitimate workplace wellness initiative to transform it into acceptable and endorsed behavior. Encouraging their downline to take at least one XR movement break a week can cultivate a culture of care in their department.

The strategic imperative is clear. Direct experience unlocks perceptions that passive awareness cannot. Organizations that fail to provide hands-on access will systematically undervalue XR S/F gaming's potential, missing a transformative opportunity to enhance employee well-being, engagement, and productivity

LIMITATIONS AND FUTURE RESEARCH

As with any study, several methodological limitations warrant acknowledgement, each pointing to a productive future research direction. First, having used a cross-sectional design, the comparison reflects findings from a single time frame. While significant mean differences are skewed towards the experienced group, pre-existing differences such as an affinity for technology or baseline activity may partially account for the findings. Addressing this notion necessitates future longitudinal or pre-post intervention trials to track the same employees' sentiments before and after XR S/F gaming exposure. A more meaningful picture might emerge through varying intervals, such as 3, 6, and 12-month trials, to generate a perception curve to assess persistence and possible diminishing returns of the experience effect (Venkatesh et al., 2003). Second, by recruiting respondents through wellness events and internal wellness communications, the sample was likely biased toward individuals already inclined toward wellness, physical activity, and technology, as suggested by the high baseline scores in the non-experienced group. Further limiting population generalizability is the inclusion of university employees only, whereas future studies should recruit from diverse industry sectors (manufacturing, healthcare, retail, logistics, construction) and employ stratified sampling on relevant covariates (age, gender, prior gaming exposure, job role, baseline activity).

Third, noting a measurement limitation is the exclusion of the self-efficacy construct ($\alpha = 0.519$) and removal of two individual items (ATT2, PTA5), which signal that some operationalization may have been ambiguous or culturally inappropriate for the South African sample. Future research should refine and revalidate self-efficacy items specifically for XR S/F gaming using Bandura's (1986) graduated, domain-specific item-generation procedures and conduct cognitive interviewing with a pilot cohort before full-scale deployment. Fourth, data were collected exclusively in two South African provinces. While this provides valuable evidence from an underrepresented emerging-market setting, findings may not generalize across cultures or economic contexts. The next progression includes collecting data from a larger sample, including all provinces, higher education institutions, and industries as noted. Better yet, replication in multiple countries to examine whether the experience-effect magnitude varies by cultural dimensions, infrastructure maturity, and national wellness policy is warranted.

Fifth, the current analysis used independent samples t-tests, appropriate for the primary objective but unable to account for confounders, interactions, or pathways. This analytical limitation prohibits reporting on the predictive power of the independent variables in the model. Future work should employ multiple regression to isolate the unique contribution of direct experience after controlling for demographic and contextual covariates. Similarly, executing moderation analysis to identify subgroups for whom experience matters more (e.g., academic or support staff) will provide further unaccounted-for insights, specifically in the higher education context. Moreover, mediation analysis will be useful to map various pathways to further uncover how experience can explain gaming intention, whereas structural equation modelling, with samples larger than 300, can validate and test the integrated eleven-factor framework simultaneously. Sixth, this study measured perceptions at one time without considering prior XR exposure, and group classification was based solely on participation in the events hosted. This means some experienced respondents may have already engaged with VR/XR in the past, outside the context of this study's scope, which explicitly asked about XR S/F gaming experience. Future research should have screening measures to ensure a comparable sample description for more trustworthy comparisons.

Last, this study is perception-oriented rather than based on actual behavior or objective health outcomes. The ultimate test of XR S/F gaming as a workplace intervention lies in measurable behavior change based on physiological and psychological markers. The effectiveness of XR S/F gaming as an outcome-driven intervention hinges on pre-post test reporting of changes in parameters such as blood pressure, heart rate, weight, BMI, emotional, mental, and job affective well-being changes over time using a mixed-methods approach. Regardless of these limitations, this

study makes a foundational contribution by systematically documenting that direct experience with XR S/F gaming significantly enhances perceptions across multiple theoretically grounded dimensions, with the notable exception of perceived usefulness. The findings provide an empirical basis for organizational investment in experiential onboarding and infrastructure, while the limitations above offer a clear agenda for future research to refine, replicate, and extend these findings.

REFERENCES

- Allen, P. (2025). How mental health data helps your business anticipate challenges. <https://www.telushealth.com/en/resources/how-mental-health-data-helps-your-business-anticipate-challenges>
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice Hall.
- Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Lawrence Erlbaum Associates. <https://doi.org/10.4324/9780203771587>
- Conn, V.S., Hafdahl, A.R., Cooper, P.S., Brown, L.M., & Lusk, S.L. (2009). Meta-Analysis of workplace physical activity interventions. *American Journal of Preventive Medicine*, 37(4), 330-339. <https://doi.org/10.1016/j.amepre.2009.06.008>
- Davis, F.D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13 (3): 319–340. <https://doi.org/10.2307/249008>
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Plenum Press. <https://doi.org/10.1007/978-1-4899-2271-7>
- Dhanpat, N., Makhubele, B., & De Braine, R. (2025). Contextualising workplace mental health in post-pandemic South Africa: A systematic review. *SA Journal of Industrial Psychology/SA Tydskrif vir Bedryfsielkunde*, 51(0), a2225. <https://doi.org/10.4102/sajip.v51i0.2225>
- Edmunds, J., Ntoumanis, N., & Duda, J. L. (2006). A test of self-determination theory in the exercise domain. *Journal of Applied Social Psychology*, 36(9), 2240–2265. <https://doi.org/10.1111/j.0021-9029.2006.00102.x>
- Garne-Dalgaard, A., Mann, S., Bredahl, T. V. G., & Stochkendahl, M. J. (2019). Implementation strategies, and barriers and facilitators for implementation of physical activity at work: A scoping review. *i27*, 48. <https://doi.org/10.1186/s12998-019-0268-5>
- Itesport. (2024). Is Fitness Gaming the Next Wellness Trend? A Deep Dive into VR Fitness. <https://litesport.com/blog/the-ring/is-vr-good-exercise>
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.
- Kwak, S.G., & Kim, J.H. (2017). Central limit theorem: the cornerstone of modern statistics. *Korean Journal of Anesthesiology*, 70(2):144-156. doi: 10.4097/kjae.2017.70.2.144.
- Mahindru, A., Patil, P., & Agrawal, V. 2023. Role of Physical Activity on Mental Health and Well-Being: A Review. *Cureus*, 15(1): e33475. doi: 10.7759/cureus.33475.
- Michinov, E., Dodeler, V., Adam, H., & Michinov, N. (2024). Relaxing at work: does virtual reality work? An exploratory study among employees in their workplace [Original Research]. *Frontiers in Organizational Psychology*, 2 - 2024. <https://doi.org/10.3389/forgp.2024.1441816>
- Muller, C. & Bonnema, J. (2025). Exploring the motivational drivers of extended reality (XR) sports and fitness gameplay intentions. *Computers in Human Behavior*, 172: 108751. <https://doi.org/10.1016/j.chb.2025.108>

- Pascoe, M., Bailey, A. P., Craike, M., Carter, T., Patten, R., Stepto, N., & Parker, A. (2020). Physical activity and exercise in youth mental health promotion: A scoping review. *BMJ Open Sport & Exercise Medicine*, 6(1), e000677. <https://doi.org/10.1136/bmjsem-2019-000677>
- Singh, B., Olds, T., Curtis, R., Dumuid, D., Virgara, R., Watson, A., Szeto, K., O'Connor, E., Ferguson, T., Eglitis, E., Miatke, A., Simpson, C. E. M., & Maher, C. (2023). Effectiveness of physical activity interventions for improving depression, anxiety and distress: An overview of systematic reviews. *British Journal of Sports Medicine*, 57(18), 1203–1209. <https://doi.org/10.1136/bjsports-2022-106195>
- Spill. (2025). 53 workplace mental health statistics you can't ignore in 2025. <https://www.spill.chat/mental-health-statistics/workplace-mental-health-statistics>
- Sun, H., Ke, Q. (2024). What Motivates You to Use VR Exergames to Substitute for Real Sports?—An Empirical Study Based on Technology Readiness and Technology Acceptance Model. In: Sserwanga, I., et al. *Wisdom, Well-Being, Win-Win*. iConference 2024. Lecture Notes in Computer Science, vol 14596. P. 31-52. Springer, Cham. https://doi.org/10.1007/978-3-031-57850-2_4
- Touloudi, E., Hassandra, M., Galanis, E., Goudas, M., & Theodorakis, Y. (2022). Applicability of an Immersive Virtual Reality Exercise Training System for Office Workers during Working Hours. *Sports*, 10(7), 104. <https://www.mdpi.com/2075-4663/10/7/104>
- Trusculescu, L.-M., Kiş, A. M., Popovici, R. A., Salcudean, A., Pititc, D. E., Feher, A., Enache, A., & Olariu, I. (2026). Pre–Post Changes Associated with Virtual Reality-Based Mindfulness in Reducing Work-Related Stress Among Corporate Employees. *Digital*, 6(2), 34. <https://www.mdpi.com/2673-6470/6/2/34>
- Venkatesh, V., Morris, M.G., Davis, G.B., & Davis, F.D. (2003). User Acceptance of Information Technology: Toward A Unified View. *MIS Quarterly*, 27 (3): 425–478. <https://doi.org/10.2307/30036540>
- World Health Organization. (2024). Physical activity. <https://www.who.int/news-room/fact-sheets/detail/physical-activity>
- Yoo, S., Gough, P., & Kay, J. (2020). *Embedding a VR Game Studio in a Sedentary Workplace: Use, Experience and Exercise Benefits* Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems, Honolulu, HI, USA. <https://doi.org/10.1145/3313831.3376371>

LEADERSHIP AS A CATALYST FOR EMPLOYEE ENGAGEMENT IN CONTEMPORARY ORGANISATIONS

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ABSTRACT

Employee engagement has emerged as a critical determinant of organisational performance, innovation, employee well-being, and long-term sustainability in contemporary workplaces. In volatile, uncertain, and digitally evolving environments, leadership plays a central role in shaping employee attitudes and motivation. This study critically synthesises the role of leadership in enhancing employee engagement through the integrated theoretical lenses of Social Exchange Theory (SET) and the Job Demands-Resources (JD-R) model. Grounded in an interpretivist research philosophy, a traditional literature review methodology was adopted to critically analyse contemporary scholarly work. Findings reveal that leadership drives engagement through dual relational and structural pathways. Relational mechanisms such as trust, psychological safety, and perceived organizational support stimulate social reciprocity, whereas structural mechanisms leverage job resources (autonomy, feedback, growth) to mitigate excessive job demands. By explicitly defining core constructs and evaluating conceptual hypotheses, this study advances an integrated model explaining how leadership acts as a strategic non-financial catalyst in dynamic global contexts.

Keywords: Leadership, Employee Engagement, Social Exchange Theory, Job Demands-Resources Theory, Psychological Safety, Contemporary Organisations.

INTRODUCTION

Employee engagement has become one of the most critical issues in contemporary organisational management because of its direct influence on productivity, innovation, employee well-being, organisational commitment, and overall organisational performance. In increasingly dynamic and uncertain business environments, organisations are under pressure to maintain a motivated, resilient, and committed workforce capable of adapting to rapid technological, economic, and social changes. Employee engagement is commonly conceptualised as a positive and fulfilling psychological state characterised by vigor, dedication, and absorption in one's work (Decuyper & Schaufeli, 2020). Engaged employees demonstrate higher levels of discretionary effort, creativity, and commitment to organisational goals, making engagement a strategic source of competitive advantage in modern organisations.

Within this context, leadership has emerged as one of the most significant determinants of employee engagement. Leaders influence employee attitudes, behaviours, and perceptions through communication, support, empowerment, recognition, and the creation of conducive work environments. Effective leadership contributes to the development of trust, psychological safety, organisational commitment, and motivation, all of which are essential for sustaining employee engagement (Schaufeli, 2021). Leadership styles such as transformational, authentic, servant, and inclusive leadership have increasingly been associated with positive engagement outcomes because they promote meaningful relationships, employee development, and supportive organisational climates.

The importance of leadership in enhancing employee engagement has become even more pronounced in the wake of global disruptions such as the COVID-19 pandemic, economic instability, digital transformation, and the rise of remote and hybrid work arrangements. These developments have fundamentally altered traditional work structures and increased employees' expectations for adaptive, empathetic, and supportive leadership. In many organisations, particularly within developing economies characterised by resource constraints, inflationary pressures, labour

migration, and organisational uncertainty, leadership has become a critical non-financial mechanism for sustaining employee motivation and performance. Consequently, organisations are increasingly recognising that leadership effectiveness is central to employee engagement and long-term organisational sustainability.

Despite extensive scholarly attention investigating the relationship between leadership and employee engagement, global engagement levels across contemporary organisations remain persistently low (Gallup, 2023). This persistent deficit highlights critical theoretical and empirical limitations in the current literature, which this study directly addresses to differentiate itself from prior research. A key shortfall in existing scholarship is theoretical fragmentation; previous studies predominantly evaluate isolated leadership styles such as transformational or authentic leadership through a single conceptual framework, typically relying on either Social Exchange Theory (SET) or the Job Demands-Resources (JD-R) model in silos. Consequently, literature rarely explains how relational dynamics (e.g., trust, psychological safety) and structural mechanisms (e.g., autonomy, workload distribution) interact simultaneously to influence engagement outcomes. Furthermore, much of the foundational research predates modern operational realities, leaving a gap in understanding how leadership drives engagement within volatile, resource-constrained, digitally transformed, and hybrid work settings.

By addressing these limitations, this study advances three pivotal scientific and theoretical contributions. First, it offers conceptual innovation by integrating SET and the JD-R framework into a unified, dual-pathway model. This model demonstrates that relational goodwill without structural support risks employee burnout, whereas structural resources lacking relational trust yield mere mechanical compliance rather than authentic engagement. Second, the study highlights the non-financial strategic value of leadership, establishing it as an essential non-monetary mechanism for sustaining workforce motivation, particularly within developing or economically constrained environments where competitive financial incentives are limited. Finally, through an interdisciplinary synthesis bridging organizational behaviour, human resource management, and strategic leadership, this research clarifies the precise conceptual mechanisms through which micro-level leader-follower interactions translate into macro-level organizational resilience and performance.

To address the persistent engagement deficit in modern workplaces and bridge existing theoretical silos, this study is guided by four interconnected research objectives. First, the study seeks to critically evaluate the relationship between leadership practices and employee engagement within contemporary, volatile, and hybrid work environments. Second, it examines the relational mechanisms specifically trust, reciprocity, psychological safety, and perceived organisational support through which leadership influences engagement, grounded in Social Exchange Theory (SET). Third, utilizing the Job Demands-Resources (JD-R) framework, the study analyses how leaders structurally provision job resources while buffering excessive job demands to sustain employee motivation. Finally, the study aims to synthesize these relational and structural dimensions into an integrated dual-pathway conceptual model that provides a holistic understanding of how leadership catalyzes employee engagement in modern organisations.

The remainder of the paper is organised as follows. The next section presents the literature review, which discusses the conceptualisation of leadership and employee engagement, as well as the theoretical foundations underpinning the study, particularly Social Exchange Theory and the Job Demands-Resources theory. This is followed by the findings and discussion section, which synthesises empirical and theoretical insights regarding how leadership enhances employee engagement. The subsequent section presents recommendations and implications for organisational leaders, policymakers, and human resource practitioners. Thereafter, the paper outlines areas for further study to guide future empirical and theoretical research. Finally, the conclusion summarises the key arguments and contributions of the study.

LITERATURE REVIEW

Conceptualising Leadership

Leadership has been widely recognised as one of the most influential organisational factors shaping employee attitudes, behaviours, and performance outcomes. Contemporary scholarship increasingly conceptualises leadership not merely as a formal position of authority, but as a dynamic process of social influence through which leaders inspire, guide, and facilitate collective action toward shared organisational goals (Haslam et al., 2020). This perspective

emphasises that leadership emerges through ongoing interactions between leaders and followers and is shaped by organisational context, communication patterns, and relational dynamics. In organisational settings, leadership plays a critical role in shaping employees' perceptions of meaning, fairness, support, and belonging. Leaders influence how employees interpret organisational objectives, experience workplace relationships, and respond to changing work demands. Effective leadership therefore extends beyond task supervision to include emotional support, motivation, empowerment, and the creation of enabling work environments. Spears (2021) argues that leadership effectiveness is increasingly determined by a leader's ability to build trust-based relationships and foster collaboration rather than relying solely on hierarchical authority. Several leadership approaches have been associated with positive organisational outcomes, particularly employee engagement. Transformational leadership remains one of the most widely studied leadership styles in organisational behaviour literature. Transformational leaders motivate followers by articulating a compelling vision, encouraging innovation, recognising employee contributions, and promoting personal development (Lai et al., 2020). Such leaders inspire employees to transcend self-interest for broader organisational goals, thereby strengthening psychological attachment and commitment.

Similarly, authentic leadership has attracted growing scholarly attention because of its emphasis on transparency, ethical conduct, self-awareness, and relational integrity. Authentic leaders foster trust and credibility by demonstrating consistency between values and actions, creating environments characterised by openness and psychological safety (Schaufeli et al., 2020). Employees working under authentic leaders are more likely to feel valued and respected, which positively influences their willingness to invest themselves in their work roles. Servant leadership also contributes significantly to employee engagement by prioritising employee growth, empowerment, and well-being. Unlike traditional leadership models that emphasise authority and control, servant leadership focuses on supporting followers and enabling them to reach their full potential. Chimakati (2024) observes that servant leaders cultivate organisational cultures rooted in empathy, ethical responsibility, and collective development, thereby strengthening employee motivation and engagement.

Inclusive leadership has further emerged as an important leadership paradigm in contemporary workplaces characterised by workforce diversity and remote or hybrid work arrangements. Inclusive leaders encourage participation, appreciate diversity, and create environments where employees feel psychologically safe to express ideas and contribute meaningfully (Wiley, 2025). This leadership approach is particularly relevant in modern organisations where employees increasingly value voice, recognition, flexibility, and emotional support. Collectively, these leadership perspectives suggest that leadership is fundamentally relational and developmental in nature. Effective leadership enhances employee engagement not only through formal managerial functions but also through supportive interpersonal relationships, ethical conduct, empowerment, and the strategic management of workplace resources.

Conceptualising Employee Engagement

Employee engagement has become a dominant construct in organisational behaviour and human resource management literature because of its strong association with employee performance, organisational commitment, innovation, and retention. The concept gained prominence through the seminal work of Kahn (1990), who defined engagement as the harnessing of employees' physical, cognitive, and emotional selves during role performance. According to Kahn, engaged employees fully express themselves in their work roles and experience a strong sense of meaningfulness, psychological safety, and availability. Subsequent scholarship expanded this conceptualisation by describing engagement as a positive, fulfilling, work-related psychological state characterised by vigor, dedication, and absorption (Schaufeli & Massaroni, 2022). Vigor refers to high levels of energy and mental resilience while working; dedication reflects enthusiasm, significance, inspiration, and pride in one's work; while absorption describes deep concentration and immersion in work activities. These dimensions collectively portray engagement as an active and motivational state rather than a passive attitude toward work.

Employee engagement differs from related concepts such as job satisfaction and organisational commitment. While job satisfaction reflects employees' evaluative feelings about their work conditions, engagement captures the extent to which employees invest their emotional, cognitive, and physical energies into work performance (Ahakwa et al., 2021). Similarly, organisational commitment primarily reflects attachment to the organisation, whereas engagement emphasises active involvement and enthusiasm in work roles. This distinction explains why engagement is increasingly viewed as a stronger predictor of organisational effectiveness and employee productivity. Empirical

research consistently associates employee engagement with numerous positive organisational outcomes. Engaged employees demonstrate higher productivity, stronger customer orientation, improved creativity, lower absenteeism, reduced turnover intentions, and greater organisational citizenship behaviour (Christian et al., 2020). In contrast, disengaged employees are more likely to exhibit reduced morale, poor performance, burnout, and withdrawal behaviours, all of which negatively affect organisational performance.

The increasing complexity of contemporary workplaces has further heightened interest in employee engagement. Rapid technological advancements, remote work arrangements, organisational restructuring, and economic uncertainty have significantly altered employee expectations and workplace experiences. Employees increasingly seek meaningful work, supportive leadership, growth opportunities, flexibility, and psychological well-being. Consequently, organisations are recognising that employee engagement is no longer solely a human resource concern but a strategic organisational priority essential for long-term sustainability and competitiveness.

Operational Definition of Core Constructs and Variables

To establish conceptual clarity prior to evaluation, the core variables and constructs underpinning this study are operationalised as follows:

- **Employee Engagement:** A multi-dimensional psychological state comprising **Vigor** (high energy and mental resilience while working), **Dedication** (sense of significance, enthusiasm, challenge, and pride), and **Absorption** (deep concentration and immersion in tasks) (Schaufeli & Massaroni, 2022).
- **Transformational Leadership:** A leadership style characterized by idealised influence, inspirational motivation, intellectual stimulation, and individualised consideration aimed at transforming follower values and driving exceptional performance (Lai et al., 2020).
- **Authentic Leadership:** A pattern of leader behaviour that draws upon positive psychological capacities and a developed ethical climate, promoting self-awareness, internalized moral perspective, balanced processing of information, and relational transparency (Schaufeli et al., 2020).
- **Servant Leadership:** An employee-centric leadership approach that prioritises the growth, well-being, and empowerment of followers above short-term leader self-interest (Chimakati, 2024).
- **Job Demands:** Physical, psychological, social, or organizational aspects of the job that require sustained physical or psychological effort and are associated with physiological and psychological costs (Decuyper & Schaufeli, 2020).
- **Job Resources:** Physical, psychological, social, or organizational aspects of the job that facilitate goal achievement, reduce job demands, and stimulate personal growth and development (Kwon & Kim, 2020).
- **Psychological Safety:** A shared belief held by team members that the team environment is safe for interpersonal risk-taking, voicing concerns, and making mistakes without fear of negative consequences (Wiley, 2025).
- **Perceived Organisational Support (POS):** Employees' general belief concerning the extent to which the organisation values their contributions and cares about their well-being (Ohemeng et al., 2020).

A Critical Examination of Leadership Paradigms

While contemporary literature frequently promotes positive leadership styles as universal panaceas for engagement, a critical analysis reveals significant boundary conditions and potential dark sides. Transformational leadership, while effective at instilling a shared vision, can occasionally induce employee fatigue or cognitive overload if inspirational demands outstrip resource provision (Lai et al., 2020). Furthermore, the assumption that transformational vision uniformly translates to engagement overlooks individual differences in follower readiness and role ambiguity.

Authentic and servant leadership focus on relational transparency, ethical behavior, and follower empowerment (Chimakati, 2024; Schaufeli et al., 2020). However, critical scholars note that relational transparency can backfire in highly competitive or volatile environments where followers require authoritative certainty rather than vulnerability. Servant leadership, despite its focus on well-being, may inadvertently reduce operational agility if consensus-building delays crucial strategic decisions. Inclusive leadership addresses modern diversity and hybrid dynamics (Wiley, 2025), yet its efficacy remains constrained by organizational cultures that implicitly reward individualistic performance over collective psychological safety.

Social Exchange Theory (SET): Critique and Relational Dynamics

Social Exchange Theory posits that workplace interactions are governed by social reciprocity (Ohemeng et al., 2020). When leaders treat employees with fairness, respect, and support, employees feel an implicit psychological obligation to reciprocate with enhanced vigor, dedication, and discretionary effort (Bwalya, 2023; Nauman et al., 2021). Trust and psychological safety act as essential relational currencies in this exchange.

However, SET suffers from a major theoretical limitation: it assumes rational, linear reciprocity. In high-stress or resource-constrained settings such as developing economies experiencing inflationary pressures and relational goodwill alone cannot indefinitely offset structural deprivation or unmanageable workloads (Chikodzi & Nyatsanza, 2020). Thus, relying solely on SET fails to account for the physical and operational constraints of task execution.

Job Demands-Resources (JD-R) Theory: Critique and Structural Dynamics

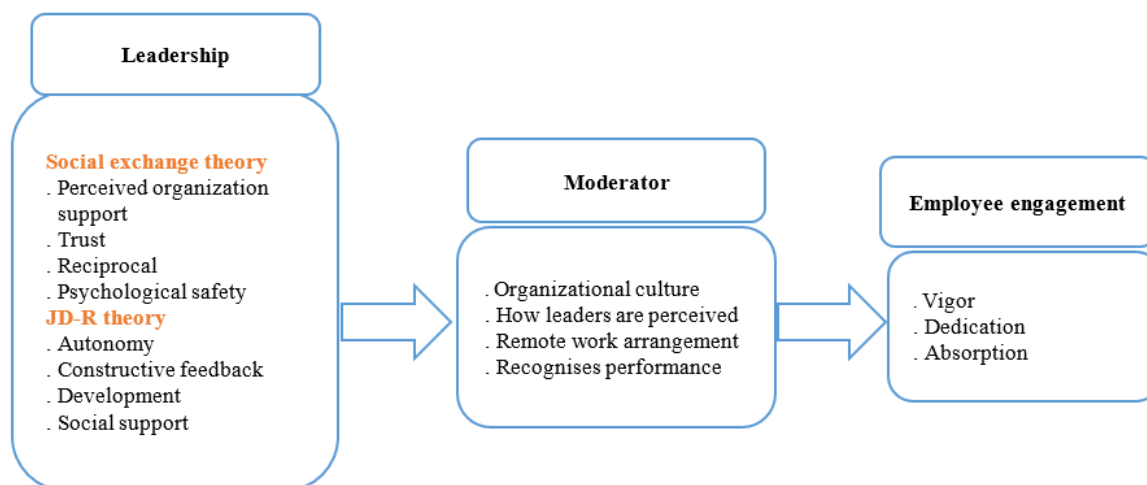
The JD-R model provides a structural, motivational framework (Decuyper & Schaufeli, 2020). It posits that while high job demands exhaust emotional resources, abundant job resources (autonomy, growth, feedback) stimulate intrinsic motivation and engagement (Kwon & Kim, 2020). Leadership acts as a crucial macro-resource that directly distributes task-level resources and buffers demand-induced burnout (Hakanen & Roodt, 2020; Snyder, 2020).

The critical flaw of the classic JD-R framework is its mechanistic treatment of human interactions. It often treats resources as structural assets, underestimating how interpersonal trust, leader integrity, and relational safety determine whether employees *perceive* and *utilize* those resources effectively. An employee may be granted autonomy, but without psychological safety, that autonomy may be experienced as isolation or fear of failure rather than an empowering resource.

Conceptual Framework

Figure 1 depicts that when leaders demonstrate fairness, ethical conduct, support, and genuine concern for employee well-being, they cultivate high-quality exchange relationships that encourage employees to reciprocate with greater psychological investment and engagement (Hakanen & Roodt, 2020).

Figure 1: Conceptual Framework.



Theoretical Framework and Hypotheses Conceptualization

Rather than utilizing descriptive objectives, this study formulates formal theoretical hypotheses grounded in Social Exchange Theory (SET) and the Job Demands-Resources (JD-R) model:

- H₁: *Supportive, authentic, and transformational leadership behaviours positively influence employee engagement by strengthening social exchange processes (trust, reciprocity, and psychological safety).*
- H₂: *Leadership enhances employee engagement structurally by increasing job resources (autonomy, feedback, developmental opportunities) and buffering the negative impacts of excessive job demands.*
- H₃: *Psychological safety and Perceived Organisational Support (POS) mediate the relationship between leadership behaviours and employee engagement dimensions (vigor, dedication, absorption)*
- H₄: *An integrated model linking relational exchange dynamics (SET) and structural resource provision (JD-R) offers a significantly superior theoretical explanation of employee engagement than either model independently.*

Synthesis of Literature and Research Gap

The reviewed literature demonstrates that leadership is a significant predictor of employee engagement through both relational and structural mechanisms. Social Exchange Theory explains how supportive leadership fosters trust, reciprocity, and psychological safety, while the JD-R framework illustrates how leadership shapes job resources and manages job demands to sustain motivation and engagement. Although existing studies provide valuable insights into the leadership-engagement relationship, several gaps remain evident. First, much of the literature focuses on isolated leadership styles without integrating multiple theoretical perspectives to explain the complexity of engagement processes. Second, limited attention has been given to how leadership simultaneously operates through relational and motivational pathways. Third, contemporary organisational challenges such as remote work, economic instability, workforce diversity, and digital transformation require more context-sensitive approaches to understanding leadership and engagement. This study therefore addresses these gaps by integrating Social Exchange Theory and JD-R theory to provide a more comprehensive understanding of how leadership enhances employee engagement in contemporary organisational environments. The integrated framework contributes to both theory and practice by explaining the multidimensional mechanisms through which leadership influences employee engagement.

METHODOLOGY

Research Design

This study adopted a traditional literature review methodology to examine the role of leadership in enhancing employee engagement in contemporary organisations. A traditional literature review is a qualitative and interpretive research approach that involves the critical examination, synthesis, and integration of existing scholarly literature relating to a particular research problem or phenomenon (Snyder, 2020). Unlike systematic reviews, which follow rigid procedural protocols and statistical synthesis techniques, the traditional literature review provides greater flexibility in analysing, interpreting, and integrating diverse theoretical and empirical perspectives. This methodological approach was considered appropriate for the present study because the research sought to develop a comprehensive conceptual understanding of how leadership influences employee engagement through multiple theoretical lenses and organisational contexts. The traditional literature review enabled the researchers to synthesise findings from diverse studies on leadership, employee engagement, Social Exchange Theory, and the Job Demands - Resources (JD-R) theory. It also facilitated the integration of theoretical explanations and empirical evidence into a coherent conceptual discussion capable of addressing the complexity of the leadership–engagement relationship in contemporary organisational environments.

Research Philosophy

The study was guided by an interpretivist research philosophy. Interpretivism assumes that organisational realities and human experiences are socially constructed and therefore best understood through interpretation and contextual analysis rather than purely objective measurement. In the context of this study, employee engagement and leadership

behaviours are viewed as socially and psychologically embedded phenomena shaped by organisational relationships, perceptions, experiences, and workplace contexts. The interpretivist perspective was appropriate because the study aimed to understand and explain how leadership behaviours influence employee engagement through relational and motivational mechanisms rather than to test causal relationships quantitatively. The philosophy allowed the researchers to critically interpret existing scholarly arguments, theories, and empirical findings in order to develop a deeper and more nuanced understanding of the phenomenon under investigation.

Sources of Literature

The study relied exclusively on secondary data obtained from peer-reviewed journal articles, scholarly books, conference papers, organisational reports, and reputable academic publications focusing on leadership and employee engagement. Literature was drawn primarily from recognised academic databases such as: Scopus, Web of Science, ScienceDirect, and Google Scholar. These databases were selected because they provide access to high-quality and credible scholarly publications in organisational behaviour, leadership, human resource management, and management studies. The review focused mainly on contemporary literature published between 2020 and 2025 to ensure relevance to emerging workplace realities such as hybrid work arrangements, digital transformation, workforce diversity, and post-pandemic organisational environments. However, seminal and foundational works such as Kahn’s (1990) conceptualisation of employee engagement and foundational theoretical contributions related to Social Exchange Theory and JD-R theory were also incorporated to provide theoretical grounding.

Search Strategy and Keywords

To identify relevant literature, the researchers employed a structured keyword search strategy using combinations of key concepts related to the study. The main search terms included: ‘leadership and employee engagement’, ‘transformational leadership and engagement’, ‘authentic leadership and employee engagement’, servant leadership and engagement, ‘Social Exchange Theory and employee engagement’, ‘Job Demands-Resources theory and leadership’, ‘employee engagement in contemporary organisations’, ‘leadership behaviours and organisational performance’, and ‘psychological safety and engagement’. Boolean operators such as “AND” and “OR” were utilised to refine the search process and improve the relevance of retrieved studies. The search process prioritised studies that directly addressed the relationship between leadership and employee engagement as well as studies explaining the theoretical mechanisms linking the two constructs.

Inclusion and Exclusion Criteria

To ensure the quality and relevance of the reviewed literature, the study applied specific inclusion and exclusion criteria.

Inclusion Criteria

The study included and excluded literature is shown in Table 1.

Table 1: Included and excluded literature.

Inclusion Criteria	Exclusion Criteria
• Focused on leadership and employee engagement • Discussed Social Exchange Theory or JD-R theory in relation to workplace behaviour • Was published in peer-reviewed academic journals or credible scholarly sources • Was published between 2020 and 2025, except for seminal theoretical works; Was written in English • Addressed organisational or workplace contexts relevant to employee engagement	• Was not directly related to leadership or employee engagement • Consisted of non-scholarly publications lacking academic credibility • Focused exclusively on unrelated psychological or behavioural constructs • Contained insufficient methodological or theoretical detail • Was duplicated across multiple databases

Data Analysis and Synthesis

The collected literature was analysed using thematic content analysis. This involved carefully reading, categorising, comparing, and synthesising recurring concepts, theoretical arguments, empirical findings, and emerging themes related to leadership and employee engagement.

The analysis focused particularly on:

- Conceptualisations of leadership and employee engagement;
- Leadership styles associated with engagement outcomes;
- Theoretical explanations provided by Social Exchange Theory and JD-R theory;
- Relational mechanisms such as trust, psychological safety, and perceived organisational support;
- Structural mechanisms such as autonomy, feedback, recognition, and job resources;
- Contextual factors influencing the leadership - engagement relationship.

Thematic synthesis enabled the researchers to identify patterns, similarities, contradictions, and gaps within existing literature. The findings were subsequently integrated into a conceptual framework explaining how leadership enhances employee engagement through relational and resource-based mechanisms.

Reliability and Credibility of the Review

To enhance the credibility and trustworthiness of the study, the review relied predominantly on peer-reviewed and reputable scholarly sources. The use of multiple databases and diverse scholarly perspectives also strengthened the comprehensiveness and balance of the review. Furthermore, the inclusion of both theoretical and empirical studies enabled triangulation of perspectives, thereby improving the reliability of the conceptual analysis. The researchers also critically evaluated the consistency, relevance, and scholarly rigor of the reviewed studies to minimise bias and ensure that the synthesis reflected current scholarly debates and developments relating to leadership and employee engagement.

Ethical Considerations

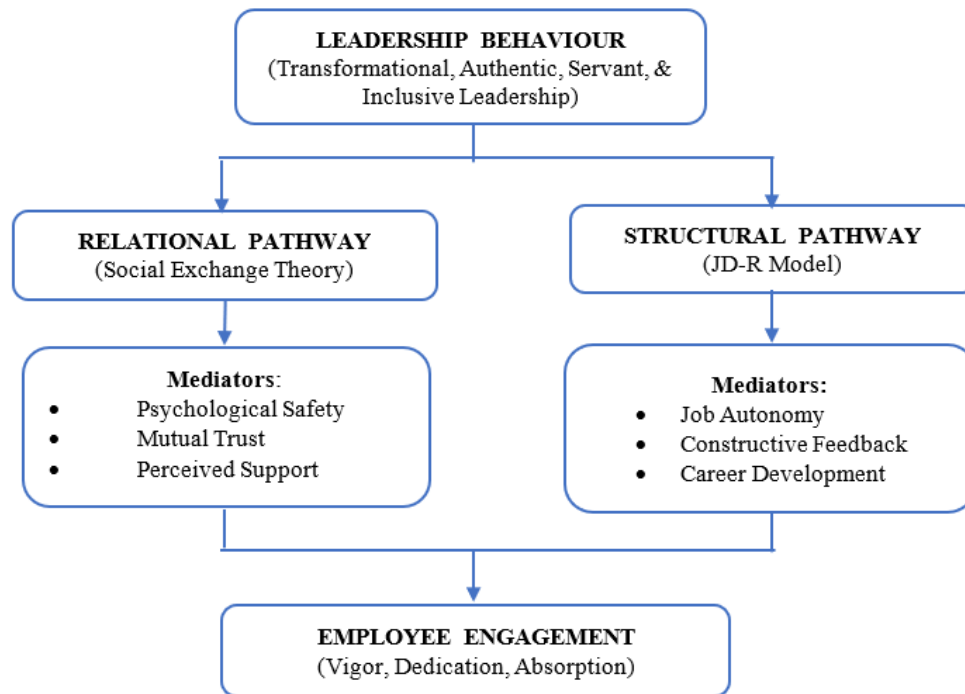
Although the study did not involve human participants or primary data collection, ethical considerations remained important throughout the review process. The study maintained academic integrity by appropriately acknowledging and citing all sources of information used in the discussion. The researchers ensured that ideas, arguments, and findings from previous studies were accurately represented and properly referenced in accordance with accepted academic standards.

FINDINGS AND DISCUSSION

The findings from the reviewed literature demonstrate that leadership plays a fundamental role in enhancing employee engagement across diverse organisational contexts. The analysis further reveals that leadership influences engagement through both relational and structural mechanisms, which can be effectively explained through the integrated lenses of Social Exchange Theory and the Job Demands-Resources (JD-R) theory. The discussion therefore highlights how leadership behaviours shape employees' psychological attachment, motivation, trust, and work experiences in contemporary organisations.

The synthesis confirms that leadership operates as a multi-dimensional catalyst as shown in Figure 2, activating engagement through simultaneous relational and structural mechanisms.

Figure 2: Leadership as a multi-dimensional catalyst.



Relational Pathways (H₁ & H₃)

The review demonstrates that trust, psychological safety, and POS directly mediate the impact of supportive leadership styles on employee engagement, supporting H₁ and H₃. Authentic and servant leadership foster environments where employees feel secure enough to voice novel ideas without risk (Wiley, 2025; Scholastica, 2023). This psychological safety triggers SET reciprocity: employees invest cognitive and emotional effort because they trust their contributions will be fairly recognized rather than exploited.

Structural Pathways (H₂ & H₃)

In alignment with H₂, leaders directly influence structural outcomes by shaping task design, granting autonomy, and providing regular developmental feedback (Park et al., 2022; Kwon & Kim, 2020). During crisis periods or digital transitions, developmental leadership acts as a buffer against excessive demands, maintaining vigor and absorption despite environmental strain (Hakanen & Roodt, 2020).

Theoretical Synthesis (H₄)

The findings strongly validate H₄. Neither SET nor JD-R independently offers a complete explanation of engagement. SET explains *why* an employee emotionally commits (relational duty and trust), whereas JD-R explains *how* an employee physically sustains performance (access to tools, autonomy, and manageable demands). Merging these frameworks resolves the tension between relational goodwill and task execution.

Leadership as a Relational Driver of Employee Engagement

One of the most consistent findings emerging from the reviewed literature is that leadership significantly enhances employee engagement through the development of positive relational exchanges between leaders and employees. Social Exchange Theory suggests that employees respond positively when they perceive organisational representatives particularly leaders as supportive, fair, and trustworthy (Ohemeng et al., 2020). In this regard, leadership behaviours characterised by empathy, ethical conduct, recognition, transparency, and open communication create reciprocal relationships that encourage employees to invest themselves more fully in their work roles. The literature indicates

that employees who perceive leadership support are more likely to experience higher levels of vigor, dedication, and emotional commitment toward organisational objectives. Supportive leadership practices such as employee recognition, mentoring, participatory decision-making, and constructive feedback strengthen employees' perceptions of organisational support and fairness (Chakraborty et al., 2024). These relational experiences foster trust and psychological safety, which subsequently increase employees' willingness to demonstrate discretionary effort and sustained engagement.

The findings also suggest that trust functions as one of the most critical mediating mechanisms linking leadership and employee engagement. Employees are more likely to engage deeply in their work when they trust leadership and perceive leaders as predictable, ethical, and competent. Trust reduces uncertainty and strengthens emotional attachment to the organisation, thereby promoting positive workplace attitudes and behaviours (Wiley, 2025). In organisations characterised by uncertainty and economic instability, trust-based leadership becomes even more essential because employees increasingly rely on leaders for reassurance, communication, and psychological support. Similarly, authentic and servant leadership approaches emerged strongly within the reviewed literature as important contributors to employee engagement. Authentic leaders cultivate engagement by demonstrating integrity, transparency, and consistency between values and actions. Employees working under authentic leadership are more likely to feel psychologically safe and respected, which enhances emotional investment in work activities (Schaufeli et al., 2020). Servant leadership further strengthens engagement through employee-centred practices such as empowerment, empathy, coaching, and personal development. These findings reinforce the argument that employee engagement is not merely a behavioural outcome but also a relational and emotional response shaped by leadership quality.

Inclusive leadership also emerged as an increasingly important leadership approach within contemporary workplaces characterised by workforce diversity and hybrid work arrangements. Inclusive leaders create environments where employees feel heard, valued, and respected regardless of background or position. Such leadership practices strengthen belongingness and psychological safety, both of which positively influence employee engagement (Christian et al., 2020). The findings therefore demonstrate that leadership enhances engagement by creating relational climates characterised by trust, fairness, support, and mutual respect.

Leadership as a Provider of Job Resources

Beyond relational influences, the findings further indicate that leadership enhances employee engagement through the strategic management of job demands and job resources, as explained by the JD-R theory. The literature consistently shows that leadership functions as an important organisational resource capable of shaping employees' work experiences and motivational levels. The reviewed studies reveal that supportive leadership increases employees' access to critical job resources such as autonomy, feedback, role clarity, recognition, developmental opportunities, and social support. These resources stimulate motivation, strengthen competence, and encourage psychological investment in work activities (Kwon & Kim, 2020). Employees who experience adequate job resources are more likely to demonstrate enthusiasm, resilience, and commitment even under demanding organisational conditions.

Autonomy emerged as one of the most significant job resources associated with employee engagement. Leaders who empower employees by involving them in decision-making and granting flexibility in task execution promote feelings of ownership and competence. Such empowerment enhances intrinsic motivation and encourages employees to become more proactive and committed to organisational objectives. Similarly, constructive feedback and recognition strengthen engagement by affirming employee value and reinforcing positive work behaviours. The findings further reveal that leadership significantly influences employee engagement through employee development and learning opportunities. Developmental leadership practices such as mentoring, coaching, training, and stretch assignments enhance employees' professional growth and career progression. Employees who perceive opportunities for growth and skill development are more likely to remain psychologically invested in their work and organisation (Park et al., 2022). These findings suggest that leadership contributes to engagement by satisfying employees' developmental and self-actualisation needs.

The reviewed literature also demonstrates that leadership plays a critical role in managing excessive job demands that may otherwise undermine engagement. In organisations characterised by high workloads, emotional strain, role ambiguity, or economic uncertainty, supportive leadership helps employees cope with stress and maintain

motivation. Leaders who provide role clarity, emotional support, and realistic workload expectations reduce burnout risks and strengthen employee resilience (Hakanen & Roodt, 2020). Consequently, leadership contributes to engagement not only by increasing job resources but also by buffering the negative effects of excessive demands.

Communication of Vision and Organisational Purpose

Another important finding emerging from the literature is that leadership enhances employee engagement through the communication of organisational vision and purpose. Transformational leadership research consistently demonstrates that employees are more engaged when leaders communicate a clear, inspiring, and meaningful organisational direction (Lai et al., 2020). Employees are more likely to demonstrate dedication and commitment when they understand how their individual contributions align with broader organisational goals. Leaders who effectively communicate vision create a sense of meaning and significance in employees' work roles. This strengthens organisational identification and encourages employees to invest greater emotional and cognitive energy into their tasks.

The findings further indicate that goal clarity and regular communication significantly reduce role ambiguity and uncertainty. Employees who clearly understand organisational expectations and performance objectives experience higher motivational focus and work engagement. Particularly in hybrid and remote work environments, communication has become increasingly critical for sustaining employee connection, trust, and organisational commitment. Recognition systems also emerged as important engagement mechanisms linked to leadership communication practices. Employees who receive fair and timely recognition for their contributions are more likely to feel valued and appreciated within the organisation. Recognition reinforces positive relational exchanges and simultaneously functions as an important job resource that enhances motivation and commitment.

Leadership and Employee Engagement in Contemporary Organisational Contexts

The findings suggest that contemporary organisational realities have significantly increased the importance of leadership in sustaining employee engagement. The emergence of remote work, digital transformation, economic uncertainty, and workforce diversity has altered traditional work structures and employee expectations. Employees increasingly expect leadership that is adaptive, empathetic, inclusive, and emotionally supportive. In economically constrained and volatile environments, particularly within many developing economies, leadership emerged as a critical non-financial mechanism for sustaining engagement. In contexts where organisations may struggle to provide competitive financial incentives, employees place greater value on supportive leadership, fairness, recognition, and opportunities for growth (Chikodzi & Nyatsanza, 2020). Leadership therefore becomes essential for maintaining morale, resilience, and organisational commitment under difficult conditions.

The reviewed literature also indicates that hybrid and remote work arrangements have transformed the leadership which is engagement relationship. Reduced physical interaction between leaders and employees has increased the importance of communication, trust, emotional intelligence, and virtual support systems. Leaders are increasingly required to maintain employee connection and motivation through digital communication platforms while simultaneously addressing employee well-being and work-life balance concerns. Furthermore, workforce diversity has strengthened the relevance of inclusive leadership practices. Employees increasingly expect workplaces characterised by equality, participation, respect, and belongingness. Leaders who fail to address diversity and inclusion concerns may unintentionally weaken engagement levels and organisational cohesion.

Integrating Social Exchange Theory and JD-R Theory

One of the most important findings of this study is that Social Exchange Theory and JD-R theory provide complementary rather than competing explanations of how leadership enhances employee engagement. Social Exchange Theory explains the relational and emotional dimensions of engagement by highlighting trust, reciprocity, fairness, and psychological safety. In contrast, JD-R theory explains the structural and motivational dimensions of engagement by emphasising job resources, autonomy, development, and workload management. The integration of these theoretical perspectives provides a more holistic understanding of the leadership-engagement relationship. The

findings demonstrate that leadership enhances employee engagement most effectively when leaders simultaneously cultivate positive relational exchanges and provide adequate organisational resources. Employees are more likely to become engaged when they experience supportive relationships with leadership while also having access to meaningful work resources and manageable demands. This integrated perspective further suggests that employee engagement cannot be sustained through isolated motivational initiatives alone. Organisations must adopt leadership approaches that address both relational and structural dimensions of employee experiences. Leadership effectiveness therefore depends not only on interpersonal behaviour but also on the ability to create supportive, resource-rich, and psychologically safe work environments.

Discussion of the Proposed Conceptual Framework

The findings strongly support the proposed conceptual framework positioning leadership as the independent variable and employee engagement as the dependent variable mediated through relational and resource-based mechanisms. Trust, perceived organisational support, psychological safety, autonomy, feedback, and developmental opportunities emerged consistently as important mediating variables linking leadership to engagement outcomes. The findings also confirm that contextual factors such as organisational culture, remote work arrangements, economic instability, and employee perceptions of leadership moderate the effectiveness of leadership practices in enhancing engagement. This suggests that leadership strategies cannot be universally applied without consideration of organisational and environmental conditions. Overall, the discussion demonstrates that leadership remains one of the most influential organisational mechanisms for enhancing employee engagement in contemporary workplaces. Effective leadership strengthens employee engagement by fostering trust-based relationships, enhancing psychological safety, improving access to job resources, and creating meaningful and supportive work environments. The findings therefore reinforce the strategic importance of leadership development in promoting sustainable organisational performance and employee well-being.

RECOMMENDATIONS

Based on the findings of the study, several recommendations can be advanced for organisations, leaders, and human resource practitioners seeking to enhance employee engagement in contemporary workplaces. Organisations seeking to enhance employee engagement should invest in leadership development programmes that strengthen emotional intelligence, ethical conduct, communication, inclusivity, and employee empowerment. Leaders should foster trust, psychological safety, participatory decision-making, and supportive workplace relationships while simultaneously enhancing job resources such as autonomy, recognition, mentoring, constructive feedback, and professional development opportunities. Organisations should also adopt leadership practices aligned with the Job Demands–Resources framework by effectively managing excessive workloads and role ambiguity to minimise burnout and disengagement. In increasingly digital and diverse workplaces, leaders must embrace adaptive and inclusive leadership approaches that sustain employee connection, motivation, and well-being in both physical and virtual work environments.

Implications of the Study

From a practical standpoint, the findings underscore the imperative for modern organisations to operationalise leadership as a dual-pathway mechanism capable of driving sustained employee engagement. First, organisational leadership development frameworks must transcend traditional transactional and purely relational paradigms by equipping managers with both interpersonal capabilities such as empathetic communication and trust-building and structural resource allocation competencies, including workload balancing and the strategic delegation of task autonomy. Second, to cultivate a workplace climate conducive to high-quality social exchanges, metrics evaluating managerial performance should explicitly institutionalise indicators of inclusive communication, psychological safety, and error tolerance. Finally, in response to the operational complexities of contemporary hybrid and digitally mediated environments, practitioners must establish adaptive resource-provisioning systems; leveraging continuous digital feedback mechanisms enables leaders to enhance role clarity, buffer excessive workplace demands, and mitigate employee burnout.

Methodological Limitations and Future Research Agenda

While this study offers a comprehensive conceptual synthesis, its insights must be considered alongside several methodological boundaries inherent to its design. First, as a qualitative and non-empirical traditional literature review, the analysis relies on secondary interpretations of published scholarship rather than primary empirical data. Second, although structured inclusion and exclusion criteria were implemented to guide the selection process, traditional review methodologies inherently carry risks of publication and selection bias when compared to exhaustive systematic meta-analyses. Finally, because the proposed dual-pathway model is derived conceptually, the precise directionality, statistical causality, and specific mediation effect sizes between variables remain to be quantitatively validated.

To build upon this conceptual foundation, future research should pursue several empirical avenues. Methodologically, scholars are encouraged to quantitatively test the proposed dual-pathway framework using Structural Equation Modelling (SEM) to evaluate the relative mediating weights of relational factors (such as psychological safety under SET) alongside structural job resources (under the JD-R model). Furthermore, employing longitudinal designs or daily diary studies would offer deeper insights into how leadership behaviours dynamically influence fluctuations in employee vigor, dedication, and absorption over time. From a contextual perspective, comparative empirical research across developed and developing economies is needed to examine how macroeconomic stability or resource constraints moderate the interplay between relational and structural leadership mechanisms. Lastly, given the rapid evolution of modern work structures, future inquiries should investigate how emerging digital, virtual, and AI-assisted leadership practices influence psychological safety and resource provisioning within fully remote and hybrid environments.

CONCLUSION AND HYPOTHESES EVALUATION

Rather than offering a purely descriptive narrative, this conclusion analytically evaluates the conceptual framework by assessing whether the proposed hypotheses are theoretical sustained by the literature synthesis:

Table 2 illustrates the Evaluation of Conceptual Hypotheses.

Table 2: Evaluation of Conceptual Hypotheses.

Hypothesis	Theoretical Focus	Analytical Evaluation / Outcome
H ₁	SET Relational Dynamics	Confirmed: Authentic, transformational, and servant leadership styles consistently cultivate social reciprocity, driving engagement through trust and mutual obligations.
H ₂	JD-R Structural Dynamics	Confirmed: Leadership serves as an essential meta-resource that enhances task autonomy, developmental feedback, and buffers high job demands.
H ₃	Mediating Mechanisms	Confirmed: Psychological safety, trust, and POS act as indispensable psychological linkages between leader behavior and the vigor/dedication components of engagement.
H ₄	Integrated Model	Confirmed: Synthesizing SET and JD-R resolves the individual limitations of both models, offering a superior framework that addresses both relational commitment and task capability.

In summary, leadership functions as a critical catalyst for employee engagement in contemporary organizations. Sustainable engagement cannot be achieved through isolated relational gestures or structural resource allocations alone; it requires an integrated strategy that addresses employees' emotional, social, and functional work needs simultaneously.

REFERENCES

- Ahakwa, I., Yang, J., Agbaam, C. A., & Kpene, A. V. (2021). Green human resource management practices and employee green behavior. *Journal of Public Affairs*, 21(4), e2625.
- Bwalya, K. (2023). Social exchange theory and employee relations in developing economies. *Journal of Organizational Behavior*, 44(3), 312–328
- Chakraborty, T., Sharada, V. S., & Anand, R. (2024). Fostering a sense of belonging: A strategic approach to employee engagement. *From the Editor's Desk*. <https://cimr.in/faculty-research.html#research-Journals>
- Chikodzi, L., & Nyatsanza, T. (2020). Leadership as a non-financial driver of morale in volatile economic contexts. *African Journal of Business Management*, 14(8), 241–252.
- Chimakati, F. M. (2024). Credible, Value-based and authentic leadership: Theory, action and reflection praxis integration. *African Journal of Emerging Issues*, 6(21), 111-122. <https://ajoeijournal.org/sys/index.php/ajoei/article/view/731>
- Christian, M. S., Garza, A. S., & Slaughter, J. E. (2020). Work engagement: A quantitative review and test of its relations with task and contextual performance. *Personnel Psychology*, 64(1), 89–136.
- Decuyper, A., & Schaufeli, W. (2020). Leadership and work engagement: Exploring explanatory mechanisms. *German Journal of Human Resource Management: Zeitschrift Für Personalforschung*, 34(1), 69-95. <https://doi.org/10.1177/2397002219892197>
- Gallup. (2023). *State of the Global Workplace: 2023 Report*. Gallup Press.
- Hakanen, J. J., & Roodt, G. (2020). Advanced applications of the JD-R model in volatile work contexts. *Work & Stress*, 34(2), 115–131.
- Haslam, S. A., Reicher, S. D., & Platow, M. J. (2020). *The new psychology of leadership: Identity, influence and power*. Routledge.
- Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal*, 33(4), 692–724.
- Kwon, K., & Kim, T. (2020). An integrative literature review of employee engagement and innovative behavior: Revisiting the JD-R model. *Human resource management review*, 30(2), 100704. <https://doi.org/10.1016/j.hrmr.2019.100704>
- Lai, F. Y., Tang, H. C., Lu, S. C., Lee, Y. C., & Lin, C. C. (2020). Transformational leadership and job performance: The mediating role of work engagement. *SAGE Open*, 10(1), 1–11. <https://doi.org/10.1177/2158244019899085>
- Nauman, S., Musawir, A. U., & Malik, S. Z. (2021). Leadership and social exchange quality in modern workplaces. *Journal of Management & Organization*, 27(4), 670–688.
- Ohemeng, F. L., Obuobisa Darko, T., & Amoako-Asiedu, E. (2020). Bureaucratic leadership, trust building, and employee engagement in the public sector in Ghana: The perspective of social exchange theory. *International Journal of Public Leadership*, 16(1), 17-40. <https://doi.org/10.1108/IJPL-05-2019-0018>
- Park, J., Han, S. J., Kim, J., & Kim, W. (2022). Structural relationships among transformational leadership, affective organisational commitment, and job performance: the mediating role of employee engagement. *European Journal of Training and Development*, 46(9), 920-936. <https://doi.org/10.1108/EJTD-10-2020-0149>
- Schaufeli W. (2021). Engaging Leadership: How to Promote Work Engagement? *Frontiers in psychology*, 12, 754556. <https://doi.org/10.3389/fpsyg.2021.754556>
- Schaufeli, W. B., & Massarone, L. (2022). The conceptualization and measurement of work engagement. *International Journal of Environmental Research and Public Health*, 19(5), 2890.

- Schaufeli, W. B., van Tuin, L., & colleagues. (2020). Engaging leadership and its implication for work engagement and job outcomes. *International Journal of Environmental Research and Public Health*, 17(4), 1–16. <https://doi.org/10.3390/ijerph17030776>
- Scholastica. (2023). The mediating effect of trust on psychological safety and job satisfaction. *Journal of Business and Management*, 4(2), 1–18. <https://doi.org/10.1111/beer.12556>
- Snyder, H. (2020). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333–339. <https://doi.org/10.1016/j.jbusres.2019.07.039>
- Spears, R. (2021). Social influence and group identity. *Annual review of psychology*, 72(2021), 367-390. <https://doi.org/10.1146/annurev-psych-070620-111818>
- Wiley. (2025). Inclusive leadership and work engagement: Exploring the role of psychological safety and trust in leader in multiple organisational contexts. *British Journal of Educational Research*, 51(2), 1–20. <https://doi.org/10.1111/beer.12556>

CAPACITY PLANNING AND INVENTORY MANAGEMENT: AN AUTOMOTIVE MANUFACTURER'S CASE STUDY IN SOUTH AFRICA

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ABSTRACT

The South African automotive industry is distinguished by the significance of its products and the variety of its inventory. There are essential strategic considerations that guarantee a quick time to market. Efficiently managing this crucial resource is essential to guarantee the strong competitiveness of automotive manufacturers. Capacity planning in the automotive sector involves calculating the most efficient production capacity needed to fulfil market demand effectively. Inventory management in the automotive industry involves overseeing the movement of raw materials, components and completed products across the supply chain. This study examines the significance of capacity planning and inventory management in improving operational efficiency and performance in the automotive industry. The study followed a quantitative approach with 215 employees in a car manufacturing company in Johannesburg, South Africa. Through a structural equation modelling (SEM) analysis, the results indicated a strong, positive, and statistically significant relationship ($\beta = 0.830$, $p < 0.001$) between Capacity Planning Practices (CPP) and Inventory Management Practices (IMP), suggesting that effective capacity planning directly enhances inventory management by optimising stock levels, reducing shortages or surpluses, and improving overall supply chain efficiency.

Keywords: manufacturing systems, inventory and supply chain management, capacity planning, production planning & control.

INTRODUCTION

Capacity planning and inventory management are vital components of the automotive sector. Capacity planning establishes an organisation's manufacturing capacity to satisfy fluctuating product demands (Krajewski & Malhotra, 2022). This technique facilitates the assurance of optimal allocation of resources, encompassing equipment, manpower and resources that effectively meet production demands (Ivanov et al., 2021). Capacity planning is a crucial aspect of the automotive industry because of intense competition and the requirement to fulfil varying customer requirements. Through efficient capacity planning, automotive producers can maximise manufacturing procedures, minimise expenses, and enhance overall operational effectiveness (Ivanov et al., 2021).

Inventory management entails supervising the movement of goods from manufacturers to warehouses and retailers (Muller, 2019). According to Caro & Gallien (2010), efficient inventory management is crucial in the automotive sector to ensure the timely availability of the necessary parts and components for production schedules and customer needs. Efficient inventory management in the automotive sector helps minimise surplus inventory, decrease carrying expenses, and prevent shortages or manufacturing delays. Automotive firms can enhance their

supply chain efficiency and profitability by employing resilient inventory management strategies (Caro & Gallien, 2010).

Problem Statement

The South African automotive manufacturing sector struggles with operational inefficiencies and weak supply chain resilience due to gaps in integrating capacity planning and inventory management (Ramezankhani et al., 2018). Poor capacity planning leads to production bottlenecks and long lead times, while ineffective inventory management results in excess stock shortages, and higher storage costs (Ogbo & Ukpere, 2014). Although these challenges are recognised, most studies treat these functions separately, offering limited insight into their combined optimisation within South Africa's unique context of volatile demand, infrastructural constraints, and global competition. This gap restricts strategies for jointly leveraging these practices to improve responsiveness, cut costs, and sustain competitiveness.

Theoretical Background and Research Gap

Capacity planning and inventory management can be understood through the lens of Resource-Based View (RBV) and contingency theory. RBV suggests that firms achieve competitive advantage by effectively deploying internal resources such as labour, equipment, production capacity, inventory systems, and managerial capabilities. In this study, capacity planning is viewed as a strategic internal capability that enables automotive manufacturers to align resources with production demand. Contingency theory further supports the study by arguing that operational practices must be aligned with environmental conditions such as demand uncertainty, supply chain disruptions, infrastructure constraints, and market competition. In the South African automotive sector, these conditions make the integration of capacity planning and inventory management particularly important.

Although existing studies have examined capacity planning and inventory management separately, limited research has empirically tested the relationship between these two practices within the South African automotive manufacturing context. This presents a theoretical and practical gap, as manufacturers require integrated planning systems to improve responsiveness, reduce stock imbalances, and strengthen operational performance.

Aim of the Study

This study examines the significance of capacity planning and inventory management in improving operational efficiency and performance in the automotive industry.

Objectives of the Study

The study's objectives included the following: (1) To examine the importance of capacity planning in matching production capabilities with market demand changes in the South African automotive sector; (2) To assess the effects of efficient inventory management strategies on cost reduction and supply chain performance improvement in automotive manufacturing; and (3) To look at the impact that Capacity Planning and Inventory Management have on one another in the Automotive Industry.

Research Hypotheses

Based on the Resource-Based View and contingency theory, the following hypotheses were developed:

H₁: Capacity planning practices have a positive and significant influence on inventory management practices in the automotive manufacturing sector.

H₂: Effective capacity planning improves the alignment between production capacity and market demand in the automotive manufacturing sector.

H₃: Effective inventory management practices contribute to improved cost control and supply chain performance in automotive manufacturing.

Scope and Limitations of the Study

The study was restricted to operations conducted exclusively in a car manufacturer's company in Johannesburg, South Africa. This analysis did not encompass all the measures undertaken by the automotive sector in South Africa, which can constitute a limitation of this study. However, because the company under study is a global one with various branches, it can be said that some of the study's findings could be generalised, at least to those branches.

Value of the study

This study contributes to operations management literature by empirically examining the relationship between capacity planning and inventory management within a South African automotive manufacturing context. While previous studies have widely discussed these functions as separate operational practices, this study positions them as interdependent capabilities that jointly influence supply chain efficiency and manufacturing responsiveness. The study therefore addresses a contextual gap by providing evidence from an emerging-market automotive environment characterised by demand volatility, infrastructure constraints, and global competitiveness pressures. Practically, the findings offer managers insight into how improved capacity planning can support better inventory control, reduce shortages and excess stock, and enhance operational performance.

BRIEF LITERATURE REVIEW

Capacity Planning in the Automotive Industry

Capacity planning in the automotive sector is essential for calculating the necessary production capacity to satisfy consumer product demand (ElMaraghy et al., 2013). It is an intricate undertaking that necessitates an attentive oversight of multiple aspects, including economic conditions, manufacturing capacity and the availability of resources (ElMaraghy et al., 2013). The capacity planning process is initiated by predicting car demand, considering several aspects such as customer preferences, financial situations, and regulatory needs. The customer demand projection is used as the basis for determining the production capacity that is needed. According to Yin et al. (2018), automotive companies must evaluate their current factories, equipment, and staff to assess if they can satisfy the predicted demand. In the event of a discrepancy between demand and capacity, producers may need to consider expanding current places of work and purchasing new technologies (Gattorna, 2017). Efficient capacity planning in the automotive industry can assist businesses in maximising production efficiency, minimising expenses, and enhancing customer loyalty (ElMaraghy et al., 2013). Businesses can prevent the inefficient use of resources or excessive manufacturing of automotive products by matching their production capacity with market demand, hence avoiding potential financial drawbacks (Ulaga & Reinartz, 2011). Using a comprehensive examination of demand projections and strategic optimisation of production capacities, automotive manufacturers may prepare themselves for achievement in an extremely competitive industry (Ulaga & Reinartz, 2011).

Inventory Management in the Automotive Industry

Inventory management in the automotive business is an important process that entails supervising the movement of products from distributors to producers to dealerships (Onisimchuk, 2023). Efficient inventory management is crucial for guaranteeing the timely availability of appropriate parts and vehicles in the required quantities to satisfy customer demand while reducing expenses and maximising efficiency. Inventory management in the automotive sector starts with distributors who furnish producers with materials and parts (Sampson & Spring, 2012). According to Sampson & Spring (2012), these components are integrated into automotive products along the assembly line. Companies must continuously monitor the status of their stocks to ensure they maintain an appropriate quantity of components to fulfil production schedules while avoiding an excess of stock that could block resources and warehouse capacity. Dealerships must efficiently manage their inventory to ensure they have enough automobiles available to meet client demand while avoiding excessive inventory that could result in depreciation and higher holding costs (Kempf et al., 2011). Efficient inventory management in the automotive sector entails employing advanced techniques for forecasting to anticipate consumer demand for vehicles and parts, establishing just-in-time inventory systems that reduce stock levels, and employing equipment such as stock tracking systems for monitoring inventory levels in real time (Lim et al., 2014). By optimising inventory management procedures, car manufacturers and dealerships can

reduce costs, improve cash flow, and increase customer satisfaction. In addition, effective inventory management can reduce waste and enhance durability by lowering surplus inventory and mitigating the negative environmental effects of transit and warehousing (Ivanov et al., 2021).

Relation between Capacity Planning and Inventory Management in the Automotive Industry

Capacity planning and inventory management are fundamental activities in the automotive industry, crucial for optimising operational efficiency and satisfying customer demand (Martínez-Costa et al., 2014). Martínez-Costa et al. (2014) define capacity planning as determining the production capacity required to satisfy the market's desire for automotive components. At the same time, inventory management is responsible for supervising the movement of goods from suppliers to factories to dealerships. The relationship between capacity planning and inventory management in the automotive sector is mutually beneficial (Martínez-Costa et al., 2014). Capacity planning determines the amount of capacity for production available for manufacturing automotive and the timing of production runs. This information is then used to influence inventory management decisions. Producers can enhance their inventory management by understanding manufacturing capacity, assisting them in ensuring the availability of appropriate components and cars as required (Gansterer, 2015). On the other hand, inventory management has an impact on capacity planning by affecting schedules for production and the distribution of resources. Utilising efficient inventory management strategies, such as adopting just-in-time inventory systems and optimising supply chain logistics, can assist enterprises in reducing surplus inventory and improving production operations (Hansen & Grunow, 2015). As a result, this can improve the average capacity efficiency and decrease the potential for production bottlenecks. By connecting capacity planning with inventory management, automotive companies may enhance production efficiency, minimise expenses, and enhance consumer loyalty (Chen et al., 2019). Organisations can enhance operational performance and profitability by effectively managing production capacity and inventory levels, preventing inadequate equipment use or automotive overproduction. The correlation between capacity planning and inventory management in the automotive sector is crucial for guaranteeing efficient processes, fulfilling client requirements, and increasing profits. By efficiently integrating these two processes, automotive companies can gain an advantage in an increasingly competitive and demanding business environment (Chen et al., 2019).

International Business and Technology Perspective

International research shows that automotive manufacturers increasingly rely on integrated planning systems, digital inventory platforms, real-time demand forecasting, and advanced production scheduling to improve responsiveness and supply chain resilience. In developed manufacturing contexts, capacity planning and inventory management are often supported by Industry 4.0 technologies such as enterprise resource planning systems, data analytics, automation, and digital supply chain coordination. However, in emerging economies such as South Africa, manufacturers often face additional constraints, including infrastructure instability, supplier delays, skills gaps, and fluctuating market demand. This study therefore adds value to the broader international business and technology literature by examining how capacity planning and inventory management interact within a developing-country automotive manufacturing environment.

RESEARCH METHODS

Research Design

Using numerical data, the study utilised a quantitative approach to analyse capacity planning and inventory management in the automotive industry. In addition, given the large number of participants and the study's design, a quantitative approach was considered the most suitable technique. The focus was on one automotive company in Johannesburg, South Africa, which makes the study follow a case study approach, limiting the results to the company only.

Data Collection

This study utilised both primary and secondary data. Primary data collected directly from stakeholders such as logistics distributors, clients, managerial staff, and automotive warehouse employees, was gathered through survey questionnaires. Secondary data was obtained from existing sources like articles, manuals, and online resources related to the company under study. The study employed a descriptive survey with closed-ended questionnaires, a widely used quantitative method due to its data collection and analysis efficiency. Participants completed the survey via secure online links or hard copies, ensuring anonymity and allowing for a combination of open-ended and closed-ended responses.

Population and Sample

The study involved a purposive sample of 215 employees (graduate trainees, logistics specialists, etc.) from an automotive company in Johannesburg, South Africa, with approximately 500 employees making up the study population.

Data Analysis

IBM SPSS version 29 was used to analyse the data provided by the participants. A descriptive analysis included calculating means, standard deviations, and frequencies. Inferential statistical analysis, specifically structural equation modelling, examined the interrelationship between the automobile industry's capacity planning and inventory management. Inferential analysis was also utilised to test the hypotheses outlined in the introduction.

Reliability

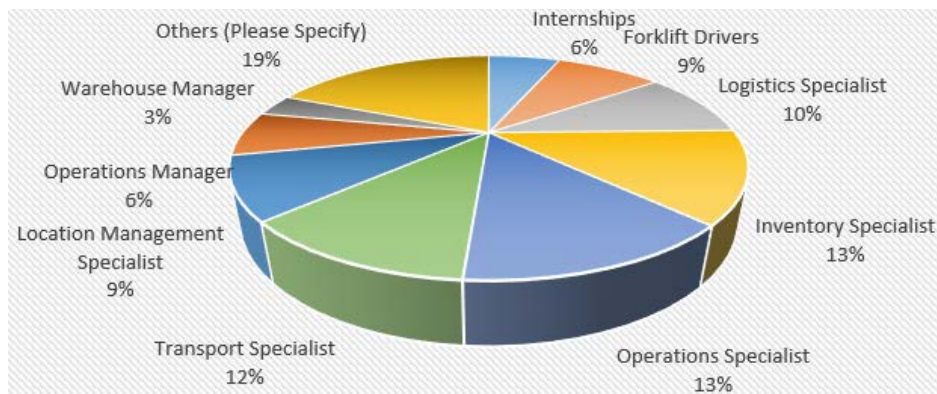
The study's reliability assessment utilised Cronbach's alpha, a widely recognised and robust statistical measure for evaluating the internal consistency of research instruments. Cronbach's alpha evaluates the extent to which items in a scale or questionnaire measure the same underlying construct, providing insights into the reliability and stability of the measurement instrument. This methodological approach ensures that the data collected is reliable and consistent, enhancing the credibility and validity of the study's findings.

RESULTS AND DISCUSSION

Descriptive Analysis: Respondent's Positions

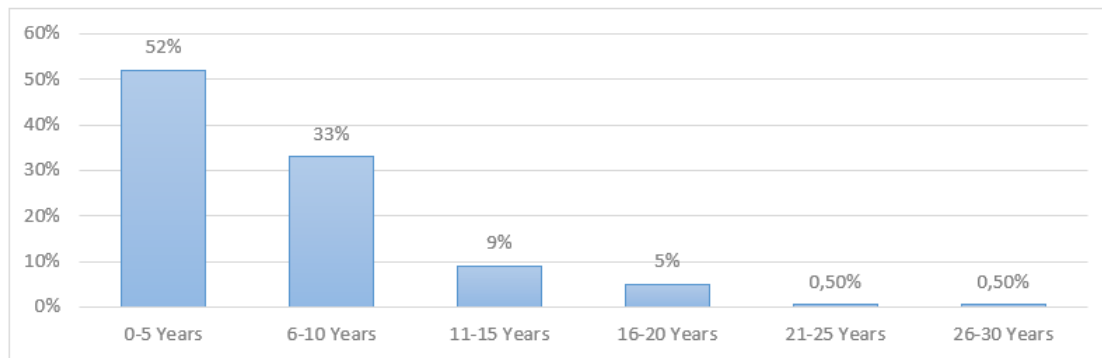
Analysis of participant roles (Figure 1) revealed a diverse workforce (pickers, interns, managers, etc.). The largest group (19%) relied on external service providers, potentially increasing logistics errors. Interns (13%) collaborated with inventory specialists (13%) to manage stock, while a few held managerial or operational roles (9%). This suggests a heavy reliance on external service providers, raising concerns about potential logistics errors due to frequent staff turnover.

Figure 1: Respondents' positions in the company.



Descriptive Analysis: Respondent's Years of Experience

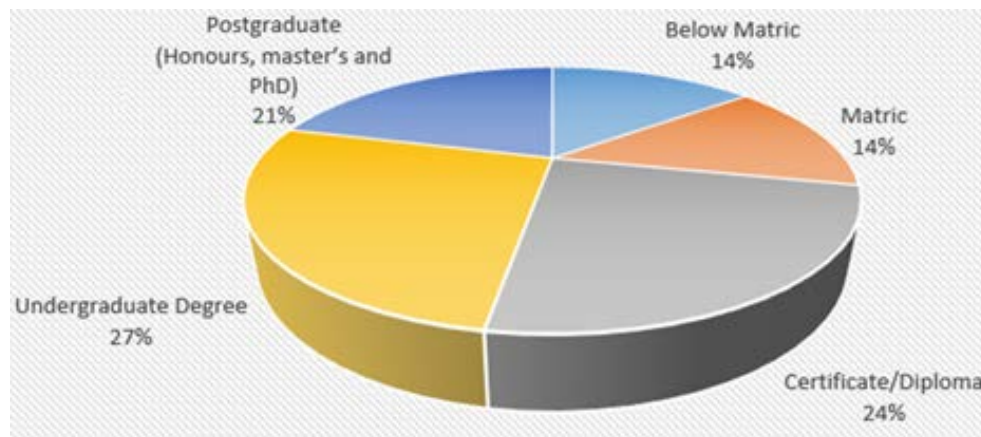
Figure 2: Respondents' years of experience in the current position.



Analysis of participant tenure (Figure 2) revealed a preference for young employees (52%), potentially fostering a dynamic work environment. A significant portion (33%) had 6-10 years of experience, while a few held long-term positions (0.5%). This suggests a strategy of promoting employee mobility and leadership opportunities.

Descriptive Analysis: Respondent's Qualifications

Figure 3: Respondents' qualifications.



Education analysis (Fig. 3) showed a focus on undergraduate degrees (27%), followed by diplomas/certificates (24%) and postgraduates (21%). Few lacked formal qualifications (14%). This suggests the company prioritises strong communication and understanding across departments.

Descriptive analysis: Capacity planning practices

Table 1: Capacity Planning Practices.

Rank	Capacity planning practices	Mean	Std. Deviation
1	Capacity Planners use labour efficiently to meet daily targets.	3.91	.986
2	Capacity Planners use a daily working schedule to measure productivity.	3.88	1.046
3	Supervisors understand the overall demand for the products.	3.88	1.007
4	The supervisor focuses on the capacity and demand of products or services.	3.87	1.018
5	Managers purchase additional equipment for the organisation.	3.87	1.099
6	Capacity Planners meet current and future demand for the products.	3.71	1.000
7	The team Leader assesses the current production capacity of the organisation.	3.67	.945

Table 1 highlights that capacity planners (mean score of 3.91) and supervisors (mean score of 3.88) play a critical role in capacity planning. Their tasks involve assessing production, labour utilisation, and product demand to meet current and future needs. Managers (mean score of 3.87) contribute by strategically investing in equipment. Team leaders (mean score of 3.67) also participate in the process by evaluating production capacity.

Descriptive Analysis: Inventory Management Practices

Table 2 highlights the critical role of Inventory Specialists (mean score of 3.99) and Inventory Planners (mean score of 3.97) in managing inventory using FIFO, LIFO, and Batch Tracking methods. Management's establishment of KPIs (mean score of 3.94) and the Team Leader's optimisation of pick and pack operations (mean score of 3.93) are also significant contributors. Finally, training Warehouse Associates in stock control (mean score of 3.88) ensures proficiency

Table 2: Management Practices.

Rank	Statements	Mean	Std.Deviation
1	An Inventory Specialist manages stock by inventory type	3.99	1.005
2	Inventory Planners use an inventory system like FIFO or LIFO for the products in the organisation	3.97	1.004
3	Inventory Planners use the batch-tracking method	3.97	1.027
4	Inventory Planners use a safety stock system to prevent stock-outs	3.96	.954
5	Supervisor overseeing the inventory control of the organisation	3.95	.970
6	Inventory Specialists categorise Inventory using ABC Analysis	3.95	1.022
7	Management establishes inventory KPIs for warehouse employees.	3.94	1.028
8	An Inventory Specialist uses an Accurate Reorder Point Formula	3.94	1.017
9	The team leader optimises the pick and pack process in the warehouse.	3.93	.964
10	Warehouse Associates are trained in stock control procedures	3.88	.947

Inferential Analysis: Structural Equation Modelling

Table 3: Structural Equation Coefficient.

	Impact between variables	Sample mean	Standard deviation	T statistics	P values
CPP* → IMP*	0.830	0.829	0.039	21.474	0.000

**CPP-Capacity Planning Practices*

**IMP-Inventory Management Practices*

The SEM results indicate a strong, positive, and statistically significant relationship ($\beta = 0.830$, $p < 0.001$) between Capacity Planning Practices (CPP) and Inventory Management Practices (IMP), suggesting that effective capacity planning directly enhances inventory management by optimising stock levels, reducing shortages or surpluses, and improving overall supply chain efficiency. While the model specifies a direct CPP → IMP path, in practice, this relationship may be influenced by mediating factors such as supplier reliability, production scheduling, and market demand variability.

The SEM results support the proposed hypothesis that capacity planning practices have a positive and significant influence on inventory management practices. This finding is consistent with previous studies which argue that effective capacity planning improves production scheduling, resource allocation, and supply chain responsiveness. The strong coefficient suggests that when production capacity is properly planned, inventory systems are better able to maintain appropriate stock levels, reduce shortages, and avoid unnecessary surplus. This confirms that inventory performance in automotive manufacturing is not only dependent on warehouse-level practices but also on upstream production planning decisions. The findings also extend previous literature by providing empirical evidence from the South African automotive sector, where operational planning is influenced by local challenges such as infrastructure constraints, labour availability, supplier uncertainty, and global competitive pressure. Therefore, the study demonstrates that capacity planning and inventory management should not be treated as isolated operational functions but as integrated strategic processes.

Inferential Analysis: Cronbach's Alpha

Table 4: Cronbach's Alpha Results for Capacity Planning Practices.

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.950	.950	7

Table 5: Cronbach's Alpha Results for Inventory Management Practices.

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.961	.961	10

Reliability analysis assesses measurement consistency (Tavakol & Dennick, 2011). Cronbach's alpha, a coefficient between 0 and 1, is used. Generally, above 0.7 indicates acceptable reliability, with higher values preferred for more precise measurements. Tables 4 and 5 show that the Cronbach alpha coefficient for the items measuring capacity planning and Inventory management practices was more than 0.7. Consequently, these items possess reliability, rendering them suitable for the development of factors

Managerial Implications

The findings provide several practical implications for automotive manufacturing managers. First, managers should strengthen the integration between production planning and inventory control by ensuring that capacity planners, inventory specialists, warehouse teams, and supervisors work with shared demand and production data. Second, the strong relationship between capacity planning and inventory management suggests that manufacturers should invest

in real-time planning systems that connect production schedules, stock levels, supplier lead times, and customer demand forecasts. Third, managers should review capacity planning practices regularly to prevent production bottlenecks, stockouts, and excess inventory. This can be supported through better use of forecasting tools, safety stock policies, reorder point systems, ABC analysis, and performance-based inventory KPIs. Finally, automotive firms should consider adopting digital planning technologies and training programmes to improve decision-making accuracy and strengthen supply chain resilience.

CONCLUSION

This study examined the relationship between capacity planning practices and inventory management practices within an automotive manufacturing company in Johannesburg, South Africa. Guided by the Resource-Based View and contingency theory, the study tested the hypothesis that effective capacity planning positively influences inventory management. The SEM results confirmed a strong, positive, and statistically significant relationship between Capacity Planning Practices and Inventory Management Practices, indicating that improved production planning contributes directly to better inventory control. The findings are consistent with previous operations management literature, which emphasises the importance of aligning production capacity, resource allocation, demand forecasting, and inventory systems. However, this study extends existing knowledge by providing empirical evidence from the South African automotive manufacturing context, where firms operate under conditions of demand uncertainty, infrastructure challenges, and global competitive pressure.

Practically, the study shows that automotive manufacturers should treat capacity planning and inventory management as integrated strategic functions rather than separate operational activities. Improved coordination between these areas can reduce stock imbalances, minimise production delays, improve resource utilisation, and strengthen supply chain performance. The study recommends that automotive firms invest in integrated planning systems, real-time inventory visibility, employee training, and data-driven forecasting tools to improve operational efficiency and competitiveness.

AI Declaration: This paper utilised artificial intelligence tools, including ChatGPT, to assist with language editing and structural refinement. All core ideas, analysis, and conclusions are the original work of the author(s). The author(s) accept full responsibility for the accuracy, integrity, and originality of the content.

REFERENCES

- Caro, F., & Gallien, J. (2010). Inventory management of a fast-fashion retail network. *Operations Research*, 58(2), 257–273.
- Chen, C. K., Palma, F., & Reyes, L. (2019). Reducing global supply chains' waste of overproduction by using lean principles: A conceptual approach. *International Journal of Quality and Service Sciences*, 11(4), 441–454.
- ElMaraghy, H., Schuh, G., ElMaraghy, W., Piller, F., Schönsleben, P., Tseng, M., & Bernard, A. (2013). Product variety management. *CIRP Annals*, 62(2), 629–652.
- Gansterer, M. (2015). Aggregate planning and forecasting in make-to-order production systems. *International Journal of Production Economics*, 170, 521–528.
- Gattorna, J. (Ed.). (2017). *Strategic supply chain alignment: Best practice in supply chain management*. Routledge.
- Hansen, K. R., & Grunow, M. (2015). Modelling ramp-up curves to reflect learning: Improving capacity planning in secondary pharmaceutical production. *International Journal of Production Research*, 53(18), 5399–5417.
- Ivanov, D., Tsipoulanidis, A., & Schönberger, J. (2021). *Global supply chain and operations management: A decision-oriented introduction to the creation of value*. Springer.
- Kempf, K. G., Keskinocak, P., & Uzsoy, R. (Eds.). (2011). *Planning production and inventories in the extended enterprise: A state of the art handbook* (Vol. 1).

- Krajewski, L. J., & Malhotra, M. K. (2022). *Operations management: Processes and supply chains*. Pearson.
- Lim, L. L., Alpan, G., & Penz, B. (2014). Reconciling sales and operations management with distant suppliers in the automotive industry: A simulation approach. *International Journal of Production Economics*, 151, 20–36.
- Martínez-Costa, C., Mas-Machuca, M., Benedito, E., & Corominas, A. (2014). A review of mathematical programming models for strategic capacity planning in manufacturing. *International Journal of Production Economics*, 153, 66–85.
- Muller, M. (2019). *Essentials of inventory management*. HarperCollins Leadership.
- Ogbo, A. I., & Ukpere, W. I. (2014). The impact of effective inventory control management on organisational performance: A study of 7up bottling company Nile Mile Enugu, Nigeria. *Mediterranean Journal of Social Sciences*, 5(10), 109–118.
- Onisimchuk, M. (2023). *Strategic management of automobile dealership center distribution channels*.
- Ramezankhani, M. J., Torabi, S. A., & Vahidi, F. (2018). Supply chain performance measurement and evaluation: A mixed sustainability and resilience approach. *Computers & Industrial Engineering*, 126, 531–548.
- Sampson, S. E., & Spring, M. (2012). Customer roles in service supply chains and opportunities for innovation. *Journal of Supply Chain Management*, 48(4), 30–50.
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53.
- Ulag, W., & Reinartz, W. J. (2011). Hybrid offerings: How manufacturing firms combine goods and services successfully. *Journal of Marketing*, 75(6), 5–23.
- Yin, Y., Stecke, K. E., & Li, D. (2018). The evolution of production systems from Industry 2.0 through Industry 4.0. *International Journal of Production Research*, 56(1–2), 848–861.

OPTIMIZING INVENTORY MANAGEMENT WITH ARTIFICIAL INTELLIGENCE DRIVEN PREDICTIVE ANALYTICS

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ABSTRACT

This study examines the implementation of the vertical lift module spare parts shuttle within Global Automotive Company in the maintenance warehouse operations, concentrating on the optimization of storage utilization through Artificial Intelligence driven analytics. The study aimed to explore how Artificial Intelligence can enhance inventory management by altering inventory levels in response to changes in storage capacity and developing affordable solutions to overcome storage limitations. Using qualitative data collected from semi-structured interviews with key stakeholders at Global Automotive Company, the findings reveal that vertical storage systems significantly improve operational efficiency, space utilization, and inventory accuracy. Although challenges such as technical issues and the need for ongoing training were also identified. The study concludes that to enhance training initiatives, funding automation, and encouraging continuous improvement methodologies. Global Automotive Company Maintenance Warehouse can improve its supply chain performance and keep a competitive edge in the automotive sector by tackling these issues and utilizing cutting-edge technologies.

Keywords: vertical lift module, global automotive company, Artificial Intelligence, vertical storage systems and inventory management.

INTRODUCTION

Efficient storage management is an important part of operational processes and supply chain performance in the competitive business environment (Ghadge et al., 2020). Advanced technology, such as Artificial Intelligence driven predictive analytics in warehouse operations, opens new horizons to revolutionize storage practices. This study looked at Global Automotive Company maintenance warehouse operations to explore the application of Artificial Intelligence predictive analytics in optimizing vertical storage systems. Global Automotive Company, a significant manufacturing site within the Global Automotive Company Group and the South African economy, plays a crucial role in producing premium automobiles and implementing advanced manufacturing methods. will need to create these components, incorporating the applicable criteria that follow.

While previous studies have examined AI-driven predictive analytics and automated storage systems independently, limited research has explored their combined application within maintenance warehouse operations in the automotive sector, particularly in developing economies such as South Africa. Existing international studies largely focus on large-scale distribution centres in Europe, North America, and Asia, where advanced digital infrastructure and automation maturity differ significantly from the operational realities of emerging markets. This study therefore contributes to current research by contextualising AI-enabled vertical storage optimisation within a South African automotive manufacturing environment characterised by storage limitations, supply chain disruptions, and energy instability. The study further extends existing literature by integrating operational, technological, and organisational perspectives into the evaluation of AI-driven inventory optimisation.

Background

The automotive industry is associated with high cost, high precision inventory components and just-in-sequence production processes, making inventory management not only a logistic function but a strategic function. Despite

years of operations, the automotive sector still experiences challenges with inefficiencies in inventory management, resulting in stockouts of important components and excess holding costs, which eventually cause production delays (Mohamed, 2024), (Shuma et al., 2024). Artificial Intelligence (AI) in the form of machine learning based predictive analytics offers an opportunity to improve inventory

Problem Statement

The storage of maintenance spares at the Global Automotive Company appears to be unreliable, which affects production volumes during equipment breakdowns due to limited storage capacity. In the current dynamic market environment, Global Automotive Company Maintenance store faces significant challenges in adequately managing inventory levels given the storage constraints, fluctuating demand patterns, supply chain disruptions, and high costs related to maintaining large storage facilities.

The most serious gap that exists in Global Automotive Company is the full implementation of advanced tools that could take the best advantage of artificial intelligence and predictive analytics for fine-tuning inventory control down to the unit level. Therefore, such advanced tools will reduce reliance on high levels of traditional storage capacity and will act as a buffer against uncertainty and inaccuracy while improving supply chain agility.

Research Question

The main research question guiding this study is as follows: How to Optimize Inventory Management with Artificial Intelligence Driven Predictive Analytics? Furthermore, the primary research question was subdivided into the following sub-questions: What role does AI-driven analysis play in optimizing storage utilization in inventory management? (1); How can inventory levels be adjusted to suit the prevailing changes in storage capacity? (2); How can a Global automotive company develop low-cost solutions to overcome storage limitations without compromising the performance levels of the supply chain? (3)

LITERATURE REVIEW

Introduction

AI applications in inventory management have shown promise in enhancing demand forecasting, replenishment planning, and safety stock management through machine learning and predictive analytics (Albayrak Ünal et al., 2023). Vertical storage systems, such as VLMs, maximize warehouse space by utilizing vertical height and automating retrieval, leading to improved operational efficiency (Shuma et al., 2024). The literature surrounding inventory management optimization with Artificial Intelligence (AI) driven predictive analytics converges on several key themes that are critical to understanding the current state and potential of AI applications in warehouse and supply chain management.

Predictive Analytics in Inventory Management

AI-enabled predictive analytics leverages historical data and machine learning algorithms to forecast demand, optimize reorder points, and reduce stockouts and overstock scenarios. This theme highlights the transformation from traditional static inventory models to dynamic, data-driven approaches that respond to real-time fluctuations in demand and supply (Mohamed, 2024). Predictive models have demonstrated increased accuracy in demand forecasting, which directly impacts inventory turnover and holding costs (Shuma et al., 2024).

Artificial Intelligence Inventory Management System

Artificial Intelligence tools such as deep learning, machine learning, and reinforcement learning are increasingly being used in inventory management. The tools encompass both supervised and unsupervised learning, which use labelled datasets to train models that can predict outcomes based on input features and identify patterns in data without prior labelling (Patka et al., 2022). Deep learning employs neural networks to analyze complex datasets, of which deep learning acts as a subset of machine learning. In inventory management, deep learning systems techniques can be

applied to predictions of time series, allowing companies to future forecast the material need based on historical records. Shuma et al., (2024) show how deep learning can improve demand forecasting accuracy by capturing intricate patterns in time series data, leading to better inventory planning and reduced stockouts. Reinforcement learning enhances decision-making processes by learning from interactions with the environment, making it particularly valuable for inventory control and replenishment strategies (Gottesman et al., 2025). For example, a reinforcement learning model can learn the optimal reorder points by simulating various inventory scenarios and adjusting its strategy based on observed outcomes.

Predictive analytics plays a vital role in inventory systems by allowing companies to forecast demand, predict lead times, and detect anomalies. Demand forecasting uses historical data and Artificial Intelligence algorithms to predict future demand correctly, which is essential for inventory management and reducing stock runouts. (Maveneer, 2023) highlights that advanced forecasting models can integrate various factors, such as seasonal fluctuation, publicity, and market trends, to improve accuracy.

Theoretical Lens for the Study

The premise used to conduct the theoretical analysis of vertical storage systems' optimization through AI stems from different theoretical perspectives that include: the technology acceptance model, the Transaction Cost Theory, and big data analytics theory.' These theories present a perspective advocating the use of Artificial Intelligence for the optimization of storage space, while explaining its effects on the operational performance of the supply chain functions.

Technology Adoption Model (TAM): TAM is the most common and accepted model for evaluating the adoption of new technology (Gupta, 2024). TAM is A theory that is planned to provide a conceptual model that explains how users adopt new technology (Gupta, 2024). The Technology Adoption Model suggests that the technology adoption of Artificial Intelligence predictive analytics in the management of storage will occur based on perceived helpfulness and ease of use (Gupta, 2024). In the context of this study, the TAM theory could explain how the Global automotive company would be susceptible to adopting an AI-driven technology to manage its storage.

Transaction Cost Theory (TCT): The TCT explains the measures adopted by an organisation to reduce the sum of its manufacturing operations (Cuypers et al., 2021). Since AI managed vertical storage would save on space and time, the TCT fits within this study as a theoretical tool.

Data Analytics Framework: The Data Analytics Framework explains the process of data gathering, analyzing, and interpreting as key to improving operational and strategic decisions. Using AI algorithms, organizations can extract information from historical inventory records to predict the forthcoming expectations and behavior (Sabharwal & Miah, 2021). The integration of these theoretical perspectives into the analysis of AI applications in storage optimization contributes to the understanding of the main processes and consequences of using AI-based predictive analysis in vertical storage systems. These frameworks underpin the research strategy and relate to major research questions predicated on the adoption and implementation of AI technologies in relation to storage management practices and their effects.

METHODOLOGY

The research methodology adopted for this study is grounded in qualitative research principles, specifically employing a grounded theory approach to explore the implementation of Artificial Intelligence (AI) driven predictive analytics in inventory management. Grounded theory is appropriate for this study as it allows for the generation of theory through systematic collection and analysis of data derived from participants lived experiences.

Theoretical Foundation

The methodology is underpinned by the Technology Acceptance Model (TAM) and Transaction Cost Theory (TCT). TAM provides a framework for understanding how users adopt new technologies based on perceived usefulness and ease of use (Gupta, 2024). This is crucial in examining employee acceptance of AI-driven inventory systems. TCT complements this by explaining how organizations seek to minimize operational costs and improve efficiency through

adoption (Cuypers et al., 2021). Together, these theories justify the exploration of both technological and organizational factors impacting AI implementation in inventory management.

Research Design and Justification

A qualitative research design was chosen to gain in-depth insights into stakeholder perceptions and experiences regarding the AI-powered Vertical Lift Module (VLM) system in a global automotive company.

Data Collection Methods

The study involved 15 purposively selected participants from the Global Automotive Company maintenance warehouse operations. Participants represented multiple stakeholder groups directly involved in inventory management and warehouse operations, including maintenance technicians, warehouse controllers, planners, finance personnel, supervisors, and operational managers. Participants were selected based on their experience with the AI-driven Vertical Lift Module (VLM) system and their involvement in inventory-related decision-making processes. The purposive sampling strategy ensured that participants possessed relevant operational and technical knowledge necessary to provide detailed insights into the implementation and performance of AI-enabled storage systems.

Ethical Considerations

Ethical approval was obtained from the University of Johannesburg Research Ethics Committee (Ethics Number: JBSREC2025050502) and the Global Automotive Company's internal review board. Participants were informed of their voluntary involvement, confidentiality measures, and the right to withdraw at any time without penalty. Data confidentiality and secure storage were rigorously maintained throughout the research process.

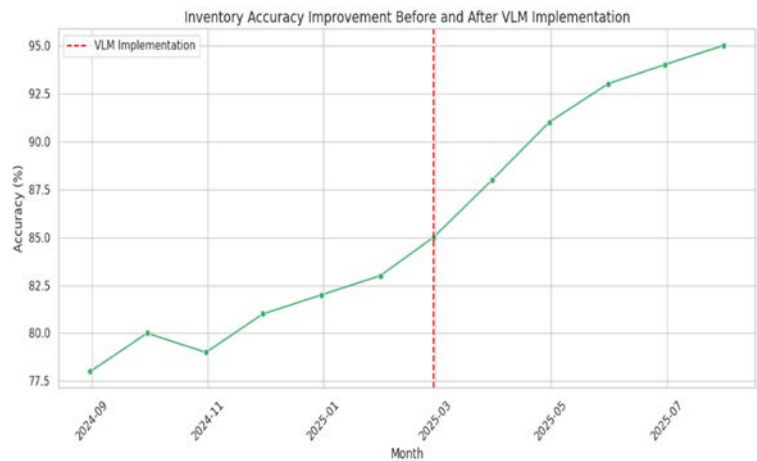
RESULTS

Impact Of AI-Driven Vertical Lift Module on Inventory Management

The integration of Artificial Intelligence (AI) driven Vertical Lift Module (VLM) spare parts shuttle significantly enhanced inventory management within the Global Automotive Company's maintenance warehouses. Participants uniformly reported marked improvements in space utilization, operational efficiency, and inventory accuracy following the implementation of the VLM system combined with predictive analytics.

The VLM system enabled vertical storage optimization, freeing up to 90% of floor space compared to traditional shelving systems. This increased storage density allowed the warehouse to accommodate a larger volume of spare parts without expanding the physical footprint, addressing the critical storage limitation challenge. Inventory accuracy improved substantially, rising from approximately 85% to 95% over a six-month period post-implementation. This improvement is attributed to the AI-driven real-time tracking and automated inventory updates integrated with the company's ERP system (e.g., SAP), which minimizes discrepancies between physical stock and recorded inventory.

Figure 1: Inventory Accuracy Improvement Over Six Months.



Source: Research data.

Furthermore, the system facilitated faster retrieval times by automatically delivering requested trays to picking stations, reducing average pick time by 20%. The ergonomic design reduced employee physical strain, contributing to enhanced productivity and a reduction in workplace injuries.

Challenges Encountered During Implementation

Despite these advantages, several challenges were identified. Load shedding (power outages) caused intermittent system downtime, which delayed operations and impacted continuity on workflow. Employees expressed concerns about the system’s dependency on continuous power supply, underscoring the need for robust backup power solutions.

The learning curve associated with adopting new technology was another significant issue. Some workers reported difficulty adapting to the new system interface and processes, which temporarily reduced productivity during the transition phase. Participants emphasized the importance of ongoing training and support to overcome these barriers.

Quantitative Assessment of Key Performance Indicators (KPIs)

Table 1 summarizes key performance indicators before and after the VLM system implementation, highlighting improvements in production efficiency, picking accuracy, and space utilization.

Table 1: Key Performance Indicators Pre- and Post-VLM Implementation Source: Research Data.

KPI	Before	After	Improvement (%)
Production Efficiency	65%	90%	25%
Picking Accuracy	75%	95%	20%
Space Utilization	50%	90%	40%

DISCUSSION

The results demonstrate that AI-driven vertical storage systems can revolutionize inventory management in automotive warehouses by maximizing space utilization and enhancing operational efficiency. The substantial improvements in inventory accuracy and picking performance confirm the value of integrating AI predictive analytics with automated storage and retrieval systems.

These findings indicate that successful AI adoption depends not only on technological capabilities but also on addressing human and organizational. The demonstrated return on investment and operational benefits suggest that AI-driven vertical storage is a viable solution to storage constraints and inventory challenges in complex supply chains. The findings of this study are consistent with international research demonstrating that AI-driven automated storage systems improve inventory accuracy, warehouse efficiency, and space optimisation. Studies conducted in Germany, Japan, and the United States have similarly reported improvements in inventory visibility and reduced retrieval times through the implementation of automated vertical storage technologies and predictive analytics (Albayrak Ünal et al., 2023; Ghadge et al., 2020). However, unlike many developed-country contexts where infrastructure stability supports uninterrupted automation, the South African environment presents unique operational challenges such as load shedding and skills adaptation barriers. This study therefore contributes an emerging-market perspective to the global discourse on AI-enabled inventory optimisation by highlighting how infrastructural and organisational constraints influence technology implementation outcomes.

Managerial and Policy Implications

The findings of this study provide important implications for warehouse managers, automotive manufacturers, and policymakers seeking to modernise inventory management systems through Industry 4.0 technologies. Managers should prioritise the integration of AI-driven predictive analytics with automated vertical storage systems to improve inventory visibility, optimise storage utilisation, and reduce operational inefficiencies. Investment in employee training and change management programmes is also critical to improve technology adoption and reduce resistance during implementation.

The study further highlights the importance of infrastructure resilience within highly automated warehouse environments. Managers operating in developing economies should invest in backup power systems and digital continuity strategies to minimise operational disruptions caused by load shedding and system downtime. From a policy perspective, government and industry stakeholders should encourage digital transformation within supply chain and warehouse operations through incentives supporting smart manufacturing technologies, workforce digital skills development, and industrial automation investment. Such initiatives may strengthen supply chain competitiveness and operational sustainability within the automotive sector.

CONCLUSION

Role of AI-Driven Analytics in Optimising Storage Utilisation

The study demonstrates that AI-driven predictive analytics plays a significant role in optimising storage utilisation within maintenance warehouse operations. The integration of the Vertical Lift Module (VLM) system improved inventory accuracy, increased space utilisation, and enhanced picking efficiency through automated storage and retrieval processes. These findings confirm that AI-enabled systems can improve operational visibility and support more responsive inventory management practices.

Adjusting Inventory Levels to Changes in Storage Capacity

The findings further indicate that predictive analytics enables organisations to adjust inventory levels more effectively in response to changing storage constraints and operational requirements. Real-time inventory tracking and forecasting capabilities improved decision-making processes and reduced inefficiencies associated with excess inventory and stock shortages. The integration of AI with ERP systems also enhanced inventory control and operational coordination within the warehouse environment.

Developing Cost-Effective Solutions to Overcome Storage Limitations

The study shows that AI-driven vertical storage systems provide a practical and cost-effective solution for addressing storage limitations without requiring warehouse expansion. By maximising vertical storage capacity and improving inventory accessibility, the organisation achieved substantial operational improvements while maintaining supply

chain performance. However, challenges related to load shedding, employee adaptation, and system training highlight the need for organisational readiness and infrastructure support during implementation.

In conclusion, the study contributes to the growing body of research on AI-enabled inventory optimisation by providing evidence from a South African automotive manufacturing context. The findings demonstrate that combining predictive analytics with automated storage technologies can strengthen supply chain efficiency, improve inventory accuracy, and support long-term operational competitiveness.

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REFERENCES

- Albayrak Ünal, Ö., ErKayman, B., & Usanmaz, B. (2023). Applications of artificial intelligence in inventory management: A systematic review of the literature. *Archives of Computational Methods in Engineering*, 30(7), 2605–2625.
- Cuypers, I. R. P., Hennart, J.-F., Silverman, B. S., & Ertug, G. (2021). Transaction cost theory: Past progress, current challenges, and opportunities for the future. *Academy of Management Annals*, 15(1), 163–198.
- Ghadge, A., Er Kara, M., Moradlou, H., & Goswami, M. (2020). The impact of Industry 4.0 implementation on supply chains. *Journal of Manufacturing Technology Management*. Advance online publication. <https://doi.org/10.1108/JMTM-10-2019-0368>
- Gottesman, Y., Nider, J., Kat, R., Weinsberg, Y., & Factor, M. (2025). Using storage class memory efficiently for an in-memory database. In *Proceedings of the 9th ACM International Conference on Systems for Energy-Efficient Built Environments*.
- Gupta, V. (2024). An empirical evaluation of a generative artificial intelligence technology adoption model from entrepreneurs' perspectives. *Systems*, 12(3), 103.
- Martins, V. W. B., Anholon, R., Filho, W. L., & Quelhas, O. L. G. (2022). Resilience in supply chain management: Understanding critical aspects and how digital technologies can contribute to Brazilian companies in the COVID-19 context. *Modern Supply Chain Research and Applications*, 4(1), 2–18.
- Maveneer. (2023). *Understanding warehouse slotting*. Maveneer.
- Mohamed, A. E. (2024). Inventory management. In *Operations management: Recent advances and new perspectives*. IntechOpen.
- Ogunleye, J. (2014). The concepts of predictive analytics. *International Journal of Knowledge, Innovation and Entrepreneurship*, 2(2), 82–90.
- Patka, M. A., Roy, A., Bhadaniya, P., Jose, J., Shaikh, V., & Salunkhe, U. (2022). Employing linear scheduling method and supply chain principles for optimizing storage demand. *International Journal of Production Research*.

Sabharwal, R., & Miah, S. J. A. (2021). New theoretical understanding of big data analytics capabilities in organizations: A thematic analysis. *Journal of Big Data*, 8, 159.

Sadrehaghighi, I. (2022). *Optimization problem*. (Accessed October 24, 2024).

Shuma, B. P., Bakama, E.M. & Mushavhanamadi, K. (2024). *An investigation of operations management and logistics challenges in the automotive industry: A case study* (Master's thesis, University of Johannesburg).

ENERGY TRANSITION, GLOBAL VALUE CHAINS, AND UNEQUAL DEVELOPMENT OUTCOMES: A COUNTRY LEVEL PANEL ANALYSIS

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ABSTRACT

The global energy transition is reshaping production networks and creating new opportunities for value capture within green industries. This study examines whether the economic benefits of energy transition in Sub-Saharan Africa depend on countries' positions within Global Value Chains (GVCs), their upgrading trajectories, and institutional quality. Using a panel dataset for 2000–2018 and fixed-effects estimation, the results show that energy transition alone does not significantly improve economic performance. While GVC position does not significantly moderate the relationship, GVC upgrading strengthens the economic benefits of energy transition. Governance quality does not directly moderate the relationship but significantly enhances the gains from GVC upgrading. These findings suggest that dynamic upgrading, rather than static GVC position, is critical for capturing energy-transition benefits.

Keywords: energy transition, Global Value Chains (GVCs), GVC upgrading, institutional quality, macroeconomic performance.

INTRODUCTION

The global energy transition refers to the shift from fossil-fuel-based energy systems towards cleaner energy sources such as solar, wind, and hydrogen in response to climate change and sustainability concerns (IEA, 2021; 2024; 2025). Beyond transforming energy systems, this transition is creating a new energy economy characterised by rising demand for critical minerals and renewable energy technologies, including batteries, electric vehicles, and wind turbines. As a result, international production networks, trade patterns, and industrial structures are being reshaped. These developments have renewed attention on Global Value Chains (GVCs), which organise production across multiple countries. Countries participate in GVCs through different activities, ranging from raw material extraction to processing, manufacturing, logistics, and innovation. The economic benefits derived from participation depend not only on whether countries are integrated into GVCs, but also on their position within value chains and their ability to upgrade into higher-value activities over time. Countries that remain concentrated in raw material exports generally capture less value than those engaged in processing, manufacturing, and technology-intensive activities.

This issue is particularly relevant for Sub-Saharan Africa (SSA), which possesses significant critical mineral resources required for the energy transition but remains largely concentrated in forward-oriented GVC participation as a supplier of raw materials and intermediate inputs. Consequently, the key development challenge is whether SSA countries can move beyond resource extraction and capture greater value from emerging green industries through GVC upgrading. The ability to do so may depend on institutional quality, including governance effectiveness, regulatory quality, political stability, and the rule of law, which influence investment, technological diffusion, and industrial transformation. While the international business literature highlights the importance of GVC position for value capture and the development literature examines the economic implications of energy transition, little is known about how energy transition, GVC position, GVC upgrading, and institutional quality jointly shape economic performance in SSA. Existing studies have generally examined these factors in isolation or in pairs. To address this

gap, this study investigates whether the economic benefits of energy transition depend on countries' positions within GVCs, their upgrading trajectories, and the quality of their institutions.

The study addresses the following research questions: (1) Does energy transition improve macroeconomic performance in Sub-Saharan Africa? (2) Does GVC position moderate the relationship between energy transition and macroeconomic performance? (3) Does GVC upgrading amplify the economic benefits of energy transition? and (4) Do GVC upgrading and institutional quality jointly enhance the economic benefits of energy transition?

LITERATURE REVIEW AND HYPOTHESIS

The global energy transition is creating a new energy economy driven by growing demand for critical minerals and renewable energy technologies. This shift is reshaping international production networks and raising important questions about how countries can capture value from emerging green industries. For Sub-Saharan Africa (SSA), the challenge is twofold: reducing dependence on fossil fuels while avoiding continued reliance on low-value raw material exports. The extent to which countries benefit from the energy transition may depend on their position within Global Value Chains (GVCs), their ability to upgrade into higher-value activities, and the quality of their institutions.

Energy Transition and Macroeconomic Performance

The literature generally finds a positive relationship between energy transition and economic performance, although the magnitude of the benefits varies across countries. Studies by Singh et al. (2019), Chen et al. (2022), and Yıldırım and Bayan (2023) show that renewable energy adoption and energy productivity contribute positively to economic growth, productivity, trade competitiveness, and technological development. However, the evidence also highlights significant heterogeneity. Azam et al. (2025) report a non-linear relationship between energy transition and growth, while Sene and Fall (2024) and Sarsar and Echaoui (2024) demonstrate that economic complexity influences the extent to which countries benefit from the transition. Similarly, Hailemariam and Ivanovski (2025) and Yang et al. (2022) show that institutional and structural conditions shape economic outcomes. Overall, the literature suggests that energy transition contributes to growth, but its benefits are conditional on country-specific characteristics.

H1: Energy transition positively influences macroeconomic performance.

Global Value Chain Position and Upgrading

The GVC literature argues that development outcomes depend not only on participation in global production networks but also on a country's position within those networks and its ability to upgrade into higher-value activities. Countries specialising in raw material extraction generally capture less value than those engaged in processing, manufacturing, innovation, and services.

Studies by Jin et al. (2022), Wang et al. (2023), and Shi and Yang (2025) link GVC position to energy and environmental outcomes, while Wiryawan et al. (2022), Ndubuisi and Owusu (2021), and Qamri et al. (2025) show that upgrading improves productivity and economic performance. Ren et al. (2026) provide evidence that GVC status influences the economic returns from clean energy transition, although their analysis excludes SSA countries. Existing studies therefore suggest that countries occupying higher-value positions and successfully upgrading within GVCs are more likely to capture the economic benefits associated with the energy transition.

H2: GVC position positively moderates the relationship between energy transition and macroeconomic performance.

H3: GVC upgrading positively moderates the relationship between energy transition and macroeconomic performance.

Institutional Quality (Governance) and Energy Transition Outcomes

Institutional quality is increasingly recognised as a critical factor influencing both energy transition outcomes and economic development. Strong institutions reduce uncertainty, improve policy implementation, encourage investment, and facilitate industrial transformation.

Evidence from SSA and other regions supports this view. Aka et al. (2024) find that institutional quality positively influences energy transition outcomes in SSA, while Diallo and Ouoba (2024) show that renewable energy contributes more strongly to economic growth when institutional quality exceeds a certain threshold. Studies by Agostino et al. (2023), Vu et al. (2024), and Hailemariam and Ivanovski (2025) similarly demonstrate that governance quality strengthens the effectiveness of energy transition policies. Emerging research also indicates that institutions influence the ability of countries to benefit from GVC participation and upgrading. For example, Noufelie and Djamen (2025) find that stronger institutions amplify the impact of GVC participation on energy-related outcomes.

H4: Institutional quality positively moderates the relationship between energy transition and macroeconomic performance.

Research Gap and Contribution

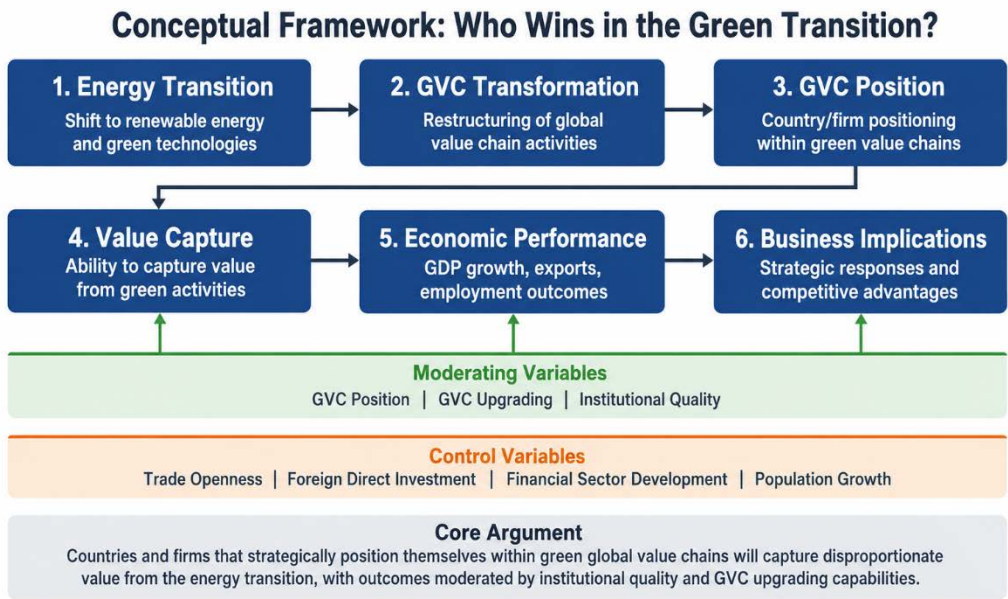
Although energy transition, GVC dynamics, and institutional quality have each been studied extensively, existing research has largely examined these factors separately or in pairs. There is limited evidence on how energy transition, GVC position, GVC upgrading, and institutional quality jointly influence macroeconomic performance, particularly in SSA. This study addresses this gap by integrating these factors within a single empirical framework.

H5: The positive effect of energy transition on macroeconomic performance is amplified when GVC upgrading occurs in the presence of strong institutional quality.

CONCEPTUAL FRAMEWORK

The economic benefits of energy transition are expected to depend on countries GVC positions, upgrading trajectories, and institutional quality.

Figure 1: Conceptual Framework.



THEORETICAL FRAMEWORK

Endogenous Growth Theory explains the potential growth effects of energy transition, Capability Building Theory explains upgrading within GVCs, while New Institutional Economics explains how governance quality influences the ability to capture value from structural transformation.

RESEARCH METHODOLOGY

Data and Sample

The study is based on a balanced panel data set of 37 Sub Saharan African countries observed for the period 2000-2018. In total there are 666 country year observations. In the Global Value Chain UNCTAD-Eora Database there are some countries without any observation due to the poor quality of observations for Valued Added decomposition analysis. These observations were excluded from the analysis in line with the recommendations from UNCTAD-Eora., while the countries remained in the broader panel dataset for non-Global Value Chain analyses. Sample sizes therefore vary across the different model specifications as informed by the available data. The data were sources from three main sources namely the World Bank Development Indicators, The World bank Governance Indicators, and the UNCTAD-Eora Database as explained in Table 1. These observations were excluded only from GVC-related estimations, while the countries remained in the broader panel dataset for non-GVC analyses.

Variable Definitions and Measurement

Table 1: Definition and Measurement of Variables.

Variable	Role	Measurement	Source	Expected Sign in Model
GDP per capita growth	Dependent Variable		World Development Indicators (WDI)	N/A
Energy Transition	Independent Variable	Renewable energy consumption as % of total final energy consumption	World Development Indicators	Positive but heterogeneous across country structures
GVC Position/Participation	Moderator	Country's relative location within global value chains based on forward and backward value-added participation (KWW Position Index).	UNCTAD-Eora	Positive. Stronger gains where countries occupy favourable positions within global value chains and are better able to capture value from green production networks
GVC Upgrading	Moderator	Five-year change in GVC Position Index	Calculated from UNCTAD-Eora	Positive Stronger economic performance where countries successfully reposition themselves within global production networks
Governance Index	Moderator	Principal Component Analysis index from six WGI governance indicators measuring the Quality of institutions	Worldwide Governance Indicators	Positive moderation as stronger governance is expected to enhance the economic benefits of the energy transition.
Financial Development Indicator	Control	Control variables included to isolate the effects of energy transition, GVC participation, and governance quality on GDP per capita growth	International Monetary Fund	Negative
Foreign Direct Investment			WDI	Positive
Trade Openness			WDI	Positive
Gross Fixed Capital Formation			WDI	Positive
Population growth			WDI	Positive or negative

Model Specification

The study estimates a sequence of panel regression models corresponding to the proposed hypotheses. The baseline specification examines the direct relationship between energy transition and economic performance, while subsequent models introduce interaction terms to test the moderating roles of GVC position, GVC upgrading, and governance

quality. The final specification evaluates the joint influence of GVC upgrading and governance quality on the economic returns to energy transition.

Model Specifications

- (1) $EP_{it} = \beta_0 + \beta_1 ET_{it} + \beta_2 X_{it} + \mu_i + \varepsilon_{it}$
Direct effect of energy transition on economic performance.
- (2) $EP_{it} = \beta_0 + \beta_1 ET_{it} + \beta_2 GVCPos_{it} + \beta_3 (ET_{it} \times GVCPos_{it}) + \beta_4 X_{it} + \mu_i + \varepsilon_{it}$
Tests the moderating effect of GVC position.
- (3) $EP_{it} = \beta_0 + \beta_1 ET_{it} + \beta_2 GVCUp_{it} + \beta_3 (ET_{it} \times GVCUp_{it}) + \beta_4 X_{it} + \mu_i + \varepsilon_{it}$
Tests the moderating effect of GVC upgrading.
- (4) $EP_{it} = \beta_0 + \beta_1 ET_{it} + \beta_2 GOV_{it} + \beta_3 (ET_{it} \times GOV_{it}) + \beta_4 X_{it} + \mu_i + \varepsilon_{it}$
Tests the moderating effect of governance quality.
- (5) $EP_{it} = \beta_0 + \beta_1 ET_{it} + \beta_2 GVCUp_{it} + \beta_3 GOV_{it} + \beta_4 (ET_{it} \times GVCUp_{it}) + \beta_5 (GVCUp_{it} \times GOV_{it}) + \beta_6 X_{it} + \mu_i + \varepsilon_{it}$
Tests the joint effect of GVC upgrading and governance quality.

Variables: EP = Economic Performance; ET = Energy Transition; GVCPos = GVC Position; GVCUp = GVC Upgrading; GOV = Governance Quality; X = Control Variables; μ_i = Country Fixed Effects; ε_{it} = Error Term.

RESULTS AND DISCUSSION

Descriptive Statistics and the Correlation Matrix

Table 2: Descriptive Statistics.

	Obs.	Mean	Std. Dev.	Min	Max
GDP per capita growth	635	1.844	4.925	-48.429	27.807
Renewable energy share	655	65.173	26.091	0.700	96.000
GVC position	558	0.085	0.169	-0.693	0.363
GVC upgrading	558	0.006	0.106	-0.245	0.998
Governance index	656	0.346	2.084	-4.638	5.653
Financial development	666	0.143	0.115	0.000	0.643
FDI	642	5.067	9.118	-8.767	103.337
Trade openness	538	74.367	42.654	21.257	347.720
Gross fixed capital formation	509	22.773	9.016	1.097	78.001
Population growth	666	2.423	1.113	-5.416	5.770
Observations	666				

The descriptive statistics show that average GDP per capita growth was 1.84%, with considerable variation across countries. Renewable energy accounted for 65.17% of total final energy consumption, reflecting the continued importance of both modern renewables and traditional biomass in Sub-Saharan Africa. The average GVC Position Index (0.085) suggests that most countries occupy intermediate positions within global production networks, while the near-zero GVC upgrading measure (0.006) indicates limited movement toward higher-value activities during the study period. Governance quality also varied substantially, highlighting significant institutional differences across the region.

The correlation matrix in Table 3 shows the pairwise relationships among the variables. Renewable energy share has a near-zero correlation with GDP per capita growth, suggesting that the energy transition-growth relationship may depend on other conditioning factors. Governance is positively correlated with GDP per capita growth, while GVC upgrading has a negative simple correlation with growth. However, these simple correlations do not control for country-specific effects, time effects, or interaction terms, so the regression analysis provides the main basis for hypothesis testing. Asterisks indicate statistical significance.

Table 3: Correlation Matrix.

Variable	GDPg	RE	GVCpos	GVCup	Gov	FinDev	FDI	Trade	GFCF	Popg
GDPg	1.000									
RE	-0.014	1.000								
GVCpos	-0.069	0.360***	1.000							
GVCup	-0.308***	-0.083*	0.351***	1.000						
Gov	0.140***	-0.675***	-0.543***	-0.136***	1.000					
FinDev	0.056	-0.771***	-0.347***	0.002	0.762***	1.000				
FDI	0.106**	-0.182***	-0.115**	-0.060	0.146***	0.040	1.000			
Trade	0.095*	-0.633***	-0.423***	0.009	0.417***	0.353***	0.366***	1.000		
GFCF	0.158***	-0.152***	-0.155***	-0.176***	0.183***	0.042	0.433***	0.351***	1.000	
Popg	-0.062	0.533***	0.455***	0.155***	-0.503***	-0.502***	-0.026	-0.399***	0.156***	1.000

Main Regression Results

Table 4 presents the fixed effects regression results for Hypotheses 1–5. The fixed effects estimator was selected as the preferred specification because it controls for unobserved country specific characteristics that may influence economic performance

Table 4: Fixed Effects Regression Results.

	(1) gdp_pc_growth	(2) gdp_pc_growth	(3) gdp_pc_growth	(4) gdp_pc_growth	(5) gdp_pc_growth
Energy Transition	0.418 (1.659)	0.457 (1.548)	1.797 (1.679)	0.537 (1.520)	2.182 (1.758)
GVC Position		2.814** (1.050)			
ET × GVC Position		0.329 (0.680)			
GVC Upgrading			-0.880 (0.646)		0.155 (0.503)
ET × GVC Upgrading			1.960** (0.891)		2.191*** (0.546)
Governance				0.473 (1.360)	1.335 (1.466)
ET × Governance				0.010 (1.166)	
Upgrading × Governance					1.534*** (0.515)
Obs.	503.000	413.000	413.000	503.000	413.000
R ²	0.027	0.058	0.150	0.027	0.194

Robust standard errors clustered at the country level were used to account for heteroskedasticity and serial correlation. The results show that energy transition has no statistically significant direct effect on economic performance, providing no support for H1. Similarly, although stronger GVC positions are associated with better economic outcomes, the interaction between energy transition and GVC position is insignificant, leading to the rejection of H2. In contrast, the interaction between energy transition and GVC upgrading is positive and significant, supporting H3 and suggesting that countries that move into higher-value activities capture greater economic benefits from the transition. Governance quality does not significantly moderate the energy transition–growth relationship, providing no support for H4. However, the integrated model shows that both energy transition–GVC upgrading and GVC upgrading–governance interactions are positive and significant. These findings support H5 and indicate that the economic gains from energy transition are greatest where GVC upgrading is accompanied by strong institutional quality.

Hypothesis Summary Table

Table 5: Hypothesis Summary Table.

Hypothesis	Prediction	Result	Supported
H1	Energy Transition improves Economic Performance	Energy Transition =0.418(p=0.803)	Not Supported
H2	GVC position strengthens the effects of energy transition	ET*GVC position=0.329(p=0.633)	Not Supported
H3	GVC upgrading strengthens the effect of energy transition	ET*GVC Upgrading =1.960 (p=0.037)	Supported
H4	Governance strengthens the effect of the energy transition	ET*Governance=0.010(p=0.993)	Not Supported
H5	The economic benefits of energy transition are enhanced when GVC upgrading occurs within a supportive institutional environment.	ET*GVC Upgrading =2.191 (p=0.000) GVC Upgrading*Governance=1.534 (p=0.006)	Supported

Diagnostic Tests

Diagnostic tests were conducted to assess the suitability of the estimated models. The Hausman specification test produced a statistically insignificant result ($\chi^2 = 9.88$, $p = 0.1299$), indicating that the random effects estimator could not be rejected. However, fixed effects estimation was retained as the preferred specification because it provides a more conservative approach and controls for unobserved country-specific heterogeneity. Variance Inflation Factor (VIF) tests indicated no serious multicollinearity concerns among the explanatory variables. Robust standard errors clustered at the country level were used throughout to account for potential heteroskedasticity and serial correlation.

Discussion

The main contribution of the study are the results from H5 and H3 that demonstrated that renewable energy adoption alone is insufficient to generate broad based economic gains. Instead, the benefits of the energy transition appear to depend on countries' ability to reposition themselves within global production networks. The insignificance of the GVC position interaction suggests that merely occupying a particular location within global value chains is not enough to capture transition-related benefits. Rather, the significant upgrading effect indicates that dynamic structural transformation is more important than static positioning. Furthermore, the results reveal that governance quality does not directly strengthen the energy transition–growth relationship. However, governance becomes important when combined with GVC upgrading. This finding suggests that institutions may facilitate the ability of countries to leverage upgrading opportunities created by the energy transition, thereby enhancing value capture and economic performance.

Overall, the findings indicate that the economic gains associated with the energy transition are not automatic. Countries benefit most when renewable energy development is accompanied by structural upgrading within global value chains and supported by effective institutional frameworks.

MANAGERIAL IMPLICATIONS

The findings suggest that renewable energy investments generate the greatest economic benefits when they support upgrading into higher value-added activities within global value chains rather than functioning as standalone projects. Firms should therefore align energy transition strategies with value chain upgrading efforts to enhance value capture and competitiveness. Strong institutions, including regulatory predictability and effective contract enforcement, further strengthen these gains. For policymakers, the results highlight the need for integrated industrial and energy policies that promote both renewable energy adoption and movement into higher-value activities, while strengthening governance frameworks that enable firms to fully benefit from the energy transition.

CONCLUSION

This study shows that the economic benefits of the energy transition in Sub-Saharan Africa depend less on renewable energy adoption itself and more on countries' ability to upgrade into higher-value activities within global value chains. While GVC position did not significantly influence the energy transition–growth relationship, GVC upgrading and its interaction with governance quality were found to be significant drivers of economic performance. The findings suggest that dynamic upgrading, supported by strong institutions, is critical for capturing the gains from the emerging green economy. The findings suggest that countries are likely to experience different economic outcomes from the energy transition depending on their upgrading trajectories and institutional quality.

LIMITATIONS AND FURTHER RESEARCH

This study is limited to Sub-Saharan Africa and uses country-level indicators that may not fully capture firm-level upgrading dynamics. In addition, the GVC Position Index reflects countries' relative positions within production networks rather than direct value capture, while data constraints required the exclusion of some countries from the analysis. Future research could use sector- and firm-level data to examine how green industries such as renewable energy technologies, batteries, and critical minerals influence upgrading and value capture within global value chains.

REFERENCES

- Adediji, A. A., Ogunbayo, I., Ajayi, P. I., & Adeniyi, O. (2024). Energy security, governance quality, and economic performance in sub-Saharan Africa. *Next Energy*, 2, 100055. <https://doi.org/10.1016/J.NXENER.2023.100055>
- Ajide, F. M. (2023). Global Value Chain and Total Factor Productivity in Africa. *Organizations and Markets in Emerging Economies*, 14(1), 26–55. <https://doi.org/10.15388/omee.2023.14.81>
- Aka, B. E., Avom, D., Nicole, D., & Alinga, N. (n.d.). Succeeding in Energy Transition in Sub-Saharan Africa: Does Institutional Quality Matter? In *Energy Studies Review* (Vol. 25, Number 1).
- Alle, Y. K. P. R., Koffi, K. M., & Wonyra, K. O. (2026). Positioning in global value chains and well-being in sub-Saharan Africa. *Research in Globalization*, 12. <https://doi.org/10.1016/j.resglo.2026.100338>
- Azam, M., Hunjra, A. I., Ben Zaied, Y., & Managi, S. (2025). Energy transition impacts on economic growth: A new economic modeling approach. *International Journal of Green Energy*, 22(15), 3301–3320. <https://doi.org/10.1080/15435075.2025.2503409>
- De Blasio, N., & Zheng, D. (2023). *P A P E R An Evaluation Framework of Integration and Segmentation Scenarios*. www.belfercenter.org/ENRP
- Energy Agency, I. (2021). *World Energy Outlook 2021*. www.iea.org/weo

- Energy Agency, I. (2024). *World Energy Outlook 2024*. www.iea.org/terms
- Energy Agency, I. (2025). *World Energy Outlook 2025*. www.iea.org/terms
- Global Value Chain Development Report 2025*. (2025). <https://doi.org/https://doi.org/10.30875/9789287085641>
- Global Value Chains Outlook 2026*: (2026).
- Hailemariam, A., & Ivanovski, K. (2025). Greener horizons: Economic freedom as a catalyst for the global energy transition. *Energy Research and Social Science*, 124. <https://doi.org/10.1016/j.erss.2025.104058>
- Karbalaee Aghababaei, M., Saifoddin, A., Zahedi, A., & Abdoos, M. (2025). Macroeconomic impact of energy transition: A comparative study of developed and developing countries. *Energy Strategy Reviews*, 62. <https://doi.org/10.1016/j.esr.2025.101910>
- Liashenko, O., Dluhopolskyi, O., Wołowiec, T., & Woźniak, D. (2026). Governance Quality and Renewable Energy Transition: Global Evidence Using Panel ARDL. *Energies*, 19(4). <https://doi.org/10.3390/en19041024>
- Ren, Y., Liu, X., & Zhu, Y. (2026). Clean energy transition and enhanced global value chain positioning: The moderating influence of the digital economy. *Finance Research Letters*, 97. <https://doi.org/10.1016/j.frl.2026.109801>
- Sarsar, L., & Echaoui, A. (2024). Empirical analysis of the economic complexity boost on the impact of energy transition on economic growth: A panel data study of 124 countries. *Energy*, 294, 130712. <https://doi.org/10.1016/J.ENERGY.2024.130712>
- Sene, L., & Fall, E. H. (2024). Productivity costs of the green energy transition in Africa. *African Development Review*, 36(4), 608–620. <https://doi.org/10.1111/1467-8268.12784>
- Singh, N., Nyuur, R., & Richmond, B. (2019). Renewable energy development as a driver of economic growth: Evidence from multivariate panel data analysis. *Sustainability (Switzerland)*, 11(8). <https://doi.org/10.3390/su11082418>
- Yang, L., Zhou, X., & Feng, X. (2022). Renewable energy led Economic Growth Hypothesis: Evidence from novel panel methods for N-11 economies. *Renewable Energy*, 197, 790–797. <https://doi.org/10.1016/j.renene.2022.07.025>
- Yin, F., Ibrahim, R. L., & Alomair, A. (2026). Governing the Green Transition: How Institutional Quality Conditions Renewable Energy's Sustainability Impacts in BRICS and MENA. *Environmental Policy and Governance*. <https://doi.org/10.1002/eet.70063>
- Yıldırım, M. Ş., & Baycan, İ. O. (2023). Analyzing the effects of energy productivity: the case of European Union countries. *Environmental Science and Pollution Research International*, 30(55), 117519–117530. <https://doi.org/10.1007/s11356-023-30516-6>
- Zhang, L., Zhao, Z., Qamri, G. M., & Makhmudov, S. (2025). Unleashing the critical role of renewable energy through global value chains and digitalization: A path towards environmental sustainability. *Journal of Environmental Management*, 392. <https://doi.org/10.1016/j.jenvman.2025.126688>
- Zhang, S., Lin, S., Wang, C., & Shahbaz, P. (2024). Towards energy sustainability: Exploring the nexus between global value chain participation and energy security in developing and developed countries. *PLoS ONE*, 19(1 January). <https://doi.org/10.1371/journal.pone.0296705>

TECHNOLOGICAL INNOVATION IN CHINA'S SOLAR ENERGY INDUSTRY AND ITS IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT

This paper investigates technological innovation in China's solar energy industry and its implications for sustainable development. Using a desktop analysis for a qualitative review, it examines the principal drivers, mechanisms and patterns of technological innovation; the environmental, economic and social outcomes; and structural constraints, governance gaps, and policy priorities. Findings underscore state policy and institutional coordination as the architecture of innovation, global value chains, technology transfer, and capability building. China's solar energy expansion has reduced costs and increased renewable energy access. However, there is a need for targeted investments to address grid integration, inequality and waste management.

Keywords: China, energy, innovation, solar, technological.

INTRODUCTION

China's solar energy industry has become one of the defining cases of technological transformation in the global low-carbon transition. Over the past fifteen years, China has moved from being an important manufacturing base to becoming the dominant actor in photovoltaic (PV) production, one of the largest deployment markets, and a major source of process, product and system innovation. Recent international energy statistics show that China remains the world's largest solar market and retains a very large share of PV manufacturing capacity across the value chain, from polysilicon to modules (IEA, 2025; IEA PVPS, 2024; REN21, 2025). This trajectory matters beyond China because global progress on decarbonisation, affordability of solar electricity and clean-energy industrialisation is now strongly shaped by Chinese capabilities.

The Chinese case is important because it challenges a simple view of innovation as frontier invention occurring before large-scale production. In solar PV, China advanced through a more hybrid pathway. Firms entered through manufacturing, equipment acquisition, export-oriented learning and participation in global value chains. Over time, this catch-up model matured into a broader innovation system involving research institutes, industrial policy, domestic market formation, patenting, provincial competition and large-scale deployment. Huang et al. (2016) argue that the rise of China's PV industry cannot be explained solely by subsidies and low labour costs; it also depended on the formation of a technological innovation system. Similarly, Zhang and Gallagher (2016) show that global value-chain integration enabled technology transfer, capability building and accelerated learning.

This makes the industry a useful lens for studying the relationship between technological innovation and sustainable development. Innovation in solar energy is often associated with falling costs, higher conversion efficiency, wider deployment and lower carbon emissions. Yet these positive outcomes are not automatic. The same trajectory can coexist with overcapacity, weak profitability, uneven regional development, grid constraints, recycling gaps and dependence on critical materials. Hu et al. (2024) note that China has accumulated the world's largest stock of PV patents, but bottlenecks remain in some core technologies. This suggests that innovation quantity and innovation quality are not always the same.

The implications for sustainable development are similarly multidimensional. Environmentally, solar deployment supports emissions reduction and cleaner power systems. Economically, the sector has generated exports, industrial clustering, investment and technological upgrading. Socially, distributed PV and poverty-

alleviation schemes have created livelihood opportunities in some rural areas, although their outcomes vary widely (Geall et al., 2018; Li et al., 2018; Liu et al., 2023). At the same time, the environmental footprint of large-scale manufacturing and the future burden of panel waste raise questions about the sector's full life-cycle sustainability (Urbina et al., 2023; Shuai et al., 2025). Sustainable development, therefore, requires more than rapid expansion; it requires a durable balance among industrial growth, social inclusion and ecological responsibility.

A further reason for studying China's solar industry is that it reveals how industrial competitiveness and climate governance have become deeply intertwined. In earlier energy transitions, manufacturing leadership and environmental policy were often analysed separately. In solar PV, they now move together. Countries want decarbonisation, but they also want secure supply chains, strategic industries and technological sovereignty. China sits at the centre of that intersection. Any serious evaluation of global sustainable development must therefore ask not only how much solar capacity China installs or exports, but also what kind of innovation system sustains that expansion and what broader consequences it entails.

The recent policy context sharpens this debate. China's "dual carbon" targets, shifts in industrial regulation, concerns over energy security, stronger attention to intellectual property, and rising global supply-chain competition have all changed the operating environment for the solar sector. The industry is no longer only a national development success story. It is also a critical component of global energy transition politics. This paper examines technological innovation in China's solar energy industry through a desktop analysis of peer-reviewed literature published in the last fifteen years, supported by a small number of authoritative energy statistics. It argues that China's solar rise reflects state-enabled but market-mediated innovation, and that its contribution to sustainable development is substantial but conditional on deeper innovation, stronger system integration, greater social inclusion, and greater circularity.

Objectives

The study pursues the following three objectives:

1. To examine the principal drivers, mechanisms and patterns of technological innovation in China's solar energy industry.
2. To assess the implications of technological innovation in China's solar energy industry for sustainable development, with particular attention to environmental, economic and social outcomes.
3. To identify the structural constraints, governance gaps and policy priorities that shape the future sustainability of China's solar innovation trajectory.

THEORETICAL FRAMEWORK

Technological Innovation Systems (TIS)

The first framework guiding this paper is the Technological Innovation Systems approach. TIS explains how technologies emerge and diffuse through interactions among firms, governments, research institutions, finance and users. It focuses on functions such as knowledge development, entrepreneurial experimentation, market formation, resource mobilisation and legitimacy building. Huang et al. (2016) use this perspective to explain the rise of China's PV industry, showing that its growth depended on interdependent institutional and industrial processes rather than isolated firm decisions. Zhang (2021) similarly shows that shifts in export dependence, domestic demand and policy design transformed the configuration of China's solar innovation system over time.

TIS is especially relevant here because it explains why a latecomer economy could become globally dominant in a strategic clean-energy industry. China's progress was not based only on invention at the frontier; it also depended on building production capabilities, coordinating policy, mobilising finance and creating markets. The framework is equally useful for identifying weaknesses. If system functions such as recycling governance, grid integration or advanced R&D remain underdeveloped, then growth may be rapid but not fully sustainable.

Sustainable Development Theory

The second framework is sustainable development theory, understood through its environmental, economic and social dimensions. This framework broadens the assessment of solar innovation beyond output growth, installed capacity or export earnings. A sector may be innovative in industrial terms while still generating uneven social outcomes or unresolved ecological costs. Sustainable development theory, therefore, provides the evaluative basis for asking whether China's solar innovation contributes to decarbonisation, resilient industrial development and social inclusion at the same time.

This framework is particularly useful because the Chinese solar industry lies at the intersection of climate policy and industrial strategy. Studies increasingly connect PV development to clean energy, climate mitigation and industrial modernisation (Qu et al., 2024; Wang et al., 2024). Yet sustainability remains conditional. Regional inequality, waste generation, mineral dependence, and curtailment can reduce the sector's developmental value. In this paper, sustainable development theory is used as a benchmark for judging not merely whether China's solar industry has expanded, but whether that expansion is environmentally sound, economically durable and socially inclusive.

LITERATURE REVIEW

China's Solar Innovation: Drivers, Mechanisms and Patterns

The literature shows broad agreement that technological innovation in China's solar industry emerged through layered capability building rather than a single breakthrough. Huang et al. (2016) argue that China's rise in PV was driven by the gradual formation of an innovation system linking policy support, entrepreneurial activity, and market formation. Their analysis is important because it challenges the narrow claim that Chinese success was driven only by cheap production. Zhang and Gallagher (2016) reach a similar conclusion from a global value chain perspective. They show that participation in international production networks enabled technology transfer, manufacturing learning and industrial upgrading, allowing Chinese firms to move from imitation and assembly toward more sophisticated capability accumulation.

A second strand of literature highlights the shift from factor-driven expansion to innovation-driven growth. Zhang et al. (2020) find that output growth in China's PV industry increasingly depends on technological innovation rather than on traditional factor inputs alone. Hu et al. (2024), using patent analysis, show that China has built a large and diverse knowledge base in PV technologies, although strategic gaps remain in some core areas. Together, these studies suggest that the sector's competitive strength now increasingly rests on learning, process improvement, and technological upgrading.

Policy scholarship adds further depth. Che et al. (2022) demonstrate that policy instruments influence PV innovation differently across regions, suggesting that local industrial foundations and governance capacities matter. Bai et al. (2024) trace the evolution of China's PV policy regime and show that the sector has passed through distinct stages, from early support and demonstration to more complex governance focused on regulation, upgrading and sustainability. Zhang (2021) extends this argument by showing that China's solar industry has undergone technological innovation system transitions as domestic deployment expanded and policy priorities shifted. Literature, therefore, presents innovation as cumulative, policy-shaped and spatially uneven. There is consensus on the importance of state support, global learning and firm competition, but less agreement on how far China has moved from rapid follower to frontier innovator.

Implications of Technological Innovation for Sustainable Development

The literature on the implications of sustainable development is more mixed. On the environmental side, studies generally agree that China's solar expansion has made a major contribution to decarbonisation. Qu et al. (2024) argue that PV development can reduce carbon emissions, improve environmental quality and support several sustainable development goals. Wang et al. (2024) similarly position the PV industry at the centre of China's low-carbon transition. These studies suggest that innovation matters because it lowers costs and increases deployment potential, thereby improving the practical role of solar in replacing fossil energy.

However, environmental benefits are not unqualified. Urbina et al. (2023) argue that the sustainability of PV technologies increasingly depends on life-cycle management, especially recycling and material efficiency. Shuai et al. (2025) raise similar concerns about the sustainable use of critical minerals in China's PV system. This literature shifts attention from operational emissions to upstream and downstream burdens, showing that renewable-energy innovation can still produce environmental pressures if circular-economy systems remain weak.

Economic and social literature presents a similarly qualified picture. Jackson et al. (2021) show that China's solar industry has widened global access to PV technologies and created opportunities for technology transfer. Yuan (2025) finds that patent activity in Chinese solar firms is positively related to corporate performance, although the benefits appear with a lag. At the social level, studies on photovoltaic poverty alleviation show that distributed solar can support livelihood diversification and rural income generation, but only under strong local institutional conditions (Geall et al., 2018; Li et al., 2018; Liu et al., 2023). The literature therefore indicates that China's solar innovation has made substantial contributions to sustainable development, but that these gains remain uneven and depend heavily on governance quality, system integration and environmental stewardship.

METHODOLOGY

This paper uses a desktop analysis of peer-reviewed journal articles published between 2011 and 2026. The methodology is designed as a structured qualitative review of published scholarship, suitable for examining patterns, debates and explanatory arguments across a broad body of literature on China's solar energy industry and sustainable development. Rather than relying on a formal reporting protocol, the study adopts a transparent desktop review process that explains how sources were identified, selected, analysed and synthesised.

The review was qualitative rather than meta-analytic because the relevant literature spans diverse methods, including policy analysis, bibliometrics, patent studies, case studies, review articles and econometric work. Searches were undertaken across Scopus, Web of Science, ScienceDirect, SpringerLink, Taylor & Francis Online, Wiley Online Library, MDPI and Google Scholar for supplementary verification. Core search strings included "China solar energy industry technological innovation", "China photovoltaic innovation sustainable development", "China PV policy innovation", "China solar patents" and "China photovoltaic poverty alleviation".

To be included, a source had to be peer-reviewed, published within the last 15 years, available in English, and substantially focused on China's solar or photovoltaic sector in relation to innovation, policy, sustainability, or developmental outcomes. Articles were excluded if they were duplicates, conference abstracts, non-peer-reviewed commentary, outside the time window, too narrowly technical, or insufficiently focused on China's solar industry.

Database searching produced 146 records from the selected platforms. After removing 38 duplicates, 108 records remained for title and abstract screening. During screening, 61 records were excluded for weak relevance. The remaining 47 articles underwent full-text review. A further 21 were excluded because they fell outside the publication window, lacked peer review, or did not speak directly to the research questions. The final synthesis, therefore, drew on 26 peer-reviewed articles. Three current statistical sources from the International Energy Agency (IEA), PVPS, and REN21/IRENA were used solely to contextualise the industry's current scale.

Table 1: Review protocol and selection criteria.

Element	Specification
Review type	Qualitative desktop analysis of peer-reviewed literature
Reporting logic	Structured desktop review using database searching, screening, eligibility checks and thematic synthesis
Databases searched	Scopus, Web of Science, ScienceDirect, SpringerLink, Taylor & Francis, Wiley Online Library, MDPI and Google Scholar for supplementary verification
Time window	2011–2026
Core focus	China's solar/PV industry, technological innovation, policy, sustainability and developmental outcomes
Inclusion criteria	Peer-reviewed, English-language, relevant to China's solar industry, within the 15-year window
Exclusion criteria	Duplicates, non-peer-reviewed commentary, weak China focus, overly narrow engineering pieces, sources outside the review window

For each included study, data were extracted on author, year, journal, method, analytical focus and principal findings. The studies were then coded thematically. Initial codes included policy support, technology transfer, patenting, manufacturing upgrading, domestic deployment, poverty alleviation, environmental outcomes, recycling and system integration. These were consolidated into six discussion themes. Methodological quality was assessed considering the clarity of the research question, transparency of the methods, empirical grounding, and relevance to the study objectives.

The desktop review followed a sequence of operational steps. Step 1 involved formulating the review question and setting the temporal boundary at 15 years to capture the phase during which China's PV sector moved from rapid scale-up to deeper technological consolidation. Step 2 involved database searching and documentation of search terms. Step 3 involved duplicate removal and preliminary relevance screening. Step 4 consisted of full-text eligibility checks against the inclusion criteria. Step 5 involved data extraction into an evidence matrix. Step 6 involved thematic synthesis and interpretation in relation to the study objectives and theoretical frameworks. Step 7 involved a final consistency check to ensure that the discussion remained anchored in the included studies rather than anecdotal market narratives.

The desktop review approach also informed the treatment of bias. Selection bias was reduced by searching across multiple databases instead of relying on a single publisher platform. Topical bias was reduced by ensuring the final sample included studies on policy, innovation systems, patenting, development outcomes, and environmental sustainability, rather than only industrial performance studies. Recency bias was reduced by combining current contextual statistics with peer-reviewed work spanning the full fifteen-year window. Even so, the author recognises that review-based studies remain interpretive exercises; the value of the method here lies in transparency, rigour and careful source selection rather than mechanical objectivity.

The method improves transparency and coherence, but some limitations remain. Restricting the review to English-language studies may under-represent Chinese-language scholarship. Differences in methods and scales across the included studies also limit strict comparability. In addition, the solar sector is evolving rapidly, so even recent scholarship may lag current market developments. These limitations were partly addressed through triangulation with current authoritative energy statistics and by focusing the analysis on broad patterns rather than short-term market fluctuations.

Table 2: Flow of study selection.

Stage	Number of records
Records identified	146
Duplicates removed	38
Records screened	108
Records excluded after title/abstract review	61
Full-text articles assessed	47
Full-text articles excluded	21
Studies included in final synthesis	26

DISCUSSION

Theme 1: State Policy and Institutional Coordination as the Architecture of Innovation

A major conclusion in the literature is that technological innovation in China's solar industry is inseparable from policy design and institutional coordination. Policy did not simply subsidise production; it created the conditions in which firms could invest, learn and compete. Huang et al. (2016) show that the rise of the PV sector depended on a sequence of system functions reinforced by public action, while Bai et al. (2024) trace the evolution of policy from early support to more complex regulation and upgrading. The analytical point is that innovation accelerated when demand creation, industrial planning and firm rivalry were aligned. At the same time, the Chinese case shows the risks of quantity-oriented policy. The same supportive framework that accelerated capability building also encouraged overcapacity and intense price competition. This suggests that policy effectiveness depends not only on

the volume of support but also on whether incentives reward innovation for quality, profitability, and sustainability rather than scale alone. China's next policy challenge is therefore to preserve coordination while shifting emphasis from expansion to system quality. A further implication is that China's institutional advantage has been both temporal and financial. Solar manufacturing and deployment policy were sustained for long enough to allow learning curves to operate. In many countries, stop-start renewable policies weaken investor confidence and interrupt technological accumulation. China's policy persistence, even as specific instruments changed, gave firms a clearer investment horizon. That continuity partly explains why firms were willing to invest in retooling and process upgrading instead of treating the sector as a short subsidy cycle.

Theme 2: Global Value Chains, Technology Transfer and Capability Building

The second theme is the role of global value chains in technological catch-up. Zhang and Gallagher (2016) show that Chinese firms learned through imported equipment, foreign markets and value-chain participation. Innovation in this phase was less about isolated invention and more about manufacturing excellence, process learning and industrial upgrading. This explains why China could move rapidly despite entering the sector as a latecomer. However, global integration has limits. Participation in value chains may build strong production capabilities without guaranteeing leadership in frontier technologies. Hu et al. (2024) note that China's patent stock is very large, but some core bottlenecks remain. The implication is that value-chain learning must increasingly be complemented by stronger original R&D, greater influence and control over key inputs, and standards-setting. This literature analysis also suggests that technology transfer should not be read as a one-way story of dependence. Once Chinese firms achieved scale and process sophistication, they began to influence global technology choices by compressing costs and accelerating the commercial diffusion of specific production routes. In other words, value-chain participation evolved into value-chain shaping. That transition is important for sustainable development because the speed of global solar deployment has been affected not only by technological innovation but also by China's ability to industrialise innovation at an exceptional scale.

Theme 3: Innovation Quality, Patenting and the Move Toward Frontier Competition

Recent literature indicates that China's solar sector is becoming more innovation-intensive. Zhang et al. (2020) show that output growth is increasingly innovation-driven, while Yuan (2025) finds that patent activity supports firm performance over time. These studies indicate that the sector is no longer defined only by low-cost scale. Yet the evidence also warns against equating patent volume with technological depth. Large patent portfolios may conceal weaknesses in originality, commercial value or control over key technologies. Hu et al. (2024) make this point directly. The analytical distinction here is between innovation intensity and innovation depth. China is clearly strong in cumulative and process-based innovation, but the extent of its frontier leadership remains more contested. For long-term sustainability, this distinction matters because future resilience depends on advanced cells, system electronics, smart manufacturing and circular technologies, not on scale alone. Another important issue is intellectual property and standards. As the industry matures, competition intensifies over who controls interfaces, process know-how, equipment ecosystems, and internationally recognised standards. A sector built mainly on rapid diffusion can face limits if it does not also secure influence over these technology governance dimensions. China's recent attention to stronger IP protection in the PV sector reflects growing recognition that the innovation challenge has moved beyond replication and incremental upgrading.

Theme 4: System Integration, Digitalisation and the Broadening of the Innovation Frontier

A fourth theme is that future innovation will increasingly depend on system integration rather than on module manufacturing alone. As deployment expands, curtailment, storage, forecasting, digital monitoring and market flexibility become more decisive. Wang et al. (2024) show that the future of China's PV industry depends heavily on the wider power system, including grid reform and distributed-generation management. The scale of China's recent deployment underlines this shift. IEA PVPS reports that China added 277.57 GWAC of new PV capacity in 2024, bringing total installed capacity to 886 GWAC, with both utility-scale and distributed segments expanding rapidly (IEA PVPS, 2024). At that scale, the central question is no longer whether modules can be produced cheaply

enough. The question is whether the electricity system can absorb, balance, and optimise such volumes. This is why digital management, storage coordination and market reform have become part of the innovation agenda rather than external policy concerns. This changes the meaning of solar innovation. The frontier is moving from component efficiency to energy-system intelligence. Hardware, software and institutions now matter together. For sustainable development, this is crucial because poorly integrated solar capacity fails to deliver its full environmental and economic value. China's long-term advantage will depend on whether it can convert manufacturing leadership into leadership in solar-plus-storage, digital grid management and flexible electricity markets.

Theme 5: Economic and Social Development Effects are Real but Uneven

The literature shows that China's solar innovation has produced significant economic gains. The industry has generated exports, industrial clusters and technological spillovers, while also lowering global solar costs and widening access to PV technologies (Jackson et al., 2021). These gains support the argument that clean-energy innovation can be both developmental and globally influential. Social benefits are visible most clearly in the literature on photovoltaic poverty alleviation. Geall et al. (2018), Li et al. (2018) and Liu et al. (2023) show that distributed solar can diversify livelihoods and create rural income under favourable conditions. But the same literature stresses uneven outcomes. Local governance quality, maintenance capacity and benefit-sharing arrangements strongly affect success. This means that innovation does not automatically produce inclusion. Social sustainability depends on institutions that can translate technical deployment into durable community gains. There is also an international justice dimension. China's manufacturing scale has lowered prices worldwide and enabled many countries to pursue cheaper solar deployment. Yet lower prices resulting from oversupply and margin compression can also transfer stress along the value chain, affecting workers, suppliers, and non-Chinese competitors. The developmental effects of Chinese solar innovation are therefore globally positive in many respects, but they are not politically neutral. They reshape industrial geography and alter who captures value in the clean-energy transition.

Theme 6: Environmental Sustainability must be Assessed Across the Full Life Cycle

The final theme is that the environmental impact of China's solar industry must be assessed across its full life cycle. There is strong evidence that PV deployment supports decarbonisation and cleaner electricity systems (Qu et al., 2024; Wang et al., 2024). Yet rapid manufacturing growth also intensifies pressure on materials, water, electricity use and future waste streams. Urbina et al. (2023) and Shuai et al. (2025) show that recycling, circularity and mineral sustainability are becoming central issues.

This theme matters because it challenges the assumption that renewable energy is automatically sustainable across all dimensions. Solar is low-carbon in operation, but the industry's long-term legitimacy depends on upstream and downstream governance. For China, where manufacturing scale is unmatched, life-cycle sustainability is no longer peripheral. It is part of the next innovation frontier. The sector's future leadership will depend not only on producing more panels, but on producing, using and recovering them more responsibly. This problem will intensify as first-generation large-scale installations age. If recycling systems lag growth in deployment, future waste streams could undermine both environmental performance and social acceptance. That is why circularity should be treated as an innovation domain. It calls for new business models, reverse logistics, standards for recoverability and incentives for manufacturers to design panels with end-of-life recovery in mind from the start.

CONCLUSION

This paper examines technological innovation in China's solar energy industry and its implications for sustainable development through a desktop review of peer-reviewed literature published over the last 15 years. The evidence shows that China's solar rise is best understood not as a simple market success but as the outcome of state-guided industrial transformation, intensive firm learning, global production network integration, and sustained technological upgrading. Innovation in this sector has widened renewable-energy access, lowered PV costs and contributed to climate mitigation, industrial development and, in some contexts, rural livelihood improvement. At the same time, the review has shown that success at scale has generated new sustainability tensions related to curtailment, grid

integration, regional inequality, material intensity and end-of-life waste. The main lesson is that technological innovation delivers the strongest developmental gains when industrial policy, infrastructure planning, environmental governance and social inclusion evolve together. A major gap in the literature is the limited integration of industrial innovation studies with social and ecological assessments over time. More work is also needed on recycling systems, distributional outcomes, local implementation capacity and the long-term quality of innovation beyond patent counts.

Several lessons emerge. First, latecomer economies can build world-leading clean-energy industries when industrial strategy is combined with market formation and sustained institutional support. Second, innovation in renewable energy should be understood in systemic terms. In China's solar sector, process innovation, deployment learning, and integration capabilities have been as important as formal R&D. Third, the industry has made major contributions to sustainable development through decarbonisation, industrial upgrading, cost reduction, and selected rural development gains.

At the same time, important gaps remain. Innovation quality does not always match innovation quantity, and some core technological bottlenecks persist. Manufacturing success has outpaced progress in system integration, profitability and circular-economy governance. Social and regional benefits have also been uneven, depending heavily on local institutional capacity. The largest unresolved issue is life-cycle sustainability, especially recycling, material dependence and the environmental footprint of large-scale production.

The review also shows that the Chinese case should not be romanticised or dismissed. It should be read as a historically specific model with clear achievements and visible contradictions. Its greatest strength has been its ability to connect industrialisation with clean-energy deployment at an exceptional pace. Its main weakness is that institutional attention has not always kept pace with the second-order effects of success, especially waste, overcapacity, integration pressure and uneven local outcomes. Recognising both sides of the story is essential if the sector is to remain a positive force in the broader energy transition.

The central conclusion is therefore balanced. China's solar energy industry has already become one of the world's most important engines of low-carbon transformation, but its long-term contribution to sustainable development will depend on the direction of the next phase of innovation. If policy and firms focus more strongly on integration, quality, circularity and inclusion, China can move beyond manufacturing dominance toward a more mature model of sustainable technological leadership.

RECOMMENDATIONS

First, China should shift solar policy from quantity-led expansion toward quality-led innovation by linking support more clearly to efficiency gains, original R&D, product reliability, recycling readiness and grid compatibility. Second, greater public and private investment should be directed toward next-generation technologies and strategic bottlenecks, including advanced cell architectures, manufacturing equipment, smart inverters, storage integration and digital energy management. Third, grid and electricity-market reforms should be accelerated so that solar innovation translates into usable low-carbon power. Flexible grids, storage deployment, better transmission coordination and stronger support for distributed generation are all essential. Fourth, China should establish a comprehensive circular-economy framework for the PV industry, including eco-design standards, producer responsibility, recycling targets and incentives for low-carbon manufacturing processes. Fifth, social sustainability should be built more deliberately into distributed and rural solar programmes through transparent benefit-sharing, maintenance support, local capacity-building and stronger post-installation monitoring. Sixth, China should deepen international collaboration on standards, recycling, supply-chain transparency and sustainable technology transfer, because its choices now influence the global character of the solar transition. Finally, future research should examine regional inequality, labour conditions, recycling readiness, and the interaction among solar, storage, and digital infrastructure to clarify the long-term sustainability of the Chinese model.

REFERENCES

- Bai, B., Li, X., & Zhang, Y. (2024). Shaping the solar future: An analysis of policy evolution in China's photovoltaic sector. *Solar Energy*, 282, 112955.
- Che, X. J., Lin, B., & Zhang, M. (2022). The policy effect on photovoltaic technology innovation in China: A heterogeneity analysis based on policy instrument perspective. *Energy Economics*, 114, 106286.
- Du, C., Zhang, J., & Wang, H. (2023). The impact of China's national sustainable development experimental zone policy on energy transition. *Sustainability*, 15(10), 8315.
- Geall, S., Shen, W., & Gao, Y. (2018). Solar energy for poverty alleviation in China: State ambitions, bureaucratic interests, and local realities. *Energy Research & Social Science*, 41, 1–8.
- Hu, F., Liu, X., & Wang, Y. (2024). Research on the evolution of China's photovoltaic technology from the perspective of patent analysis. *Solar Energy*, 270, 112301.
- Huang, P., Negro, S. O., Hekkert, M. P., & Bi, K. (2016). How China became a leader in solar PV: An innovation system analysis. *Renewable and Sustainable Energy Reviews*, 64, 777–789.
- International Energy Agency. (2025). *China's share in global PV manufacturing capacity, 2024 and 2030*. Paris: IEA.
- International Energy Agency. (2025). *Solar PV*. Paris: IEA.
- International Energy Agency Photovoltaic Power Systems Programme. (2024). *National survey report of PV power applications in China 2024*. Paris: IEA PVPS.
- Jackson, M. M., Li, Y., & Grant, J. (2021). A green expansion: China's role in the global deployment and transfer of solar photovoltaic technology. *International Review of Economics & Finance*, 76, 670–684.
- Li, Y., Shi, X., & Su, B. (2018). A review of photovoltaic poverty alleviation projects in China. *Renewable and Sustainable Energy Reviews*, 93, 516–527.
- Liu, D., & Sun, X. (2013). Development of photovoltaic power generation in China: A transition perspective. *Renewable and Sustainable Energy Reviews*, 25, 535–543.
- Liu, J., Zhang, Q., & Wang, S. (2023). Impacts of solar photovoltaic projects on sustainable livelihoods in rural China. *IIMB Management Review*, 35(3), 100–112.
- Qu, Z., Wang, L., & Zhao, H. (2024). China's photovoltaic development and its spillover effects on sustainable development. *Sustainability*, 16(22), 9922.
- REN21 Secretariat. (2025). *Global status report 2025: Solar PV*. Paris: REN21.
- Shuai, J., Chen, Y., & Li, P. (2025). Are critical mineral resources sustainable for China's solar photovoltaic industry? *Energy*, 332, 137693.
- Urbina, A., Wambach, K., & Salibi, N. (2023). Sustainability of photovoltaic technologies in future net-zero energy systems. *Progress in Photovoltaics: Research and Applications*, 31(10), 1035–1048.
- Wang, F., Chen, H., & Li, Z. (2024). The current status, challenges, and future of China's photovoltaic industry. *Energies*, 17(22), 5694.
- Wu, W., Liu, Q., & He, J. (2025). Exploring the role of renewable energy expansion in alleviating energy poverty in China. *Environment, Development and Sustainability*, 27, 1–24.
- Xin, L., Zhao, Y., & Chen, X. (2022). How does renewable energy technology innovation affect environmental pollution in China? *Environmental Science and Pollution Research*, 29, 56789–56805.

- Yuan, J. (2025). The impact of China's solar energy industry technology innovation on corporate performance and implications for sustainable development. *Sustainability*, 17(19), 8709.
- Zhang, F., & Gallagher, K. S. (2016). Innovation and technology transfer through global value chains: The case of solar photovoltaic technology in China. *Energy Policy*, 94, 191–203.
- Zhang, Y. (2021). The transitions of technological innovation systems in China's solar photovoltaic industry. *Technology Analysis & Strategic Management*, 33(11): 1270–1283.
- Zhang, Z. X., Wang, J., & Chen, K. (2020). Driving force for China's photovoltaic industry output growth. *Journal of Cleaner Production*, 280, 124371.

PERCEPTIONS OF HOSPITALITY STUDENTS ABOUT WORK-INTEGRATED LEARNING AS A SKILLS DEVELOPMENT IMPERATIVE

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ABSTRACT

Work-Integrated Learning (WIL) is bridging the gap between what is taught in learning institutions and expectations for students in the workplace. Therefore, this investigation focused on hospitality students' perceptions regarding WIL as an imperative component for skills development in the workplace. A qualitative research approach utilised semi-structured interviews as a data collection technique from a purposefully selected sample of hospitality students. Study data show that WIL clarifies perceived skills priority in the hospitality industry; improves soft and hard skills; and advances theoretical knowledge and practical application. Challenges include a lack of proper guidance during WIL placements, necessitating structured guidance.

Keywords: hospitality, skills, skills development, students, work-Integrated learning.

INTRODUCTION

Work-integrated learning (WIL) has gradually become a significant approach for students to engage with the work environment. WIL is defined as a process in which students apply their theoretical understanding in real-world work settings (Lubbe & Svensson, 2022). WIL provides graduates exposure not just to the environment of employment but also to the expectations in the industry (Kokt & Solomons, 2021). Lategan (2022) postulates that numerous outcomes on assessments of students in different countries show that university graduates are not principally obtaining the types of skills essential for the industry. By partaking in WIL initiatives, students are highly likely to be exposed to practical conditions which improve their graduate skills, likelihood of employment, as well as attaining information on job prospects. Students, universities, as well as the work industry consider graduate skills, employability and employment opportunities as indispensable success fundamentals for degree programs (Lubbe & Svensson, 2022). WIL is a vital element for the development of work skills. Deen and Tichaawa (2016) argue that WIL has been emphasised as a critical component in the amalgamation of theory with practice in every vocational programme. The hospitality sector, which is predominantly a service industry, demands the effective utilisation of WIL to ensure that students become invaluable to the sector.

Preparing future professionals in South Africa's hospitality industry is crucial, as noted by Kokt and Solomons (2021), since this sector is the largest within the tourism sector. The South African hospitality industry significantly contributes to the nation's economy and provides top-quality services to both local and international visitors (Kokt & Solomons, 2021). Involvement in WIL initiatives allows students in hospitality to gain valuable knowledge about the industry and develop skills to handle challenging situations (Nguyen, Goh & Murillo, 2023). The hospitality industry prioritises practical skills and hands-on experience, making WIL a vital part of education in this area (Patiar et al., 2021). Essentially, WIL offers significant work experience benefits to students studying hospitality.

However, the hospitality work environment has long been prominent for being a stressful and demanding atmosphere (Ramgoolam-Atchiamith et al., 2022). Certain students view WIL as an interruption to their academic timetable and express concerns about managing their work and study responsibilities (Bowen, 2020). Nguyen et al.

(2023) identified that disputes with immediate supervisors and colleagues are a common issue faced by hospitality students. Gaining insight into these issues from the students' viewpoint is essential for the success and effectiveness of WIL programs. Experiencing real-life hospitality work experience can assist them in acquiring skills that are relevant to their prospective careers.

Even though numerous studies have examined WIL models, strategies, implementation, and motivation, limited studies have been carried out to comprehend the perceptions of students in the hospitality sector, focusing on WIL as a skills development imperative. One of the impediments that hampers students who have graduated from getting employment is the requirement by employers for some form of work experience and practical 'on-the-job' insight, not just a qualification from university (Lubbe & Svensson, 2022). This study focuses on the knowledge gap in the in-depth qualitative exploration of students' perceptions concerning aspects of perceived skills prerequisites and non-negotiable aspects of developing skills in hospitality students. The perceptions of hospitality students about WIL as a skills development imperative offer insight into how students studying hospitality perceive the incorporation of practical work experience with their academic learning. Therefore, the primary objectives of this article are to understand the perceptions of hospitality students regarding the importance and value of WIL as a means of developing skills relevant to the hospitality industry, and to determine the challenges associated with WIL in shaping their skill sets.

LITERATURE REVIEW

WIL has become the practical component of learning, which assists students to be involved in their prospective working industry. This work experience is likely to play a significant role in influencing the students' career trajectory. Therefore, the subsequent section discusses the different dynamics with regard to WIL.

WIL Contributions

WIL is capable of contributing towards practical skills development. WIL permits students to obtain hands-on experience in numerous aspects of the tourism and hospitality sector, such as hotel management, event management, customer service, as well as food and beverage operations (Dhevabanchachai & Wattanacharoensil, 2017). Instructions in a classroom setting alone fail to create graduates who are prepared for future work (Govender & Wait, 2017). By working in real-life situations, students can develop practical skills that are indispensable for success in their future careers.

Industry exposure is another substantial advantage of WIL. Through WIL placements in tourism and hospitality organisations, students are exposed to the internal operations of the sector (Sonnenschein, Barker & Hibbins, 2019). Students can observe how various businesses operate, comprehend sector trends, and learn about the opportunities and challenges that the industry experiences (Caldicott, Wilson, Donnelly & Edelman, 2020). This work exposure assists the students in becoming better equipped for the demands of the industry when they graduate. WIL also assists students with networking prospects. During their WIL experiences, students have the opportunity to network with industry management, experts, and executives (Hodges & Martin, 2020). Constructing a professional network can open doors to future job prospects, mentorship, and internships, which can substantially influence the students' career trajectory.

WIL also ensures that it helps students to enhance their confidence and work ethic. WIL experiences can increase students' confidence in their capabilities and work ethic (Arney, 2022). Edwards (2014) also adds that experiencing WIL enhances students' self-efficacy, particularly regarding their confidence in submitting applications and participating in interviews, as well as in expressing their skills and strengths. When students partake in WIL, they participate in meaningful work and obtain positive feedback from supervisors and colleagues, which can increase their self-belief as well as motivate them. WIL also helps students to get used to carrying out duties and responsibilities in a work environment. An additional important contribution offered by WIL to students is problem-solving and adaptability. Working in a real-world context usually encompasses encountering unexpected challenges (Brewer, Lewis & Ferns, 2022). Therefore, WIL assists students in developing problem-solving skills and adaptability by necessitating them to think on their feet and find creative resolutions to industry-specific issues.

Furthermore, WIL also enhances employability. Graduates with WIL experience are usually more attractive to employers because of their industry-specific competencies and relevant experience in the tourism and hospitality sector (Hewitt & Sao Joao, 2022). Therefore, the experience obtained during WIL can afford students who have graduated an advantage in the employment market within the tourism and hospitality sector. WIL can also offer chances for long-term employment within the industry. Many students who excel during their WIL placements may be presented with full-time work contract options or internships by host organisations (Pham & Jackson, 2020). WIL offers opportunities for long-term employment within the tourism and hospitality sector.

Additionally, WIL involves feedback and reflective learning. WIL experiences generally encompass feedback sessions with mentors and supervisors (Nisbet, Haw & Caldicott, 2022). Generally, students gain insights related to their field, particularly regarding the advantages and drawbacks of intervention strategies needed to tackle issues within the work environment (Ojo, 2019). Such feedback and opportunities for reflective learning allow students to identify areas for improvement and set goals for their professional development within the tourism and hospitality sector.

WIL Challenges and Concerns

One of the challenges encountered during WIL is a lack of mentorship. Mukeredzi et al. (2015) posit that some students have reported feeling they do not receive adequate guidance and support from their mentors during WIL. Griffiths, Shean and Jackson (2021) also argue that some supervisors usually have incomplete knowledge of the particular theoretical details being delivered to the WIL students they are assisting. The aspect of mentorship during WIL can be a problematic area which may affect the delivery of necessary skill development during the placement process.

Mismatch of expectations can also be a challenge which is encountered during WIL. Students may occasionally have differing expectations before placement compared to the actual experiences they encounter during their WIL (Edwards, 2014). A study by Ntshangase, Mabaleka and Sibisi (2024) revealed that data did not support students' expectations regarding "skill development," "support and guidance," and "personal and professional growth," showing that there was no statistically significant connection between these factors and the WIL program. Vhumbunu, Chitura and Mogami (2023) also assert that there are limited skills, gaps between educational programs and industry requirements, and an inadequate work ethic in the hospitality and tourism sector. Therefore, there are areas that are still of concern regarding WIL meeting different students' expectations, including skills development. This study provides insight into the contributions of WIL to skills development.

Another major challenge that is experienced during WIL is translating theoretical knowledge into the work environment. Ojo (2019) highlights that students encounter challenges in applying theoretical concepts to real-world situations, struggle to grasp the variety of contexts within their discipline or field, require explicit instructions, and are apprehensive about failing in the assigned tasks. Therefore, considering such challenges of translating theoretical knowledge into fitting practical practices in the work environment necessitates a study on WIL as a skills development imperative.

METHODOLOGY

The study utilises a qualitative research approach and an interpretivist research paradigm. The use of the qualitative research approach implies that the study selected a sample of 15 hospitality students from Walter Sisulu University. To select the study sample, participants were selected using purposive sampling. Participants were purposively selected from students who are registered for a tourism and hospitality course because of their lived experiences, which were useful in providing perceptions regarding WIL and understanding of WIL's usefulness as a skills development imperative. The sample comprised both female and male student participants. Semi-structured interviews were used to collect the study's primary data. The data collection procedure was selected as a suitable method for this study because it permitted the researcher to elicit and delve deep to uncover insightful information about the participants' experiences (Magaldi & Berler, 2020). The interviews were approximately 20 minutes each, and consent was sought from participants before they participated in the interview process. The study adhered to research ethical considerations, ensuring informed consent, voluntary participation, confidentiality, anonymity, and no harm to participants. The data gathered through interviews were transcribed, presented and discussed thematically with themes aligned to the main objectives of WIL as a skills development imperative.

FINDINGS AND DISCUSSION

This paper's findings are presented and discussed in accordance with emerging themes that were in tandem with the main objectives of this study. The emerging themes underscored the dual nature of WIL as a skills development imperative, capturing both its advantages and underlying challenges.

Perceived Skills Priority

Imperativeness is about the necessary aspect. In this regard, from the study, it was revealed that WIL is noted to be necessary in assisting students in the hospitality sector with clarity on skills priority, both hard and soft skills. Essentially, the data from this study suggests that students in the hospitality sector view WIL as a means to identify critical skills needed in the hospitality industry. One of the participants who responded to this study said that:

"There are a lot of skills that you acquire from hands-on experience of WIL, such as culinary, politeness, using the computer, budgeting, housekeeping, cleaning, and stock management, as in food and drinks that are available.... After WIL, you surely can pinpoint areas that can help you advance your career in the hospitality sector".

Identification of both soft and hard skills is a prerequisite for advancing a career in the hospitality sector. The prominent soft skills that are perceived as imperative in the hospitality sector include communication, creativity, emotional intelligence, active listening, and professional etiquette. The hard skills essential for skills development in the sector include academic qualifications, digital competencies, culinary, housekeeping, beverage and food management, event management, bartending, front desk operations, and concierge. The results of this study acknowledge WIL as a crucial avenue for obtaining practical experience and enhancing understanding of the skills that are essential for career growth in hospitality. These findings confirm the suppositions by Dhevabanchachai and Wattanacharoensil (2017) that WIL provides hands-on experience. This study's findings further demonstrate that the distinction and ability to balance between soft and hard skills is nurtured by partaking in WIL programs.

Soft and Hard Skills Advancement

The nature of skills development promoted by WIL engagement is material to imperativeness. A segment of this study's findings depicted that the nature of skills development in WIL participation includes the advancement of soft and hard (technical) skills. The study revealed that WIL provides students a platform to develop their skills in a real-world work setting, helping them become more job-ready when they graduate. Soft skills advancement is usually overlooked as it is not incorporated into most academic curricula. Soft skills are critical in the hospitality sector because personalised and experiential customer service is necessary for the sector's success. Soft skills are generally not incorporated as part of the academic syllabus; WIL plays a crucial role in offering hospitality students an opportunity to enhance their soft skills. WIL also provides these hospitality students with an opportunity to utilise and advance hard skills that have been learned from their academic qualifications. One participant who expressed this view stated that:

"I think we benefit a lot from this WIL program in many ways. We get to improve our skills like how to talk to clients, nicely solve a problem, listen, and work with others. The work also helps to utilise and advance the skills that we get from our classes, such as digital skills, culinary, food, and beverage management".

The excerpt above points to a significant theme in this study, which is the nature of skills development during WIL participation, encompassing the advancement of soft and hard skills. WIL as a skills development imperative allows students' involvement in work tasks and duties that are relevant to different aspects of the hospitality sector.

Theoretical Knowledge and Practical Application

Bridging the gap between theoretical knowledge and practical application of acquired academic knowledge is an essential element of skills development. The utilisation of theoretical knowledge in a practical situation helps students understand the work environment. WIL bridges the gap between academic learning and the skills needed in a professional corporate landscape. WIL fosters skills development by providing practical experience for students to utilise their academic knowledge in preparation for the entrance and progression in the hospitality work environment.

The practical experience presented through WIL participation also allows the mismatch between the students' expectations and reality to be reduced. One student who was interviewed mentioned that:

"WIL ensures that we put into practice the things that we learn in class. The ability to use things that you have learned in practice is interesting and illuminating. I think you start understanding your career path after a practical".

Another student who shared a different view said that:

"I like the practical application of academic knowledge that we get from WIL. But I find that most of the superiors allocate us tasks and duties that I feel do not really benefit us because it is mostly the low-skilled tasks, such as cleaning and carrying things. For me, it feels like we just have cheap labour for some of these businesses".

Discoveries of the study depicted by the statements above demonstrate that WIL plays a significant role in bridging the gap between theoretical knowledge and practical application. This bridging of the gap between theoretical knowledge and practical application is important for skills development as it enables students to convert their knowledge into practical skills, improving their job prospects and problem-solving capabilities. However, some of the students also highlighted that the lack of meaningful work during WIL undermines the much-needed skills development acquisition. This finding departs from the general conception that through WIL, students are always obtaining a meaningful platform to bridge the gap between academic knowledge and practical application. The finding supports the argument raised by Ntshangase et al. (2024) that, in some cases, there is a disconnection between bridging the gap of knowledge acquired and the implementation of work under a WIL program. Essentially, the extent of efficiency of WIL in skills development differs with specific cases and with the implementation of WIL.

Confidence, Adaptability, and Problem-Solving Abilities

Furthermore, the imperative skills development that accompanies WIL participation is the enhancement of confidence, adaptability and problem-solving capabilities. WIL ensures the students can deal with real-life practical work situations. This process of dealing with real-life work experience allows the integration of theoretical and practical knowledge, which improves the students' confidence in their ability to carry out duties and tasks in a professional setting. WIL also allows students to learn how to adapt, enhance understanding and build resilience when they are in the corporate landscape. The real-life conditions in the workplace enable that students are able to solve problems, deal with challenges and gain practical work skills. A participant who offered an insight into this perspective commented that:

"WIL has been significant in improving so many things in my life. WIL boosts our confidence as students as we get to know about our abilities, making us more self-assured when entering the job market. Also, dealing with different situations when working requires us to use our minds to think about the things that we learned in academics. Then sometimes you don't use academic knowledge, but you have to solve the problem".

From the responses presented above, participants depicted a heightened sense of confidence, adaptability, and problem-solving abilities attained through WIL experiences. The finding endorses the study outcomes of Arney (2022), which highlight the improvement of confidence among students who participate in WIL. Additionally, this study also found that there are complementary elements such as adaptability and problem-solving skills, which become a skills development imperative when hospitality students partake in WIL programs. Additionally, WIL provides students with psychological readiness in preparation for dealing with challenges when working in the hospitality industry.

Understanding Workplace Complexity

The ability to comprehend workplace complexity is a key competence that is gained during WIL. The findings illustrated that through WIL, students are able to obtain a deeper understanding of workplace dynamics. Their understanding of different processes and structures within an organisation helps students to comprehend the relevance and application of particular academic courses, trends, tasks, workload management, complexities and ever-shifting demands within the hospitality industry. This comprehensive picture of workplace complexity is vital in acquiring essential skills, career readiness, career advancement, motivation and cognitive skills in the hospitality industry. Explaining this perception of understanding workplace complexity, one student stated that:

“WIL has been very instrumental in the understanding of the workplace. We all want to work, but what I have noticed through WIL is that the workplace is a very difficult place. Everything is complicated and sometimes different from what you thought. Things change, and you have to adjust to do the tasks you have been assigned by your supervisor”.

An additional supporting view from another student revealed that:

“I think the practical done through WIL has shown me that the hospitality sector is very complicated. Also, you need to know what to do; the hospitality sector is demanding. There is a lot of work. But in all that, you need to know if you want to work in it and what skills you need to advance”.

The excerpts above by students indicate that WIL assists them in comprehending the complexity of the hospitality work environment. The diverse aspects that characterise the workplace are elements that students learn about during WIL, which help them to develop their work abilities, aiding them in achieving success in their future professions in the hospitality industry. Fundamentally, exposure to the complexity of the workplace enables the students to establish the skills that help them to deal with a variety of complex situations in the hospitality sector.

Employability Prospects

Moreover, the ability to identify the employability prospects offered by participating in WIL is significant for hospitality students. This study’s findings reveal that through WIL, students attain practical experience, bettering their hospitality industry-specific skills and also obtain opportunities to develop essential skills, making these students more attractive candidates to potential employers. WIL improves job readiness. One participant who held this view remarked that:

“Generally, WIL can be regarded as the first layer for any student to get a job. With all the experience that you get from WIL, you can mention to an organisation that you have some form of work experience, which increases the prospect of being employed”.

The statement from the student proves that WIL provides students with foundational elements that prepare them to be ready to enter the job market. Due to exposure to work, the decision-making process of students improves, which increases their employability prospects. This finding corroborates the findings of Hewitt and Sao Joao (2022), who mention that WIL makes students attractive to potential organisations. Essentially, WIL provides a competitive edge as it makes students distinct among other applicants with exclusively academic qualifications. The necessary skills development becomes easier when the student has been exposed to a work environment.

Cultivate Opportunity Networks

The cultivation of industry networks is also part of WIL outcomes. The network capabilities of students are enhanced by participating in WIL. As students take part in WIL, they interact with various industry professionals, mentors, and colleagues. In the process of interacting, they build connections that can lead to job referrals, recommendations, and even job offers after graduating from their academic program. The necessity of such exposure to networks through WIL makes WIL a skills development imperative. A student sharing the importance of cultivating industry networks through WIL said:

“In the period when doing WIL, there is a lot that a student gets, such as information on the prospective organisations that align with one’s passion and desire”.

Adding to this view, one student commented that:

“You get to meet with so many people and share information, which is good for your career”.

The views of the students based on their experience are that WIL as a skills development imperative provides a cultivation of industry networks and prospective career opportunities. The results of this study affirm the argument by Pham and Jackson (2020) that some students get employment networks from WIL, and those who excel get job opportunities. Notably, WIL is crucial for developing skills, as it gives students a foundational advantage when seeking job opportunities by facilitating connections within the industry.

Challenges

The challenges that make it difficult for WIL to become a skills development imperative in the hospitality sector vary, including poor guidance during WIL placements. This study's findings reveal that there are experiences of poor guidance during WIL placements. The study found that due to poor guidance and mentorship, some students fail to attain the required on-the-job experience from WIL. As a result of poor guidance, students also fail to maximise engagement and participate in work-related issues. The development of skills is curtailed in such conditions. One participant explained that:

"We often experience different instructions, sometimes we end up being confused. Some students end up finishing the placement more confused without gaining a lot from the programme".

Clearly, improper guidance and poor mentorship during WIL placements are challenges that affect the learning process. The lack of proper and adequate guidance during WIL affects the skills development process among students in the hospitality sector. This finding resonates with the findings of Mukeredzi et al. (2015) that underscore the impact of poor guidance and mentorship as influential in the learning and development of skills during WIL. WIL benefits are premised on the ability of the supervisors and mentors to provide proper guidance to students so that they can acquire and utilise the required practical skills.

Furthermore, the ability to strike a balance between academic commitments and WIL work requirements can be challenging for some students. The academic tasks can be demanding for students. Adding work demands to this academic workload can be overwhelming, resulting in academic stress. The students also face challenges if their tasks during the placement do not align with their expectations or academic focus, leading to a disconnect between their studies and the practical experience. Meeting the expectations of the academic supervisors and work supervisors can be stressful and challenging. A student expressed this concern, stating that:

"We sometimes struggle with balancing schoolwork and practical training. The demands can be overwhelming sometimes. The workload becomes so much that we would always get tired. The expectations from the lecturers and work supervisor can sometimes clash".

From the excerpt, WIL can strain students. The complexity of balancing work and academic responsibilities causes some students to struggle and sometimes lose focus on their academic work. The workload balance can be a complex factor that affects the ability of student to develop their skills within the hospitality industry. However, WIL presents an opportunity for students to understand the necessity of developing capabilities to manage workload in different work environment settings.

CONCLUSIONS AND RECOMMENDATIONS

This research concludes that WIL is a form of skills development because it enhances both hard (technical) and soft skills within the hospitality industry. Both hard and soft skills are considered imperative competencies in the hospitality industry and can only be advanced through WIL. Students also regard the advancement of hard and soft skills as a valuable aspect in increasing their employability, which makes WIL a skills development imperative for every hospitality student. Advancement of soft and hard skills plays a significant role in shaping prospective career path development within the hospitality industry, making it clearer for the student to understand their career path. Essentially, based on these research results, academic institutions should prioritise the implementation of WIL to help students within the hospitality industry gain exposure to hospitality work realities. Although students may develop some soft skills, they remain underprepared for the hospitality industry because the academic curriculum lacks specific training in this area. Therefore, to meet industry demands, academic institutions must prioritise the integration of soft skills within their hospitality curricula.

Furthermore, from the findings, it can be concluded that WIL bridges the gap between theoretical knowledge and practical application. However, the efficiency of bridging this gap between theoretical knowledge and practical application varies and largely depends on how WIL is implemented in a particular organisation. WIL provides students with a sense of confidence, work adaptability, and problem-solving capabilities. The exposure to work provided by WIL prepares hospitality students for the complexity and realities of the hospitality work environment. However, even though there is a bridging of the gap between theoretical knowledge and practical application, students felt that there is no structured guidance, which is vital for targeted support for critical services within the hospitality industry.

Therefore, there is a need for structured guidance, which can be provided through a structured template on skill-focused support.

Additionally, WIL also assists students in building networks that help them get career opportunities. The networking during WIL is essential in providing opportunities for career coaching and mentorship. The coaching and mentorship attained during WIL build the skills and coping mechanisms for the demanding hospitality working environment. The networking during WIL also helps hospitality students to create professional connections, which will be beneficial in understanding the job market and its trajectory. More so, the connections from networking during WIL are also perceived to improve employability prospects. Therefore, it is imperative to provide information to hospitality students on the importance of networking during WIL before their deployment. The academic institutions can incorporate this information as part of the curriculum.

Even though hospitality students largely perceive WIL as a skills development imperative, some challenges undermine participation in WIL. The challenges are poor guidance during WIL and managing a balance between academic commitments and WIL training requirements. The poor guidance implies that there is a need for structured guidance, which will provide a systematic approach to skills development and active and purposeful engagement. In conclusion, this study aimed to demonstrate the importance and value of WIL as perceived by hospitality students, making it a skills development imperative. Fundamentally, hospitality students view WIL as a means to connect their education with the real demands of the hospitality sector.

LIMITATIONS AND FURTHER RESEARCH

The research employs a qualitative methodology, which comes with its limitations, including a limited sample size. The small sample provided in-depth, insightful data necessary in understanding the perceptions of the hospitality students on WIL as a skills development imperative. However, a different study with a larger sample size, utilising a quantitative research method, could be carried out to examine WIL effectiveness among students across various academic levels and institutions. This research was restricted to the hospitality academic discipline in its assessment of WIL as a skills development imperative; more studies can be conducted to find out about skills development in WIL in other academic disciplines.

REFERENCES

- Arney, N. (2022). A Relational Understanding of Learning: Supporting Indigenous Work-Integrated Learning Students. *International Journal of Work-Integrated Learning*, 23(2), 153-167.
- Brewer, M., Lewis, S., & Ferns, S. (2022). Interdisciplinary Work-Integrated Learning: Australian university project-based learning pilots and practices. *International Journal of Work-Integrated Learning*, 23(1), 17-30.
- Bowen, T. (2020). Work-Integrated Learning Placements and Remote Working: Experiential Learning Online. *International Journal of Work-Integrated Learning*, 21(4), 377-386.
- Caldicott, J., Wilson, E., Donnelly, J. F., & Edelman, J. R. (2020). Fostering Self-Authorship Through Work-Integrated Learning in University Tourism Programs: A Missed Opportunity? *Journal of Hospitality & Tourism Education*, 32(4), 220-233.
- Dhevabanchachai, N. T., & Wattanacharoensil, W. (2017). Students' Expectations, Experiences, and Career Direction After In-House Internship: The Pedagogical Role of the Hotel Training Center in Thailand. *Journal of Teaching in Travel & Tourism*, 17(2), 118-134.
- Deen, A., & Tichaawa, T.M. (2016). Hospitality Management Student's Preplacement Perceptions of Work Integrated Learning (WIL). *African Journal of Hospitality, Tourism and Leisure*, 5(4), 1-9.
- Edwards, M. (2014). The Impact of Placements on Students' Self-Efficacy. *Higher Education, Skills and Work-Based Learning*, 4(3), 228-241.
- Govender, C. M., & Wait, M. (2017). Work Integrated Learning Benefits for Student Career Prospects-Mixed Mode Analysis. *South African Journal of Higher Education*, 31(5), 49-64.

- Griffiths, M., Shean, M., & Jackson, D. (2021). Supervision in Initial Teacher Education: A Scoping Review. *Issues in Educational Research*, 31(2), 476-494.
- Hewitt, K., & Sao Joao, E. (2022). The Gap Between Expectations of Hospitality Graduates and Hotel Managers After the Pandemic. *Studia Periegetica*, 40(4), 149-168.
- Hodges, L. D., & Martin, A. J. (2020). Enriching Work-Integrated Learning Students' Opportunities Online During a Global Pandemic (COVID-19). *International Journal of Work-Integrated Learning*, 21(4), 415-423.
- Kokt, D., & Solomons, J. E. (2021). The Effect of Work-Integrated Learning on the Job Satisfaction and Motivation of Hospitality Alumni. *Journal for New Generation Sciences*, 19(1), 38-50.
- Lategan, K. (2022). An Integration of Graduate Attributes in Teaching and Learning at a Hotel School in Cape Town (Doctoral dissertation, Cape Peninsula University of Technology).
- Lubbe, I., & Svensson, G. (2022). Work Integrated Learning (WIL) Model-A Win-Win Process Between University, Postgraduate Business Students, and Industry. *The Independent Journal of Teaching and Learning*, 17(1), 39-59.
- Magaldi, D., & Berler, M. (2020). Semi-Structured Interviews. In: Zeigler-Hill, V., & Shackelford, T.K. (Eds.) *Encyclopedia of Personality and Individual Differences*. Cham: Springer.
- Mukeredzi, T. G., Mthiyane, N., & Bertram, C. (2015). Becoming Professionally Qualified: The School-Based Mentoring Experiences of Part-Time PGCE Students. *South African Journal of Education*, 35(2), 1057-1057.
- Nguyen, I., Goh, E., & Murillo, D. (2023). Living Through the Lives of Hospitality Students During Work-Integrated Learning (WIL) Internships: An Application of the Critical Incident Technique to Explore Factors Affecting Students' WIL Experience. *Journal of Hospitality & Tourism Education*, 35(3), 225-236.
- Nisbet, S., Haw, J., & Caldicott, J. (2022). Students as Harsh Critics: A Comparison of Student and Industry Assessment of Placement Competencies. *International Journal of Work Integrated Learning*, 23(1), 1-16.
- Ntshangase, S.D., Mabaleka, N.M. & Sibisi, A.S. (2024). Students' Expectations of Work-Integrated Learning in Tourism and Hospitality. *African Journal of Hospitality, Tourism and Leisure*, 13(4), 897-905.
- Ojo, T. A. (2019). Work-integrated Learning Practices: Lessons from Private Higher Education Institutions. *Educator Multidisciplinary Journal*, 3(1), 7-25.
- Patiar, A., Kensbock, S., Benckendorff, P., Robinson, R., Richardson, S., Wang, Y., & Lee, A. (2021). Hospitality Students' Acquisition of Knowledge and Skills Through a Virtual Field Trip Experience. *Journal of Hospitality & Tourism Education*, 33(1), 14-28.
- Pham, T., & Jackson, D. (2020). 13 Employability and Determinants of Employment Outcomes. Developing and Utilizing Employability Capitals: Graduates' Strategies Across Labour Markets, 237-255
- Ramgoolam-Atchiamith, A., Khan, A., Rodrigues, C., & Wardle, K. M. (2022). Stress During Work Placement-Examining Positive Outcomes for Hospitality Students in a Work-Integrated Learning Programme. *Higher Education, Skills, and Work-Based Learning*, 12(4), 674-688.
- Sonnenschein, K., Barker, M., & Hibbins, R. (2019). Benefits of Work-Integrated Learning: Perceptions held by Chinese International Students Enrolled in an Australian University and Managers in the Chinese hotel industry. *Journal of Hospitality & Tourism Education*, 31(3), 139-148.
- Vumbunu, T., Chikuta, O. & Mogami, S. (2023). Challenges and Prospects of Work Integrated Learning in Hospitality Training and Education in Botswana: A Case of Botho University's Dual Learning Model. *African Journal of Hospitality, Tourism and Leisure*, 12(5SE), 1785-1796.

THE USE OF USER-GENERATED CONTENT IN SHAPING BRAND IMAGE

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ABSTRACT

This study explores how user-generated content (UGC) shapes brand image with an emphasis on three crucial qualities drawn from Source Credibility Theory including trustworthiness, attractiveness, and expertise. Understanding how these elements affect brand image is important in the ever changing digital landscape, where social media platforms dominate consumer-brand interactions. A quantitative research approach was adopted within a positivist paradigm, using an online survey administered to 100 South African consumers. To evaluate the suggested hypotheses, data were analyzed using SPSS, utilizing exploratory factor analysis, correlation analysis, and descriptive statistics. The results show that brand image is positively correlated with both attractiveness and expertise, with expertise showing the strongest relationship with brand image. Conversely, trustworthiness does not exhibit a statistically significant influence despite being positively correlated. These results point to a change in how consumers evaluate material, with traditional ideas of credibility in digital contexts being subordinated to visual attractiveness and perceived expertise of content creators. By refuting the notion that all aspects of source credibility have an equal impact on brand image, the study adds to the body of existing literature. It emphasizes how attractiveness and knowledge are becoming increasingly important in user-generated content (UGC), especially among younger, tech-savvy customers. Furthermore, the study provides insights from a South African context, which remains under-researched in UGC studies. Practically speaking, the results provide useful information for businesses and marketers, highlighting the necessity of working with skilled and aesthetically pleasing content producers to improve brand perception in cutthroat digital markets.

Keywords: consumer trust, fashion industry, South Africa, source credibility model, social media platforms, user-generated content.

INTRODUCTION

User-generated content (UGC) refers to any type of media content that is developed and shared voluntarily by users rather than professional content developers or marketers (Luca, 2015). It includes online reviews, ratings, testimonials, social media posts, pictures, videos, blogs, and forums (Arnhold, 2010). The emergence of social media and digital platforms has accelerated the distribution of UGC, allowing customers to share their experiences, views, and recommendations on products and services with a global audience (Udoka, Ubong & Emmanuel, 2024). Research indicates that consumer interactions with brands have changed dramatically in the digital age, with UGC now having a substantial impact on brand image (Reichmann, 2017). As social media platforms such as Instagram, Facebook, TikTok, and X continue to expand, the importance of UGC in shaping brand perception has grown significantly (Smith, Fischer & Yongjian, 2012). UGC is regarded as more authentic and trustworthy than branded content since it is created by actual customers who have firsthand experience with the brand or product (Shetty et al., 2024).

UGC is also closely related to electronic word-of-mouth (eWOM), which refers to any positive or negative statement made by consumers about a product or company that is available to a wide audience via the internet (Thao & Shurong, 2020). While UGC is broader than eWOM, the two overlap considerably when content is brand-related (Sharma, 2023). Businesses that properly manage UGC can enhance their reputation, but those that ignore or mishandle it risk negative publicity and reduced consumer trust (Reichmann, 2017). Therefore, understanding how UGC shapes brand image is critical for organisations seeking to remain competitive in the digital economy.

The main objective of this study is to investigate the use of User-Generated Content (UGC) in shaping brand image. To achieve the main objective the secondary research objectives are:

- To examine the role of user-generated content (trustworthiness) in shaping brand image.
- To investigate how user-generated content (attractiveness) shapes brand image.
- To explore the role of user-generated content (expertise) in shaping brand image.
- To make recommendations on how companies can effectively leverage user generated content to enhance their brand image. and to provide practical recommendations for fashion brands and content creators to leverage UGC effectively.
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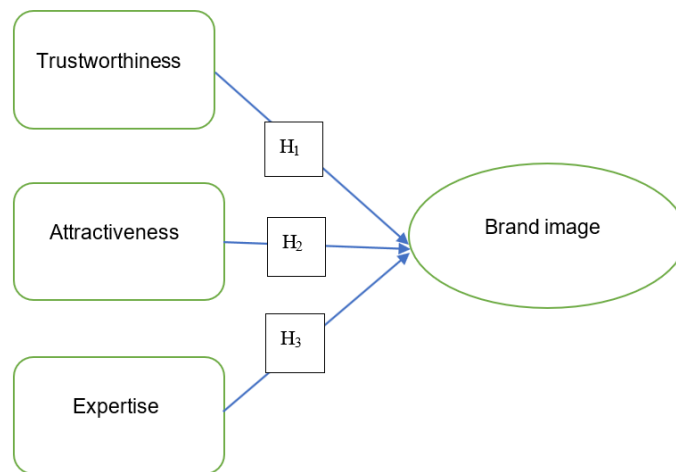
The research hypothesis are as follows:

H1: There is a significant relationship between trustworthiness and brand image.

H2: There is a significant relationship between attractiveness and brand image.

H3: There is a significant relationship between expertise and brand image.

Figure 1: The proposed hypothesized model for this study.



LITERATURE REVIEW

This section provides the theoretical framework and empirical insights of UGC.

Theoretical Framework

This study is based on the Source Credibility Theory.

Source Credibility Model

Source credibility theory is a commonly used framework that examines trustworthiness, attractiveness and expertise, as key constructs influencing consumer perception (Wellman, 2024). According to Stoddard, Nafees, and Cook (2023), source credibility has long been shown to influence consumer attitudes and behaviours. Content from credible sources such as influencers or experts is more likely to be trusted and engaged with by consumers. Credibility is not an objective property of the source but a perceived quality shaped by consumer interpretation (Chakraborty, 2019). If customers perceive the source as reliable, they are more likely to accept the information. Iqbal (2023) further argues that consumers are more willing to share and believe information from trusted sources.

Trustworthiness

Trustworthiness refers to whether a source communicates genuine opinions without external influence (Wiedmann & Von Mettenheim, 2021). It is associated with honesty, sincerity, and truthfulness (Chao et al., 2024). As trust increases, consumers develop stronger relationships with brands (Torres-Moraga & Barra, 2023). However, some studies suggest that consumers increasingly perceive influencers as financially motivated, which reduces the impact of trustworthiness on brand perception (Djafarova & Trofimenko, 2019).

Attractiveness

Attractiveness is defined as the degree to which a stimulus person's characteristics are pleasing to observe (Wiedmann & Von Mettenheim, 2021). It includes physical appearance, personality, and relatability (AlFarraj et al., 2021). Attractive influencers tend to increase engagement and positively influence consumer purchase intention (Muda & Hamzah, 2021). Visual appeal in UGC increases attention, engagement, and positive brand perception (Ikawati, Militina & Achmad, 2021).

Expertise

Expertise refers to the knowledge, experience, or ability of a source to make credible claims about a product (Chao et al., 2024). Consumers are more likely to trust and accept content from knowledgeable individuals (Ismagilova et al., 2020). Expertise is particularly important in product categories such as electronics and skincare, where consumers seek detailed guidance (Lou & Yuan, 2019). Expert endorsements increase brand trust and strengthen brand image.

Conceptual Framework

This study consists of different variables on the role of user-generated content in shaping brand image, those variables are dependent variables, independent variables.

Independent Variables

Attractiveness is defined as "the degree to which a stimulus person's facial features are pleasing to observe." This perspective is applied in this study (Wiedmann, & Von Mettenheim, 2021). Put another way, the influencer who finds the elevated level of attractiveness appealing has a greater chance of influencing their followers' purchasing intentions (AlFarraj et al., 2021). Purchase intention will be significantly impacted by attractiveness. The attractiveness of a brand advertisement refers to how well the commercial can astonish or draw the attention of its audience, and it is critical since it improves communication effectiveness (Ikawati, Militina, & Achmad, 2021). Physical attractiveness rarely goes overlooked and is crucial. Numerous scholars have described attractiveness as being likable, sexy, and chic. These results have been supported by several other researchers, who have found that attractiveness increases favorable sentiments (Muda & Hamzah, 2021). Pleasant consumption experiences are indicative of attitude toward user-generated content (UGC) (Tyrväinen, Karjaluo, & Ukpabi, 2023).

Subsequently, the following hypothesis is formulated:

H1: There is a significant relationship between trustworthiness and brand image.

Trustworthiness addresses the question of whether a person is credible: does the source communicate their true opinion, or are they influenced by third parties? (Wiedmann, & Von Mettenheim, 2021). Source credibility includes expertise and dependability, and it reflects whether the audience believes the information source is honest, sincere, and truthful (Chao et al., 2024). As trust grows, customers perceive their connections with suppliers more positively and develop greater trust in the brand (Torres-Moraga, & Barra, 2023). Trustworthiness is also defined as the level of acceptance and confidence in the speaker and the message (Muda & Hamzah, 2021). Persuasion and communication efficacy are closely tied to trustworthiness. Customers evaluate endorsements based on credibility and acceptance of the communicator (Iqbal, 2023).

Subsequently, the following hypothesis is formulated:

H2: There is a significant relationship between attractiveness and brand image.

Expertise is the capacity or qualification of a source to make specific claims about a subject, including knowledge or proficiency (Chao et al., 2024). The source's experience and reliability significantly influence persuasion, attitudes, and actions of the audience (Ismagilova et al., 2020). Expert opinions are more often accepted than those of non-experts (Wiedmann & Von Mettenheim, 2021). Expertise has a substantial, beneficial impact on a brand's image (Zaharani, Kusumawati, & Aprilianty, 2021).

Subsequently, the following hypothesis is formulated:

H3: There is a significant relationship between expertise and brand image.

Dependent Variable

Brand image refers to the knowledge that customers have of a brand, formed through associations and mental organization (Hien et al., 2020). This association might be based on customer experience, acquired information, or existing consumer perceptions. Brand image prioritizes customer perceptions and emotions associated with the brand and provides a competitive advantage in the market. Consumers frequently prioritize brand image over quality, price, and advantages (Nurhandayani et al., 2019). Brand image consists of characteristics and benefits, including functional, symbolic, and experiential elements (Bernarto et al., 2020). A favorable brand image improves market position and performance (Dam & Dam, 2021). Brands that engage in user-generated content build a sense of community, and even negative reviews can provide improvement opportunities (AlFarraj et al., 2021). Brand awareness includes recognition and recall, while brand associations influence first impressions and consumer perceptions (Saydan & Dölek, 2019; Wang et al., 2021).

Empirical Evidence

Social Marketing

According to Li, Larimo, and Leonidou (2021), in marketing terms, social media are platforms where individuals may create networks and share information and/or feelings. Social media has brought about three fundamental changes in the economy due to its “dynamic, interconnected, egalitarian, and interactive organisms” nature. Social media enables businesses and customers to connect in ways that were previously impossible through platforms such as Facebook, Twitter, and YouTube, where social networks grow from shared interests and ideals (Santos, 2022). Research by Saura et al. (2019) states that a method for evaluating user-generated information in social networks is needed to determine the worth of businesses' goods and services. Social media serves as a conduit between users and viewers, facilitating online communication and the exchange of information about the company (Agarwal, 2020). It also allows customers to share opinions that inform businesses and provide insights into consumer behavior. According to Saydan and Dölek (2019), modern companies have begun to appear more frequently in social media, as customers generate and share content extensively. Customer involvement is becoming increasingly important, and it is seen as a key factor in consumer behavior studies (Agarwal, 2020). Companies use content marketing to engage customers at the right stage of their purchasing process (Müller & Christandl, 2019). Jacobson, Gruzd, and Hernández-García (2020) state that social media is changing how individuals live and interact, although consumers may form negative opinions if marketers misuse social media data. Hermanda, Sumarwan, and Tinaprillia (2019) further suggest that traditional marketing channels have become less effective due to social media growth, while influencer recommendations are often more trusted than those of friends or family.

User-Generated Content (UGC)

According to Musto and Dahanayake (2022), user-generated content refers to material produced and disseminated online by users that can influence purchasing decisions. UGC increases marketers' reliance on digital consumer content and improves engagement opportunities on platforms like Facebook and Twitter. Relationship marketing and customer involvement are closely linked, and brands can increase engagement through likes, retweets, and responses (Read et al., 2019). Brand recognition and engagement often begin at the “top-of-the-funnel” stage through online content consumption (Buzeta, De Pelsmacker, & Dens, 2020). Trust and loyalty are essential in marketing, although loyalty is not only determined by repeat purchasing behavior (AlFarraj et al., 2021). Digital technologies and Web 2.0 have made it easier for users to create and share content (Santos, 2022). UGC continues to grow in importance, especially in influencing purchases and brand visibility. According to Nuralam and Astuti (2025), UGC includes customer reviews, social media posts, and endorsements that function as social proof by sharing real customer

experiences. This builds trust because consumers perceive it as more believable than traditional advertising. However, not all UGC is evaluative, and its effects can vary depending on the type of content (Müller & Christandl, 2019). Muda and Hamzah (2021) state that consumers value UGC because it is created by individuals with similar interests, often influencing self-perception and trust. UGC builds credibility by offering authentic feedback and real-world experiences (Nuralam & Astuti, 2025). Future research is still needed to explore its long-term effects on brand loyalty across different contexts (Nuralam & Astuti, 2025).

METHODOLOGY

This study adopts a positivist paradigm, which focuses on objective reality and statistical measurement. Positivism assumes a single reality that can be measured using scientific methods (Alharahsheh, 2020). An explanatory research design is used to examine relationships between independent variables (trustworthiness, attractiveness, expertise) and the dependent variable (brand image) using quantitative analysis and hypothesis testing. A quantitative approach is used, focusing on numerical data, hypothesis testing, and statistical analysis to measure relationships between variables (Ghanad, 2023).

Online surveys (Google Forms) were used as the primary data collection tool. Secondary data was obtained from literature sources such as Google Scholar, EBSCOhost, and the University of Fort Hare library. A structured questionnaire was used, including demographic questions and Likert-scale items measuring trustworthiness, attractiveness, expertise, and brand image. The population consists of South African consumers who engage with UGC. A non-probability convenience sampling method was used, targeting 100 respondents who had interacted with user-generated content. Data was collected through online surveys and secondary literature sources. The process was cost-effective, accessible, and efficient.

SPSS was used for data processing. Reliability and validity were tested using Cronbach's alpha and Exploratory Factor Analysis (EFA). Data was analysed using descriptive and inferential statistics. Correlation analysis was used to test relationships between variables, while SPSS was used for statistical testing. Ethical clearance was obtained from the University of Fort Hare IFHREC. Participation was voluntary, anonymous, and confidential. Data was securely stored and used only for academic purposes.

RESULTS

Participant Profile

The majority of participants are female, with a total of 42 females (42%), while males account for 33 (33%), and others comprise 25 (25%). This gender distribution will enable comparison between the groups in relation to our study variables, which are Attractiveness, Trustworthiness, Expertise, and brand image. With respect to the population groups, the majority of participants are African, represented by 95 respondents, which accounts for 95%. Coloureds have the smallest population, with 3 respondents, accounting for 3%. The least represented groups are Indian and White population groups, as they have only one respondent each. Although the above figures do not depict the demographics of South Africa, it indicates that Africans are the majority, followed by Coloureds, Whites, and Indians. The largest group in the sample is between the ages of 18 and 24 years, comprising a total of 64 participants, which accounts for 64%. This implies that a high proportion of young people are those who are consistently active on social media and are familiar with creating user-generated content. The group of respondents aged 25-30 years accounts for 29% of the total number of 29 respondents, while the group of respondents aged 31-40 years accounts for 6% of the total number of 6 respondents. The least represented group was those aged 41-50 years, with only one respondent.

Table 1 focuses on the question about the type of social media platform that each respondent engages with. Importantly, this is a multiple-response type of question, which means that respondents could select more than one social media platform. Based on Table 1, it is evident that WhatsApp is the most used social media platform, with a total of 18.4% of all responses and 56.6% of total cases. This indicates that over half of the respondents prefer to engage using WhatsApp. YouTube, at 53.5%, also shows substantial engagement, reflecting that respondents prefer video-driven and visual content platforms. Facebook is used by 50.5% of respondents; it is a moderately used platform, but it is not dominant like WhatsApp and YouTube. TikTok is used by 44.4% of respondents, indicating significant

popularity among young demographics. Instagram has 48.5% respondents, which is slightly less than YouTube and WhatsApp, but it also reflects that respondents prefer visual content and videos.

Table 1: Social media platforms.

Social media platforms				
		Responses		Percent of Responses
		N	Percent	
Social media	TikTok	44	14.5%	44.4%
	Instagram	48	15.8%	48.5%
	Facebook	50	16.4%	50.5%
	X	53	17.4%	53.5%
	YouTube	53	17.4%	53.5%
	WhatsApp	56	18.4%	56.6%
Total		304	100.0%	307.1%
a. Dichotomy group tabulated at value 1.				

Table 2: User-Generated Content Frequencies.

User-generated content frequencies				
		Responses		Percent of Cases
		N	Percent	
User-generated content	SA5.1	41	17.5%	43.2%
	SA5.2	33	14.1%	34.7%
	SA5.3	38	16.2%	40.0%
	SA5.4	40	17.1%	42.1%
	SA5.5	35	15.0%	36.8%
	SA5.6	47	20.1%	49.5%
Total		234	100.0%	246.3%
a. Dichotomy group tabulated at value 1.				

Table 2 focuses on the question types of user-generated content that each respondent engages with. This is a multiple-response type of question, which means that respondents could select more than one social media platform. Based on Table 2, all six User-Generated Content items showed little engagement, according to the frequency study. Item SA5.6 had the highest degree of agreement at 20.1%, indicating that respondents tend to use this user-generated content more. The lowest levels of agreement were found on items SA5.1 (17.5%) and SA5.5 (15.0%), indicating that these behaviors are less frequently displayed. SA5.4 has a moderate level of respondents who frequently engage with user-generated content. SA5.2 (14.1%) and SA5.4 (17.1%) are the second lowest frequency, which implies that respondents are less engaged with these behaviors.

Descriptive Analysis on Major Theoretical Variables and Constructs

Table 3: Summary of Descriptive Statistics of main theoretical variables.

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Z_Trustworthiness	98	6.00	30.00	21.3673	3.83255
Z_Attractiveness	98	8.00	30.00	21.6837	4.03234
Z_Expertise	99	13.00	30.00	22.5859	3.26706
Z_Brand Image	97	10.00	30.00	22.5979	4.07139
Value N	92				

Table 3 provides a comprehensive overview of variability and central tendency for the main variables. Due to incomplete responses, valid cases ranged from 92 to 99. All variables have means above the midpoint, which implies that respondents rated these variables positively. Trustworthiness was measured using a 5-point Likert scale. Based on the results, there is a moderate mean for Trustworthiness (Mean = 21.3673; SD = 3.83255), indicating that the respondents have mixed emotions about this variable. Attractiveness was measured using a 5-point Likert scale. Based on the results, there is a moderate mean for Attractiveness (Mean = 21.6837; SD = 4.03234), which implies that respondents have mixed emotions about Attractiveness. They are positive but not extremely enthusiastic. Expertise was measured using a 5-point Likert scale. Based on the results, there is a high mean (Mean = 22.5859; SD = 3.26706), which suggests that respondents have a positive impression of Expertise, leaning toward a good impression. Brand image was measured using a Likert scale. Based on the results, there is a well above the midpoint (Mean = 22.5979; SD = 4.071339), which suggests that respondents view the Brand image positively slightly above the average midpoint. Brand image has a high mean, similar to Expertise. Regarding Expertise, three items did not load successfully in the factor analysis, resulting in a total of three items.

Validity and Reliability of the Measuring Instrument

In this study, Exploratory Factor Analysis (EFA) was used to assess the validity of the measuring instrument. The EFA involves both decisions relating to extraction and the rotation method (Auerswald, & Moshagen, 2019). Principal Axis Factoring, which aims to minimize the number of extracted factors by evaluating squared multiple correlations among the items, was determined to be the most appropriate extraction approach for the study out of the various extraction techniques available when utilising the EFA. Following the extraction process, the rotation method adopted was Oblimin with Kaiser Normalization. When using rotation, a shift occurs on the axes, resulting in a change in the factor loading on each item. When the change incorporates factor items, it identifies and removes items that do not fit, items with loadings below 0.7 were considered for removal. Two tests must be performed to confirm the extent to which the study data is adequate for factor analysis. These tests are the Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO).

- H^0 : There is no correlation between variables.
- H^1 : There are correlations between the variables.

A p-value less than 0.05 indicates that the null hypothesis (H^0) will be rejected, allowing the continuation of factor analysis. The KMO statistic is 0.9, supporting this analysis, and Bartlett's Test of Sphericity is significant at $p < 0.05$, confirming the suitability of the data for exploratory factor analysis.

Trustworthiness

Table 4 below shows the results for KMO and Bartlett's test for Trustworthiness. The KMO value for Trustworthiness is 0.814, indicating that the data is suitable for factor analysis. The significant Bartlett's Test of sphericity ($p < 0.05$) confirms the appropriateness of conducting factor analysis.

Table 4: KMO and Bartlett's Test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.814
Bartlett's Test of Sphericity Approx. Chi-Square	176.145
Df	15
Sig.	<0.01

All the items for Trustworthiness loaded successfully, as shown in Table 5 below. Trustworthiness has a factor loading that ranges between 0.548 and 0.840, along with a total Cronbach's alpha of 0.810. These results indicate that the Trustworthiness scale is both valid and reliable.

Table 5: Trustworthiness.

Cronbach's alpha: 0.810				
Item	Items	Factor loading	Item total correlation	Cronbach's alpha after deletion
SB6	I find user-generated content (UGC) about brands on social media to be honest.	.840	0.481	0.798
SB7	The UGC gives a trustworthy representation of a brand.	.667	0.588	0.777
SB8	I believe UGC reflects genuine customer experiences	.647	0.729	0.745
SB9	I rely on UGC when I need credible opinions about a brand.	.611	0.562	0.784
SB10	I trust the intentions of users who share content about brands.	.583	0.558	0.783
SB11	Brands that allow UGC appear more transparent to me.	.548	0.524	0.791

Attractiveness

Table 6 below shows the results for KMO and Bartlett's test for Attractiveness. The KMO value for Attractiveness is 0.832, indicating that the data is suitable for factor analysis. The significant Bartlett's Test of sphericity ($p < 0.05$) confirms the appropriateness of conducting factor analysis.

Table 6: KMO and Bartlett's Test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.832
Bartlett's Test of Sphericity	Approx. Chi-Square	186.749
Df		15
Sig.		<.001

All the items for attractiveness loaded successfully, as shown in Table 7 below. Attractiveness has a factor loading that ranges between 0.583 and 0.769, along with a total Cronbach's alpha of 0.828. These results indicate that the Attractiveness scale is both valid and reliable.

Table 7: Attractiveness.

Cronbach's alpha: 0.828				
Item	Items	Factor loading	Item total correlation	Cronbach's alpha after deletion
SB12	I find the creators of UGC content relatable.	.630	0.564	0.807
SB13	I am more influenced by UGC when I find the creator appealing.	.743	0.662	0.786
SB14	Attractive or well-presented UGC draws my attention to a brand.	.581	0.523	0.815
SB15	I tend to trust brand content more when it's created by people I admire or relate to.	.769	0.684	0.781
SB16	The visual appeal of UGC affects how I perceive a brand.	.694	0.627	0.794
SB17	I prefer to follow UGC creators who present themselves in an engaging and appealing way.	.583	0.525	0.815

Expertise

Table 8 below shows the results for KMO and Bartlett's test for Expertise. The KMO value for Expertise is 0.649, indicating that the data is suitable for factor analysis. The significant Bartlett's Test of sphericity ($p < 0.05$) confirms the appropriateness of conducting factor analysis.

Table 8: KMO and Bartlett's Test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.649
Bartlett's Test of Sphericity Approx. Chi-Square	61.983
Df	3
Sig.	<.001

All the items for expertise loaded successfully, as shown in Table 9 below. Expertise has a factor loading that ranges between 0.528 and 0.810, together with a total Cronbach's alpha of 0.719. These results indicate that the scale of Expertise is both valid and reliable. Regarding Expertise, three items did not load successfully in the factor analysis, resulting in a total of three items.

Table 9: Expertise.

Cronbach's alpha: 0.719				
Item	Items	Factor loading	Item total correlation	Cronbach's alpha after deletion
SB19	I believe many UGC creators are knowledgeable about the products they post about.	.528	0.564	0.600
SB20	I consider some UGC creators as experts in the brands or categories they discuss.	.711	0.452	0.731
SB21	I trust UGC more when the creator shows product knowledge.	.810	0.608	0.545

Inferential Statistics

Table 10: Summary of the hypothesized framework.

Hypothesis	Description	Correlation (r)	p-value	Result
H1	Trustworthiness and Brand Image	0.175	> 0.05	Not Supported
H2	Attractiveness and Brand Image	0.481	< 0.05	Supported
H3	Expertise and Brand Image	0.566	< 0.05	Supported

Trustworthiness and brand image show a weak positive relationship ($r = 0.175$; $p = 0.090$). However, this relationship is not statistically significant at the 5% level ($p > 0.05$), indicating that trustworthiness does not significantly influence brand image.

DISCUSSION

A majority of respondents were female, with a total of 42 respondents (42%), followed by males with a total of 33 respondents (33%), and others with a total of 25 respondents (25%). These results are consistent with the view that user-generated content is prevalent. Females are more attracted to user-generated content than males (Lou & Kim, 2019). Most of the respondents fell within the 18-24 age range, with a total of 64 respondents (64%). These results are consistent with the view that most individuals attracted to UGC are young. Regarding the population group, most

respondents fell within the African category, comprising a total of 93 respondents (95%). These results are consistent in that most respondents who use user-generated content are Africans, followed by Coloured, Indians, and Whites. This group's dominance within the sample is consistent with broader national usage trends because they are likewise very active consumers and distributors of digital content (Ki, Cuevas, Chong, & Lim, 2020).

Hypothesis One

There is a significant relationship between trustworthiness and brand image.

Trustworthiness addresses the question of whether a person is credible: does the source genuinely express their true opinion, or are they influenced by third parties? (Wiedmann, & Von Mettenheim, (2021). Trustworthiness is a reliable system since such a measurement can serve as an objective indicator to confirm the system's quality with a certain degree of assurance (Cho, et al 2019). In the literature, the current study found a positive but not statistically significant correlation between trustworthiness and brand image; however, it is not strong enough to be statistically significant. The results of the current study do not support these views. These results suggest that trustworthiness did not play a significant role in the current study's brand image. The impact of trustworthiness on brand image may be diminished if consumers see most influencers as financially motivated. According to research, consumers rely more on peripheral cues like attractiveness, entertainment value, and content engagement in highly visual and fast-paced digital contexts than they do on trustworthiness as an isolated cue (Djafarova, & Trofimenko, 2019).

Hypothesis Two

There is a significant relationship between attractiveness and brand image.

According to the definition of attractiveness, it is merely "a stereotype of positive associations to a person and entails not only physical attractiveness but also other characteristics such as personality and athletic ability." Put another way, the influencer is more likely to influence their followers' purchasing intentions because of their high level of beauty (AlFarraj, et al 2021). The results indicate that attractiveness and brand image have a positive correlation and a strong relationship, which plays a crucial role in shaping brand image and consumer perception in a more positive light, ultimately attracting customers from the source. The study's results support these views. These results suggest that customers are more likely to be attracted to a brand influenced by a content creator they know. Research indicated that consumers associate attractive influencers with positive traits such as competence and trust, leading to cognitive biases that enhance brand perception. Social media users' increased interaction with visually appealing influencers also boosts the influencer's brand image (Jin, Muqaddam, & Ryu, 2019).

Hypothesis Three

There is a significant relationship between expertise and brand image

The primary definition of expertise is "the extent to which the endorser is believed to possess the necessary expertise, experience, or abilities to market the goods. Therefore, compared to people unfamiliar with the context or field, field experts are expected to provide more credible information on the subjects. To put it another way, interacting with someone who has exceptional competence in a clearly identified advertisement should have less of an impact than any decreased trustworthiness with other celebrities from the same timeframe (AlFarraj, et al 2021). According to the results, expertise has a strong relationship with brand image, exhibiting a positive correlation, which makes the factor more reliable. The results of the current study have supported these views. Customers often perceive brands that are endorsed by individuals with relevant experience and knowledge. Because they want precise, trustworthy information, consumers rely on influencers who are seen as experts. Where consumers are more likely to develop long-lasting favourable opinions of the company and pay closer attention to arguments. Both brand trust and brand image rise when customers view an influencer as an expert (Lou, & Yuan, 2019).

CONCLUSION AND RECOMMENDATIONS

The results indicate a positive association between trustworthiness and brand image, but it is not strong enough to be statistically significant, indicating that trustworthiness had no discernible impact on the brand image of the current study. The results show a high and positive association between attractiveness and brand image, which is important for improving consumer perception and brand image. Additionally, the results demonstrate that expertise has a substantial positive link with brand image, making it the strongest factor. This is because consumers tend to choose brands that are supported by people who have appropriate experience and knowledge.

By offering empirical evidence from a South African setting on how trustworthiness, attractiveness, and competence differently influence consumer perceptions of brand image, these results add to the body of knowledge already available on user-generated content and brand image. The study refutes preconceived notions in UGC literature that all source credibility qualities contribute equally by demonstrating that beauty and competence are bigger drivers of brand image than trustworthiness.

According to the study's results, consumers appear to rely less on trustworthiness to trust a brand; instead, they prefer brands that are promoted by knowledgeable people. Attractiveness and expertise have a significantly higher influence when using user-generated content, while trustworthiness has no strong significant relationship with brand image.

AI Use Declaration: *The authors declare that AI was used to improve the readability, language, grammar, and spelling of the manuscript as part of the writing process and not to analyze and draw insights from data as part of the research process.*

REFERENCES

- AlFarraj, O., Alalwan, A. A., Obeidat, Z. M., Baabdullah, A., Aldmour, R., & AlHaddad, S. (2021). Examining the impact of influencers' credibility dimensions: Attractiveness, trustworthiness, and expertise on purchase intention in the aesthetic dermatology industry. *Review of International Business and Strategy*, 31(3), 355–374. <https://doi.org/10.1108/RIBS-07-2020-0089>
- Arnhold, U. (2010). *User-generated branding: Integrating user-generated content into brand management*. Springer.
- Auerswald, M., & Moshagen, M. (2019). How to determine the number of factors to retain in exploratory factor analysis: A comparison of extraction methods under realistic conditions. *Psychological Methods*, 24(4), 468–491. <https://doi.org/10.1037/met0000200>
- Bernarto, I., Berlianto, M. P., Meilani, Y. F. C. P., Masman, R. R., & Suryawan, I. N. (2020). The influence of brand awareness, brand image, and brand trust on brand loyalty. *Journal Management*, 24(3). <https://doi.org/10.24912/jm.v24i3.676>
- Buzeta, C., De Pelsmacker, P., & Dens, N. (2020). Motivations to use different social media types and their impact on consumers' online brand-related activities (COBRAs). *Journal of Interactive Marketing*, 52, 79–98. <https://doi.org/10.1016/j.intmar.2020.04.004>
- Chao, F., Zhou, Q., Zhao, J., Xu, Y., & Yu, G. (2024). Trustworthiness matters: Effect of source credibility on sharing debunking information across different rumour types. *Information Processing & Management*, 61(4), 103747. <https://doi.org/10.1016/j.ipm.2024.103747>
- Djafarova, E., & Trofimenko, O. (2019). 'Instafamous': Credibility and self-presentation of micro-celebrities on social media. *Information, Communication & Society*, 22(10), 1432–1446. <https://doi.org/10.1080/1369118X.2018.1438491>
- Ghanad, A. (2023). An overview of quantitative research methods. *International Journal of Multidisciplinary Research and Analysis*, 6(8), 3794–3803.
- Hien, N. N., Phuong, N. N., Tran, T. V., & Thang, L. (2020). The effect of country-of-origin image on purchase intention: The mediating role of brand image and brand evaluation. *Management Science Letters*, 10(6), 1205–1212. <https://doi.org/10.5267/j.msl.2019.11.038>
- Ikawati, K., Militina, T., & Achmad, G. N. (2021). The effect of celebrity endorsers and advertising attractiveness on brand image and purchase decisions. *International Journal of Economics, Business and Accounting Research*, 5(2).
- Ismagilova, E., Slade, E. L., Rana, N. P., & Dwivedi, Y. K. (2020). The effect of electronic word of mouth communications on intention to buy: A meta-analysis. *Information Systems Frontiers*, 22, 1203–1226. <https://doi.org/10.1007/s10796-019-09924-y>
- Jin, S. V., Muqaddam, A., & Ryu, E. (2019). Instafamous and social media influencer marketing. *Marketing Intelligence & Planning*, 37(5), 567–579. <https://doi.org/10.1108/MIP-09-2018-0375>

- Ki, C. W. C., Cuevas, L. M., Chong, S. M., & Lim, H. (2020). Influencer marketing: Social media influencers as human brands. *Journal of Retailing and Consumer Services*, 55, 102133. <https://doi.org/10.1016/j.jretconser.2020.102133>
- Li, F., Larimo, J., & Leonidou, L. C. (2021). Social media marketing strategy. *Journal of the Academy of Marketing Science*, 49, 51–70. <https://doi.org/10.1007/s11747-020-00733-3>
- Lou, C., & Yuan, S. (2019). Influencer marketing: How message value and credibility affect consumer trust. *Journal of Interactive Advertising*, 19(1), 58–73. <https://doi.org/10.1080/15252019.2018.1533501>
- Luca, M. (2015). User-generated content and social media. In *Handbook of media economics* (Vol. 1, pp. 563–592). <https://doi.org/10.1016/B978-0-444-63685-0.00012-7>
- Muda, M., & Hamzah, M. I. (2021). Should I suggest this YouTube clip? The impact of UGC on brand trust.
- Musto, J., & Dahanayake, A. (2022). Quality characteristics for user-generated content. *Information Modelling and Knowledge Bases XXXIII*, 244–263. <https://doi.org/10.3233/FAIA210490>
- Nurhandayani, A., Syarief, R., & Najib, M. (2019). The impact of social media on brand image and purchase intention. *Jurnal Aplikasi Manajemen*, 17(4), 650–661. <https://doi.org/10.21776/ub.jam.2019.017.04.09>
- Read, W., Robertson, N., McQuilken, L., & Ferdous, A. S. (2019). Consumer engagement on Twitter. *European Journal of Marketing*, 53(9), 1905–1933. <https://doi.org/10.1108/EJM-10-2017-0772>
- Reichmann, S. (2017). *User-generated content strategies for building brand-consumer relationships* (Doctoral dissertation).
- Santos, M. L. B. D. (2022). The “so-called” UGC: An updated definition of user-generated content. *Online Information Review*, 46(1), 95–113. <https://doi.org/10.1108/OIR-06-2020-0258>
- Sharma, R. (2023). Consumer perceived CSR and electronic word of mouth. *Journal of Financial Services Marketing*. <https://doi.org/10.1057/s41264-023-00219-7>
- Smith, A. N., Fischer, E., & Yongjian, C. (2012). How brand-related UGC differs across platforms. *Journal of Interactive Marketing*, 26(2), 102–113. <https://doi.org/10.1016/j.intmar.2012.01.002>
- Stoddard, J. E., Nafees, L., & Cook, C. M. (2023). Social media influencer perceived source credibility scale validation.
- Thao, T., & Shurong, T. (2020). Electronic word-of-mouth and user-generated content. *Journal of Marketing and Consumer Research*, 65, 65–74.
- Torres-Moraga, E., & Barra, C. (2023). Does destination brand experience help build trust? *Journal of Destination Marketing & Management*, 27, 100767. <https://doi.org/10.1016/j.jdmm.2022.100767>
- Wiedmann, K. P., & Von Mettenheim, W. (2021). Attractiveness, trustworthiness, and expertise. *Journal of Product & Brand Management*, 30(5), 707–725. <https://doi.org/10.1108/JPBMM-06-2019-2442>
- Zaharani, G. F. R., Kusumawati, N., & Aprilianty, F. (2021). The impact of micro-influencers on brand image and purchase intention.

FACTORS INFLUENCING THE EFFECTIVE IMPLEMENTATION OF STRATEGY IN A RETAIL BANK IN DURBAN

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ABSTRACT

Strategy implementation has attracted increasing attention from researchers in recent years, with many viewing it as the most challenging phase of the strategic management process. This study aims to investigate the factors influencing the effective implementation of strategy within retail bank branches in the Pinetown and Durban regions in South Africa. Adopting a qualitative research approach and a cross-sectional design, data were collected through semi-structured interviews with 9 Branch Managers, and audio recordings were used to accurately capture participants' responses. The findings present challenges to successful strategy implementation, including poor communication and a lack of knowledge among employees. While participants recognized the importance of meeting strategic expectations, many expressed uncertainties about how to achieve them. A key issue identified was the limited involvement of senior management in the implementation process. These results offer valuable insights to top management in retail banks about the importance of enhancing strategy implementation by strengthening leadership involvement, improving organisational structures, and fostering effective communication and collaboration between senior management and branch-level employees.

Keywords: strategy, implementation, retail bank, managers, employees.

INTRODUCTION

Strategy implementation has attracted the interest of many researchers for the past few years. Researchers such as Maika and Wachira (2020) believe that strategy implementation is the most difficult part of the strategy management process. Strategy implementation is “the process where an organisation changes policies and puts strategies into action (Mwangi and Kihara, 2021, p. 1). The retail banking sector has undergone significant changes in recent years, driven by new technologies, shifting consumer preferences, and increased competition. In Durban, a growing urban city in KwaZulu-Natal, South Africa, retail banks are focusing on management strategies to improve operational efficiency, customer satisfaction, and profitability. Janes and Sutton (2017, p. 5) define strategy as “the management’s action plan to run the business and conduct operations.” The challenge is that the true worth of a strategy can only be recognized through implementation, as the ability to implement a strategy is more vital than the quality of the strategy itself (Maika and Wachira, 2020). Given the changing nature of the financial services industry, effectively implementing a strategy is crucial for the bank to remain competitive. The study aims to identify the factors that influenced the effective implementation of strategy in the retail bank in Durban, South Africa. The managerial and organizational levers that affect strategy implementation processes demonstrate that a well-structured, competent management team that effectively leverages the appropriate organizational levers can lead to successful strategy implementation (Holm, Kringelum, and Anand, 2026). Understanding the factors that drive the successful execution of banking strategies is crucial for various stakeholders, including bank management, investors, and policymakers. As retail banks in Durban navigate the complexities of a rapidly evolving landscape, enhancing their strategic implementation processes can stimulate profitability, customer loyalty, and sustainable growth. Profitability is a key measure of how well a business manages its resources, as a business that continuously maintains and increases its profitability demonstrates both its ability to increase revenue and the efficiency of its operational strategy (Masithoh, 2024). Organisations are increasingly acknowledging that strengthening strategic implementation processes can drive customer growth and improve competitiveness (Vasilev, 2024). Insights from this study may contribute to the broader literature on strategic management in financial services, offering practical recommendations for improving strategic execution in emerging

markets. Furthermore, as South Africa's banking sector continues to face challenges such as regulatory compliance, technological disruptions, and changing consumer behavior, this research can provide valuable guidance for future strategic planning efforts (Chitamba, 2024). Despite acknowledging its significance, many South African banks struggle to implement their strategies effectively. Factors such as communication, inadequate resource allocation, insufficient leadership commitment, top management support, structure, clear strategy, and employee involvement often undermine the execution of strategic plans (Ali, 2023). One of the challenges for effective strategy implementation is the lack of a clear, understandable, and well-structured implementation framework and guidelines (Nair, Svedberg, Larsson, and Nygren, 2024). As a result, retail banks may struggle to achieve their strategic goals, ultimately affecting their competitiveness and market presence. This research explores these impediments in detail to develop actionable insights that can inform both practice and policy in the banking industry. The study aims to achieve the following objectives:

- To identify key factors influencing effective strategy implementation in the retail bank, focusing on Durban branches
- To evaluate the relationship among identified factors and their collective impact on the successful execution of strategic plans in retail banking
- To provide recommendations for retail banks to enhance strategy implementation based on the identified factors, ultimately improving their competitiveness in the industry.

LITERATURE REVIEW

Theoretical Framework

This study utilizes two prominent frameworks: the McKinsey 7S Model of Strategy Implementation and Higgins' 8S Model of Strategy. The main theory underpinning this research is the McKinsey 7S Model, which emphasises that successful strategy execution hinges on seven interconnected elements: Strategy, Structure, Systems, Shared Values, Style, Staff, and Skills (Waterman et al., 1980). The model suggests that all seven elements need to align effectively to achieve strategic goals. In the context of retail banking, these elements can be classified as follows:

First, according to Waterman et al. (1980, p. 9-22), Structure is about tasks and provides coordination; it trades off specialization and integration. Second, Strategy refers to the actions a company plans in response to or anticipating changes in its external environment (customers and competition). Further, it aims to improve its market position. Third, the System includes all formal and informal procedures that keep the organisation running. Fourth, Style refers to the primary personality of a top management team and how the team comes across to the organisation. Fifth, staff relate to people in two ways: the hard end (appraisal system, remuneration, formal training programs, etc.) and the soft end (morale, attitude, motivation, and behavior). Sixth, Skills focuses on capturing the company's crucial attributes, and Superordinate goals refer to the guiding concepts, which include a set of values and aspirations, often unwritten, that go beyond the conventional formal statement of corporate objectives. Superordinate goals are the fundamental ideas that underpin a business. All these elements are linked to each other. The McKinsey 7S 's' is used as a diagnostic tool and seven identification criteria for the successful implementation of business (Chareanporn, Ingmalairaks & Jongsureyaphas, 2020, p. 155). Okumus (2003) criticized Waterman and Peters (1982), as the 7S's' McKinsey of strategy implementation provides no clear explanation of the relationships and interactions between elements provided and how these factors implement strategy successfully. Higgins' 8S Model expands 7S's' McKinsey by introducing an additional element, "Support," making it the 8S model. This explicit focus on support includes resources, infrastructure, and stakeholder engagement, which are crucial for effective strategy execution (Higgins, 2005). In retail banking, this encompasses financial backing, technological support systems, and communication channels that facilitate alignment and stakeholder participation. The McKinsey 7S Model and Higgins 8S Framework are suitable for this study, as both provide a holistic approach to analysing the organizational factors that influence strategy implementation. These frameworks emphasise the interrelationships among these factors, making them effective for evaluating their collective impact on strategy execution and for developing practical recommendations to enhance implementation effectiveness and competitiveness in retail banking.

Empirical Insights into Factors Influencing Strategy Implementation

Organizational Culture:

Positive organisational cultures that encourage collaboration, employee commitment, and adaptability are likely to enhance the effectiveness of strategy implementation, while resistance to change may negatively affect strategic outcomes (Bukoye and Abdulrahman, 2023). Maika and Wachira (2020, p. 15) note that “success in strategy implementation is supported by a well-built organisational culture that strengthens competitive capabilities.” Organisational culture can be a barrier to effective strategy implementation. Maika and Wachira (2020) investigated the impact of organisational culture on strategy implementation in Kenya and found that organisations implement only about 30% of the formulated strategies due to poor corporate culture. Furthermore, as banks increasingly adopt digital technologies and fintech innovations, fostering a culture of innovation and continuous learning is crucial for achieving strategic goals and maintaining competitiveness (Naveed et al., 2022).

Leadership Commitment:

Leadership commitment is essential for effective strategy implementation. Leaders who communicate a clear vision, motivate employees, and promote employee involvement contribute significantly to organisational performance and successful strategy execution (Khuzwayo, Flotman, and Mitonga-Monga, 2023). Effective leadership also helps align employees with organisational objectives and fosters commitment to strategic goals. Furthermore, the involvement of senior managers during strategy implementation helps ensure that stakeholders remain informed about the progress of strategic initiatives (Chen et al., 2021). Top executives are responsible for providing an integrated perspective on functional, strategic, and tactical activities to support the alignment of organisational structures, systems, leadership behaviour, human resource policies, culture, values, and management processes (Pryor et al., 2019). Leadership, therefore, remains a key driver of successful strategy implementation and organisational performance (Ondari, Koech and Otieno, 2020).

Resource Allocation:

Successful implementation of strategic initiatives requires sufficient financial, human, and technological resources. The lack of resources, including limited equipment and technological support, can hinder the effective implementation of organisational strategies (Lane, Wolfenden, Hall, Sutherland, Naylor, Oldmeadow, Leigh, Shoesmith, Bauman, McCarthy, and Nathan, 2022). Delays, poor coordination, and compromised strategic performance can result from inadequate resource allocation.

Employee Engagement:

Employee engagement is also essential to strategy implementation. Engaged employees are more likely to contribute positively to organisational goals and strategic execution, whereas disengaged employees may hinder organisational progress (Nienaber, 2022; Ngobeni, Saurombe, and Joseph, 2022). Nwachukwu, Zufan, and Chládková (2020) found that committed employees lead to improved organizational performance and successful strategy implementation. Resistance to change, absenteeism, and poor customer service are indicators of a lack of employee commitment and can negatively derail strategy implementation.

RESEARCH METHODOLOGY AND DESIGN

This study applied a qualitative research approach to explore the factors affecting effective strategy implementation in the retail banking sector in the Durban and Pinetown areas, KwaZulu-Natal, South Africa. The aim of this study is to obtain detailed insights from those directly involved in implementing the strategy. Specifically, this cross-sectional study targeted nine Branch Managers of a selected retail bank. The study population consists of 21 Branch Managers (BMs) employed in the Operations Division in the Durban and Pinetown regions. A purposive sampling technique was used to select nine BMs, including one participant from a pilot study. The choice is justified by the managers' extensive experience at the bank and their immersion in the factors influencing strategy implementation. Johnson, Scholes, and Whittington (2020) say that operational management is the key to successful strategy execution, and more attention should be paid to the importance of people who know what is going on.

The primary data collection procedure for this study was semi-structured interviews, a method known for facilitating an in-depth understanding of participants' perspectives (Creswell, 2023). The interviews were conducted face-to-face using open-ended questions that allowed participants to elaborate on their experiences and perspectives

regarding strategy implementation. The interview guide was developed based on relevant literature and aligned with the study objectives to ensure the collection of rich and meaningful qualitative data (Bryman, Bell, Reck, and Fields, 2022). All interviews were audio-recorded with participants' consent to ensure accurate data collection and were conducted at times and locations convenient to participants to minimise disruption. A pilot study was conducted with one Branch Manager prior to the main data collection process to assess the clarity and effectiveness of the interview questions. Feedback from the pilot study indicated that some questions needed to be simplified and shortened because the initial interview duration exceeded expectations. Consequently, adjustments were made to the interview guide to ensure that the interviews could be completed within a manageable timeframe. The data analysis process involved transcribing the interviews and conducting thematic analysis to identify patterns and themes across participants' responses (Naeem et al., 2023; Saunders et al., 2023). Ethical considerations were integral throughout the research process. A gatekeeper's letter was obtained from the retail bank, and informed consent was secured from all participants before data collection commenced. Participants were informed of the study's purpose, their voluntary participation, their right to withdraw at any time without penalty, and the measures in place to ensure confidentiality and anonymity.

PRESENTATION OF RESULTS

Figure 1: Profile of participants who were interviewed.

Demographic Variables	Relative Frequency	Percentage
<u>Gender</u>		
Females	5	56%
Males	4	44%
<u>Age Distribution</u>		
26-30 years	3	33%
31-35 years	4	44%
36-45 years	2	22%
<u>Level of Education</u>		
National diploma	4	44%
Bachelor degree	4	44%
Honours degree	2	22%
Number of years in the management position		
< 3 years	4	44%
4-5 years	3	33%
6-7 years	-	-
8-9 years	2	23%
<u>Number of years in the company</u>		
2-4 years	2	22%
5-7 years	1	11%
8-10 years	4	44%
11-13 years	1	11%
14-16 years	1	12%
Total Sample	9	

The results show that participants ranged in age from 26 to 45 years and were evenly split by gender. All participants possessed tertiary qualifications. The majority had been employed by the company for more than eight years, while most had less than five years of experience in management positions.

Factors that Influence the Effective Implementation of the Strategy

Impact of Organisational Structure on Strategy Implementation

The findings show that the company's structure hindered the implementation of its strategy. Two participants indicated that one of the main challenges was that issues had to be raised first with the Regional Manager before being escalated to the Business Manager, although there was a sense that the RM was not taking action on the concerns. As a result, when the BMO visited the branch, employees felt unable to raise the issues directly because they were expected to follow the proper channels and processes. *Participant 9: "The company structure requires that as Branch Managers communicate with the line managers, which is basically a protocol. However, senior managers can interact with BMs during pulse meetings to learn about their challenges and provide support when needed."* The findings suggest that senior management (Business Managers Operations) across all regions should find more effective ways to support Branch Managers rather than relying heavily on middle management (Regional Managers). In addition, middle managers need to ensure that information and directives communicated by senior management are properly conveyed and effectively implemented at the branch level. *Participant 6: "What I have seen in this region is that Business Manager Operations (BMO) is more in tune with the branches, comes a lot to the branches to find out what is happening, but it is difficult. In the region I come from, senior management paid little attention to the branches."*

Leadership Involvement

The findings revealed that leadership involvement plays an important role in effective strategy implementation. *Participant Three stated that, "I think strong leadership and effective communication are the main contributors to effective strategy implementation"*. Similarly, participant nine indicated, *"I believe senior managers need to support Branch Managers."* Four participants stressed the importance of senior management drawing a clear blueprint, monitoring how each Branch Manager is implementing the strategy, and using documentation to track progress, ensuring the strategy is broken down at every level and that everyone remains aligned. Participants one and nine further agreed that senior management should manage not only the results but also the implementation process itself. In addition, *Participant seven stated that, "I feel that senior management should check for understanding, as it can be a challenge to adopt a strategy that you do not understand; it would be difficult to drive the team towards a goal you do not know"*. This shows that there is a need for senior management to address all challenges faced by the employees as *Participant nine stressed "it is necessary for senior management to manage the process of implementation also not the results only"*

Reward System (Team Award)

The company has implemented a reward structure to motivate employees to work as a team and drive the achievement of organisational goals. However, some interviewees indicated that the targets are often perceived as difficult, and at times almost impossible, to achieve. Furthermore, some participants emphasised the importance of recognising and rewarding individual performance, as one of the qualifying criteria was that everyone in the team must meet the target, promoting teamwork. *Participant Two: "The current reward system does not factor in the contribution percentages, yet at the same time, in order to qualify for a greater reward, it depends on the performance of others"*. It creates a challenge for Branch Managers when consultants realise that some team members are unwilling to contribute equally. As a result, they may become demotivated, particularly because their rewards depend on others' collective performance. Participants suggested that the company should consider introducing additional measures to enhance employees' salaries, as financial incentives are viewed as a strong source of motivation. *Participant Three "The company has to look at more incentive schemes like medical aid benefit, provident funds, and when the company takes care of its people, they will give their full commitment to the goals of the company"*.

Communication

All participants agreed in voice that clear communication is key to the success of strategy implementation and improving employee commitment. *Participant 8: "In some instances, the implementation process is only discussed as far as senior management, with those at the lower level not knowing the objectives, goals not clear, and having to come up with action plans"*. Participants believe that communication should not only be top-down, but that management should also create a platform that encourages bottom-up communication. *Participant nine: "Effective*

communication with all parties involved ensures success in the implementation of the strategy. . Participant Five pointed out that helping the teams understand what needs to be achieved and how to achieve the expected results is important. Participant nine: “To get buy-in from committed Branch Managers, having a cohesive team and committed sales consultants can contribute positively to the strategy implementation process.”

Employees

The majority of interviewees felt that senior management is often unwilling to listen to employees’ concerns and suggestions and instead expects them to simply follow instructions. Participants indicated that listening to employees can support smoother strategy implementation, as frontline employees interact with clients daily. Some participants further suggested that lower management must be given an opportunity to contribute to strategy formulation to feel part of the organization rather than merely implementers. Participant nine: “Top management needs to drive the implementation process to understand challenges”. Participants also highlighted that recruiting the right people is an important factor influencing strategy implementation, expressing concern that some individuals accept positions simply because employment is available. Participant six: “The company should recruit people who possess the skills and qualifications necessary to perform the required tasks. The disadvantage of recruiting candidates with qualifications unrelated to the banking industry is that they are always complaining, fail to meet expectations, and their behaviour negatively affects the whole team.

Balance Scorecard

The balanced scorecard has been instrumental in helping bank employees improve team performance, as it clearly assigns each employee a clear responsibility to achieve the organisation's expected objectives. Participant Two: “I would say it makes my work easier; it assists employees in staying focused and driving what the company wants to achieve”. Some participants believe that the balanced scorecard drives employees toward organizational goals, thereby improving performance. Participant Seven: “The balanced scorecard points a clear direction to drive strategy implementation and for the team to remain focused on organisational goals as it addresses key problem indicators”.

DISCUSSION OF FINDINGS

The Key Factors Influencing Effective Strategy Implementation in the Retail Bank

Results of this study suggest that the critical factors for the successful implementation of strategy in retail banking include organisational structure, leadership involvement, communication, employee participation, reward systems, and the balanced scorecard. These findings are consistent with the McKinsey 7S Model and Higgins’ 8S Framework, which stress that successful strategy execution depends on the alignment of organisational elements such as structure, systems, staff, leadership style, strategy, and shared values.

Organisational structure has been identified as an important determinant of strategy implementation. Participants noted that hierarchical reporting lines and strict communication rules can prevent direct contact between Branch Managers and senior management, and slow decision-making and responsiveness to operational challenges. According to the McKinsey 7S Model, the organisational structure should support, rather than hinder, strategic objectives. Chirwa and Boikanyo (2022) found that organizational effectiveness and strategy implementation are improved when communication channels and organizational arrangements promote information flow and collaboration across organizational levels.

Leadership involvement was also identified as a critical success factor. Participants highlighted the importance of strong leadership, continued support from senior management, monitoring of implementation progress, and employees’ understanding of the organisation's objectives. The findings support the 8S Framework of Higgins, which identifies leadership and managerial style as the key to strategy execution. Great leaders don’t just articulate strategic direction; they provide the guidance and support employees need to turn strategic plans into operational activities. Similarly, Zayed and Farghly (2023) found that strategic leadership positively influences strategy implementation through employee engagement and organisational commitment.

One of the biggest factors that affected implementation success was communication. Employees need clear communication about the strategic objectives, implementation expectations, and performance requirements. Moreover, the participants underscored the importance of creating opportunities for top-down and bottom-up communication. Good communication leads to better understanding, alignment, and commitment, which in turn reduces resistance to change and improves implementation outcomes. Chirwa and Boikanyo (2022) find similar results that communication is a key mechanism for translating strategic objectives into operational actions.

A further important theme that emerged from the findings was employee involvement. Participants said, “Employees are often expected to implement strategies without being consulted in the planning process. The findings suggest that successful implementation and commitment can be improved through employee involvement, particularly Branch Managers and frontline staff, who possess significant operational knowledge and direct customer experience. According to Ackah (2023), employee involvement helps strengthen the relationship between strategy formulation and implementation by fostering ownership, commitment, and accountability.

The findings also indicate that reward systems affect employees' motivation and commitment to organisational goals. The organisation operates a team-based reward system that encourages collaboration. However, participants noted that rewards are heavily dependent on others' performance, which can be demotivating for high-performing employees. This finding implies that reward systems should incorporate a mix of team and individual rewards to sustain motivation and performance. Rewards and performance management mechanisms are organisational systems that are a critical part of both the McKinsey 7S and Higgins' 8S frameworks, in supporting strategic objectives. Finally, the balanced scorecard was identified as an important tool supporting strategy implementation. Yawson and Paros (2023) contend that the Balanced Scorecard supports organisational learning, enhances communication, and improves strategy execution through ongoing feedback and performance evaluation. Overall, the findings suggest that successful strategy implementation in retail banking depends on the alignment of these interrelated organisational factors.

Evaluating the Relationship Among Identified Factors and their Collective Impact on the Successful Execution of Strategic Plans in Retail Banking

The findings demonstrate that organisational structure, leadership, communication, employee involvement, reward systems, and performance management mechanisms are highly interconnected and collectively influence the effectiveness of strategy implementation. This finding supports both the McKinsey 7S Model and Higgins' 8S Framework, which emphasise that successful strategy execution depends on the alignment of organisational elements rather than on individual factors operating independently. Effective leadership promotes communication, employee engagement, and commitment to organisational goals, while communication serves as a critical link between strategic objectives and operational activities. The findings further suggest that organisational structure influences both communication effectiveness and leadership accessibility, with rigid reporting structures potentially restricting information flow and limiting employees' ability to communicate implementation challenges to senior management.

The study also found a strong relationship between employee involvement, reward systems, and strategy execution. Employees who feel valued, consulted, and fairly rewarded are more likely to support organisational objectives, whereas perceived inequities in reward systems may reduce motivation and hinder implementation efforts. These findings are consistent with Zayed and Farghly (2023), who found that employee engagement plays a significant role in linking leadership practices to successful strategy execution. Furthermore, the balanced scorecard was found to serve as an integrating mechanism that aligns organisational strategy, employee performance, communication, and leadership oversight. By providing measurable performance indicators and accountability structures, it facilitates strategic alignment and continuous monitoring of implementation progress. This finding supports Lewandowski and Cirella (2023), who argue that performance management systems enhance organisational learning and improve strategy execution through ongoing feedback and performance evaluation. Overall, the findings suggest that successful strategy implementation in retail banking depends on aligning these interrelated organisational factors.

Recommendations for Retail Banks to Enhance Strategy Implementation Based on the Identified Factors

Based on the findings, retail banks should establish communication systems that encourage both top-down and bottom-up information sharing to improve employee understanding, engagement, and commitment. Greater employee involvement during strategy formulation and implementation should be encouraged to promote ownership and ensure that strategic decisions reflect operational realities. Retail banks should also review reward systems to ensure that both individual and team contributions are recognised. Such an approach may improve motivation, fairness perceptions, and overall organisational performance. Finally, organisations should continue utilising the balanced scorecard as a strategic management tool to monitor implementation progress, align employee activities with organisational objectives, and support continuous improvement. In conclusion, the study demonstrates that effective strategy implementation in retail banking is influenced by the interaction of multiple organisational factors. Consistent with the McKinsey 7S and Higgins' 8S frameworks, successful strategy execution requires alignment among structure, leadership, communication, employees, systems, and performance management practices. Retail banks that effectively align these organisational elements are more likely to achieve strategic objectives and maintain competitiveness in an increasingly dynamic business environment.

Managerial Implications

Based on the findings, retail banks should strengthen leadership involvement throughout the implementation process by ensuring that senior managers actively support Branch Managers, monitor implementation progress, and address operational challenges. Organisations should also review structural arrangements to improve communication and facilitate greater interaction between senior management and branch-level employees.

REFERENCES

- Ackah, A.P. (2023). Employee involvement mediates the relationship between strategy formulation and implementation: The case of rural and community banks in Ghana. *European Journal of Business and Strategic Management*, 8(2):71–93. <https://doi.org/10.47604/ejbsm.2084>
- Ali, A. (2023). Factors Influence Strategic Implementation: Review Study. *Remittances Review*, 8(4): 3742–3758. <https://doi.org/10.33182/rr.v8i4.258>.
- Boikanyo, D. H. (2024). The Role of Employee Behavior and Organizational Culture in Strategy Implementation and Performance. *Organizational Culture: Cultural Change and Technology*, 121. <https://doi.org/10.5772/intechopen.113830>
- Boikanyo, D.H. & Gomwe, G. (2024). Exploring organizational culture and strategy implementation in the 4IR. *International Journal of Business Ecosystem & Strategy*, 6(6):71–78. <https://doi.org/10.36096/ijbes.v6i6.572>
- Bryman, A., Bell, E., Reck, J. & Fields, J. (2022). *Social Research Methods*. Oxford: Oxford University Press.
- Bukoye, O.T. & Abdulrahman, A.H. (2023). Organizational culture typologies and strategy implementation: lessons from Nigerian local government. *Policy Studies*, 44(3):316–335. <https://doi.org/10.1080/01442872.2022.2051467>
- Chareanporn, T., Ingmalairaks P., & Jongsureyaphas, C. (2020). Strategy implementation to organizational competency development in tourist accommodation in Thailand: An exploratory research with the McKinsey Seven S's (7S's) approach. *Journal of Management Science*, 15(1): 154 – 175.
- Chen, Y., Hu, Y., Tseng, M., Juang, Y. & Chang, C. (2021). The influence of business intelligence systems on strategic management and operational process through organisational competitiveness. *Benchmarking: An International Journal*, 28(9):2991–3011. <https://doi.org/10.1108/BIJ-03-2020-0121>
- Chirwa, M. & Boikanyo, D.H. (2022). The role of effective communication in successful strategy implementation. *Acta Commercii*, 22(1):1-13. <https://doi.org/10.4102/ac.v22i1.1020>

- Chitamba, A. (2024). Understanding customer decision-making in retail banking: Insights from a selected retail bank in South Africa. *International Journal of Research in Business & Social Science*, 13(7): 261-268
- Creswell, J.W. & Poth, C.N. (2023). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. 5th ed. Thousand Oaks, CA: Sage Publications.
- Higgins, J.M. (2005). The 8S's of successful strategy execution. *Journal of Change Management*, 5(1), 3–13.
- Holm, C. G., Kringelum, L., & Anand, A. (2026). Creating effective strategy implementation: a systematic review of managerial and organizational levers. *Review of Managerial Science*, 20(2):673–705. <https://doi.org/10.1007/s11846-025-00880-3>.
- Janes, A. & Sutton, C. (2017). *Crafting and executing strategy: The quest for competitive advantage*. McGraw-Hill. London.
- Johnson, G., Whittington, R., Regnér, P., Angwin, D., & Scholes, K. (2020). *Exploring strategy*. 12th edition. Pearson UK.
- Khuzwayo, A.B., Flotman, A.P. & Mitonga-Monga, J. (2023). Transformational leadership influences on organisational justice and employee commitment in a customer service organisation. *SA Journal of Industrial Psychology*, 49(0): 1-13. <https://doi.org/10.4102/sajip.v49i0.1979>
- Lane, C., Wolfenden, L., Hall, A., Sutherland, R., Naylor, P., Oldmeadow, C., Leigh, L., Shoesmith, A., Bauman, A., McCarthy, N. & Nathan, N. (2022). Barriers and facilitators to the implementation of school-based physical activity policies in Australia. *Health Promotion Journal of Australia*, 33(1):123–132.
- Lewandowski, R.A. & Cirella, G.T. (2023). Performance management systems: Trade-off between implementation and strategy development. *Operations Management Research*, 16(1), pp.280–295. <https://doi.org/10.1007/s12063-022-00305-4>
- Maika, L. K., & Wachira, K. (2020). Effects of organizational culture on strategy implementation in water boards in Kenya. *International Journal of Research in Business and Social Science* (2147–4478), 9(4): 15–28. <https://doi.org/10.20525/ijrbs.v9i4.697>.
- Masithoh, N. (2024). Financial management strategies to increase company profitability. *International Journal of Health, Economics, and Social Sciences (IJHESS)*, 6(4): 936-941. DOI: 10.56338/ijhess.v6i4.7410
- Mwangi, M., & Kihara, A. (2021). Strategy implementation practices and performance of private hospitals in Nairobi City County. *Journal of Business and Strategic Management*, 6(1), 1-22.
- Naeem, M., Ozuem, W., Howell, K. & Ranfagni, S. (2023). ‘A step-by-step process of thematic analysis to develop a conceptual model in qualitative research’, *International Journal of Qualitative Methods*, 22:1–18.
- Nair, M., Svedberg, P., Larsson, I., & Nygren, J. M. (2024). A comprehensive overview of barriers and strategies for AI implementation in healthcare: Mixed-method design. *Plos one*, 19(8):1-27
- Naveed, R.T., Alhaidan, H., Al Halbusi, H. & Al-Swidi, A.K. (2022). Do organizations really evolve? The critical link between organizational culture and organizational innovation toward organizational effectiveness: Pivotal role of organizational resistance. *Journal of Innovation & Knowledge*, 7(2):1-14 <https://doi.org/10.1016/j.jik.2022.100178>
- Ngobeni, D.A., Saurombe, M.D. & Joseph, R.M. (2022). The influence of the psychological contract on employee engagement in a South African bank. *Frontiers in Psychology*, 13, 958127. <https://doi.org/10.3389/fpsyg.2022.958127>
- Nienaber, H., (2022). Employee engagement: Driving strategy implementation through dimensions of organisation. *Journal of Management & Organization*, 28(5):1036–1056. <https://doi.org/10.1017/jmo.2019.22>

- Nwachukwu, C., Zufan, P., & Chladkova, H. (2020). Employee commitment to strategy implementation performance: Organisational policy as moderator. *International Journal of Business Excellence*, 20(3): 337–358. <https://doi.org/10.1504/IJBEX.2020.106167>
- Okumus, F. (2003). A framework to implement strategies in organizations. *Management Decision*, 1(9): 871–982.
- Ondari, L.M., Koech, S.C. & Otieno, R.O. (2020). Influence of leadership styles on strategy implementation in commercial banks in Kenya. *International Academic Journal of Human Resource and Business Administration*, 3(9):156–172.
- Pryor, M.G., Anderson, D., Toombs, L.A., & Humphreys, J.H. (2019). Strategic implementation as a core competency: the 5P's model. *Journal of Management Research*, 11(1):1–15. <https://doi.org/10.5296/jmr.v11i1.14048>
- Saunders, C. H. et al. (2023). Practical thematic analysis: a guide for multidisciplinary health services research teams engaging in qualitative analysis. *Bmj*, 381:1-10.
- Vasilev, V. (2024, June). The impact of Human capital on strategic planning and implementation of CRM for enhancing customer relationship in environment and resources. *Environment. Technology. Resources., Proceedings of the International Scientific and Practical Conference*, 1: 408–412.
- Waterman, R. Jr., Peters, T., & Phillips, J.R. (1980). Structure is not organization. *Business Horizons*, 23(3):14–26.
- Yawson, R.M. & Paros, A.K.B., 2023. Systems perspective of the use of the Balanced Scorecard for organization development and change. *SAGE Open*, 13(4). <https://doi.org/10.1177/21582440231218064>
- Zayed, A. & Farghly, R.N., (2023). Analyzing the expected role of strategic leadership and supportive culture in executing business strategies: The mediating role of employee engagement. *The Academic Journal of Contemporary Commercial Research*, 3(2), pp.18–42. <https://doi.org/10.21608/AJCCR.2023.304706>

EXPLORING INDIGENOUS CULINARY PRACTICES AS INTANGIBLE CULTURAL HERITAGE IN SOUTH AFRICA

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ABSTRACT

Indigenous culinary practices in South Africa include traditional food preparation methods, ingredients, and cultural activities that accentuate cultural memory, identity, social cohesion, community knowledge, and environmental awareness. Despite their social and ecological significance, these practices are under-documented, under-explored, and not yet structurally recognised or formally preserved, particularly in the light of the country's diverse cultural landscape and colonial history. Drawing on literature, the preservation of indigenous culinary practices is being threatened by loss of indigenous knowledge, cultural marginalisation, urbanisation, westernisation and global food systems, decline in indigenous agriculture and biodiversity, policy and institutional gaps, and health and nutrition perceptions, thus affecting cultural continuity and community resilience.

This conceptual research explores indigenous culinary practices as intangible cultural heritage in South Africa using a desk-based review of theoretical and empirical literature, policy and legislative frameworks, and international heritage documentations. The rationale for this study arises from the understanding that while indigenous culinary practices are increasingly endangered, they remain important source of cultural identity, social cohesion, ecological knowledge, and sustainable tourism. By synthesising secondary data, this research identifies gaps in South Africa's heritage documentation, preservation, and policy and legislative frameworks. The study emphasises the implications of acknowledging South Africa's indigenous cuisine as intangible cultural heritage, thereby proposing a conceptual framework that emphasizes cultural-social knowledge preservation, ecological and agricultural sustainability, and policy, institutional, and community governance. The study provides theoretical implications by presenting a structured lens to the discourse on ICH, and practical implications by informing policy, heritage management, and community-based preservation strategies.

Keywords: culinary heritage, food practices, indigenous knowledge systems, intangible cultural heritage, South Africa.

INTRODUCTION

Culinary heritage has increasingly gained recognition within global heritage discourse as an important component of intangible cultural heritage (ICH), reflecting systems of knowledge, ritual meaning, social cohesion, and environmental adaptation transmitted across generations (Akagawa, 2018; United Nations Educational, Scientific and Cultural Organization [UNESCO], 2003). Scholars accentuate that culinary practices function as living archives through which communities reproduce belonging, reinforce cultural continuity, and negotiate social change (Qiu et al., 2022; Romagnoli, 2019). The UNESCO (2003) Convention for the Safeguarding of Intangible Cultural Heritage formally recognises traditional foodways within broader categories of social practices, rituals, festive events, and knowledge and practices concerning nature and the universe, positioning culinary heritage within international safeguarding frameworks.

The UNESCO inscriptions demonstrate the growing recognition of foodways as essential to cultural identity, rural development, and sustainable tourism. As of 2024, more than 700 elements across 150 countries are inscribed on UNESCO's Representative List of Intangible Cultural Heritage, with culinary-related traditions forming a visible and expanding category to bolster to culinary sustainability (UNESCO, 2024). Mangion (2025) and United Nations

World Tourism Organization (UNWTO, 2019) further argue that culinary heritage contributes not only to cultural continuity but also to economic resilience, with gastronomy tourism projected to account for approximately 30–40% of global tourism expenditure, making it one of the rapidly growing sectors of the tourism industry. These global developments show how culinary practices have become vital to heritage-based development strategies while at the same time raising concerns about commercialisation and authenticity (Akagawa, 2018; de Miguel Molina & de Miguel Molina, 2016).

Despite the aforementioned global developments, the safeguarding of culinary heritage remains uneven, particularly in contexts shaped by colonial histories, socio-economic inequality, and rapid urbanisation ((Fisher & Du Rand, 2022; Romagnoli, 2019; Swiderska et al., 2022). In most postcolonial settings, indigenous culinary systems were historically marginalised and restructured through imposed agricultural systems and cultural hierarchies, leading to the deterioration of indigenous culinary practices (Masenya & Bhuda, 2025; Molokwa & Setshego, 2025). Contemporary global food systems, characterised by industrial production, supermarket expansion, and standardised consumption patterns, continue to challenge the continuity of localised culinary knowledge (Molokwa & Setshego, 2025; Swiderska et al., 2022).

Within the South African context, indigenous culinary practices are deeply rooted in diverse ethnolinguistic traditions. Although some may be similar, each ethnolinguistic have their culinary practices, which usually reflect accumulated knowledge of fermentation, seed preservation, seasonal harvesting, and communal preparation methods to name but a few (Magaya, 2021; Ntlanga et al., 2023). Indigenous culinary practices function not merely as nutritional components but as expressions of identity, belonging, and intergenerational continuity (Lewis et al., 2024; Pereira et al., 2021). Unfortunately, these practices are threatened by the challenges stated in the previous paragraph. Although South Africa ratified the UNESCO (2003) Convention and operates under national heritage and food security legislation (South Africa, 1999, 2018), indigenous culinary practices are rarely explicitly recognised as distinct ICH elements within formal safeguarding mechanisms.

This paper responds to these challenges by examining indigenous culinary practices in South Africa as a form of intangible cultural heritage and proposing a conceptual framework for their preservation. Drawing on cultural heritage theory, ecological sustainability principles, and tourism literature, the study develops a context-specific framework capable of addressing socio-cultural, environmental, and institutional pressures concurrently.

METHODOLOGY

This study employs a conceptual research design grounded in a desk-based review of theoretical and empirical literature, policy and legislative frameworks, and international heritage documentation. Conceptual methodology is appropriate where the objective is theory building, synthesis, and framework development rather than primary data generation (Jaakkola, 2020; Snyder, 2019). The research draws on interpretivist and critical heritage perspectives, recognising ICH as socially constructed, politically mediated, and dynamically reproduced (Akagawa, 2018). A structured review process was employed to examine three interrelated bodies of knowledge: theoretical literature on ICH, gastronomy, sustainability, and tourism; empirical studies addressing indigenous culinary practices in South Africa and comparable contexts; and governance instruments. Academic databases such as Scopus, Web of Science, and Google Scholar were consulted, with emphasis placed on peer-reviewed publications and policy documents from 1999–2026, alongside foundational works of theoretical significance.

The analytical process involved thematic synthesis and conceptual integration. Thematic analysis enabled the identification of recurring patterns across the literature, including knowledge erosion, cultural marginalisation, biodiversity decline, westernisation, urbanisation, shifting health perceptions, and institutional fragmentation (Braun & Clarke, 2021). These themes were then examined through conceptual analysis to establish relationships between socio-cultural, ecological, and governance dimensions of indigenous culinary heritage (Jaakkola, 2020). Triangulation across theoretical, empirical, and policy sources strengthened analytical rigour and ensured coherence in framework development (Snyder, 2019). Through this integrative methodological approach, the study constructs a context-specific preservation framework that bridges global ICH discourse with South Africa's socio-historical and ecological realities, while providing a foundation for future empirical research and policy refinement.

LITERATURE REVIEW

Culinary Heritage and ICH

Culinary heritage has increasingly been recognised globally as an important part of ICH, following the adoption of the UNESCO 2003 Convention for the Safeguarding of the ICH. According to Oliveira et al. (2020), culinary heritage represents the values, knowledge, and traditions that communities preserve and transmit across generations. It serves as a dynamic force that connects people with their origins while contributing to the preservation of cultural identities, traditions, and rituals (Gangiah, 2024; Vishwakarma et al., 2025). Cirillo (2022) refers to culinary practices as expressions of collective memory and creativity, reflecting how communities make sense of place and belonging. Similarly, Sharma (2024) points out that culinary traditions reflect local environmental knowledge and embodied cultural practices, aligning with key UNESCO principles such as community participation, intergenerational transmission, and respect for cultural diversity. Wan Sageng et al. (2024) indicate that indigenous culinary practices or culturally significant practices of food production, preparation, and consumption, are vital to community identity, fostering a sense of belonging (Wan Sageng et al., 2024). These practices provide not only a sense of belonging across generations but also a symbolic framework for social cohesion and heritage preservation (Bortolotto & Ubertazzi, 2018) and are deeply embedded in regional histories and collective memory (Maffei, 2012).

Memory and identity are closely entwined in culinary heritage because food practices function as important symbol of belonging and cultural continuity (Syed, 2025). Lee (2023) conceptualises “food memories” as embodied forms of intangible heritage, arguing that culinary experiences carry emotional and cultural knowledge that transcends generations, particularly in contexts of migration and globalisation. Similarly, Suresha and Chaudhary (2025), in their Malamuthan (India) study, demonstrate how traditional culinary practices function as sources of collective memory, particularly in communities affected by climate change and socio-economic transformation. Soyombo et al. (2024), focusing on Nigeria, indicate how culinary narratives in urban African contexts reinforce community cohesion and cultural identity, demonstrating that storytelling around food strengthens intergenerational continuity. Qiu et al. (2022) further argue that ICH including culinary traditions represents a symbolic anchor for identity formation, particularly when mobilised within tourism and heritage policies. Collectively, the aforementioned studies confirm that culinary heritage operates as a living and adaptive archive of memory, sustaining identity at community, national, and diasporic levels while responding dynamically to modern socio-economic pressures. The link between memory and identity explains why culinary heritage plays an increasing role in tourism development. By embodying collective narratives and local knowledge, indigenous culinary practices offer visitors authentic cultural experiences rather than mere consumption.

Culinary heritage is therefore tightly connected to tourism, acting as both a cultural asset and an economic resource. Sotiriadis (2017) and Qiu et al. (2022) state that ICH can be strategically leveraged for cultural tourism, accentuating ethical considerations and the need to maintain authenticity while promoting economic benefits. Matečić and Barišić (2019) further point out the role of gastronomy in intangible heritage-based tourism, linking culinary practices with national and regional branding strategies. Expanding this perspective, Björk and Kauppinen-Räsänen (2016) argue that culinary heritage enhances destination attractiveness by creating experiential value grounded in local culture, while de Miguel Molina and de Miguel Molina (2016) reveal that UNESCO-recognised culinary elements can strengthen destination competitiveness, notwithstanding the risk of over-commercialisation and cultural standardisation. In this manner, the development of culinary heritage into a tourism resource signifies both a continuation of its role as an active repository of memory while recontextualising that memory within global economic and heritage governance systems. This dual role emphasises how culinary heritage not only safeguard local identities but also connects communities to wider global discourses on cultural heritage, setting the stage for exploring global perspectives

Global Perspectives on Culinary Heritage

International recognition of culinary traditions has elevated the visibility and perceived value of food practices, positioning them within global policy, heritage management, and development agendas (Barzallo-Neira & Pulido-Fernández, 2023). Beyond UNESCO inscriptions, frameworks such as the Food and Agriculture Organization (FAO), Globally Important Agricultural Heritage Systems (GIAHS), the World Intellectual Property Organization (WIPO)

for Geographical Indications, and United Nations World Tourism Organization (UNWTO) initiatives for gastronomy-based tourism provide complementary avenues for destinations to safeguard, promote, and economically leverage culinary heritage, aligning with broader sustainability frameworks (Dordai et al., 2026; Romagnoli, 2019). These programs create opportunities for cultural exchange, cross-border collaboration, and regional branding, enabling communities to link traditional food practices to sustainable tourism, local development, and educational initiatives. Case studies of Japanese Washoku and the region of Serra da Estrela in Portugal focusing on Mediterranean diets and South Asian spice traditions demonstrate that international acknowledgment can foster cultural pride, reinforce identity, and strengthen governance strategies for sustainable development, while connecting local practices to global networks (Akagawa, 2018; Rodrigues et al., 2022). Beyond Asia and Europe, in Africa Bachouch and Kohli (2025) examine Harissa, knowledge, skills and culinary and social practices in Tunisia, revealing that international recognition serve as a catalyst to bolster community resilience and tourism potential; however, requires sensitive localisation to preserve authenticity for future generations. Other African countries with rich or indigenous culinary practices recently recognised by UNESCO as ICH include Senegal for Ceebu Jën, knowledge, know-how and practices pertaining to the production and consumption of couscous in Algeria, Mauritania, Morocco, and Tunisia, Nsima a culinary tradition of Malawi, and skills related to Attiéké production in Côte d’Ivoire; and if the inscription is used strategically it can attract tourists to these destinations (Nistor & Dezsi, 2022).

Despite these advantages, the institutionalisation of culinary heritage under global frameworks introduces several challenges. Romagnoli (2019) notes that formal recognition can create tensions between maintaining local authenticity and accommodating global commodification, as communities may feel pressured to adjust dishes, presentation, or rituals to appeal to international audiences. Standardisation, certification requirements, and branding regulations may privilege “marketable” cuisines over marginalised, regional, or minority practices, leaving smaller or less-documented indigenous practices underrepresented (de Miguel Molina & de Miguel Molina, 2016; Mangion, 2025). Furthermore, institutional recognition often frames dynamic and evolving culinary practices as fixed “authentic” forms, potentially constraining natural adaptation and innovation within living communities. Asharaf and Vatakkayil (2025) and Singh et al. (2024) point out the manner in which communities respond to changing ecological, social, and economic landscapes, ensuring that food practices remain both culturally meaningful and practically sustainable. In this regard, South Africa offers a compelling case, where indigenous culinary practices, shaped by local knowledge systems, colonial histories, and communal traditions, illustrate both the richness of culinary heritage and the contemporary challenges it faces. Understanding these practices in their specific socio-cultural and ecological context is crucial for designing effective preservation strategies, supporting sustainable culinary-based initiatives, and ensuring that culinary heritage continues to function as a living, adaptive resource for communities.

Indigenous Culinary Practices in South Africa

South Africa’s indigenous culinary practices are deeply embedded within the country’s complex socio-historical and ecological landscape shaped by indigenous knowledge systems, colonial disruption, apartheid-era marginalisation, and post-apartheid transformation (Fisher & Du Rand, 2022). Rooted in indigenous knowledge systems, these practices reflect accumulated understandings of seasonality, land stewardship, seed preservation, fermentation techniques, and communal food preparation, reflecting adaptive strategies developed over centuries in response to environmental variability (Magaya, 2021). Foods such as maize-based pap, sorghum dishes, fermented beverages like mageu, wild leafy greens (imifino), and communal braai traditions operate as more than subsistence mechanisms; they function as cultural archives through which identity, belonging, and social memory are reproduced across generations (Ntlanga et al., 2023). According to Bihari (2023) and Malapane et al. (2024), such cultural heritage represents embodied knowledge systems that sustain intergenerational continuity and reinforce community cohesion.

Despite their cultural and ecological and social significance, the literature consistently demonstrates that these culinary systems are increasingly vulnerable to structural transformation. A central concern is the **loss of indigenous knowledge**, driven by generational discontinuities, rural-urban migration, and weakened communal transmission systems (Govindasami, 2021; Maepa et al., 2025). As culinary knowledge is often transmitted orally and experientially, reduced participation in indigenous culinary practices accelerates knowledge erosion. This phenomenon is closely entwined with **cultural marginalisation**, historically rooted in colonial and apartheid structures that undervalued indigenous culinary practices in favour of Western dietary models (Masenya & Bhuda, 2025). Such marginalisation persists in contemporary food hierarchies, where indigenous culinary practices are sometimes perceived as symbols of rural poverty rather than cultural wealth (Molokwa & Setshego, 2025).

Urbanisation and the expansion of **globalised food systems** further intensify these pressures. Increased access to industrially processed foods, supermarket supply chains, and multinational food corporations has reshaped dietary practices and displaced locally sourced ingredients (Molokwa & Setshego, 2025; Swiderska et al., 2022). Westernisation affects aspirations and consumption patterns, predominantly among younger generations, altering everyday engagement with indigenous culinary practices. At the same time, the **decline in indigenous agriculture and biodiversity**, caused by monocropping, commercial farming systems, land access challenges, and climate variability, reduces the availability of traditional crops such as sorghum, millet, and indigenous legumes (Buthelezi & Hughes, 2014; Maepa et al., 2025). The erosion of biodiversity undermines the ecological foundation upon which culinary heritage depends. In addition, evolving **health and nutrition perceptions** influence how indigenous foods are valued (Molokwa & Setshego, 2025). While many traditional foods are nutritionally rich and microbiologically beneficial, especially fermented foods, modern dietary descriptions sometimes stigmatise them as outdated or unhealthy (Govindasami, 2021). The tension between biomedical nutrition frameworks and indigenous dietary knowledge remains insufficiently explored within South African scholarship, revealing another critical research gap.

Alongside these socio-cultural and ecological challenges, the literature identifies significant **policy and institutional shortcomings** (Buthelezi & Hughes, 2014). Although South Africa has established legislative frameworks (see Table 1)), culinary heritage is rarely explicitly recognised as a distinct safeguarding ICH category. Some related cultural initiatives do exist in South Africa that celebrate indigenous foods, though most are informal or project-based. For example, the National Arts Festival, the Knysna Oyster Festival, and the South African Cheese Festival often includes food exhibitions highlighting traditional South African ingredients and dishes (Intrepid Travel, 2016). Moreover, community-driven programs, such as local heritage food markets and heritage interpretation, provide platforms for intergenerational knowledge transmission and cultural tourism, though these initiatives are not formally recognised as ICH (Mangion, 2025). These efforts demonstrate a grassroots appreciation for indigenous culinary practices while highlighting a policy and recognition gap (Buthelezi & Hughes, 2014), as they remain largely informal and project-based rather than being institutionalised under national ICH frameworks.

Table 1 depicts the evolution of ICH governance structure in South Africa.

Table 1: The timeline of ICH governance structures in South Africa.

Year	Milestone	Implication for culinary heritage
1999	National Heritage Resources Act	Broad heritage protection without culinary specificity
2003	UNESCO ICH Convention	Establishes living heritage safeguarding principles
2007	South Africa ratifies UNESCO Convention	Formal commitment with limited culinary implementation
2002 / 2018	Food & Nutrition Security Policy	Emphasises food access and nutrition, limited heritage integration
2010 – 2022	Growth in academic studies	Documentation of knowledge loss, biodiversity decline, and dietary transitions
2023 – Present	Emerging revitalisation initiatives	Partial integration into tourism and sustainability strategies

Source: Author's compilation.

This timeline reveals a persistent disconnect between international commitments, national legislation, and practical safeguarding mechanisms for indigenous culinary practices. Addressing these gaps requires targeted policy integration, formal recognition of culinary practices as ICH, and context-specific programs that combine community participation, ecological sustainability, and heritage- and tourism-driven preservation strategies and policies (Brako, 2024; Mangion, 2025). Without systematic and scientific or grounded documented research, indigenous culinary practices risk being rhetorically recognised but structurally unsupported. These observations directly inform the design of the proposed South African framework, which draws on empirical research, documented evidence to integrate cultural, ecological, and governance strategies with tourism as a cross-cutting enabler, ensuring the safeguarding, revitalisation, and sustainable transmission of indigenous culinary practices.

CONCEPTUAL FRAMEWORK FOR PRESERVING SOUTH AFRICA INDIGENOUS CULINARY PRACTICES

In response to the multidimensional challenges facing South Africa's indigenous culinary heritage, including knowledge erosion, cultural marginalisation, urbanisation, biodiversity loss, dietary westernisation, and policy fragmentation, the proposed framework integrates three interdependent domains: (i) **cultural-social knowledge preservation**, (ii) **ecological and agricultural sustainability**, and (iii) **policy, institutional, and community governance**. Two cross-cutting enablers, namely (i) **ethical and sustainable tourism** and (ii) **digital technology and innovation**, operate across all domains to enhance knowledge transmission, governance coordination, ecological stewardship, and economic sustainability. The framework positions preservation as a coordinated, systemic process rather than isolated interventions, reflecting the interdependent nature of heritage, sustainability, and institutional support.

The cultural-social domain emphasises the continuity of intergenerational knowledge and the reinforcement of community identity. Strategies include systematic community-based archiving, documentation, mentorship programmes, and integration of indigenous culinary knowledge into educational initiatives. These interventions directly address challenges such as knowledge loss, marginalisation, and disruption from urbanisation. Ethical tourism initiatives including culinary workshops, guided market tours, and interactive heritage experiences provide both economic incentives and experiential learning opportunities, reinforcing cultural pride and active participation in indigenous culinary practices (Brako, 2024; Gangiah, 2024; Wasela, 2023).

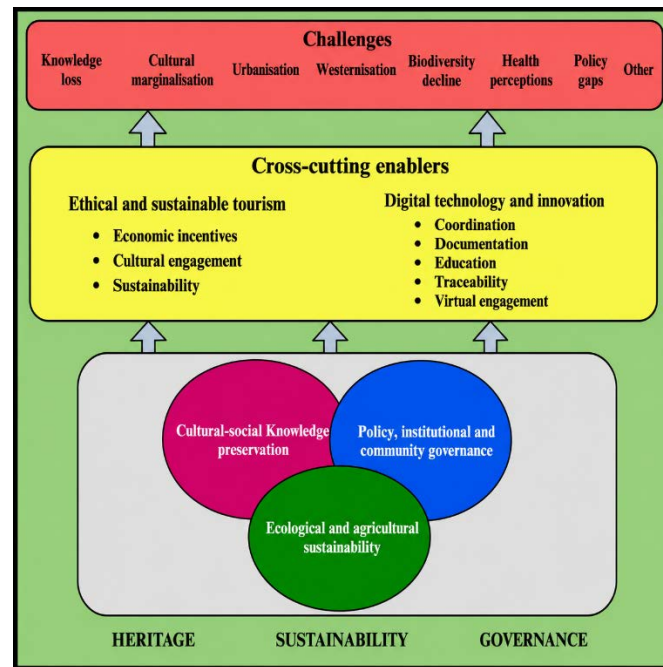
The ecological and agricultural domain highlights the environmental foundations required for culinary practices to thrive. Conservation of indigenous crops, promotion of ecologically adaptive farming, nutrition education, and strengthened urban-rural supply chains address biodiversity decline, monoculture dependence, and negative dietary perceptions (Masenya & Bhuda, 2025; Molokwa & Setshego, 2025; Swiderska et al., 2022). Agri- and eco-tourism initiatives further create market demand for indigenous produce while raising awareness of sustainable resource management. Technology complements these strategies by enabling digital systems such as GIS-based mapping, digital seed banks, and climate-monitoring tools, to support evidence-based conservation and adaptive planning.

The policy, institutional, and governance domain strengthens structural support and community agency (Brako, 2024; Mangion, 2025). Technology facilitates integrated digital databases and shared platforms, improving coordination among agencies (Derashri et al., 2025) such as the South African Heritage Resources Agency (SAHRA) and tourism authorities. It also supports ethical tourism through traceability systems, digital storytelling, and virtual experiences, ensuring transparency, equitable benefit-sharing, and community ownership (Derashri et al., 2025; Mangion, 2025; Romagnoli, 2019).

Figure 1 illustrates the interconnections among the three domains, showing how tourism and technology function as dual cross-cutting enablers. Cultural, ecological, and governance strategies are visually linked to the challenges they address, highlighting the interdependent nature of preservation interventions. By synthesising evidence from heritage theory, sustainability scholarship, and tourism studies, the framework provides a holistic, context-specific roadmap for safeguarding South Africa's indigenous culinary practices while enhancing cultural continuity, ecological resilience, community empowerment, and inclusive economic development.

The proposed framework synthesises evidence from the literature; for example, Bihari (2023), Malapane et al. (2024), and Mangion (2025) emphasise the critical role of intergenerational knowledge transmission in maintaining culinary heritage. Studies highlight the importance of ecological sustainability and biodiversity preservation as foundational to the continuity of indigenous food practices (Masenya & Bhuda, 2025; Maepa et al., 2025; Molokwa & Setshego, 2025;). Brako (2024) and Mangion (2025) stress persistent gaps in policy and institutional coordination that hinder effective safeguarding. Mangion (2025) and Wasela (2023) point out that tourism can reinforce preservation while providing economic incentives. By integrating cultural, ecological, policy, and tourism dimensions, the framework provides a holistic, context-specific approach to safeguarding South African indigenous culinary heritage, ensuring sustainability, community empowerment, and heritage visibility.

Figure 1: A Framework for Preserving Indigenous Cultural Heritage in South Africa.



Source: Author's compilation.

IMPLICATIONS

From a theoretical perspective, the study contributes to the evolving discourse on ICH by demonstrating how indigenous culinary practices function as living archives of knowledge, identity, and ecological stewardship. The findings reinforce UNESCO's (2003) conceptualisation of ICH as practices that are meaningful only when actively transmitted and remembered within communities, providing empirical support for the theory of heritage as a socially embedded, dynamic process (Akagawa, 2018). Furthermore, this research highlights the multidimensionality of culinary heritage, showing how socio-cultural, ecological, and institutional factors intersect to shape the transmission, adaptation, and sustainability of indigenous culinary practices (Romagnoli, 2019).

The study also expands theoretical understanding by illustrating the role of culinary tourism as a mediating mechanism for safeguarding ICH, connecting local practices to global networks while ensuring cultural significance is maintained (Mangion, 2025; Wasela, 2023). Finally, by foregrounding South Africa's ethnolinguistic diversity, the study underlines the importance of context-sensitive, localised approaches in ICH theory, providing a framework that other multicultural contexts can adapt to analyse the interaction between heritage, identity, and sustainability.

In addition to theoretical implications, the findings of this study have several practical implications for policymakers, heritage practitioners, and community stakeholders involved in the safeguarding of South African indigenous culinary practices. The proposed framework demonstrates that integrating cultural-social knowledge preservation, ecological sustainability, and policy governance with tourism as a cross-cutting enabler can simultaneously address multiple threats while providing economic and educational benefits (Bortolotto & Ubertazzi, 2018; Wasela, 2023).

Practically, this suggests that government institutions and agencies should implement programs that combine documentation of culinary knowledge, mentorship between elders and youth, sustainable agricultural practices, and heritage-focused tourism initiatives. Festivals, cooking workshops, and market-based culinary tourism can provide platforms for intergenerational knowledge transfer, reinforce social cohesion, and create income-generating opportunities for local communities (Gangiah, 2024; Matečić & Barišić, 2019). Furthermore, embedding indigenous culinary practices in formal education curricula, community development projects, and conservation strategies can

help mitigate the effects of urbanisation and dietary westernisation, ensuring the sustainability and continued relevance of these practices (Brako, 2024; Gangiah, 2024).

LIMITATIONS AND RESEARCH PROSPECTS

Despite providing a holistic and contextually informed framework, this study is integrally limited by its conceptual and desk-based approach, relying primarily on theoretical and empirical literature, policy documents, and international heritage guidelines. The lack of primary data from indigenous communities, culinary practitioners, and tourism stakeholders limit the ability to evaluate the framework's practical feasibility, implementation challenges, and local acceptability. Moreover, while the framework integrates technology and ethical tourism as cross-cutting enablers, it does not empirically assess digital infrastructure availability, community digital literacy, or the scalability of specific interventions. Therefore, future research should prioritise participatory and empirical research that test and refine the framework within diverse South African contexts, including urban-rural settings and across different ethnic groups. Longitudinal studies could evaluate the effectiveness of intergenerational knowledge transmission, ecological sustainability, and socio-economic outcomes when digital systems and ethical tourism initiatives are implemented. Further research into policy coordination, institutional capacity, and market-based mechanisms would provide insights into operationalising safeguarding strategies at national and provincial levels. By bridging conceptual research approach with grounded, community-based evidence, future research can strengthen the practical application of the framework, ensure its cultural and ecological relevance, and support sustainable preservation of South Africa's indigenous culinary heritage.

CONCLUSION

This paper has explored the significance, challenges, and preservation strategies for South African indigenous culinary practices as a form of ICH. The analysis demonstrates that these practices are deeply embedded in the country's socio-historical and ecological contexts, reflecting intergenerational knowledge, social cohesion, identity formation, and adaptive strategies for sustainability (Brako, 2024; Gangiah, 2024; Molokwa & Setshego, 2025). Despite their cultural and ecological value, indigenous culinary practices face persistent threats from knowledge erosion, cultural marginalisation, urbanisation, dietary westernisation, biodiversity decline, and fragmented policy and institutional frameworks (Brako, 2024; Mangion, 2025). To address these challenges the proposed framework integrates cultural-social knowledge preservation, ecological and agricultural sustainability, and policy and governance mechanisms, with ethical and sustainable tourism and digital technology and innovation functioning as cross-cutting enablers. This holistic approach demonstrates how empirical research evidence and theoretical insights can be operationalised to safeguard culinary heritage, promote intergenerational knowledge transfer, and create socio-economic opportunities while respecting ecological and cultural integrity (Akagawa, 2018; Brako, 2024; Wasela, 2023). Given the conceptual nature of this paper, it is recommended for the proposed framework be tested through participatory and interdisciplinary research approaches to assess its prospects for preserving South African indigenous culinary practices; ultimately, recognising them as ICH.

REFERENCES

- Akagawa, N. (2018). National identity, culinary heritage and UNESCO: Japanese Washoku. In N. Akagawa & L. Smith (Eds.), *Safeguarding intangible heritage* (pp. 200–217). Routledge. <https://doi.org/10.4324/9780429507137>
- Asharaf, S., & Vatakkayil, J. (2025). From tradition to transformation: The gastronomic and cultural significance of Ravuthar Biriyan in Palakkad. *International Journal for Multidisciplinary Research*, 7(2). <https://doi.org/10.36948/ijfmr.2025.v07i02.40337>
- Bachouch, N., & Kohli, H. (2025). Cultural tourism and local produce: Harissa, cultural heritage of humanity—Souk El Felfel, Nabeul, as a case study. In E. Martinelli, E. C. C. Gonçalves, R. A. M. D. Castanho, & T. Pivac (Eds.), *Cultural heritage-based sustainable tourism approaches: CST 2024. Advances in Science, Technology & Innovation* (pp. 31–44). Springer. https://doi.org/10.1007/978-3-031-93275-5_4

- Barzallo-Neira, C., & Pulido-Fernández, J. I. (2023). Identification of the main lines of research in gastronomic tourism: A review of the literature. *Sustainability*, 15(7), 5971. <https://doi.org/10.3390/su15075971>
- Bihari, S. (2023). Cultural heritage and indigenous knowledge: Reviving traditions for future generations. *Sustainable development goals in SAARC countries: Key issues, opportunities and challenges*, 1(12), 24-32.
- Björk, P., & Kauppinen-Räsänen, H. (2016). Exploring the multi-dimensionality of travellers' culinary-gastronomic experiences. *Current Issues in Tourism*, 19(12), 1260–1280. <https://doi.org/10.1080/13683500.2013.868412>
- Bortolotto, C., & Ubertazzi, B. (2018). Foodways as intangible cultural heritage. *International Journal of Cultural Property*, 25(4), 409-418. <https://doi.org/10.1017/S0940739119000055>
- Brako, M. (2024). Preserving culinary heritage: Challenges faced by Takoradi Technical University food service lab students. *World Journal of Advanced Research and Reviews*, 21(3). <https://doi.org/10.30574/wjarr.2024.21.3.0882>
- Braun, V., & Clarke, V. (2021). *Thematic analysis: A practical guide* (2nd ed.). Sage Publications.
- Buthlezi, N. N., & Hughes, J. C. (2014). Indigenous knowledge systems and agricultural rural development in South Africa: Past and present perspectives. *Indilinga: African Journal of Indigenous Knowledge Systems*, 13(2), 231–250. <https://journals.co.za/content/linga/13/2/EJC166451>
- Cirillo, K. (2022). *Eating ourselves: Marking identity and belonging through food & sensorial recreations* (Doctoral dissertation, HMKW University of Applied Sciences). https://docuphilemedia.com/images/EatingOurselves_KarenCirillo_Oct2022.pdf
- de Miguel Molina, M., & de Miguel Molina, B. (2016). Intangible heritage and gastronomy: The impact of UNESCO gastronomy elements. *Journal of Culinary Science & Technology*, 14(1), 25–48. <https://doi.org/10.1080/15428052.2015.1129008>
- Derashri, A., Sharma, D., Dwivedi, A., & Rajput, D. (2025). Future directions and innovations. In *Quality assurance of ethno-herbals: Cultivating confidence in alternative medicine* (pp. 121–136). Bentham Science Publishers. <https://doi.org/10.2174/9789815274554125010011>
- Dordai, L., Becze, A., & Roman, M. (2026). Gastronomic Tourism: Global Trends, Sustainability Challenges, and Research Directions (2010–2025)—A Comprehensive Review. *Gastronomy*, 4(1), 4. <https://doi.org/10.3390/gastronomy4010004>
- Fisher, H., & Du Rand, G. (2024). A methodological framework for researching and preserving South African culinary heritage. In *New frontiers in economics and tourism – FET 2024* (Vol. 10, p. 643).
- Gangiah, S. (2024). Infusing sub-Saharan culinary heritage in university learning for a delectable academic journey. *Inkanyiso: Journal of Humanities and Social Sciences*, 16(1), 1-14. <https://www.ajol.info/index.php/ijhss/article/view/291619>
- Govindasami, Y. (2021). *Indigenous food knowledge and consumption patterns of Johannesburg residents* (Unpublished master's thesis). University of Johannesburg, South Africa.
- Intrepid Travel. (2026). *Festivals in South Africa*. Retrieved February 16, 2026, from <https://www.intrepidtravel.com/za/south-africa/festivals-in-south-africa>
- Jaakkola, E. (2020). Designing conceptual articles: Four approaches. *AMS Review*, 10(1), 18–26. <https://doi.org/10.1007/s13162-020-00161-0>
- Lee, K. S. (2023). Cooking up food memories: A taste of intangible cultural heritage. *Journal of Hospitality and Tourism Management*, 54, 1-9. <https://doi.org/10.1016/j.jhtm.2022.11.005>

- Lewis, D., Reddy, V., Moletsane, R., & Thuynsma, H. A. (Eds.). (2024). Thinking through food in South Africa: Identities, embodiment and representation. ESI Press. <https://doi.org/10.35293/esi.46>
- Maepa, N. M., Matsoso, A. N., & Muedi, H. T. (2025). Documenting and preserving the indigenous foods to ensure food security by the Moshana people in the Northwest Province, South Africa. In *Revaluation and preservation of indigenous knowledge systems in modern society* (pp. 197–214). IGI Global Scientific Publishing. <https://doi.org/10.4018/979-8-3693-7964-6.ch011>
- Maffei, M. C. (2012). *Culinary traditions as cultural intangible heritage and expressions of cultural diversity*. Brill.
- Magaya, S. (2021). *Indigenous knowledge systems cues essential in agricultural management and tracking seasonality in KwaZulu-Natal and Eastern Cape, South Africa*. University of the Witwatersrand, Johannesburg (South Africa).
- Mangion, D. (2025). Beyond food tourism: Empowering rural communities through heritage interpretation. The Online Open Access Repository of the Institute of Tourism Studies (Malta). <https://futouristic.scholasticahq.com/article/144323.pdf>
- Masenya, T. M., & Bhuda, M. T. (2025). Resurgence, reclamation, and preservation of South African indigenous knowledge systems: Using the past to look to the future. In *Revaluation and preservation of indigenous knowledge systems in modern society* (pp. 1–16). IGI Global Scientific Publishing. <https://doi.org/10.4018/979-8-3693-7964-6.ch001>
- Matečić, I., & Barišić, P. (2019). The importance of gastronomy and culinary practices in creation of intangible cultural heritage-based tourism products. In J. Šimurina, I. Načinović Braje, & I. Pavić (Eds.), *Proceedings of FEB Zagreb 10th International Odyssey Conference on Economics and Business* (pp. 815–826). Faculty of Economics & Business, University of Zagreb. <https://doi.org/10.22598/odyssey/2019.1>
- Molokwa, D. T., & Setshego, M. V. (2025). Traditional food systems as a tool for achieving food sovereignty in South Africa. In *Resurgence and revalorization of indigenous knowledge systems in the contemporary society* (pp. 69–90). IGI Global Scientific Publishing. <https://doi.org/10.4018/979-8-3373-4124-8.ch004>
- Nistor, E. L., & Dezsí, Ş. (2022). An insight into gastronomic tourism through the literature published between 2012 and 2022. *Sustainability*, 14(24), 16954. <https://doi.org/10.3390/su142416954>
- Ntlanga, S. S., Jiba, P., Christian, M., & Mdoda, L. (2023). Assessing awareness and perceptions towards the existence of indigenous foods in Port St Johns of the Eastern Cape South Africa. *South African Journal of Agricultural Extension*, 51(3), 115-134.
- Oliveira, B. S., Tricárico, L. T., & Sohn, A. P. L. (2020). The culinary intangible cultural heritage of UNESCO: A review of journal articles in EBSCO platform. *Journal of Culinary Science & Technology*, 18(4), 138–156. <https://doi.org/10.1080/15428052.2018.1513882>
- Pereira, L. M. (2023). Follow the ‘ting: sorghum in South Africa. *Food, Culture & Society*, 26(1), 116-144. <https://doi.org/10.1080/15528014.2021.1984631>
- Qiu, Q., Zuo, Y., & Zhang, M. (2022). Intangible cultural heritage in tourism: Research review and investigation of future agenda. *Land*, 11(1), 139. <https://doi.org/10.3390/land11010139>
- Rodrigues, C., Salgado, M., Pires, P., & da Silva, R. G. (2022). Gastronomy and the contribution to the sustainable development of tourism in the Serra da Estrela region: The case of the Museu do Pão. *PASOS: Revista de Turismo y Patrimonio Cultural*, 20(5), 1191–1202. <https://doi.org/10.25145/j.pasos.2022.20.080>
- Romagnoli, M. (2019). Gastronomic heritage elements at UNESCO: Problems, reflections on and interpretations of a new heritage category. *International Journal of Intangible Heritage*, 14(2), 135–146. <https://doi.org/10.35638/ijih.2019.14.2.009>

- Sharma, R. (2024). Rediscovering the lost cuisines of the Himalayas: A study on traditional culinary practices, cultural heritage and their potential for sustainable tourism. *International Journal for Multidimensional Research Perspective (IJMRP)*, 2(9), 73–85. <https://doi.org/10.61877/ijmrp.v2i9.191>
- Singh, S., Verma, S., & Srivastav, D. K. (2024). From fields to forests: A comparative study of culinary traditions in Bihar and Jharkhand. *ShodhKosh Journal of Visual and Performing Arts*, 5(4). <https://doi.org/10.29121/shodhkosh.v5.i4.2024.5150>
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333–339. <https://doi.org/10.1016/j.jbusres.2019.07.039>
- Sotiriadis, M. (2017). Pairing intangible cultural heritage with tourism: The case of Mediterranean diet. *EuroMed Journal of Business*, 12(3), 269–284. <https://doi.org/10.1108/EMJB-07-2016-0019>
- South Africa. (1999). National Heritage Resources Act 25 of 1999. *Government Gazette*. <https://www.gov.za/documents/national-heritage-resources-act>
- South Africa. (2018). National Policy on Food and Nutrition Security (2002; revised 2018). Government of South Africa. <https://www.gov.za/documents/national-policy-food-and-nutrition-security-south-africa>
- Soyombo, D. A., Kupa, E., Ijomah, T. I., & Stephen, A. (2024). Culinary narratives: Exploring the socio-cultural dynamics of food culture in Africa. *Open Access Research Journal of Science and Technology*, 11(02), 088–098. <https://doi.org/10.53022/oarjst.2024.11.2.0086>
- Suresha, M., & Chaudhary, P. (2025). Unveiling the Food Heritage: Traditional Food Systems and Transitions in Malamuthan Community. *International Journal of Environmental Sciences*, 1393–1402. <https://doi.org/10.64252/r929gh53>
- Swiderska, K., Argumedo, A., Wekesa, C., Ndalilo, L., Song, Y., Rastogi, A., & Ryan, P. (2022). Indigenous peoples' food systems and biocultural heritage: Addressing indigenous priorities using decolonial and interdisciplinary research approaches. *Sustainability*, 14(18), 11311. <https://doi.org/10.3390/su141811311>
- Syed, A. (2025). Food and culture in Kashmiri writings. *International Journal of Research and Scientific Innovation*, 12(8), 2226–2231. <https://doi.org/10.51244/ijrsi.2025.120800199>
- United Nations Educational, Scientific and Cultural Organization (UNESCO). (2003). Convention for the safeguarding of the intangible cultural heritage. <https://ich.unesco.org/en/convention>
- United Nations Educational, Scientific and Cultural Organization (UNESCO). (2024). Intangible cultural heritage: Discover the new inscriptions of the living heritage elements. <https://ich.unesco.org/en/news/discover-the-new-inscriptions-of-the-living-heritage-elements-13540>
- United Nations World Tourism Organization (UNWTO). (2019). Guidelines for the development of gastronomy tourism. <https://www.e-unwto.org/doi/book/10.18111/9789284420957>
- Vishwakarma, N., Jaiswal, A., & Verma, M. (2025). Introduction to culinary heritage. In S. K. Jain, R. Gupta, S. Vengurlekar, & N. Bais (Eds.), *Quality assurance of ethno-herbals: Cultivating confidence in alternative medicine* (pp. 1–15). Bentham Science Publishers. <https://doi.org/10.2174/9789815274554125010003>
- Wan Sageng, C., Leong, Q.-L., Irvine Mikal, I., Sandhu, M. K., Pudun, J., & Bin Umadi, M. F. (2024). Culinary practices of the Bidayus in Sarawak, Malaysia: A qualitative study. *Journal of Ethnic Foods*, 11(16), 1–13. <https://doi.org/10.1186/s42779-024-00225-7>
- Wasela, K. (2023). The role of intangible cultural heritage in the development of cultural tourism. *International Journal of Eco-Cultural Tourism, Hospitality Planning and Development*, 6(2), 15–28. <https://doi.org/10.21608/ijecth.2024.297283.1004>

THE INFLUENCE OF E-COMMERCE ON THE ADVANCED INVENTORY MANAGEMENT STRATEGIES FOR SMALL AND MEDIUM-SIZED ENTERPRISES

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ABSTRACT

This study examines the significant impact of electronic commerce (e-commerce) adoption on inventory management strategies among Small and Medium Enterprises (SMEs) in South Africa. As digital marketplaces reshape the global retail environment, the primary aim of this research is to understand how local businesses transition from traditional storefronts to integrated digital supply chains. While the growth of global e-commerce is well-documented, the literature remains sparse on how SMEs in emerging regional economies, particularly in the Sedibeng District, address the challenges posed by outdated inventory systems in the face of the fast-paced, real-time demands of digital trade. This research highlights the difficulties many SMEs face when trying to adapt their legacy systems to an online marketplace. This challenge often leads to operational inefficiencies, stockouts, and reduced competitiveness. The study utilised a quantitative research design, collecting data from 401 SME owners and managers across the Sedibeng region. A conceptual framework was tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyse the interdependencies between digital adoption and operational strategies. The findings revealed a strong relationship between the key components of the framework: advanced inventory technologies (H_1) and modern strategies such as Just-In-Time (JIT) (H_2) were identified as critical predictors of online success. Additionally, the results indicate that adopting e-procurement enhances the integration of e-commerce (H_3), while increasing customer expectations serve as the primary driver for this digital transformation (H_4). Ultimately, the model confirms that effective e-commerce adoption directly leads to improved business performance (H_5). This study offers a unique, localised strategic roadmap for SMEs to leverage digital tools for operational resilience, providing valuable insights into navigating the complexities of a developing economy.

Keywords: e-commerce, inventory management strategies, SMEs, business performance, customer expectations.

INTRODUCTION

Electronic commerce (e-commerce) has revolutionised digital transactions, driving organizational growth by significantly reducing operational overhead. Embracing this digital model enhances efficiency and positions businesses for long-term sustainability (Bartak, Božić, Šafran, and Pivar, 2025). As global commerce increasingly hinges on internet-powered supply chains, e-commerce has evolved beyond simple transactions into a sophisticated collaboration among multiple stakeholders (Patil and Divekar, 2014). The rapid evolution of electronic commerce (e-commerce) has fundamentally restructured the global business landscape, shifting the focus from traditional brick-and-mortar storefronts to integrated, internet-powered supply chains. While e-commerce offers transformative opportunities for Small and Medium Enterprises (SMEs) to achieve economies of scale and expand their market reach (Sombultawee, 2020), it also necessitates a profound re-evaluation of internal operations. Unlike physical retail, digital marketplaces operate on real-time demand cycles that require high-precision synchronisation between digital listings and physical stock (Bartak et al., 2025). As consumer expectations for rapid, same-day delivery escalate, SMEs must transition from localised, conventional practices to agile, data-driven inventory systems (Saleeshya & Rahul, 2023). Effective inventory management is vital for the success of any e-commerce business, impacting everything from financial health to customer satisfaction and operational efficiency. The risks of poor inventory practices like stockouts and overstocking can impose significant financial burdens and severely undermine customer loyalty. Ensuring precise

inventory control not only safeguards your bottom line but also reinforces your brand's reputation and trustworthiness (Groenewald and Kilag, 2024). The acceleration of global commerce is largely driven by the internet, which facilitates an interconnected supply chain. E-commerce requires careful coordination among various stakeholders. As consumer expectations for accuracy increase, retailers must adopt advanced demand-supply management practices and lean inventory strategies to ensure cost efficiency (Patil and Divekar, 2014). Furthermore, the evolution of e-commerce has introduced significant challenges to logistics management. Synchronising order flow and product storage is particularly complex for companies with expansive catalogs, as the digital marketplace demands higher speed and accuracy (Al-Debei, Dwivedi, & Williams, 2023).

However, while global trends are well-documented, there is a lack of empirical evidence regarding the operational resilience of SMEs in emerging regional economies. Most existing research focuses on front-end consumer behavior or the digital maturity of large corporations in developed markets. There is a lack of empirical evidence exploring how SMEs in specific localized contexts, such as the Sedibeng District in South Africa, navigate the complexities of transitioning from manual, legacy systems to advanced, data-driven inventory strategies. This study addresses this gap by providing a localised, evidence-based strategic roadmap for digital supply chain integration.

PROBLEM STATEMENT

The rise of electronic commerce has fundamentally changed the global business landscape, leading to significant shifts in operational strategies, competitive dynamics, and organizational growth. This digital transformation of trade has created a complex ecosystem that offers both strategic opportunities and systemic challenges for stakeholders at all levels of business (Raji, Olawore, and Osahor, 2023). Despite the strategic opportunities presented by the digital economy, many SMEs face systemic barriers to e-commerce adoption, including limited digital literacy and a lack of technological infrastructure (Costa and Castro, 2021). The transition to online commerce introduces critical operational hurdles, specifically the demand for high-precision inventory tracking and swift order fulfillment (Yusof, 2024). Yet, these hurdles are countered by groundbreaking digital innovations, like predictive analytics and automated replenishment systems. By harnessing these advancements, organisations can tap into integrated supply networks, enabling them to secure a competitive edge in today's market. Embracing these technologies is essential for thriving in the evolving retail landscape (Bartak et al., 2025). Consequently, many SMEs struggle to effectively adapt their existing inventory strategies to meet the unique demands of online sales, resulting in operational inefficiencies and diminished profitability.

The core of the problem lies in the technological-operational misalignment prevalent among regional SMEs. Many local businesses attempt to enter the online marketplace using outdated inventory practices, leading to a digital friction characterised by stockouts, overstocking, and operational inefficiencies (Groenewald & Kilag, 2024). While consumers in the digital era expect rapid, same-day delivery and absolute stock accuracy, many SMEs lack the resources or framework to integrate modern tools like cloud-based tracking or Just-In-Time (JIT) strategies (Ridwan, Muzakir, & Nurhidayati, 2024). Furthermore, SMEs often lack the resources to integrate modern tools like cloud-based tracking or predictive analytics, leading to increased shipping costs and diminished customer satisfaction (Al-Debei, Dwivedi, & Williams, 2023). Many SMEs lack the resources and expertise to effectively implement and integrate modern inventory management technologies, such as cloud-based inventory systems and real-time tracking tools, which hinders their ability to optimise inventory levels and streamline operations (Brynjolfsson, Jin, & O'Hanlon, 2023). Without identifying effective inventory management strategies and technological solutions tailored to the SME context, these enterprises risk obsolescence in an increasingly competitive digital marketplace.

This study investigates the influence of e-commerce on inventory management practices within South African SMEs, providing actionable insights for optimising operational efficiency.

LITERATURE REVIEW

E-commerce

E-commerce, broadly defined as economic activity facilitated through electronic connections, has significantly transformed supply chain logistics over the past several decades (Zennaro, Finco, Calzavara, & Persona, 2022).

Integrating Artificial Intelligence (AI) into e-commerce is no longer just a trend; it has become a competitive necessity. However, transitioning from a conceptual pilot to a fully integrated system requires overcoming significant technical, organisational, and psychological challenges (Rane, Choudhary & Rane, 2024). Laudon and Traver (2021) state that e-commerce has become integral to the modern economy because of internet accessibility and digital advancement. Consumers rely on online cues to assess vendor credibility, and digital trust is important for consumer convenience and security as these factors influence consumer behavior (Pavlou, 2003). Highlighting the importance of online reputation management, online reviews, and social media influence consumers' purchasing decisions (Verhagen & Van Dolen, 2011). Optimised supply chain management is necessitated by challenges that include order fulfilment, warehousing, and delivery (Agrawal et al., 2021). AI-driven personalisation and customer service, ML-based demand forecasting, and blockchain-enabled secure transactions are increasingly prevalent.

Quality is another factor that may affect the success of e-commerce (Gajewska, Zimon, Kaczor, & Madzík, 2020). According to Raji, Olawore, and Osahor (2023), SMEs must adopt a synergistic approach by forming strategic partnerships with large platforms to survive and thrive in the digital economy. The adoption of e-commerce in SMEs is primarily driven by senior management pressure, performance expectations, customer demand, and competitive pressure (Sánchez-Torres, Berrío, & Rendón, 2021). Overcoming these barriers is crucial for leveraging e-commerce's potential. As consumers become more conscious of environmental and social impacts, sustainability and ethical considerations are also gaining importance. To shape the future, e-commerce continues to evolve, with trends like voice commerce, augmented reality (AR) shopping, and enhanced personalisation (Pantano et al., 2020). Customer relationship management (CRM) and personalisation further enhance customer loyalty and repeat purchases.

Inventory Management

Inventory management plays a vital role in supply chain management (SCM), going beyond just procurement and logistics. It helps regulate stock at different stages of production. By coordinating the movement of raw materials to finished products, organisations can strike a balance between meeting service-level requirements and controlling total inventory costs (Kaul & Khurana, 2022). Supplier Relationship Management connects procurement and fulfillment, playing a crucial role in how online retailers optimize inventory to stay ahead of the competition (Grant, 2024). According to Atnafu and Balda (2018), businesses use this system to track their inventory assets to monitor stock levels, predict demand, and optimise reordering processes. E-commerce has revolutionised global trade by significantly altering consumer behavior and transforming traditional business models. Driven by widespread internet access and rapid digital innovation, it has now become a vital component of the modern economy (Zennaro, Finco, Calzavara, & Persona, 2022). To optimise inventory, businesses must implement effective demand forecasting. Predictive analytics enables businesses to anticipate variations, thereby reducing costs associated with stockouts and surplus inventory through historical data and advanced machine learning algorithms (Kot & Grondys, 2011).

This capability allows managers to accurately predict future sales, enabling them to optimise stock levels, reduce overhead costs, and avoid both stockouts and overstocking (Pallathadka, Ramirez-Asis, Loli-Poma, Kaliyaperumal, Ventayen, & Naved, 2023). In today's dynamic market, characterised by fluctuating demand and global disruptions, effective inventory strategies are paramount. Moreover, inventory management has an impact on profitability, customer satisfaction, and supply chain resilience for businesses across various industries (Mashayekhy, Mahdavi & Razmi, 2022). Inventory management is transformed by the integration of advanced technologies like artificial intelligence (AI), machine learning (ML), and the Internet of Things (IoT). To enhance accuracy and efficiency, businesses use AI-driven demand forecasting, real-time inventory tracking through IoT sensors, and automated replenishment systems (Rani et al., 2024). Supply-Aware Recommendation and Substitute-Aware Recommendation were introduced to supply constraints in e-commerce (Bartak et al., 2025). The importance of inventory resilience is highlighted by global supply chain disruptions, such as pandemics and geopolitical conflicts (Becerra et al., 2024). Strategies like safety stock optimisation, multi-sourcing, and flexible inventory policies are adopted by businesses to mitigate risks (Chopra & Sodhi, 2020). Integrated inventory management is necessary for the rise of omnichannel retailing across multiple sales channels. For seamless customer experiences, real-time inventory visibility and synchronised fulfilment are critical for businesses (Ishfaq & Raja, 2021).

The importance of leveraging technology, adopting sustainable practices, and building resilience in inventory management is emphasised by recent research (Ivanov, 2020). To achieve operational efficiency and competitive advantage, businesses need to innovate inventory strategies as they navigate an increasingly complex and dynamic environment. To minimise costs, optimise resource allocation, and enhance customer service within supply chains, inventory management strategies are important (Chopra & Sodhi, 2020). Automated inventory monitoring and data

collection are facilitated by integrating the Internet of Things (IoT) to improve accuracy and responsiveness (Ivanov et al., 2021). Real-time visibility and accessibility, enabling efficient stock tracking and replenishment, are offered by cloud-based inventory management systems. Modern strategies are increasingly characterised by their reliance on advanced technologies and data-driven decision-making (Christopher & Byrnes, 2020). To forecast demand fluctuations based on historical data and market trends, Predictive analytics and machine learning algorithms are utilised. Stockouts and excess inventory are minimised by accurate demand forecasting (Syntetos et al., 2022). Furthermore, the need for resilient inventory management strategies is highlighted through global supply chain disruptions. To mitigate risks and ensure continuity of supply, businesses are adopting approaches like safety stock optimisation, multi-sourcing, and flexible inventory policies (Govindan & Hasanagic, 2018). Inventory strategies are being altered to accommodate more sustainable sourcing and less waste.

E-Procurement

E-procurement consolidates multiple suppliers' catalogs into a single, easily navigable source for purchasers. To support supplier negotiations, this technology enables procurement teams to examine product buying patterns and leverage this data (Perez, 2022). Perez (2022) further states that in areas like supply chain management and handling local and foreign procedures, technology adoption significantly impacts many SMEs. To procure indirect products for administration, maintenance, sales, and operations, including office supplies, cleaning solvents, office furniture, and computer equipment, firms have adopted E-procurement systems. To profile the most suitable suppliers, firms are assisted by e-procurement tools that they provide to enhance visibility into day-to-day transactions (Setiadi, Arief, Hamsal, & Abdinagoro, 2024). Therefore, SMEs must prioritise the integration of e-procurement systems to synchronise their inbound logistics with real-time digital demand, thereby reducing lead times and ensuring that inventory levels remain responsive to the velocity of online sales.

Customer Expectations

Customer expectations, according to Akinlabi (2021), are measured in terms of size, quality, and loyalty of the firm's base, and they depend on the flexibility of supply chain partners. Many customers remain hesitant to shop online due to concerns about privacy, perceived risks, a lack of trust, and perceptions of low service quality, despite increased participation in e-commerce platforms by both companies and consumers (Oliveira et al., 2023). Quality of logistics services has become an essential element in companies' competitive strategies (Gajewska et al., 2020). Given the intense competition within the e-commerce industry, retaining existing customers is crucial for sustained success. To foster greater customer loyalty, e-commerce companies frequently employ digital marketing strategies (Felix & Rembulan, 2023). Online shopping is expected to be an experience that is convenient, trustworthy, efficient, and personalised to customers. SMEs must meet and exceed these expectations to thrive in today's competitive market.

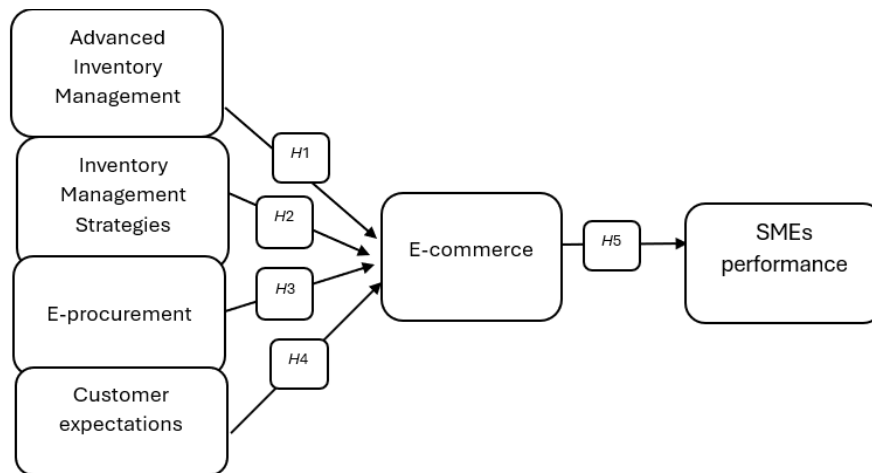
Business Performance

To balance the risks of overstocking against the costs of shortages is the primary objective of inventory management. Businesses that are managed by managers with skills and abilities in inventory management systems can transform inventory into a proactive force that lowers inventory investment (Orobia, Nakibuuka, Bananuka, & Akisimire, 2020). Within the e-commerce landscape, effective inventory management is essential for the operational success and overall business performance of enterprises. It involves the processes of ordering, storing, and utilising a company's inventory, which can greatly impact overall performance. Companies maintain the right amount of stock, preventing costly stockouts and excessive inventory through proper management (Fakhrhosseini & Rudsari, 2024). To understand the determinants of e-commerce performance, companies need to excel in the digital marketplace. Customer satisfaction is a critical driver of e-commerce business performance. It is influenced by website usability, product quality, delivery speed, and customer service. For long-term success, SMES must build customer loyalty through personalised experiences, effective communication, and responsive customer support (Pavlou, 2003).

To fulfill, inventory management and logistics operational efficiency is crucial for e-commerce businesses. To enhance performance, it is essential to streamline processes, reduce operational costs, and optimise delivery times. Integrating technology, such as automated warehousing and real-time tracking, can significantly improve operational performance (Saleeshya & Rahul, 2023). E-commerce business performance is enhanced by technological innovation. Customer engagement and personalising the shopping experience can be improved through emerging technologies like AI, machine learning, and augmented reality (Dwivedi et al., 2021). For understanding customer behavior, optimising marketing campaigns, and improving decision-making, e-commerce data analytics and business

intelligence are essential. To gain valuable insights and enhance performance, businesses must be able to collect, analyse, and interpret data from various sources such as social media, website traffic, and customer transactions (Brynjolfsson et al., 2023). Companies must leverage data analytics, optimise operational efficiency, and prioritise customer satisfaction and technological innovation to achieve sustainable growth and competitiveness in the dynamic e-commerce landscape (Ivanov, 2020).

Figure 1: Conceptual Framework.



Source: Author's compilation.

Conceptual Framework and the Formula of Hypotheses

The study proposes a conceptual framework (Figure 1) that posits e-commerce adoption as a mediating variable. This framework investigates how several key factors- inventory management practices, inventory management strategies, e-procurement adoption, and customer expectations influence the success of e-commerce initiatives. Subsequently, the framework explores how successful e-commerce adoption impacts SMEs' business performance.

Advanced inventory management and adoption of e-commerce (H_1)

For businesses to manage the complexities of global supply chains with greater agility and precision, it is crucial to integrate RFID, IoT, and AI to reduce inaccuracies while enhancing operational efficiency (Groenewald & Kilag, 2024). Similarly, to manage perishable or high-value goods, real-time data on environmental conditions such as temperature and humidity is delivered by IoT sensors. Proactive inventory management is facilitated by the IoT to supply data that supports immediate decision-making (Atzori et al., 2010). Additionally, to reduce labor costs and improve efficiency, robots are increasingly automating warehouse tasks (Grosse et al., 2017). To predict demand and optimise stock levels, (AI) and (ML) algorithms analyse historical data and market trends, thereby enhancing forecasting accuracy (Syntetos et al., 2022). By leveraging these technologies, businesses can significantly improve their inventory practices and gain a competitive advantage. Consequently, the adoption of technology in inventory management is a critical factor in enhancing an SME's operational capabilities. This study will explore how this technological capability influences other aspects of the business, leading to the following hypothesis:

H₁: There is a positive relationship between the adoption of advanced inventory management technologies and the effectiveness of e-commerce in South African SMEs.

The Influence of Inventory Management Strategies on E-commerce (H_2)

In addressing the challenges and optimising best practices in e-commerce inventory, technological advancements have emerged as transformative agents. Vast datasets can be analysed by AI algorithms at unprecedented speeds, enabling real-time insights into inventory levels and trends (Groenewald & Kilag, 2024). Significant improvement of supply chain efficiency, accuracy, and responsiveness has been achieved through the integration of technology (Christopher

& Byrnes, 2020). The financial well-being of companies is maintained by reducing logistics costs. To stay ahead of their competitors and meet customer demands, e-commerce companies continuously strive to deliver products on time and at reduced costs (Gomes, de Lima Junior, Soliani, de Souza Oliveira, de Oliveira, Siqueira, da Silva Nora & de Macêdo, 2023). To overcome loss of customers, decreased consumer confidence, and financial loss, e-commerce companies need to develop effective and sophisticated strategies in inventory management (Ridwan et al., 2024). Strategies such as Just-in-Time (JIT) are particularly relevant to e-commerce to minimise inventory holding costs by receiving materials precisely when they are needed. Close coordination and accurate demand forecasting are required for JIT principles to support data analytics. Therefore, strong supplier relationships need this approach to reduce waste and storage space (Womack & Jones, 1990). Effectively, when these strategies are implemented, they enable e-commerce businesses to optimise their operations, ensure stock availability, and enhance the overall customer experience. This study, therefore, hypothesises that:

H₂: There is a positive relationship between the adoption of modern inventory management strategies and the effectiveness of e-commerce in South African SMEs.

E-procurement and E-commerce (H₃)

The viability of E-procurement adoption depends on the variable's technology behavior, and organisation. Big, managerially innovative firms with robust centralised offices are more likely to use e-procurement systems (Perez, 2022). E-procurement and e-commerce are two essential applications of technology that serve different yet interconnected functions within a business, although both are internet-based (Makudza et al., 2023; Oshoma et al., 2024). According to Perez (2022), a successful e-commerce operation that focuses on the online sale of goods and services needs an effective e-procurement system. E-procurement ensures that a business can efficiently acquire the materials and products needed to fulfil online orders by enhancing inbound supply chain processes. SMEs are faced with inadequate ICT infrastructure and a lack of expertise as significant barriers. To enhance operational efficiency and strengthen e-commerce capabilities, the opportunities presented by e-procurement are substantial despite these obstacles (Vencentius & Semente, 2025). Therefore, this study proposes the following hypothesis:

H₃: E-procurement has a positive influence on the effectiveness of e-commerce in South African SMEs.

The Influence of Customer Expectations on E-commerce (H₄)

Customer behavior and new expectations are reshaped by technological advances. Because of their dynamic and complex relationship, customers expect businesses to understand their individual needs and preferences. Customers need a smooth and seamless transition across all channels, and businesses need to provide a cohesive brand experience (Kotler, Kartajaya & Setiawan, 2021; Chaffey & Ellis-Chadwick, 2019). Businesses must streamline processes, simplify interactions, and offer intuitive tools to minimise customer effort and deliver frictionless experiences as today's customers anticipate quick responses, fast delivery, and user-friendly interfaces (Brown & Paulin, 2020). Kaplan and Haenlein (2019) highlighted that while bridging the gap between the digital and physical worlds, emerging technologies such as AI and augmented reality (AR) further shape customer expectations by enabling more personalised and predictive experiences. To build lasting relationships and succeed, businesses must prioritise personalisation, omnichannel integration, speed, and convenience using their e-commerce platforms. It is therefore essential for SMEs to meet these modern customer demands

Therefore, this study hypothesises that:

H₄: Customer expectations have a positive influence on the effectiveness of e-commerce in South African SMEs.

E-commerce and SMEs' Performance (H₅)

The combination of IT infrastructure and IT human resources is referred to as technological readiness. Technological innovation is an essential element in the digital era for businesses to succeed amid competitors (Hussain, Akbar, Shahzad, Poulouva, Akbar & Hassan, 2022). While improving the efficiency of their operations, traditional retailers are offered opportunities by e-commerce to expand their market share. Compared with firms relying solely on traditional offline models, those that use online sales channels perform better overall (Šaković Jovanović, Vujadinović, Mitreva, Fragassa & Vujović, 2020). The firm's operational performance is not directly influenced by e-commerce. However, it enhances operational efficiency, which increases operational performance (Hussain et al., 2022). Organisations with

a strong entrepreneurial orientation allocate more resources toward innovation, allowing the firm to gain a competitive advantage related to daily activities. to both organizational growth and superior business performance, Entrepreneurial orientation (EO) is widely recognised as a critical antecedent (Octavia, Indrawijaya, Sriayudha, & Hasbullah, 2020).

Therefore, the successful integration of e-commerce can significantly enhance the business performance of SMEs by expanding their market reach, improving operational efficiency, and driving sustainable growth. Based on this, the following hypothesis is proposed:

H₅: E-commerce has a positive influence on the business performance of SMEs in South Africa.

THEORETICAL CONTRIBUTIONS AND SYNTHESIS

A three-fold contribution has been made in this study to the expanding literature on digital transformation within emerging economies. The Resource-Based View (RBV) is extended, providing empirical evidence that digital infrastructure and inventory agility function as strategic resources, enabling SMEs to secure a competitive edge in an increasingly volatile digital landscape. Furthermore, the research contextualises the Technology-Organisation-Environment (TOE) framework by identifying customer expectations as a significant driver (*H₄*). The study demonstrates how external environmental pressures serve as a primary catalyst for technological adoption in developing regional contexts where internal resources are often constrained. Finally, unlike many existing studies that prioritise front-end e-commerce metrics such as user interface or web traffic, this research shifts the academic focus toward the integrated digital supply chain. It proves that back-end operational resilience, facilitated by advanced inventory synchronisation, is the fundamental engine driving sustainable business performance (*H₅*).

RESEARCH METHODOLOGY

This study adapted and tailored existing scales to fit its specific context. This section outlines the research design, sample, data collection procedures, statistical methods, and ethical considerations.

Research Design and Sample

This study utilised a quantitative research approach with a cross-sectional survey design. The target population consisted of owners and managers of Small and Medium-Sized Enterprises (SMEs) in the Sedibeng region. This group was chosen because they are key decision-makers capable of providing accurate data on the variables being investigated. A non-probability sampling method was employed, resulting in the distribution of 520 questionnaires. Of these, 401 were completed and considered valid, yielding a high response rate of 77.12%. This rate exceeds the minimum acceptable threshold of 60% recommended by scholars (Mweshi and Sakyi, 2020) to reduce the risk of non-response bias. To ensure the reliability of the findings, variables were operationalised using validated scales adapted from existing literature, tailored to the South African SME context. Each construct includes Advanced Inventory Management (AIM), Inventory Management Strategies (IMS), E-Procurement (EP), E-Commerce (EC), Customer Expectations (CE), and Business Performance (BP). The research utilised a structured questionnaire where participants were requested to mark the appropriate number opposite each evaluation statement based on a 5-point Likert scale: 5 = Strongly Agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly Disagree. Respondents were allowed to mark N/A (Not Applicable) for irrelevant statements. After completing the task, the arithmetic average of all rankings was calculated to determine the mean scores for each construct.

Reliability and Validity Analysis

To ensure the quality of our measurement scales, reliability and validity were evaluated. The data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM). The convergent validity was assessed through the Average Variance Extracted (AVE). As shown in Table 1, all AVE values were significantly above the recommended criterion of 0.50, providing strong evidence that the items effectively measure their respective constructs. Discriminant validity was confirmed using the Fornell-Larcker criterion, which involved comparing the square root of the AVE for each construct with its correlation coefficients against all other constructs (see Table 2). In all instances, the square root of the AVE for a construct exceeded its highest correlation with any other construct, confirming the distinctiveness of each variable. Internal consistency reliability was evaluated using Cronbach's alpha and Composite Reliability (CR). To provide a more precise and statistically sound measurement of a construct's

reliability, Composite Reliability (CR) utilises factor loadings from Confirmatory Factor Analysis (CFA) as a more robust alternative (Rosli, Saleh, Alshammari, Ibrahim, Atan & Atan, 2021). All obtained Cronbach's alpha values surpassed 0.80, and all CR values were above 0.84, both exceeding the recommended threshold of 0.70. This indicates high internal consistency and reliability for all constructs. Additionally, all item factor loadings were significantly greater than the acceptable cutoff of 0.5, with the majority exceeding 0.70, further reinforcing the quality of the measurement.

Table 1: Constructs and measurement items.

Construct	Item code	Mean	SD	Item-item Correlation	Cronbach's alpha	CR	AVE	Item loading
Advanced Inventory Management	AIM1- AIM5	3.986	0.4141	0.817	0.928	0.933	0.778	0.881
Inventory Management Strategies	IMS1- IMS5	3.967	0.626	0.852	0.931	0.949	0.786	0.885
E-Procurement	EP1- EP5	4.008	0.407	0.786	0.834	0.848	0.602	0.776
E-Commerce	EC2- EC5	3.764	0.603	0.850	0.819	0.843	0.574	0.758
Customer Expectation	CE1- CE5	4.182	0.438	0.842	0.864	0.893	0.645	0.803
Business Performance	BP1- BP5	3.946	0.402	0.809	0.884	0.893	0.677	0.745

Source: Author's compilation.

The results of the measurement model, shown in Table 1, indicate strong reliability and convergent validity for all constructs. Internal consistency was confirmed, as all constructs demonstrated high reliability. Both Cronbach's Alpha and Composite Reliability (CR) values were significantly above the recommended threshold of 0.70, suggesting strong internal consistency among the items that measure each construct. Additionally, convergent validity was established since all Average Variance Extracted (AVE) values exceeded the criterion of 0.50. This finding indicates that the items effectively capture the variance of their respective latent constructs. Furthermore, the loadings for all items were above the acceptable cutoff of 0.50, with most exceeding 0.70, confirming that each item makes a significant contribution to its designated construct.

Overall, these results provide compelling evidence for the reliability and validity of the measurement scales utilised in this study.

Table 2: Correlation and discriminant validity.

	AIM (0.882)	IMS (0.886)	EP (0.776)	EC (0.758)	CE (0.803)	BP (0.745)
AIM	1.000					
IMS	0.442	1.000				
EP	0.808	0.491	1.000			
EC	0.611	0.608	0.672	1.000		
CE	0.498	0.337	0.634	0.593	1.000	
BP	0.191	0.144	0.277	0.421	0.443	1.000

Source: Author's compilation. Note: Diagonal values in bold represent the square root of the AVE.

Hypothesis Testing and Results

Table 3: Presents the results of the PLS-SEM hypothesis testing analysis, examining the direct relationships outlined in the conceptual model.

Path	Direct effect	T statistics	P values	Hypothesis test result
H1: AIM→ EC	0.185	2.727	0.007**	Supported
H2: IMS→ EC	0.156	2.748	0.006**	Supported
H3: EP→ EC	0.272	5.003	0.000***	Supported
H4: CE→ EC	0.433	8.961	0.000***	Supported
H5: EC→ BP	0.415	7.929	0.000***	Supported

Source: Author's compilation. Note: ** $p < 0.01$; *** $p < 0.001$.

Table 3 displays the results of the Partial Least Squares (PLS) hypotheses testing analysis, which investigates the direct relationships proposed in the conceptual model. The findings provide strong support for all five hypotheses. The significance of each path was assessed using the t-statistic and p-value, with a p-value less than 0.05 indicating evidence against the null hypothesis and suggesting a statistically significant direct effect. H_1 (AIM → EC): The results reveal a positive and significant relationship between inventory management and e-commerce ($\beta = 0.185$, $t = 2.727$, $p < 0.05$). This supports the hypothesis that effective inventory management systems drive e-commerce adoption. H_2 (IMS → EC): A positive and significant relationship was also found between inventory management strategies and e-commerce ($\beta = 0.156$, $t = 2.748$, $p < 0.05$). The results provide strong empirical support for both H_1 and H_2 . The high mean score for Advanced Inventory Management (3.986) suggests that SMEs in Sedibeng are increasingly transitioning from manual tracking to automated systems like RFID and IoT. This indicates that implementing strategic inventory approaches is a significant factor in e-commerce adoption.

H_3 (EP → EC): E-procurement was found to have a strong positive and significant influence on e-commerce ($\beta = 0.272$, $t = 5.003$, $p < 0.05$). This provides strong evidence that digitalising procurement processes is a key driver of e-commerce effectiveness. H_4 (CE → EC): The strongest relationship observed in the model was between customer expectations and e-commerce ($\beta = 0.433$, $t = 8.961$, $p < 0.05$). This suggests that meeting high customer expectations for online services is a primary factor in the success of a business's e-commerce efforts. H_5 (EC → BP): Finally, a strong positive and significant relationship was found between e-commerce and the business performance of SMEs ($\beta = 0.415$, $t = 7.929$, $p < 0.05$). With the highest mean score in the study (4.120), Customer Expectations emerged as the primary external driver for digital transformation. This supports the hypothesis that successful e-commerce adoption significantly contributes to improved business performance.

This research investigated the nexus between e-commerce adoption and advanced inventory management in the South African SME sector, with a focus on the Sedibeng District. By employing a robust PLS-SEM analysis, the study empirically validated that the transition to digital marketplaces necessitates a fundamental shift from static, legacy inventory systems to agile, data-driven strategies. The findings confirm that advanced technologies (H_1), modern strategies like JIT (H_2), and integrated e-procurement (H_3) are not merely optional enhancements but critical determinants of e-commerce success and overall business performance (H_5).

In summary, the findings indicate that the adoption of e-commerce among SMEs is significantly driven by a combination of effective inventory management systems, strategic inventory approaches, e-procurement implementation, and the need to meet heightened customer expectations. Furthermore, the results confirm that this successful integration of e-commerce positively contributes to the overall business performance of SMEs in South Africa.

ETHICAL CONSIDERATIONS

Participation in this study was completely voluntary. Respondents were informed that they could withdraw from the study at any time without facing any negative consequences. To maintain anonymity and confidentiality, all personally identifiable information was excluded from the questionnaires. Additionally, no monetary or other incentives were provided for participation.

CONCLUSION

Practical and Managerial Implications

For small and medium-sized enterprise (SME) owners and managers, this study delivers an important roadmap for thriving in the digital age. The findings emphasize that e-commerce adoption must be comprehensive; simply setting up an online store without effectively linking physical inventory through IoT or cloud-based systems can lead to stockouts and erode consumer trust. Managers must prioritise establishing robust e-procurement networks to ensure that inbound supplies align with the real-time demands of online shoppers. Moreover, this study serves as an urgent call to action for South African policymakers to enhance technological readiness. By implementing targeted digital literacy initiatives and providing infrastructure subsidies in regions like Sedibeng, we can empower businesses to succeed in a competitive digital landscape.

Limitations and Recommendations

The findings of this study may be specific to the Sedibeng region in Gauteng Province, which could limit their applicability to other areas with different economic conditions, infrastructure, and profiles of small and medium enterprises (SMEs). The use of a non-probability sampling method may also raise concerns about the representativeness of the sample. Furthermore, while the study focuses on advanced inventory management, it may not encompass the full range of operational changes that SMEs experience with e-commerce adoption. To gain a more comprehensive understanding, future research should consider replicating this study in various regions of South Africa. The author recommends conducting future research that examines the specific e-commerce platforms and inventory management technologies used by SMEs in different provinces, aiming to provide a more holistic view of their impact on inventory efficiency and overall business performance. Additionally, comparative studies between urban and rural SMEs can provide deeper insights into how the digital divide affects inventory synchronisation across the broader South African economy.

AI Declaration: AI was used to improve the readability, language, grammar, and spelling of the manuscript as part of the writing process and to analyse and draw insights from data.

REFERENCES

- Akinlabi, B.H. (2021). Effect of inventory management practices on operational performance of flour milling companies in Nigeria. *International Academy Journal of Management, Marketing and Entrepreneurial Studies*, 8(2), pp.137-174.
- Al-Debei, M. M., Dwivedi, Y. K., & Williams, M. D. (2023). Unravelling the nexus between e-commerce and business performance: A systematic review and research agenda. *International Journal of Information Management*, 72, 102677.
- Atnafu, D. & Balda, J. (2018). The impact of inventory management practice on firms' competitive advantage and organizational performance. *Journal of Business and Retail Management Research*, 12(2), 1-15.
- Atzori, L., Iera, A., & Morabito, G. (2010). The internet of things: A survey. *Computer Networks*, 54(15), 2787-2805.
- Agrawal, A., Gans, J. S., & Goldfarb, A. (2021). *Prediction machines: The simple economics of artificial intelligence*. Harvard Business Review Press.
- Bartak, K., Božić, D., Šafran, M. and Pivar, I., 2025. The impact of e-commerce development on inventory management. *Transportation Research Procedia*, 91, pp.385-392.
- Bauer, S., Churchill, B., Mahendran, L., Walwyn, B., Lizotte, C., & Villa-Rueda, B. (2021). What are acceptable response rates in survey research? A review of the literature. *Survey Practice*, 14(1), 1-13.
- Becerra, L., R., V., G., & P. (2024). Inventory management in the context of circular economy: A review and research agenda. *Journal of Business Research*, 173, 114421.

- Brown, J. R., & Paulin, A. D. (2020). The digital customer journey: A framework for analyzing and improving customer experience. *Journal of Business Research*, 120, 115-126.
- Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. W. W. Norton & Company.
- Brynjolfsson, E., Jin, Y., & O'Hanlon, C. (2023). *The digital transformation of small and medium-sized enterprises*. MIT Press.
- Chaffey, D., & Ellis-Chadwick, F. (2019). *Digital marketing: Strategy, implementation and practice*. Pearson UK.
- Chopra, S., & Sodhi, M. S. (2020). Managing risk to avoid supply-chain breakdowns. *Sloan Management Review*, 61(4), 51-57.
- Christopher, M., & Byrnes, J. (2020). *Logistics & supply chain management*. Pearson UK.
- Costa, J. and Castro, R., 2021. SMEs must go online—E-commerce as an escape hatch for resilience and survivability. *Journal of Theoretical and Applied Electronic Commerce Research*, 16(7), pp.3043-3062.
- De Vries, S. (2021). The effects of e-commerce on firm performance: A meta-analysis. *Journal of Retailing and Consumer Services*, 60, 102509.
- Donner, J., & Tellez, C. A. (2008). Mobile banking and economic development: A review of the evidence. *Journal of E-commerce and Mobile Commerce*, 12(1), 159-170.
- Dwivedi, Y. K., Hughes, L., Pal, R., et al. (2021). The COVID-19 pandemic: A catalyst for digital transformation. *International Journal of Information Management*, 60, 102144.
- Fakhrhosseini, S. M., & Rudsari, F. M. (2024). A systematic literature review on inventory management and its impact on business performance. *Journal of Business and Economics*, 15(1), 100-115.
- Felix, R., & Rembulan, V. R. (2023). The role of digital marketing strategies in building customer loyalty in e-commerce. *Journal of Marketing and Social Science*, 3(2), 23-35.
- Flores, B. E., & Whybark, D. C. (1986). Multiple criteria ABC analysis. *International Journal of Production Research*, 24(6), 1357-1365.
- Forbes, S. A., Jackson, E., & Poth, M. (2021). *Statistics for business and economics*. Cengage Learning.
- Gajewska, K., Zaremba, M., & Gajewski, D. (2020). Logistics services quality and customer satisfaction in e-commerce. *Sustainability*, 12(11), 4611.
- Gajewska, T., Zimon, D., Kaczor, G. and Madzík, P., 2020. The impact of the level of customer satisfaction on the quality of e-commerce services. *International Journal of Productivity and Performance Management*, 69(4), pp.666-684.
- Grant, O., 2024. Understanding the Role of Supplier Relationship Management in E-Commerce Inventory Optimization.
- Gomes, A.C., de Lima Junior, F.B., Soliani, R.D., de Souza Oliveira, P.R., de Oliveira, D.A., Siqueira, R.M., da Silva Nora, L.A.R. and de Macêdo, J.J.S., 2023. Logistics management in e-commerce: challenges and opportunities. *Revista de Gestão e Secretariado*, 14(5), pp.7252-7272.
- Govindan, K., & Hasanagic, M. (2018). A systematic review on inventory management in closed-loop supply chains. *Journal of Cleaner Production*, 181, 615-631.
- Groenewald, E. and Kilag, O.K., 2024. E-commerce inventory auditing: Best practices, challenges, and the role of technology. *International Multidisciplinary Journal of Research for Innovation, Sustainability, and Excellence (IMJRIS)*, 1(2), pp.36-42

- Grosse, E. H., Glock, C. H., & Jaber, M. Y. (2017). An integrated model for warehouse assignment and picking routing. *Computers & Industrial Engineering*, 103, 168-177.
- Harris, F. W. (1913). How many parts to make at once. *Factory, The Magazine of Management*, 10(2), 135-136.
- Haryanti, S., & Subriadi, A. P. (2020). The impact of e-commerce on business performance: A systematic review. *Journal of Information Systems Engineering and Business Intelligence*, 6(2), 118-128.
- Hussain, A., Akbar, M., Shahzad, A., Poulouva, P., Akbar, A. and Hassan, R., 2022. E-commerce and SME performance: The moderating influence of entrepreneurial competencies. *Administrative Sciences*, 12(1), p.13.
- Ishfaq, R., & Raja, K. (2021). Inventory management challenges in omnichannel retail: A systematic review. *Journal of Supply Chain Management*, 57(3), 101-115.
- Ivanov, D. (2020). Predicting the impacts of the COVID-19 pandemic on the global supply chain: A simulation-based analysis of the bullwhip effect. *Journal of Business Logistics*, 41(3), 263-272.
- Jain, S., Malviya, R., & Arya, S. (2021). A review on e-commerce business models. *International Journal of Engineering and Technology*, 13(2), 123-134.
- Kaplan, A. M., & Haenlein, M. (2019). Siri, Siri, in my hand: Who is the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence. *Business Horizons*, 62(1), 15-25.
- Kaul, D. and Khurana, R., 2022. Ai-driven optimization models for e-commerce supply chain operations: Demand prediction, inventory management, and delivery time reduction with cost efficiency considerations. *International Journal of Social Analytics*, 7(12), pp.59-77.
- Kingshott, R. P., & Pecotich, A. (2022). The challenges and opportunities of e-commerce for SMEs. *Journal of Small Business Management*, 60(2), 223-247.
- Kot, A. & Grondys, K. (2011). The role of demand forecasting in effective inventory management. *Journal of Modern Science*, 1(1), 19-32.
- Kotler, P., Kartajaya, H., & Setiawan, I. (2021). *Marketing 5.0: Technology for humanity*. John Wiley & Sons.
- Laudon, K. C., & Traver, C. G. (2021). *E-commerce 2021: Business, technology, society*. Pearson.
- Lee, H. L., & Whang, S. (2000). E-business and supply chain integration. *Stanford University Research Paper*.
- Makudza, F., Jaravaza, T. M., Govha, P., Mukucha, P., & Saruchera, L. (2023). E-procurement adoption and supply chain performance in SMEs. *Journal of Logistics Management*, 12(1), 1-15.
- Mashayekhy, N., Mahdavi, I., & Razmi, J. (2022). A review of inventory management in a dynamic environment. *Journal of Industrial and Systems Engineering*, 15(2), 131-151.
- Mweshi, G.K. and Sakyi, K., 2020. Application of sampling methods for the research design. *Archives of Business Review–Vol*, 8(11), pp.180-193.
- Octavia, A., Indrawijaya, S., Sriayudha, Y. and Hasbullah, H., 2020. Impact on E-commerce adoption on entrepreneurial orientation and market orientation in business performance of SMEs. *Asian Economic and Financial Review*, 10(5), p.516.
- Oliveira, T., Thomas, M., & Pires, E. (2023). Trust and privacy concerns in e-commerce: A systematic review. *Journal of E-commerce Research*, 10(1), 1-15.
- Orobia, L.A., Nakibuuka, J., Bananuka, J. and Akisimire, R., 2020. Inventory management, managerial competence and financial performance of small businesses. *Journal of Accounting in Emerging Economies*, 10(3), pp.379-398.
- Oshoma, E. B., Raji, R. A., & Yusuf, Y. B. (2024). E-procurement adoption and its impact on cost reduction in small and medium enterprises. *International Journal of Research in Business and Social Science*, 13(1), 14-23.

- Pallathadka, H., Ramirez-Asis, E.H., Loli-Poma, T.P., Kaliyaperumal, K., Ventayen, R.J.M. and Naved, M., 2023. Applications of artificial intelligence in business management, e-commerce and finance. *Materials Today: Proceedings*, 80, pp.2610-2613.
- Pantano, E., Pizzi, G., & Scarpi, D. (2020). Is sustainability an emerging marketing trend in retailing? Evidence from a systematic review. *Journal of Business Research*, 117, 308-316.
- Patil, H. and Divekar, B.R., 2014. Inventory management challenges for B2C e-commerce retailers. *Procedia Economics and Finance*, 11, pp.561-571.
- Pavlou, P. A. (2003). Consumer acceptance of electronic commerce: Integrating trust and risk with the technology acceptance model. *International Journal of Electronic Commerce*, 7(3), 101-134
- Perez, M. A. (2022). E-procurement adoption by SMEs and its impact on supply chain. *Journal of Business & Retail Management Research*, 16(2), 1-12.
- Pratap, K. M., Al-Saifi, A., & Khan, Z. R. (2023). The role of e-commerce on global tourism and travel: A systematic review. *Journal of Digital Tourism*, 3(1), 22-38.
- Price, P. C., Jhangiani, R. S., & Chiang, I. A. (2015). *Research methods in psychology*. BCcampus
- Raji, Olawore, and Osahor, 2023. The impact of E-commerce giants on SMEs: Challenges, opportunities, and the fight for survival in the digital economy. *World Journal of Advanced Research and Review*, 20(2), pp.1412-1433.
- Raji, R. A., Olatunji, S. A., & Adebisi, S. O. (2023). The effect of e-commerce on business performance of small and medium enterprises in Nigeria. *Journal of Small Business and Entrepreneurship Development*, 11(1), 145-160.
- Rane, N., Choudhary, S.P. and Rane, J., 2024. Acceptance of artificial intelligence technologies in business management, finance, and e-commerce: factors, challenges, and strategies. *Studies in Economics and Business Relations*, 5(2), pp.23-44.
- Rani, K., Kaur, R., & Singh, S. (2024). The role of artificial intelligence in inventory management: A systematic review. *Journal of Business & Industrial Marketing*, 39(1), 1-15.
- Ridwan, A., Muzakir, U. and Nurhidayati, S., 2024. Optimizing e-commerce inventory to prevent stock outs using the random forest algorithm approach. *International Journal Software Engineering and Computer Science (IJSECS)*, 4(1), pp.107-120.
- Rosli, M.S., Saleh, N.S., Alshammari, S.H., Ibrahim, M.M., Atan, A.S. and Atan, N.A., 2021. Improving Questionnaire Reliability using Construct Reliability for Researches in Educational Technology. *Int. J. Interact. Mob. Technol.*, 15(4), pp.109-116.
- Šaković Jovanović, J., Vujadinović, R., Mitreva, E., Fragassa, C. and Vujović, A., 2020. The relationship between E-commerce and firm performance: The mediating role of internet sales channels. *Sustainability*, 12(17), p.6993.
- Saleeshya, S., & Rahul, R. (2023). Impact of e-commerce on inventory management and operational efficiency of SMEs. *Journal of Operations Management*, 41(4), 567-582.
- Sánchez-Rodríguez, C., González-Benito, Ó., & Sanchis, R. (2020). E-procurement and its relationship with purchasing performance. *Industrial Management & Data Systems*, 120(1), 1-19.
- Setiadi, H., Arief, M., Hamsal, M. and Abdinagoro, S.B., 2024. An Integrated Model of Digital Adoption, Strategic Sourcing, Inventory Management and Procurement Excellence Driving Firm Performance. *Journal of System and Management Sciences*, 14(9), pp.453-471.
- Smith, J. (2020). *Inventory management for small business*. Entrepreneur Press.
- Sombultawee, C. (2020). E-commerce adoption and its effect on SMEs' business performance. *Journal of Business & Management*, 14(2), 1-12.

- Stokes, D. (2020). *E-commerce and social commerce: A guide for small businesses*. SAGE Publications.
- Syntetos, A. A., Babai, M. Z., & Zied, B. M. (2022). A review of machine learning applications in demand forecasting for inventory management. *European Journal of Operational Research*, 300(1), 1-17.
- Stevenson, W. J. (2021). *Operations management*. McGraw-Hill Education.
- Turban, E., King, D., Lee, J. K., Liang, T. P., & Turban, D. (2018). *Electronic commerce 2018: A managerial and social networks perspective*. Springer.
- Yusof, Z.B., 2024. Analyzing the role of predictive analytics and machine learning techniques in optimizing inventory management and demand forecasting for e-commerce. *International Journal of Applied Machine Learning*, 4(11), pp.16-31.
- Vencentius, J. & Semente, M. (2025). Barriers to e-procurement adoption among SMMEs in Namibia. *Journal of Small Business and Enterprise Development*, 32(1), 1-15.
- Verhagen, T., & Van Dolen, W. (2011). The influence of online store reviews on consumer purchase decisions. *Journal of Interactive Marketing*, 25(3), 162-171.
- Vollmann, T. E., Berry, W. L., Whybark, D. C., & Jacobs, F. R. (2018). *Manufacturing planning and control for supply chain management*. McGraw-Hill Education.
- Waller, M. A., Johnson, M. E., & Davis, T. R. J. (1999). Vendor-managed inventory in the supply chain. *Journal of Business Logistics*, 20(1), 1-19.
- Womack, J. P., & Jones, D. T. (1990). *The machine that changed the world*. Rawson Associates.
- Zennaro, I., Finco, S., Calzavara, M. and Persona, A., 2022. Implementing E-commerce from a logistic perspective: Literature review and methodological framework. *Sustainability*, 14(2), p. 911.

THRIVING BEYOND AUTOMATION: HOW MANUFACTURING SMEs IN eTHEKWINI CAN HARNESS EMERGING TECHNOLOGIES TO FUTURE-PROOF THEIR BUSINESSES

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ABSTRACT

This study investigates how manufacturing SMEs in the eThekweni District Municipality can harness emerging technologies to future-proof their businesses and enhance competitiveness in the era of automation. A quantitative research design was employed, using structured questionnaires administered to 300 manufacturing SME owners and managers across diverse sectors in eThekweni. Data were analysed using SPSS v27.0 and AMOS v26.0 through descriptive statistics, frequency distribution, barrier ranking, cross-tabulation, multiple regression, and structural equation modelling (SEM). Only 20.3% of SMEs have achieved advanced technology adoption while 18.0% use no digital tools. Equipment cost ($M = 4.61$) and finance access ($M = 4.54$) were the most severe barriers. Organisational readiness ($\beta = 0.52$) emerged as the strongest driver of business competitiveness, with innovation capability ($\beta = 0.38$) and automation awareness ($\beta = 0.45$) as significant contributors. The SEM demonstrated excellent fit ($\chi^2/df = 2.16$, CFI = 0.93, RMSEA = 0.062). Targeted capacity-building programmes and digital training initiatives are recommended to strengthen SMEs' technological readiness. Policymakers should prioritise financial support mechanisms, electricity infrastructure investment, and ecosystem development to accelerate technology adoption. This study provides novel empirical evidence from a developing economy context, grounded in Dynamic Capabilities Theory and the Resource-Based View, demonstrating how automation awareness, organisational readiness, and innovation capability interact to drive manufacturing SME competitiveness and long-term sustainability.

Keywords: emerging technologies, manufacturing SMEs, digital transformation, innovation capability, business competitiveness, automation, eThekweni.

INTRODUCTION

The global manufacturing landscape is undergoing unprecedented transformation driven by automation and digital technologies. In South Africa, SMEs account for approximately 91% of formally registered businesses, employ roughly 60% of the workforce, and contribute 34% to GDP (KZN Top Business Portfolio, 2020). Within KwaZulu-Natal, the manufacturing sector accounts for 22% of provincial GDP and employs 20% of the provincial workforce. The eThekweni District Municipality hosts a diverse manufacturing ecosystem spanning food processing, clothing and textiles, furniture, steel fabrication, jewellery, beverages, and sanitary products. Yet manufacturing SMEs in this region face compounding structural challenges: limited finance, inadequate digital infrastructure, workforce skills shortages, load-shedding-induced disruptions, and the disruptive pressures of Industry 4.0. Technologies such as AI, IoT, automation systems, cloud computing, robotics, and additive manufacturing present both transformative opportunities and formidable implementation challenges (Bahrin et al., 2016; Li et al., 2017; Vaidya et al., 2018).

While globally, firms harnessing automation have achieved superior efficiency, quality, and competitive advantage (Frank et al., 2019), eThekweni manufacturing SMEs remain at a nascent stage of digital adoption (Henning, 2019; Maisiri & van Dyk, 2021). The critical challenge is not merely awareness of these technologies, but developing the organisational readiness, dynamic capabilities, and innovation capacity to future-proof operations. This study investigates how manufacturing SMEs in eThekweni can harness emerging technologies to enhance competitiveness by: assessing the current state of technology adoption and automation readiness; identifying key barriers and enablers;

evaluating innovation capability as a mediating mechanism between technology adoption and business competitiveness; and proposing targeted, evidence-based recommendations.

LITERATURE REVIEW

Manufacturing SMEs in South Africa's Automation Era

SMEs are universally recognised as key drivers of economic growth, employment, and innovation. In South Africa, they are defined as enterprises with 50–200 employees, annual turnover of R10–R40 million, and gross assets of R3.75–R15 million excluding property (Fletcher & Sunjka, 2018). Manufacturing production declined 10.8% in 2020, and fiscal and monetary stabilisation policies proved insufficient to reverse the sector's structural decline (Statistics South Africa, 2020; Hunter et al., 2025). Unlike large enterprises with resources for comprehensive digital transformation, SMEs must navigate automation adoption within severe resource constraints, and financial barriers, skills shortages, and infrastructure deficits consistently emerge as primary obstacles in developing economies (Moeuf et al., 2018; Ombongi & Long, 2018).

Emerging Technologies and Industry 4.0

The Fourth Industrial Revolution is characterised by the convergence of digital, physical, and biological systems. AI, IoT, robotic automation, cloud computing, big data analytics, and additive manufacturing enable self-optimising production systems of unprecedented efficiency (Vaidya et al., 2018; Liao et al., 2017). For SMEs, automation offers reduced manual processes, improved quality, and greater flexibility without proportionally increasing headcount (Frank et al., 2019). While automation may displace routine tasks, it creates higher-value work and enables scaling previously constrained by workforce limitations (World Economic Forum, 2016). However, implementation requires substantial investment in equipment, skills, and organisational change management.

Innovation Capability as a Mediating Force

Innovation capability – the capacity to continuously develop new products, processes, and business models – is the organisational mechanism through which technology adoption translates into sustained competitive advantage (Cohen & Levinthal, 1990). Innovation-capable SMEs identify impactful automation applications, integrate new technologies with existing processes, and continuously improve technology-enabled operations (Audretsch et al., 2019). For eThekwin manufacturing SMEs, innovation capability is the bridge between automation awareness and realised competitive advantage, amplifying competitive gains through specialised niches, superior quality, and faster development cycles (Spigel, 2017; Stam, 2015).

Theoretical Framework

This study is grounded in Dynamic Capabilities Theory (DCT) and the Resource-Based View (RBV). DCT (Teece, Pisano & Shuen, 1997; Teece, 2007) posits that competitive advantage in rapidly changing environments derives from a firm's ability to sense emerging opportunities, seize them through strategic investment and reconfiguration, and continuously transform its resource base. Applied to eThekwin SMEs, DCT's three micro foundations sensing, seizing, and transforming – map directly onto automation awareness, technology adoption, and organisational readiness respectively. RBV (Penrose, 1959; Barney, 1991) complements DCT by explaining how firm-level resources generate sustained competitive advantage. Barney's (1991) VRIN framework stipulates that resources generating sustainable advantage must be valuable, rare, inimitable, and non-substitutable. For eThekwin SMEs, organisational readiness, innovation capability, and knowledge assets satisfy the VRIN criteria: they are firm-specific, path-dependent, and causally ambiguous in ways that generic automation technologies are not (Wernerfelt, 1984; Barney, 2001). Together, DCT explains the process of capability development in dynamic environments while RBV explains why firm-specific resource configurations produce differential competitive outcomes.

RESEARCH METHODOLOGY

This study employed a quantitative descriptive cross-sectional research design grounded in the post-positivist paradigm (Mohajan, 2020; Rahman, 2016). The target population comprised manufacturing SMEs registered in eThekweni District Municipality. Using Krejcie and Morgan's (1970) formula at a 95% confidence level with a $\pm 5\%$ margin of error, a stratified random sample of 300 participants was drawn across sub-sectors including food processing, clothing and textiles, furniture, steel fabrication, jewellery, beverages, and sanitary products. Data were collected via a structured, self-administered Likert-scale questionnaire adapted from validated scales in the technology adoption and innovation management literature, pre-tested with a 30-SME pilot. Five analytical techniques were applied using SPSS v27.0 and AMOS v26.0: frequency distribution analysis, barrier severity ranking, cross-tabulation, multiple regression analysis, and structural equation modelling (SEM). Model fit was assessed using χ^2/df , CFI, TLI, RMSEA, SRMR, and GFI. Reliability was confirmed via Cronbach's alpha ($\alpha \geq 0.70$ threshold) and discriminant validity via confirmatory factor analysis.

RESULTS AND DISCUSSION

Demographic Profile and Measurement Reliability

Of the 300 respondents, 62.3% were male and 66.0% identified as African/Black. The majority (62.3%) were aged 30–49 years. Most SMEs had operated for 3–10 years (61.0%) and employed 6–20 workers (47.3%). Formal CIPC registration was reported by 66.0% of respondents, while 12.7% operated informally. Food processing (26.0%) and steel fabrication (20.3%) were the dominant sub-sectors. Table 1 presents the measurement reliability and descriptive statistics for all study constructs.

Table 1: Descriptive Statistics and Internal Consistency for Study Constructs (N=300).

Construct	M	SD	Cronbach's α	Items
Automation Awareness (AA)	3.91	0.54	0.79	6
Financial Constraints (FC)	4.38	0.49	0.83	10
Organisational Readiness (OR)	3.72	0.58	0.81	11
Gov. & Ecosystem Support (GES)	2.28	0.70	0.80	8
Innovation Capability (IC)	3.64	0.62	0.86	12
Technology Adoption (TA)	2.87	0.67	0.88	14
Business Competitiveness (BC)	2.93	0.65	0.84	15

Note. Overall questionnaire $\alpha = 0.90$ (76 items). All constructs exceed $\alpha \geq 0.70$ threshold. M = Mean; SD = Standard Deviation.

All Cronbach's alpha values ranged from 0.79 to 0.88, confirming excellent measurement reliability. A critical pattern emerges, financial constraints were rated highest ($M = 4.38$), while government and ecosystem support was lowest ($M = 2.28$), confirming a structural support deficit. Both technology adoption ($M = 2.87$) and business competitiveness ($M = 2.93$) scored well below the midpoint, revealing that moderate awareness and readiness have not translated into adoption or competitive outcomes – a gap consistent with the broader SME digitalisation literature (Maisiri & van Dyk, 2021; Henning, 2019). Notably, the standard deviations for government and ecosystem support ($SD = 0.70$) and financial constraints ($SD = 0.49$) indicate relatively low dispersion, suggesting that SMEs across all sub-sectors and size categories consistently perceive these structural barriers and support deficits rather than as idiosyncratic firm-level experiences.

Correlation Analysis

Table 2 presents the Pearson correlation matrix examining bivariate associations among all seven study constructs. Correlation analysis was conducted to assess the direction, magnitude, and statistical significance of relationships between constructs prior to regression and SEM analyses, providing an initial test of the theoretical propositions embedded in the DCT–RBV framework.

Table 2: Pearson Correlation Matrix (N=300).

Variable	1	2	3	4	5	6	7
1. AA	1						
2. FC	-.31	1					
3. OR	.64	.26	1				
4. GES	.33	-.42	-.24	1			
5. IC	.71	-.33	.75	.48	1		
6. TA	.68	-.49	.72	.36	.81	1	
7. BC	.61	-.44	.69	.58	.83	.77	1

Note. $p < .01$ (2-tailed). AA = Automation Awareness; FC = Financial Constraints; OR = Organisational Readiness; GES = Government & Ecosystem Support; IC = Innovation Capability; TA = Technology Adoption; BC = Business Competitiveness.

The correlation matrix reveals a consistent and theoretically coherent pattern of associations. Innovation capability demonstrated the strongest positive correlations with both technology adoption ($r = 0.81$, $p < .01$) and business competitiveness ($r = 0.83$, $p < .01$), confirming its pivotal role as the organisational bridge between adoption and competitive performance. Organisational readiness was also strongly correlated with technology adoption ($r = 0.72$) and business competitiveness ($r = 0.69$), validating RBV's premise that firm-level resource configurations drive performance outcomes (Barney, 1991). Automation awareness showed significant positive associations with technology adoption ($r = 0.68$) and competitiveness ($r = 0.61$), confirming DCT's sensing microfoundation. Financial constraints were significantly negatively correlated with both adoption ($r = -0.49$) and competitiveness ($r = -0.44$), confirming the resource constraint paradox. Government and ecosystem support showed meaningful positive associations with competitiveness ($r = 0.58$) and innovation capability ($r = 0.48$), indicating that ecosystem-level factors modulate the adoption–performance relationship. The strong correlation between innovation capability and technology adoption ($r = 0.81$) and between technology adoption and business competitiveness ($r = 0.77$) suggests sequential mediation pathways that are formally tested in the SEM analysis. All statistically significant correlations were in the theoretically predicted direction, providing strong preliminary evidence for the integrated DCT–RBV structural model prior to formal multivariate testing.

Analysis 1: Frequency Distribution of Technology Adoption Levels

Table 2 maps current technology adoption levels across manufacturing sub-sectors, revealing which sectors lead or lag on the digital transformation continuum.

Table 2: Frequency Distribution of Technology Adoption Levels by Manufacturing Sector (N=300).

Manufacturing Sector	No Digital Tools %	Basic Digital %	Intermediate %	Advanced AI/IoT %	n
Food processing	22.1	35.9	29.5	12.8	78
Clothing & textiles	24.1	38.9	25.9	11.1	54
Furniture & wood products	26.2	35.7	28.6	9.5	42
Steel fabrication & metalwork	11.5	26.2	31.1	31.1	61
Jewellery, beverages & other	14.1	29.3	32.3	24.2	65
Total sample	18.0	32.7	29.0	20.3	300

Only 20.3% of SMEs have achieved advanced AI/IoT adoption while 18.0% operate without any digital tools. Steel fabrication led in advanced adoption (31.1%), reflecting the precision-driven competitive pressures of metalworking that create stronger automation incentives. Clothing and textiles showed the lowest advanced adoption (11.1%), consistent with their labour-intensive, thin-margin production models. Food processing SMEs demonstrated only 12.8% advanced adoption despite representing the largest sub-sector a concern given intense competition from large-scale automated food manufacturers. These distributional patterns confirm DCT's sensing micro foundation: sectors experiencing stronger competitive pressure from automated rivals demonstrate higher rates of technology sensing and adoption (Teece et al., 1997).

Analysis 2: Technology Adoption Barrier Ranking

Table 3 presents a weighted mean barrier severity ranking across 12 identified adoption constraints, rated by respondents on a 5-point Likert scale (1 = Not a barrier; 5 = Severe barrier).

Table 3: Technology Adoption Barrier Ranking by Weighted Mean Score (N=300).

Rank	Barrier Category	Weighted Mean	SD	% Severe
1	High cost of automation equipment and software	4.61	0.42	68.3%
2	Limited access to finance and credit	4.54	0.47	64.7%
3	Inadequate digital skills in the workforce	4.38	0.51	57.3%
4	Unreliable electricity supply (load-shedding)	4.31	0.56	54.0%
5	Lack of technical support and after-sales service	4.19	0.58	49.3%
6	Insufficient government incentives or grants	4.12	0.63	46.7%
7	Limited awareness of available technologies	3.91	0.54	38.3%
8	Resistance to change among employees	3.74	0.67	31.0%
9	Cybersecurity concerns	3.62	0.71	28.7%

Rank	Barrier Category	Weighted Mean	SD	% Severe
10	Regulatory and compliance complexity	3.48	0.74	24.3%
11	Limited market demand for automated products	3.21	0.81	19.3%
12	Language barriers with technology suppliers	2.94	0.88	14.0%

Note. Weighted mean on 5-point Likert scale (1 = Not a barrier; 5 = Severe barrier). SD = Standard Deviation.

Financial barriers dominated the constraint hierarchy: equipment cost (M = 4.61, 68.3% severe) and finance access (M = 4.54, 64.7% severe) were the two most critical obstacles, confirming that capital is the primary adoption bottleneck. Inadequate digital skills ranked third (M = 4.38), confirming that human capital deficits compound financial barriers. South Africa’s unique load-shedding context was starkly visible at rank four (M = 4.31), reflecting how electricity unreliability fundamentally undermines the business case for automation-dependent production systems. Insufficient government support ranked sixth (M = 4.12), while limited awareness ranked seventh (M = 3.91) – confirming the gap is primarily a resource and ecosystem problem rather than an information deficiency. These rankings align directly with RBV’s resource heterogeneity premise: firms with stronger financial and human capital resource bases face lower effective barrier levels, creating systematic performance differentials (Barney, 1991).

Analysis 3: Cross-Tabulation Analysis

Table 4 presents technology adoption level distributions disaggregated by firm size, registration status, and years of operation, revealing structural patterns that explain differential adoption trajectories.

Table 4: Cross-Tabulation of Technology Adoption Level by Firm Characteristics (N=300).

Characteristic	Category	No Digital %	Basic %	Intermediate %	Advanced %
Company Size	Micro (1–5)	34.3	38.8	20.9	6.0
	Small (6–20)	16.9	33.1	30.3	19.7
	Small–medium (21–50)	6.6	27.9	39.3	26.2
	Medium (51–200)	0.0	20.0	33.3	46.7
Registration	Unregistered/informal	50.0	36.8	10.5	2.6
	Municipal registration	17.2	37.5	32.8	12.5
	Formally registered (CIPC)	7.6	30.8	32.8	28.8
Years Operating	< 3 years	35.4	41.7	18.8	4.2
	3–5 years	20.7	37.9	29.9	11.5
	6–10 years	11.5	31.3	33.3	24.0
	> 10 years	5.8	24.6	34.8	34.8

The cross-tabulation reveals dramatic adoption stratification across all three dimensions. By firm size, advanced AI/IoT adoption increases from 6.0% among micro enterprises to 46.7% among medium firms a nearly eightfold differential while 34.3% of micro firms use no digital tools at all. By registration status, formally registered

firms show 28.8% advanced adoption compared to only 2.6% among informal enterprises, and 50.0% of informal SMEs operate entirely without digital tools. Formal registration serves as a proxy for institutional integration: registered firms access government programmes, formal credit, and procurement networks that facilitate technology adoption. By firm age, advanced adoption increases from 4.2% among firms under 3 years to 34.8% for firms over 10 years, reflecting path-dependent dynamic capability accumulation over time (Teece, 2007). These findings provide clear policy targeting guidance: micro, informal, and young firms face the most severe adoption deficits and require the most intensive intervention.

Analysis 4: Multiple Regression Analysis

Table 5 presents the multiple regression results identifying the relative predictive contributions of key constructs to business competitiveness.

Table 5: Multiple Regression Analysis – Predictors of Business Competitiveness (N=300).

Predictor Variable	Std. β	t-value	p-value	Part r^2	Tolerance
Automation Awareness (AA)	0.45	10.98	< .001	.214	0.58
Financial Constraints (FC)	-0.31	-8.16	< .001	.118	0.63
Organisational Readiness (OR)	0.52	12.09	< .001	.261	0.55
Gov. & Ecosystem Support (GES)	0.22	5.18	< .001	.048	0.71
Innovation Capability (IC)	0.38	9.74	< .001	.168	0.49
Technology Adoption (TA)	0.29	6.87	< .001	.084	0.52
$R^2 = 0.76$; Adjusted $R^2 = 0.74$; $F(10, 289) = 91.47$, $p < .001$					

The model was highly significant ($F(10, 289) = 91.47$, $p < .001$) explaining 76% of the variance in business competitiveness (Adjusted $R^2 = 0.74$). Organisational readiness emerged as the strongest unique predictor ($\beta = 0.52$, part $r^2 = 0.261$), uniquely explaining 26.1% of competitive variance – validating RBV’s VRIN framework: organisational readiness encompasses firm-specific, inimitable capabilities that competitors cannot easily replicate (Barney, 1991). Automation awareness ranked second ($\beta = 0.45$, part $r^2 = 0.214$), confirming DCT’s sensing microfoundation that competitive advantage begins with identifying and interpreting technological opportunities (Teece et al., 1997). Innovation capability contributed the third largest unique effect ($\beta = 0.38$, part $r^2 = 0.168$), validating its absorptive capacity role in translating awareness into competitive value (Cohen & Levinthal, 1990). Financial constraints exerted a substantial negative effect ($\beta = -0.31$), while government and ecosystem support ($\beta = 0.22$) and technology adoption level ($\beta = 0.29$) also made significant unique contributions. All tolerance values exceeded 0.40, confirming the absence of problematic multicollinearity.

Structural Model Fit Indices

Table 6 presents the SEM model fit indices, confirming the overall validity of the integrated DCT–RBV structural model.

Table 6: Structural Model Fit Indices.

Fit Index	Value	Recommended Threshold	Interpretation
χ^2/df	2.16	< 3.0 (excellent)	Excellent fit
CFI	0.93	≥ 0.90 (acceptable)	Good fit
TLI	0.92	≥ 0.90 (acceptable)	Good fit
RMSEA	0.062	≤ 0.08 (acceptable), ≤ 0.06 (excellent)	Acceptable fit

Fit Index	Value	Recommended Threshold	Interpretation
SRMR	0.054	≤ 0.08 (good fit)	Good fit
GFI	0.91	≥ 0.90 (acceptable)	Acceptable fit

The structural model demonstrated excellent overall fit across all indices. The χ^2/df of 2.16 was well below the 3.0 threshold; CFI (0.93) and TLI (0.92) both exceeded 0.90; RMSEA of 0.062 and SRMR of 0.054 both fell within acceptable ranges; and GFI of 0.91 met the acceptability threshold. These converging indices confirm that the seven-construct DCT–RBV theoretical model accurately represents the structural relationships governing technology adoption and competitiveness among eThekwini manufacturing SMEs, providing a psychometrically sound basis for the study’s conclusions and recommendations.

DISCUSSION

The multi-method findings consistently confirm that manufacturing SMEs in eThekwini can thrive beyond automation, but only through a strategic, capability-centred approach that simultaneously addresses financial barriers, organisational readiness, innovation capability, and ecosystem support. The persistent gap between automation awareness ($M = 3.91$) and actual adoption ($M = 2.87$) is not an information problem but a capacity and ecosystem problem, mirroring patterns across the SME digitalisation literature (Maisiri & van Dyk, 2021; Frank et al., 2019). The barrier ranking, cross-tabulation, and regression analyses collectively confirm that financial resource constraints are the most severe structural bottleneck, with equipment cost ($M = 4.61$) and finance access ($M = 4.54$) creating insurmountable adoption barriers for micro and informal enterprises lacking collateral or credit history. The eightfold adoption differential between micro and medium firms reveals a compounding capability divide: larger firms with greater resource bases develop stronger dynamic capabilities over time, creating self-reinforcing performance advantages that smaller firms cannot overcome without targeted external support (Teece, 2007; Barney, 1991).

Organisational readiness emerged as the single most powerful competitive driver ($\beta = 0.52$, part $r^2 = 0.261$), validating both RBV’s VRIN logic and DCT’s seizing and transforming microfoundations: competitive advantage derives not from owning technologies but from the firm-specific, inimitable capabilities developed to deploy them effectively (Barney, 2001; Teece, 2007). Innovation capability’s significant independent contribution ($\beta = 0.38$, part $r^2 = 0.168$) validates Cohen and Levinthal’s (1990) absorptive capacity concept in the SME automation context: firms require prior innovation-related knowledge and learning routines to absorb and exploit automation technologies. The correlation analysis further revealed that innovation capability ($r = 0.81$ with TA; $r = 0.83$ with BC) is the most strongly intercorrelated construct in the model, functioning as an amplifier through which both automation awareness and organisational readiness translate into realised competitive advantage. The sector-level frequency findings confirm DCT’s sensing microfoundation: steel fabrication firms operating in more automation-competitive environments have developed stronger technological sensing and adoption urgency than clothing or food processing SMEs. For policymakers, the barrier ranking provides an evidence-based intervention priority list anchored by financial mechanisms (barriers 1–2), skills development (barrier 3), and electricity infrastructure (barrier 4). The cross-tabulation findings demand differentiated targeting: micro, informal, and young firms require the most intensive support given their dramatically lower adoption baselines.

The practical implications of these findings are substantial for all stakeholders in eThekwini’s manufacturing ecosystem. For SME owners and managers, the regression findings ($R^2 = 0.76$) confirm that competitive performance is highly predictable and systematically determined by addressable capability and resource factors, not by market luck or uncontrollable externalities. This means targeted internal investments in workforce digital skills, technology infrastructure, and innovation processes will yield measurable competitive returns. The barrier ranking finding that only 38.3% of SMEs rated limited awareness as a severe constraint compared to 68.3% for equipment cost and 64.7% for finance access confirms that awareness-raising campaigns alone are insufficient policy responses. For financial institutions and development finance organisations, the combination of high financial barrier severity ($M = 4.54$ for finance access) and high potential returns from adoption ($R^2 = 0.76$ model explanatory power) makes manufacturing SME digitalisation a compelling impact investment category. For universities and TVET colleges in eThekwini, the skills barrier ranking third ($M = 4.38$, 57.3% severe) identifies a clear institutional mandate: developing accessible, affordable, Industry 4.0-aligned curriculum that builds the workforce digital competencies underpinning both organisational readiness and innovation capability. The SEM model fit confirmation ($\chi^2/df = 2.16$, CFI = 0.93) further

validates that these seven constructs form an integrated, mutually reinforcing system meaning ecosystem interventions addressing multiple constructs simultaneously will generate compounding rather than additive competitive returns for eThekweni manufacturing SMEs.

CONCLUSIONS

This study investigated how manufacturing SMEs in eThekweni District Municipality can harness emerging technologies to future-proof their businesses. Grounded in Dynamic Capabilities Theory and the Resource-Based View, and employing five complementary analytical methods, the study provides robust, multi-layered empirical evidence of the structural determinants of digital transformation success. Only 20.3% of eThekweni manufacturing SMEs have achieved advanced technology adoption, while 18.0% operate without any digital tools – confirming an urgent and widening digitalisation divide. Financial barriers dominate the constraint landscape, with equipment cost ($M = 4.61$) and finance access ($M = 4.54$) as the most severe obstacles. The multiple regression model explained 76% of the variance in business competitiveness, with organisational readiness ($\beta = 0.52$) as the dominant predictor, followed by automation awareness ($\beta = 0.45$) and innovation capability ($\beta = 0.38$). The SEM demonstrated excellent fit ($\chi^2/df = 2.16$, CFI = 0.93, RMSEA = 0.062), confirming the validity of the integrated DCT–RBV theoretical model. Several limitations should be acknowledged. Geographically, the study is confined to eThekweni District Municipality, limiting generalisability to other South African provinces with different industrial structures and ecosystem conditions. KwaZulu-Natal’s unique combination of port-linked manufacturing, diverse entrepreneurial communities, and load-shedding severity may produce adoption dynamics that differ from Gauteng or Western Cape contexts. The cross-sectional design prevents examination of how dynamic capabilities evolve over time, how barrier profiles shift as technologies mature and costs decline, or how the DCT–RBV framework’s explanatory power changes as digital transformation deepens. The sample is predominantly composed of small enterprises with 6–20 employees, which may not represent the more complex digitalisation journeys of medium-sized manufacturing firms. The exclusively quantitative methodology, while enabling precise statistical inference, does not capture the strategic reasoning and contextual nuances of SME owners navigating automation disruption. Future research should employ longitudinal panel designs tracking SMEs’ digital transformation journeys over 3–5 years, mixed-methods approaches combining surveys with in-depth interviews, comparative regional studies testing whether the DCT–RBV framework applies uniformly across South Africa’s manufacturing provinces, and sector-specific studies examining the differential competitive impacts of AI, IoT, robotics, and additive manufacturing within eThekweni’s diverse sub-sectors.

Based on the multi-method evidence, the following integrated recommendations are proposed:

- Develop a coordinated eThekweni district-level digital transformation strategy aligning SEDA, DTI, KZN EDTEA, industry associations, and educational institutions around shared digitalisation targets and dedicated funding mechanisms.
- Establish Automation Innovation Hubs providing SMEs with hands-on AI, IoT, and robotics demonstrations, technical training, mentorship, and shared advanced manufacturing infrastructure – directly building the organisational readiness and innovation capability identified as primary performance drivers.
- Introduce a tiered financial support framework: grants for technology feasibility assessments, subsidised loans for equipment acquisition, and tax incentives for digital transformation investment, with programmes specifically targeting micro and informal enterprises with limited collateral.
- Develop modular Industry 4.0 skills programmes in partnership with Durban University of Technology, UKZN, and TVET colleges; prioritise electricity supply stabilisation as a foundational infrastructure prerequisite; and launch a “Future-Ready SME” recognition programme disseminating best-practice adoption models across the eThekweni manufacturing sector.

ETHICAL CONSIDERATIONS

The research received ethical clearance from Durban University of Technology Institutional Research Ethics Committee. All ethical procedures were strictly observed including informed consent, confidentiality and anonymity, beneficence and non-maleficence.

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REFERENCES

- Audretsch, D. B., Cunningham, J. A., Kuratko, D. F., Lehmann, E. E., & Menter, M. (2019). Entrepreneurial ecosystems: Economic, technological, and societal impacts. *Journal of Technology Transfer*, 44(2), 313–325.
- Bahrin, M. A. K., Othman, M. F., Azli, N. H. N., & Talib, M. F. (2016). Industry 4.0: A review on industrial automation and robotic. *Jurnal Teknologi*, 78(6–13).
- Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.
- Barney, J. B. (2001). Is the resource-based “view” a useful perspective for strategic management research? Yes. *Academy of Management Review*, 26(1), 41–56.
- Bellamy, C. (2011). *Principles of methodology: Research design in social science*. SAGE Publications.
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128–152.
- Frank, A. G., Dalenogare, L. S., & Ayala, N. F. (2019). Industry 4.0 technologies: Implementation patterns in manufacturing companies. *International Journal of Production Economics*, 210, 15–26.
- Futcher, M. S., & Sunjka, B. P. (2018). *Competitive advantage during industry 4.0: The case for South African manufacturing SMEs* (Doctoral dissertation, University of the Witwatersrand).
- Gamidullaeva, L., Vasin, S., & Wise, N. (2020). Increasing small and medium enterprises’ performance through improved cross-sector interaction and knowledge exchange. *Knowledge Management Research & Practice*, 18(4), 403–416.
- GEM (Global Entrepreneurship Monitor). (2020). *Global Report*. <https://www.gemconsortium.org>
- Henning, M. (2019). *A conceptual approach to increase competitiveness in a typical South African manufacturing SME* (Doctoral dissertation, Stellenbosch University).
- Hunter, D. L., Tsegaye, A., & Kapingura, F. M. (2025). Manufacturing industry performance and stabilisation policies in South Africa. *South African Journal of Economic and Management Sciences*, 28(1), 5842.
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39(1), 31–36.
- Kamble, S. S., Gunasekaran, A., & Dhone, N. C. (2020). Industry 4.0 and lean manufacturing practices for sustainable organisational performance. *International Journal of Production Research*, 58(5), 1319–1337.
- King, W. R., & He, J. (2006). A meta-analysis of the technology acceptance model. *Information & Management*, 43(6), 740–755.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607–610.
- KZN Top Business Portfolio. (2020). *KwaZulu-Natal business statistics* (Provincial report).
- Li, G., Hou, Y., & Wu, A. (2017). Fourth Industrial Revolution: Technological drivers, impacts and coping methods. *Chinese Geographical Science*, 27(4), 626–637.
- Liao, Y., Deschamps, F., Loures, E. D. F. R., & Ramos, L. F. P. (2017). Past, present and future of Industry 4.0. *International Journal of Production Research*, 55(12), 3609–3629.

- Maisiri, W., & Van Dyk, L. (2021). Industry 4.0 skills: A perspective of the South African manufacturing industry. *SA Journal of Human Resource Management*, 19, 1416.
- McCormick, K., & Salcedo, J. (2020). *SPSS statistics for dummies*. John Wiley & Sons.
- Mohajan, H. K. (2020). Quantitative research: A successful investigation in natural and social sciences. *Journal of Economic Development, Environment and People*, 9(4), 50–79.
- Moeuf, A., Pellerin, R., Lamouri, S., Tamayo-Giraldo, S., & Barbaray, R. (2018). The industrial management of SMEs in the era of Industry 4.0. *International Journal of Production Research*, 56(3), 1118–1136.
- Ombongi, P. N., & Long, W. (2018). Factors affecting adoption of information technology in SMEs: A case of Kenya. *International Journal of Information Technology and Business Management*, 63(1), 1–16.
- Otto, W. H. (2025). Implications to mitigate business failure. *Southern African Journal of Entrepreneurship and Small Business Management*, 17(1), 1–13.
- Penrose, E. T. (1959). *The theory of the growth of the firm*. Blackwell.
- Rahman, M. S. (2016). The advantages and disadvantages of using qualitative and quantitative approaches in language testing research. *Journal of Education and Learning*, 6(1), 102–112.
- Rogers, E. M. (2003). *Diffusion of Innovations* (5th ed.). Free Press.
- Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson.
- SEDA. (2016). *The small, medium and micro enterprise sector of South Africa*. Bureau for Economic Research.
- Shipalana, P. (2021). *Macroeconomic policy development: Lessons learnt from South Africa during COVID-19*. South African Institute of International Affairs. <https://saiia.org.za>
- Spigel, B. (2017). The relational organisation of entrepreneurial ecosystems. *Entrepreneurship Theory and Practice*, 41(1), 49–72.
- Stam, E. (2015). Entrepreneurial ecosystems and regional policy: A sympathetic critique. *European Planning Studies*, 23(9), 1759–1769.
- Statistics South Africa. (2020). *Manufacturing: Production and sales (Preliminary) P3041.2*. Stats SA.
- Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350.
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533.
- Vaidya, S., Ambad, P., & Bhosle, S. (2018). Industry 4.0 – a glimpse. *Procedia Manufacturing*, 20, 233–238.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171–180.
- World Economic Forum. (2016). *The future of jobs report*. WEF.
- Zhong, R. Y., Xu, X., Klotz, E., & Newman, S. T. (2017). Intelligent manufacturing in the context of Industry 4.0. *Engineering*, 3(5), 616–630.

MACHINE LEARNING-BASED MARKET SEGMENTATION OF THE CHATGPT APP ADOPTION INTENTION: A BRAND-CENTRIC APPROACH

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ABSTRACT

Generative artificial intelligence (AI) services, such as ChatGPT, have rapidly evolved from functional tools into consumer-facing brands. However, much adoption research still relies on average-effect models that assume a homogeneous market, offering limited decision-ready guidance for brand strategy. This study addresses this gap by applying a machine learning-based segmentation approach to develop a brand-centric typology of the intention to use ChatGPT. Using survey data (N = 176) and a reproducible KNIME workflow, we implement k-means clustering on eight focal constructs: perceived control, perceived risk, trust, brand awareness, brand familiarity, brand attitude, perceived brand benefit, and electronic word of mouth (eWOM). Three segments/clusters emerge, demonstrating clear market heterogeneity and strong behavioural validation and differing sharply in high- versus low-intention distributions: a near-universal high-intention group (confident brand-positive advocates), a predominantly low-intention group (sceptical low-control resisters), and a mixed “moveable middle” (cautious familiar users). Segment profiles align with a trust-risk mechanism and customer-based brand equity logic, where higher intention is associated with higher trust, lower perceived risk, stronger brand knowledge and evaluations, and comparatively higher eWOM. Managerially, the results indicate that brand-led adoption strategies should be differentiated by segment, sustaining trust and advocacy among adopters, reducing perceived risk and strengthening trust among cautious users, and building perceived control alongside trust and risk mitigation among resisters. The study demonstrates the value of machine learning segmentation for translating brand-centric adoption theory into actionable guidance for AI service adoption.

Keywords: ChatGPT, generative AI, market segmentation, k-means, KNIME.

INTRODUCTION

The rapid evolution of generative artificial intelligence AI (Gen AI) has transformed tools like ChatGPT from mere technological utilities into prominent consumer-facing brands, fundamentally altering the landscape of digital adoption. In this context, ChatGPT is not simply an interface, but a branded service whose uptake is shaped by brand-centric mechanisms, including awareness, familiarity, brand attitude, trust, perceived risk, and electronic word of mouth (eWOM) (Chang & Park, 2024; Shahzad et al., 2024). Classic brand theory posits that brand knowledge structures consumer responses and decisions, suggesting that ChatGPT’s adoption intentions are best interpreted through the lens of customer-based brand equity (CBBE) and trust-building processes (Chang & Park, 2024).

Despite this, much of the extant adoption research relies on single-population, average-effect models, often assuming a homogeneous market. However, digital service adoption is inherently heterogeneous; consumers may arrive at high- or low-adoption intention through diverse combinations of risk, trust, control, and brand meaning (Chang & Park, 2024; Y. Li & Lee, 2025; Shahzad et al., 2024). This heterogeneity challenges the explanatory power of traditional models and highlights the need for actionable segmentation that can inform differentiated brand strategies (Lathifah & Azzahra, 2025; Sáez et al., 2023). The tension between explanatory fit and decision-ready insight is well established in modelling literature, which cautions that explanatory models do not always yield actionable, segment-level guidance for managers (Sáez et al., 2023).

To address this gap, this study employs machine learning – specifically, k-means clustering integrated with dimensionality reduction techniques, such as principal component analysis (PCA) – to develop a brand-relevant typology of ChatGPT adoption intentions (Lathifah & Azzahra, 2025; Uddin et al., 2024; Wang, 2025). This approach enables the identification of distinct market segments, each with unique psychological and behavioural profiles, and supports the validation of these segments through interpretable cluster means and visual mapping (Lathifah & Azzahra, 2025; Wang, 2025). Such methodology aligns with established marketing segmentation logic and recent advances in AI-driven customer analytics, which show machine learning techniques' superiority in uncovering actionable consumer insights and enhancing marketing efficiency (Lathifah & Azzahra, 2025; Sáez et al., 2023; Uddin et al., 2024; Wang, 2025).

In summary, this research aims to: uncover distinct market segments via k-means clustering; profile these segments through interpretable cluster means and visual maps; and validate the segments by demonstrating meaningful differences in high-/low-intention distributions. This approach advances theoretical understanding of brand-based adoption and provides practical, data-driven guidance for targeted brand strategy in the era of Gen AI (Chang & Park, 2024; Shahzad et al., 2024; Uddin et al., 2024; Wang, 2025).

THEORETICAL BACKGROUND

ChatGPT as a Brand: Customer-Based Brand Equity Foundations

Treating ChatGPT as a branded service positions its adoption as an outcome of the brand equity it holds in users' minds. CBBE conceptualises brand equity as the differential effect that brand knowledge has on consumers' responses to a brand's marketing (Keller, 1993). Brand knowledge comprises awareness (recognition and recall) and brand image – a network of associations about attributes, benefits, and attitudes (Keller, 1993). For GenAI, ChatGPT awareness ensures cognitive accessibility, whilst benefit-related associations (usefulness, efficiency) and brand attitude shape usage intentions.

Aaker (1991) defined brand equity as assets and liabilities linked to the brand – notably awareness, perceived quality, associations, and loyalty – that add value to firms and customers. These assets are interrelated antecedents of behavioural responses such as purchase or usage intention (Datta et al., 2017). In digital markets, brand awareness and image foster perceptions of quality and trust, which drive intention and loyalty (Park & Namkung, 2022).

Meta-analytic integration of CBBE with the theory of planned behaviour (TPB) reveals that brand image, association, and perceived quality are key antecedents of brand attitude, which positively influences behavioural intention (Wu et al., 2020). Brand awareness typically operates indirectly via perceived quality and associations rather than directly affecting intention (Azzari & Pelissari, 2020). Therefore, brand knowledge (awareness and familiarity) and evaluations (attitude and perceived benefits) are theoretically grounded drivers of adoption intention for branded AI services.

Behavioural Intention Foundations

Differences in intention to use ChatGPT can be framed through behavioural intention theories. The TPB conceptualises intention as a function of attitude towards the behaviour, subjective norm, and perceived behavioural control (Ajzen, 1991). Meta-analyses confirm that perceived behavioural control systematically moderates how attitudes translate into intention and behaviour, with individuals feeling more in control being more likely to act on positive intentions (Hagger et al., 2022; La Barbera & Ajzen, 2020).

The technology acceptance model (TAM) highlights perceived usefulness and perceived ease of use as core belief structures shaping attitudes and intention (Davis, 1989). Recent TAM applications show that perceived usefulness remains a key predictor, often mediating the effects of ease of use on behavioural intention and actual use (Al-Adwan et al., 2023; Irimia-Diéguez et al., 2023). Work on GenAI suggests that usefulness-type benefits coexist with inhibiting perceptions (cyber risk, task misfit), reinforcing that variation in evaluative and control-related beliefs underpins heterogeneous intention levels (Al-Adwan et al., 2023). This supports the idea that attitudes, benefit

perceptions, and control-related beliefs systematically explain why some users report high adoption intention whilst others remain hesitant.

Trust-Risk Path in Digital Services (why “low” intention exists)

Low intention to use ChatGPT can be grounded in trust-risk mechanisms documented in digital exchanges. In e-commerce, an integrated TAM suggests that trust and perceived risk jointly shape intention, with higher trust increasing and higher risk decreasing adoption (Pavlou, 2003). Systematic reviews conclude that increased trust reduces perceived risk and promotes adoption, whilst higher risk undermines trust and discourages use (Saveljeva, 2025). Brand trust is conceptualised as willingness to rely on a brand under risk conditions, reducing uncertainty and impacting purchase intentions and loyalty (Delgado-Ballester, 2004; Saveljeva, 2025).

In public digital services, trust directly fosters e-government adoption, whilst perceived risk exerts a negative effect and can dampen trust's positive influence (W. Li, 2021; Venkatesh et al., 2016). This pattern is mirrored in commercial channels, where performance expectancy raises purchase intention, perceived risk lowers it, and trust mediates these relationships (Farhat et al., 2025). Survey evidence on ChatGPT users demonstrates that trust strongly predicts intention to use and directly affects actual use, with intention partially mediating this relationship (Choudhury & Shamszare, 2023). This confirms that insufficient trust or heightened risk perceptions can sustain a "low-intention" segment. Therefore, higher trust and lower perceived risk provide a route to "high-intention" clusters, whilst low trust and elevated risk map onto "low-intention" segments.

Social Influence as Brand-Level Adoption Accelerators

eWOM offers a social influence channel through which ChatGPT brand perceptions can diffuse and intensify adoption. Foundational work identifies key motivations for engaging in online reviews – social interaction, economic incentives, self-enhancement – and demonstrates that these communications shape information adoption and decisions (Hussain et al., 2018). Exposure to peer-generated content and its evaluation (argument quality, credibility) can reduce uncertainty, inform brand beliefs, and influence behavioural intentions, especially in high-uncertainty categories (Rosario et al., 2020).

Integrative reviews conclude that online reviews and recommendations influence attitudes, perceived value, trust, and risk perceptions, which predict usage intentions across digital contexts (Hussain et al., 2018; Rosario et al., 2020). In this context, eWOM about ChatGPT can shape brand knowledge, recalibrate benefit perceptions and risks, and provide social proof that accelerates or dampens adoption. Thus, eWOM intensity and valence become plausible differentiators of user segments, with stronger positive eWOM expected to co-occur with higher intention to use.

Segmentation in Machine Learning as the Right Contribution

Heterogeneity in behavioural drivers suggests that segmenting users is essential for theory and practice. Segmentation theory emphasises that markets consist of distinct groups differing systematically in needs, beliefs, and responses, and that uncovering such structure enables precise predictions and targeted strategies (Wedel & Kamakura, 2000). Cluster analysis identifies segments with homogeneous internal patterns but clear differences across clusters (Rababa et al., 2025). Cluster solutions should be evaluated statistically and for behavioural validity, referring to the extent segments differ on meaningful outcomes such as intention (Irimia-Diéguez et al., 2023; Rababa et al., 2025).

K-means clustering provides a scalable, interpretable approach to partitioning survey data into segments by minimising within-cluster variance (MacQueen, 1967). Marketing applications demonstrate that k-means suits continuous attitudinal variables, particularly when informed by expert judgement for selecting k and interpreting clusters (Irimia-Diéguez et al., 2023; Rababa et al., 2025). For visual clarity, PCA can project the multi-construct space onto a low-dimensional map whilst retaining maximum variance, aiding segment separation and profiling (Jolliffe, 2002). Implementing this workflow in KNIME enables transparent data preparation, clustering, and visualisation, facilitating replication (Berthold et al., 2009).

Grounded in segmentation logic and technology-adoption theory, this study posits that meaningful behavioural segments emerge from respondents' joint profiles across perceived control, perceived risk, trust, brand knowledge and evaluations (brand awareness, familiarity, attitude, perceived benefit), and eWOM (Ajzen, 1991; Punj & Stewart, 1983; Wedel & Kamakura, 2000). Furthermore, these segments should demonstrate behavioural validity by differing systematically in intention to use ChatGPT (Ajzen, 1991). Higher-intention segments should be characterised by favourable trust-risk configurations (higher trust, lower risk) (Delgado-Ballester, 2004; Pavlou, 2003), stronger brand knowledge and evaluations (Aaker, 1991; Keller, 1993), and greater eWOM influence, consistent with evidence that online WOM shapes perceptions and intentions (Cheung & Thadani, 2012; Hennig-Thurau et al., 2004). Considering the above, the hypotheses are:

- *H1: Distinct segments emerge based on the joint pattern of perceived control, perceived risk, trust, brand awareness, brand familiarity, brand attitude, perceived brand benefit, and eWOM.*
- *H2: Segment membership is associated with intention to use ChatGPT (high versus low), such that the distribution of intention differs significantly across clusters.*
- *H3: Segments with higher trust and lower perceived risk show a higher share of high intention to use ChatGPT.*
- *H4: Segments with higher brand awareness, brand familiarity, brand attitude, and perceived brand benefit show a higher share of high intention.*
- *H5: Segments with higher eWOM show a higher share of high intention.*

RESEARCH METHODOLOGY

Research Design and Sampling

A cross-sectional quantitative survey design was employed using an online self-administered questionnaire, consistent with contemporary ChatGPT and technology adoption studies that capture behavioural intentions at a single point in time (Abdaljaleel et al., 2024; Liu & Ma, 2024; Sallam et al., 2023). A non-probability sampling strategy was employed, utilising digital distribution to target technologically savvy South African Generation Z (Gen Z) individuals (18–24 years). This cohort was targeted because it comprises digitally immersed, early adopters of new technologies who are responsive to digital branding and influencer cues (Axcell & Ellis, 2023; Duffett & Mxunyelwa, 2025; Maraule et al., 2025).

The survey link was disseminated via major social media platforms (Facebook, WhatsApp, X, Instagram), mirroring recent studies on Gen Z technology and social media adoption that rely on online reach and snowball-type diffusion to access young, highly connected users (Axcell & Ellis, 2023; Duffett & Mxunyelwa, 2025; Maraule et al., 2025). To participate, respondents had to at least have heard of, explored, or used ChatGPT, so that attitudes, beliefs, and intentions reflected a minimum level of brand exposure (Abdaljaleel et al., 2024; Liu & Ma, 2024). A total of 176 valid responses were obtained.

Instrument Development and Data Collection

The questionnaire comprised three sections: background and screening items assessing prior exposure to ChatGPT; demographic characteristics; and psychometric measures capturing the study's focal constructs and behavioural intention. Demographic items included gender, ethnicity, education level, and age, consistent with prior research on digital banking and technology usage among South African and international student populations (Axcell & Ellis, 2023).

Measurement items were adapted from validated instruments in technology acceptance, ChatGPT adoption, and marketing research, following established guidance on survey adaptation and validation (see Appendix 1; Shahzad et al., 2024). All items were measured using a multi-point Likert-type response format (see Appendix 1). Ethical clearance was obtained from the relevant institutional ethics committee (Ref.: 2023SCiS015). Participation was voluntary and anonymous, with informed consent obtained electronically before respondents proceeded to the main questionnaire, consistent with recent survey protocols in ChatGPT adoption research.

Analytical Approach

Data were analysed using a machine learning segmentation workflow implemented in the KNIME Analytics Platform, which enables reproducible and auditable analytical pipelines (Ordenes & Silipo, 2021). The procedure comprised four stages:

Pre-processing: All scale variables and computed construct scores were confirmed to be numeric. Any remaining missing data were addressed using an approach appropriate to the analysis stage (listwise deletion or simple imputation). For segmentation, the eight focal constructs (perceived behavioural control, perceived risk, trust, brand attitude, brand familiarity, perceived brand benefit, brand Awareness, and eWOM) were standardised using z-scores to prevent variables with larger variances from disproportionately influencing the clustering solution, as recommended for k-means applications (Alkhayrat et al., 2020).

Segmentation method: K-means clustering was applied to the eight standardised constructs to uncover latent segments. K-means partitions observations into k clusters by minimising within-cluster variance and is widely used for customer and user segmentation, where attitudinal and belief-based variables constitute the segmentation feature space (Alkhayrat et al., 2020; Ordenes & Silipo, 2021).

Interpretation and visual analytics: Cluster profiles were derived by computing cluster means for each construct and summarised in profiling tables to support substantive interpretation of segment characteristics. To aid visual interpretation of segment structure, a two-component PCA was conducted on the same construct set, and cluster memberships were projected into the reduced-dimensional space. PCA is commonly used to summarise multivariate attitudinal data and to provide an interpretable representation of how segments relate across underlying latent dimensions (Alkhayrat et al., 2020).

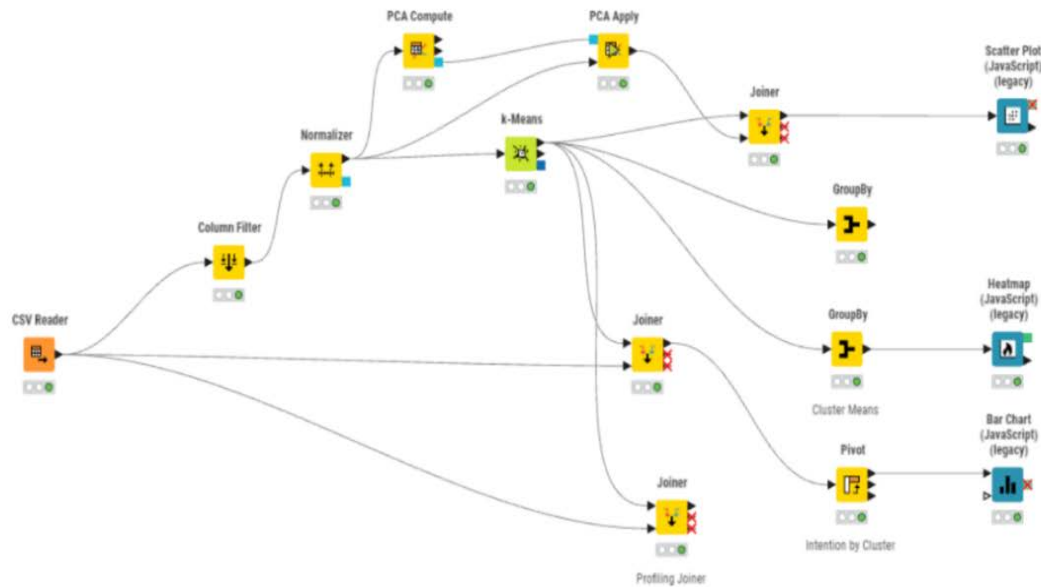
Reproducibility: All data preparation, clustering, and visualisation steps were implemented as nodes within a single KNIME workflow, producing an auditable end-to-end pipeline that can be shared and replicated by other researchers (Ordenes & Silipo, 2021).

This analytical strategy yielded an unsupervised segmentation grounded in key control-, risk-, trust-, brand-, and eWOM-related beliefs, with behavioural validation assessed through differences in intention to use ChatGPT across the derived clusters.

RESULTS

The KNIME workflow (see Figure 1) implemented the analytical pipeline specified in the methodology: (1) data pre-processing and z-score standardisation of the eight construct measures; (2) k-means clustering on the standardised variables; (3) extraction of cluster centres and membership; and (4) profiling and validation using intention and demographics. The three-cluster solution was retained due to its interpretability and theoretical consistency with the segmentation logic in marketing analytics (MacQueen, 1967; Punj & Stewart, 1983; Wedel & Kamakura, 2000). The following subsections report segment emergence and behavioural validation (H1–H2), construct-based profiling (H3–H5), demographic context, and the resultant segment labels.

Figure 1: KNIME analytical workflow for data preparation, standardisation, k-means clustering, and cluster profiling.



Source: Author-generated from KNIME visual output.

Segment Emergence and Behavioural Validation

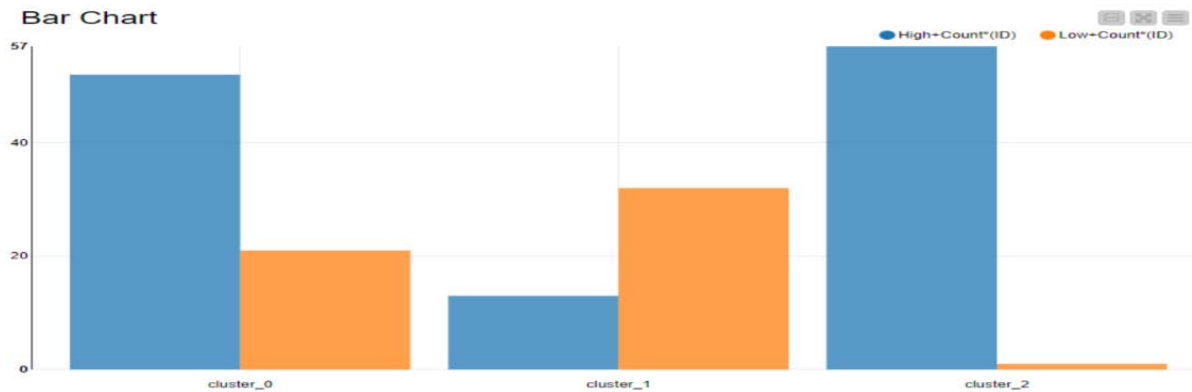
Segment membership differs strongly in intention to use ChatGPT across clusters, as shown in Table 1. Cluster 2 was almost universally high in intention (57 out of 58; 98.3%), Cluster 1 was dominated by low intention (32 out of 45; 71.1% low), and Cluster 0 was mixed but leant towards high intention (52 out of 73; 71.2% high). This pattern was consistent with the expectation that intention varies systematically with underlying evaluations and control-related beliefs, rather than being randomly distributed (Ajzen, 1991). Recent evidence on Gen AI further indicates that trust, perceived usefulness, and perceived risk account for substantial variance in ChatGPT usage intention among students, reinforcing the plausibility of intention as a behavioural validator of latent segments (Choudhury & Shamszare, 2023; Irimia-Diéguez et al., 2023; Rababa et al., 2025; Shahzad et al., 2024). H2 was supported, as the intention to use ChatGPT differed significantly and systematically across the identified clusters.

Table 1: Cluster membership by intention to use ChatGPT (high versus low).

Cluster	High intention (n)	Low intention (n)	Total (n)	High intention (%)
Cluster 0	52	21	73	71.2
Cluster 1	13	32	45	28.9
Cluster 2	57	1	58	98.3
Total	122	54	176	—

Source: Author's own.

Figure 2: Intention to use ChatGPT by cluster (high versus low counts).



Source: Author-generated from KNIME visual output.

Construct-Based Cluster Profiling (segmentation features)

Table 2 reports standardised cluster centres (z-scores) across the eight segmentation variables. Three distinct patterns emerged: Cluster 2 scored positively on most constructs, Cluster 1 markedly negatively, and Cluster 0 near the sample mean. These non-overlapping configurations indicate ChatGPT adoption market heterogeneity, consistent with segmentation arguments that consumer groups can be differentiated based on joint psychological and brand-related patterns (Punj & Stewart, 1983; Wedel & Kamakura, 2000). H1 was supported.

The high-intention segment (Cluster 2) exhibited favourable trust-risk configuration: trust substantially above the mean (0.847) and perceived risk notably below (-0.809). The low-intention segment (Cluster 1) combined lower trust (-0.772) with higher risk (0.537). Cluster 0 fell between with mildly negative trust (-0.198) and moderately elevated risk (0.312). This aligns with evidence that trust promotes technology use intentions whilst perceived risk suppresses them (Y.-H. Chen & Barnes, 2007; Im et al., 2008; Pavlou, 2003; Choudhury & Shamszare, 2023). H3 was supported.

Brand constructs systematically differentiated clusters. Cluster 2 recorded positive z-scores for brand awareness (0.713), familiarity (0.669), attitude (0.921), and perceived benefit (0.658), aligning with higher CBBE levels where brand knowledge and positive evaluations lead to stronger behavioural responses (Aaker, 1991; Keller, 1993; Xu et al., 2022). Cluster 1 showed pronouncedly negative scores (e.g., brand familiarity = -1.207; attitude = -1.020), suggesting weak ChatGPT brand perception. Cluster 0 occupied a middle ground: familiarity marginally above the mean (0.213) but attitude, awareness, and perceived benefit slightly below zero, suggesting familiarity had not translated into positive evaluations (Ping et al., 2010; Yazid & Kawiryan, 2023). H4 was supported.

The eWOM construct differentiated segments in the expected direction. Cluster 2 had the highest score (0.363), Cluster 1 the lowest (-0.341), and Cluster 0 near the mean (-0.078), consistent with research linking eWOM to more favourable beliefs and intentions (Cheung & Thadani, 2012; Hennig-Thurau et al., 2004; Maru & Vijay, 2024). However, eWOM separation was smaller than for trust, risk, and brand attitude, suggesting weaker discriminating power. H5 was supported, though trust and brand perceptions play a more central role in differentiating segments.

Table 2: Standardised cluster centres (z-scores) across segmentation constructs.

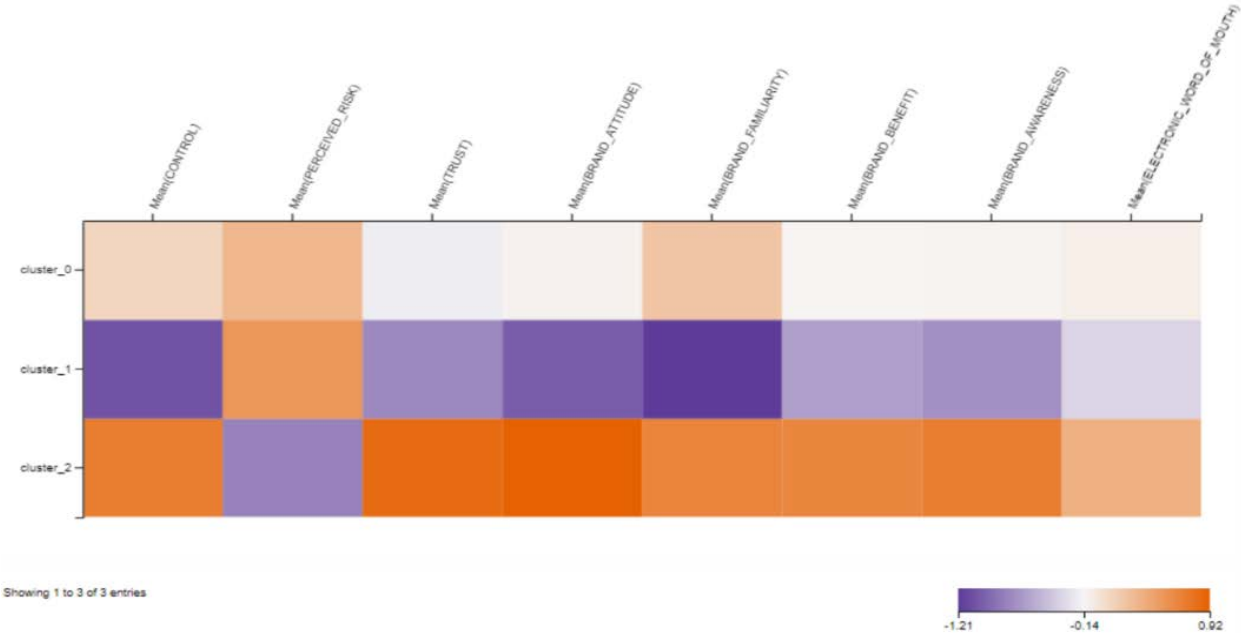
Cluster	PC	PR	T	BA	BF	PBB	BA	eWOM
Cluster 0	0.094	0.312	-0.198	-0.103	0.213	-0.124	-0.118	-0.078
Cluster 1	-1.074	0.537	-0.772	-1.020	-1.207	-0.647	-0.728	-0.341
Cluster 2	0.715	-0.809	0.847	0.921	0.669	0.658	0.713	0.363

Notes: PC = perceived control; PR = perceived risk; T = trust; BA = brand attitude; BF = brand familiarity; PBB = perceived brand benefit; BA = brand awareness

Source: Author-generated from KNIME k-means results (MacQueen, 1967).

The heat map in Figure 3 provides a comprehensive visual summary of the construct profiles presented in Table 2. Cluster 2 appears as a predominantly “warm” profile (positive z-scores) on control, trust, and brand attitude constructs, combined with a “cool” cell on perceived risk. Cluster 1 shows the opposite, with “cool” cells for control, trust, and brand constructs, and “warm” cells for perceived risk. Cluster 0 presents a more muted mix of colours, reflecting its intermediate status. This visual confirmation strengthened the case for distinct, interpretable segments, consistent with H1, H3, and H5.

Figure 3: Cluster profile heatmap of standardised construct means (z-scores).



Source: Author-generated from KNIME visual output.

Demographic and Intention-Based Cluster Context

Age distribution was heavily concentrated in the 18–24 category across all clusters and intention levels, reflecting the Gen Z sampling frame. This homogeneity indicated that intention differences were unlikely driven by age structure and were more plausibly attributable to psychological and brand-related factors. Gender composition varied modestly across clusters and intention levels, with no consistent pattern mirroring the sharp intention differences in Tables 1 and 2. Both high- and low-intention users were present across genders within each cluster, suggesting gender does not explain segmentation outcomes.

Ethnicity exhibited variation across clusters, with black, Asian/Indian, and "other" categories represented in all segments and intention levels. However, distributions did not align systematically with intention to use ChatGPT, providing contextual diversity rather than explanatory leverage. Education exhibited the clearest demographic differentiation: Cluster 2 (high-intention, brand-positive) had the highest proportion of postgraduate respondents (47.4%), whilst Cluster 1 (dominated by low intention) showed the highest concentration with matric as highest qualification (50%). This suggests higher educational attainment may associate with more favourable ChatGPT perceptions, consistent with evidence that more educated users adopt advanced digital tools earlier (Ravšelj et al., 2025). Nevertheless, postgraduate respondents were present in all clusters, indicating education alone does not account for intention differences.

Demographic patterns supported the conclusion that segmentation's primary explanatory power lies in psychological and brand constructs rather than demographic composition. Clusters were derived from these focal constructs; demographic variables served a contextual rather than causal role.

Table 3: Compact demographic profile by cluster and intention to use ChatGPT.

Cluster	Intention	Gender (dominant)	Ethnicity (dominant)	Education (dominant)	Age (dominant)
Cluster 0	High	Male (51.9%) Female (46.2%)	Other (44.2%) Black (34.6%)	Matric (44.2%) Postgraduate (34.6%)	18–24 (76.9%)
	Low	Female (66.7%)	Other (52.4%) Black (42.9%)	Matric (52.4%) Postgraduate (42.9%)	18–24 (95.2%)
Cluster 1	High	Male (53.8%) Female (46.2%)	Black (61.5%)	Matric (69.2%)	18–24 (100%)
	Low	Male (56.3%) Female (37.5%)	Black (50.0%) Other (31.3%)	Matric (50.0%) Postgraduate (31.3%)	18–24 (84.4%)
Cluster 2	High	Male (56.1%) Female (38.6%)	Other (38.6%) Black (35.1%)	Postgraduate (47.4%) Matric (31.6%)	18–24 (86.0%)
	Low	Male (100%)*	Black (100%)*	Diploma/Certificate (100%)*	18–24 (100%)*

Notes: * Low-intention cases in Cluster 2 are based on a single respondent and should be interpreted with caution; percentages are calculated within cluster × intention groups.

Source: Author-generated from KNIME.

Segment Labels

Drawing on the construct profiles (Table 2), intention distributions (Table 1), and demographic context (Table 3), three segments were labelled to aid interpretation and potential managerial application.

Table 4: Cluster labels and interpretations derived from construct profiles and intention distributions.

Cluster	Proposed label	Construct configuration (as measured)	Intention pattern
Cluster 2	Confident brand-positive advocates	Higher perceived control; lower perceived risk; higher trust; higher brand awareness, brand familiarity, brand attitude, perceived brand benefit; higher eWOM	Near-universal high intention
Cluster 0	Cautious familiar users	Slightly higher perceived control and brand familiarity; elevated perceived Risk; slightly lower trust; mildly weaker brand awareness/brand attitude/perceived brand benefit; near-neutral eWOM	Mixed; majority high intention
Cluster 1	Sceptical low-control resisters	Very low perceived control; higher perceived risk; lower trust; lower brand awareness/familiarity; negative brand attitude and perceived brand benefit; lower eWOM	Predominantly low intention

Source: Author-generated interpretation based on Tables 1–3.

Confident brand-positive advocates (Cluster 2) represented a segment that felt in control using ChatGPT, perceived relatively low risk, and expressed high trust. They demonstrated strong brand equity indicators, including greater awareness, familiarity, positive attitudes, and perceived benefits, as well as comparatively higher engagement with eWOM about ChatGPT. Nearly all members expressed a high intention to use ChatGPT, suggesting this segment is an attractive target for retention and advocacy strategies.

Cautious familiar users (Cluster 0) were moderately familiar with ChatGPT and reported slightly higher control; yet, they exhibited elevated perceived risk and slightly lower trust, alongside muted brand evaluations and near-average eWOM. The intention distribution was mixed, but tilted towards high intention. This configuration suggests a segment that is open to using ChatGPT but retains reservations. Targeted communication that reduces perceived risk, clarifies usage boundaries, and strengthens brand attitudes may help move these users towards more confident, sustained usage (Abou-Shouk & Soliman, 2021; Žvanut & Mihelič, 2024).

Sceptical low-control resisters (Cluster 1) perceived low control, high risk, and low trust in ChatGPT, combined with limited awareness and familiarity, as well as negative brand attitudes and perceptions of benefits.

EWOM engagement was lowest and the segment was dominated by low intention. This group appeared resistant to adoption, reflecting broader concerns about misinformation, privacy, and the ethical implications of Gen AI, as documented in recent work on AI risk perceptions and the ethics of Gen AI (Al-kfairy et al., 2024; Hagendorff, 2024). For practitioners, this segment would require substantial reassurance, transparency, and evidence of value to shift perceptions, and some members may remain structurally resistant despite such efforts. Together, these labels synthesised H1–H5 by showing that (1) distinct, theory-consistent segments emerge from the joint pattern of control, risk, trust, brand constructs and eWOM; (2) segment membership is meaningfully associated with high versus low intention; and (3) segments differ in ways that lend themselves to targeted brand and communication strategies for ChatGPT among South African Gen Z users.

DISCUSSION

This study conceptualises ChatGPT as a consumer-facing branded service and uses k-means clustering to reveal heterogeneous adoption intentions among South African Gen Z users. High and low intention arise from distinct configurations of perceived control, perceived risk, trust, brand awareness, brand familiarity, brand attitude, perceived brand benefit, and eWOM, in line with segmentation work that highlights heterogeneous decision pathways (Borges et al., 2020; Dessart et al., 2019). Three interpretable clusters emerge: a high-intention group combining high trust, low risk, and strong brand equity; a low-intention group marked by low control, high risk, and weak brand equity; and a cautious but moderately positive segment that is familiar with ChatGPT, yet remains risk-sensitive. This pattern supports a trust-risk pathway to adoption and echoes evidence that trusted brands and perceived benefits are crucial for behaviour in uncertain digital environments and in the presence of misinformation and AI-ethics concerns (Al-kfairy et al., 2024; J. Chen & Parker, 2023; Hagendorff, 2024).

From a CBBE perspective, Cluster 2's favourable scores on awareness, familiarity, attitudes, and perceived benefits illustrate how stronger brand knowledge structures translate into higher intention, consistent with research linking brand equity to intention and loyalty in digital and service settings (Hashem et al., 2022; J. Wu et al., 2024). Cluster 1's negative brand evaluations reinforce its low-intention profile, while Cluster 0's moderate awareness, but weaker attitudes and benefits underscore that familiarity alone does not guarantee adoption; evaluative mechanisms, perceived value, and trust remain central (J. Chen & Parker, 2023; Hashem et al., 2022; J. Wu et al., 2024). EWOM differences across clusters are directionally consistent – highest in the positive segment and lowest among sceptics – but smaller than for trust, risk, and core brand constructs, suggesting eWOM reinforces existing perceptions, instead of acting as a primary segmentation driver (Borges et al., 2020; Dessart et al., 2019). Managerially, these results show segment-specific strategies should prioritise trust-building, risk reduction, and clear benefit communication for Gen Z users, with eWOM leveraged as an amplification mechanism once these foundations are established.

MANAGERIAL IMPLICATIONS

The three identified segments form a brand-relevant adoption typology with clear managerial implications, reinforcing the value of technology-specific user segmentation as a decision-orientated alternative to aggregate adoption models (Hollebeek et al., 2019; Jaiswal et al., 2022). For **confident brand-positive advocates**, managers should maintain trust and suppress risk through visible governance cues, such as transparent data policies and clearly defined use boundaries (Poeppelbuss et al., 2022; Tanninen & Meyers, 2025; Venkatesh et al., 2016), whilst reinforcing brand equity by sustaining awareness and highlighting differentiated benefits (Aaker, 1991; Calderón Fajardo et al., 2023; Keller, 1993; Shimul, 2022). Organisations can enable advocacy by promoting shareable use cases and peer endorsement, leveraging digital engagement as an amplifier (Hollebeek et al., 2019, 2022). For **cautious familiar users**, the priority is risk reduction and trust reinforcement through explicitly communicating safeguards, accuracy boundaries, and appropriate use contexts (Poeppelbuss et al., 2022; Venkatesh et al., 2016), whilst converting familiarity into positive evaluation by emphasising concrete performance and experiential benefits (Aaker, 1991; Hollebeek et al., 2019; Jaiswal et al., 2022; Keller, 1993). For **sceptical low-control resistors**, interventions should enhance perceived control and competence through simplified onboarding and guided tutorials (Ajzen, 1991), whilst simultaneously addressing data security, accuracy, and human oversight to rebalance trust-risk perceptions (Poeppelbuss et al., 2022; Tanninen & Meyers, 2025; Venkatesh et al., 2016).

Across segments, three cross-cutting implications emerge. First, CBBE is a practical adoption lever – higher intention segments consistently display stronger brand awareness, familiarity, attitudes, and perceived benefits (Aaker,

1991; Calderón Fajardo et al., 2023; Keller, 1993; Shimul, 2022). Second, trust-risk and uncertainty management is central, as trust, transparency, and perceived risk provide the clearest segmentation boundaries and remain decisive for digital service use (Poeppelbuss et al., 2022; Tanninen & Meyers, 2025; Venkatesh et al., 2016). Third, digital engagement and eWOM function as accelerators, aligning with high intention segments but offering limited leverage in the absence of favourable core beliefs and brand equity foundations (Hollebeek et al., 2019, 2022).

CONCLUSION

This study advances a brand-centric perspective on ChatGPT adoption by demonstrating that adoption intention among Gen Z users is meaningfully heterogeneous and best captured through machine learning segmentation. Using k-means clustering, three segments were identified based on perceived control, perceived risk, trust, brand awareness, brand familiarity, brand attitude, perceived brand benefit, and eWOM, and were behaviourally validated through sharply divergent intention profiles. The segment configurations align with established theory. High-intention segments exhibit higher trust, lower perceived risk, stronger brand knowledge and evaluations, and greater engagement with eWOM, consistent with trust-risk mechanisms in technology acceptance and CBBE frameworks that link brand awareness, associations, and perceived quality/benefits to behavioural responses (Aaker, 1991; Delgado-Ballester, 2004; Keller, 1993; Pavlou, 2003). Recent research on ChatGPT adoption further supports these patterns, highlighting the roles of trust, perceived intelligence or performance, perceived usefulness/benefits, and related experience factors in shaping intention and usage across educational, consumer, and general user contexts (Balaskas et al., 2025; Choudhury & Shamszare, 2023). Together, the findings support a clear managerial conclusion: for predominantly Gen Z users, effective ChatGPT strategies must simultaneously build trust, reduce perceived risk, strengthen brand-equity-related perceptions of ChatGPT, and selectively leverage eWOM, with interventions calibrated to the distinct profiles of confident advocates, cautious familiar users, and sceptical low-control resisters.

APPENDIX

Construct	Item code	Item statement	scale
Control	C1_1	I felt in control of what I was doing when I was using the ChatGPT app.	1 = strongly disagree ... 5 = strongly agree
	C1_2	I could easily control the information that was provided to me when I was using the ChatGPT app.	1–5
	C1_3	I felt I could control my use of the information I received from using the ChatGPT app.	1–5
	C1_4	The level of information provided by the ChatGPT app helped me to feel in control when interacting with the app.	1–5
Perceived risk (Im et al., 2008)	PR_1	It is probable that the ChatGPT app would not be worth its effort.	1–5
	PR_2	It is probable that the ChatGPT app would frustrate me because of its poor performance.	1–5
	PR_3	Compared with other technologies, using the ChatGPT app has more uncertainties.	1–5
	PR_4	It is uncertain whether the ChatGPT app would be as effective as I think.	1–5
Trust (Chen & Barnes, 2007)	T_1	The ChatGPT app is trustworthy and honest.	1–5
	T_2	The ChatGPT app wants to keep promises and obligations.	1–5
	T_3	The information on the ChatGPT app is plentiful and of sufficient quality.	1–5
	T_4	The ChatGPT app is dependable.	1–5
Attitude (Ajzen, 1991)	ATT_1	All things considered, I find using the ChatGPT app to be a good idea.	1 = strongly disagree ... 7 = strongly agree
	ATT_2	All things considered, I find using the ChatGPT app to be a positive thing.	1–7
	ATT_3	All things considered, I find using the ChatGPT app to be favourable.	1–7
Brand familiarity (Catalán et al., 2019; Ping et al., 2010)	BF_1	How familiar are you with the ChatGPT app brand?	1 = not at all familiar ... 5 = very familiar
	BF_2	How often have you used the ChatGPT app in the past six months?	1 = not often ... 5 = very often
	BF_3	How knowledgeable are you about the ChatGPT app?	1 = not very knowledgeable ... 5 = very knowledgeable
Brand attitude (Catalán et al.,	BA_1	My attitude towards the ChatGPT app is unfavourable/favourable.	1 = unfavourable ... 7 = favourable
	BA_2	My attitude towards the ChatGPT app is Bad/Good	1 = bad ... 7 = good1

Construct	Item code	Item statement	scale
2019; Wise et al., 2008)	BA_3	My attitude towards the ChatGPT app is Negative/Positive	1 = negative ... 7 = favourable
Brand benefits – symbolic (Tseng et al., 2021; Tseng & Lee, 2018)	BB_1	The ChatGPT app brand makes my life richer and more meaningful.	1 = strongly disagree ... 5 = strongly agree
	BB_2	I can use (consume) the ChatGPT app brand to express who I am.	1–5
	BB_3	The ChatGPT app brand represents my deepest values.	1–5
	BB_4	The ChatGPT app helps me make a good impression on other people.	1–5
	BB_5	Using the ChatGPT app brand makes me feel superior to other people.	1–5
Brand awareness (Abou-Shouk & Soliman, 2021; Samala et al., 2019)	BAW_1	I would like to learn more about the ChatGPT brand.	1–5
	BAW_2	I pay attention to anything about the ChatGPT brand.	1–5
	BAW_3	Anything related to ChatGPT will grab my attention.	1–5
	BAW_4	I concentrate on the ChatGPT brand.	1–5
	BAW_5	Sharing experiences and recalling memories will help increase brand awareness of ChatGPT.	1–5
Satisfaction	SAT_1	Overall, I am satisfied with the ChatGPT app I used.	1 = strongly disagree ... 7 = strongly agree
	SAT_2	The ChatGPT app exceeded my expectations.	1–7
	SAT_3	The ChatGPT app is close to my ideal interaction with a content generator tool.	1–7
Intention to use (Im et al., 2008)	IU_1	I predict I would use the ChatGPT app.	1 = strongly disagree ... 5 = strongly agree
	IU_2	The ChatGPT app would be one of my favourite technologies for my work.	1–5
	IU_3	I intend to use the ChatGPT app.	1–5
eWOM (Bialkova & Te Paske, 2020; Rao et al., 2021)	EWM_1	I regularly read online reviews and other online sources to determine which new technology developments make a good impression.	1–5
	EWM_2	I refer to online reviews and other online sources to choose new technology developments.	1–5
	EWM_3	I collect information using online reviews and other online sources before choosing new technology developments.	1–5
	EWM_4	I perceive information obtained from online reviews and online sources as very important when choosing new technology developments.	1–5

REFERENCES

Aaker, D. A. (1991). *Managing brand equity: Capitalizing on the value of a brand name*. Free Press.

Abdaljaleel, M., Barakat, M., Alsanafi, M., Salim, N. A., Abazid, H., Malaeb, D., Mohammed, A. H., Hassan, B. A. R., Wayyes, A. M., Farhan, S. S., Khatib, S. E., Rahal, M., Sahban, A., Abdelaziz, D. H., Mansour, N. O., AlZayer, R., Khalil, R., Fekih-Romdhane, F., Hallit, R., Hallit, S., & Sallam, M. (2024). A multinational study on the factors influencing university students' attitudes and usage of ChatGPT. *Scientific Reports*, 14, Article 1893. <https://doi.org/10.1038/s41598-024-52549-8>

Abou-Shouk, M., & Soliman, M. (2021). The impact of gamification adoption intention on brand awareness and loyalty in tourism: The mediating effect of customer engagement. *Journal of Destination Marketing & Management*, 20, Article 100559. <https://doi.org/10.1016/j.jdmm.2021.100559>

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)

Al-Adwan, A., Li, N., Al-Adwan, A., Abbasi, G., Albelbis, N., & Habibi, A. (2023). Extending the technology acceptance model (TAM) to predict university students' intentions to use metaverse-based learning platforms. *Education and Information Technologies*, 28, 15381–15413. <https://doi.org/10.1007/s10639-023-11816-3>

Al-kairy, M., Mustafa, D., Kshetri, N., Insiew, M., & Alfandi, O. (2024). Ethical challenges and solutions of generative AI: An interdisciplinary perspective. *Informatics*, 11(3), Article 58. <https://doi.org/10.3390/informatics11030058>

- Alkhayrat, M., Aljnidi, M., & Aljoumaa, K. (2020). A comparative dimensionality reduction study in telecom customer segmentation using deep learning and PCA. *Journal of Big Data*, 7, Article 9. <https://doi.org/10.1186/s40537-020-0286-0>
- Axcell, S., & Ellis, D. (2023). Exploring the attitudes and behaviour of Gen Z students towards branded mobile apps in an emerging market: UTAUT2 model extension. *Young Consumers: Insight and Ideas for Responsible Marketers*, 24(2), 184–202. <https://doi.org/10.1108/yc-03-2022-1491>
- Azzari, V., & Pelissari, A. S. (2020). Does brand awareness influence purchase intention? The mediation role of brand equity dimensions. *Brazilian Business Review*, 17(6), 669–685. <https://doi.org/10.15728/bbr.2020.17.6.4>
- Balaskas, S., Tsiantos, V., Chatzifotiou, S., & Rigou, M. (2025). Determinants of ChatGPT adoption intention in higher education: Expanding on TAM with the mediating roles of trust and risk. *Information*, 16(2), Article 82. <https://doi.org/10.3390/info16020082>
- Berthold, M. R., Cebron, N., Dill, F., Gabriel, T. R., Kötter, T., Meinl, T., Ohl, P., Thiel, K., & Wiswedel, B. (2009). KNIME – the Konstanz information miner: Version 2.0 and beyond. *ACM SIGKDD Explorations Newsletter*, 11(1), 26–31. <https://doi.org/10.1145/1656274.1656280>
- Bialkova, S., & Te Paske, S. (2021). Campaign participation, spreading electronic word of mouth, purchase: How to optimise corporate social responsibility, CSR, effectiveness via social media? *European Journal of Management and Business Economics*, 30(1), 108–126. <https://doi.org/10.1108/EJMBE-08-2020-0244>
- Borges-Tiago, T., Tiago, F., Silva, O., Martínez, J. M. G., & Botella-Carrubi, D. (2020). Online users' attitudes toward fake news: Implications for brand management. *Psychology & Marketing*, 37(9), 1171–1184. <https://doi.org/10.1002/mar.21349>
- Calderón-Fajardo, V., Molinillo, S., Anaya-Sánchez, R., & Ekinci, Y. (2023). Brand personality: Current insights and future research directions. *Journal of Business Research*, 166, Article 114062. <https://doi.org/10.1016/j.jbusres.2023.114062>
- Catalán, S., Martínez, E., & Wallace, E. (2019). Analysing mobile advergames effectiveness: The role of flow, game repetition and brand familiarity. *Journal of Product & Brand Management*, 28(4), 502–514. <https://doi.org/10.1108/JPBM-07-2018-1929>
- Chang, W., & Park, J. (2024). A comparative study on the effect of ChatGPT recommendation and AI recommender systems on the formation of a consideration set. *Journal of Retailing and Consumer Services*, 78, Article 103743. <https://doi.org/10.1016/j.jretconser.2024.103743>
- Chen, J., & Parker, C. (2023). Framing security under time pressure: Brand familiarity matters for mobile application choices. *Journal of Cognitive Engineering and Decision Making*, 17(4), 383–404. <https://doi.org/10.1177/15553434231200119>
- Chen, Y.-H., & Barnes, S. (2007). Initial trust and online buyer behaviour. *Industrial Management & Data Systems*, 107(1), 21–36. <https://doi.org/10.1108/02635570710719034>
- Cheung, C. M. K., & Thadani, D. R. (2012). The impact of electronic word-of-mouth communication: A literature analysis and integrative model. *Decision Support Systems*, 54(1), 461–470. <https://doi.org/10.1016/j.dss.2012.06.008>
- Choudhury, A., & Shamszare, H. (2023). Investigating the impact of user trust on the adoption and use of ChatGPT: Survey analysis. *Journal of Medical Internet Research*, 25, Article e47184. <https://doi.org/10.2196/47184>
- Datta, H., Ailawadi, K. L., & van Heerde, H. J. (2017). How well does consumer-based brand equity align with sales-based brand equity and marketing-mix response? *Journal of Marketing*, 81(3), 1–20. <https://doi.org/10.1509/jm.15.0340>

- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Delgado-Ballester, E. (2004). Applicability of a brand trust scale across product categories: A multigroup invariance analysis. *European Journal of Marketing*, 38(5–6), 573–592. <https://doi.org/10.1108/03090560410529222>
- Dessart, L., Aldás-Manzano, J., & Veloutsou, C. (2019). Unveiling heterogeneous engagement-based loyalty in brand communities. *European Journal of Marketing*, 53(9), 1854–1881. <https://doi.org/10.1108/ejm-11-2017-0818>
- Duffett, R., & Mxunyelwa, A. (2025). Instagram mega-influencers' effect on Generation Z's intention to purchase: A technology acceptance model and source credibility model perspective. *Journal of Theoretical and Applied Electronic Commerce Research*, 20(2), Article 94. <https://doi.org/10.3390/jtaer20020094>
- Farhat, R., Yang, Q., Ahmed, M. A. O., & Hasan, G. (2025). E-commerce for a sustainable future: Integrating trust, product quality perception, and online-shopping satisfaction. *Sustainability*, 17(4), Article 1431. <https://doi.org/10.3390/su17041431>
- Hagendorff, T. (2024). Mapping the ethics of generative AI: A comprehensive scoping review. *Minds and Machines*, 34, Article 39. <https://doi.org/10.1007/s11023-024-09694-w>
- Hagger, M. S., Cheung, M. W.-L., Ajzen, I., & Hamilton, K. (2022). Perceived behavioral control moderating effects in the theory of planned behavior: A meta-analysis. *Health Psychology*, 41(2), 155–167. <https://doi.org/10.1037/hea0001153>
- Hashem E, A. R., Salleh, N. Z. M., Abdullah, M., Ali, A., Faisal, F., & Nor, R. M. (2022). Research trends, developments, and future perspectives in brand attitude: A bibliometric analysis utilizing the Scopus database (1944–2021). *Heliyon*, 9(1), Article e12765. <https://doi.org/10.1016/j.heliyon.2022.e12765>
- Hennig-Thurau, T., Gwinner, K. P., Walsh, G., & Gremler, D. D. (2004). Electronic word-of-mouth via consumer-opinion platforms: What motivates consumers to articulate themselves on the internet? *Journal of Interactive Marketing*, 18(1), 38–52. <https://doi.org/10.1002/dir.10073>
- Hollebeek, L. D., Sharma, T. G., Pandey, R., Sanyal, P., & Clark, M. K. (2022). Fifteen years of customer engagement research: A bibliometric and network analysis. *Journal of Product & Brand Management*, 31(2), 293–309. <https://doi.org/10.1108/jpbm-01-2021-3301>
- Hollebeek, L. D., Sprott, D. E., Andreassen, T. W., Costley, C., Klaus, P., Kuppelwieser, V., Karahasanovic, A., Taguchi, T., Islam, J. U., & Rather, R. A. (2019). Customer engagement in evolving technological environments: Synopsis and guiding propositions. *European Journal of Marketing*, 53(9), 2018–2023. <https://doi.org/10.1108/ejm-09-2019-970>
- Hussain, S., Guangju, W., Jafar, R. M. S., Ilyas, Z., Mustafa, G., & Jianzhou, Y. (2018). Consumers' online information adoption behavior: Motives and antecedents of electronic word of mouth communications. *Computers in Human Behavior*, 80, 22–32. <https://doi.org/10.1016/j.chb.2017.09.019>
- Im, I., Kim, Y., & Han, H.-J. (2008). The effects of perceived risk and technology type on users' acceptance of technologies. *Information & Management*, 45(1), 1–9. <https://doi.org/10.1016/j.im.2007.03.005>
- Irimia-Diéguez, A., Velicia-Martín, F., & Aguayo-Camacho, M. (2023). Predicting fintech innovation adoption: The mediator role of social norms and attitudes. *Financial Innovation*, 9, Article 36. <https://doi.org/10.1186/s40854-022-00434-6>
- Jaiswal, D., Deshmukh, A. K., & Thaichon, P. (2022). Who will adopt electric vehicles? Segmenting and exemplifying potential buyer heterogeneity and forthcoming research. *Journal of Retailing and Consumer Services*, 67, Article 102969. <https://doi.org/10.1016/j.jretconser.2022.102969>

- Jolliffe, I. T. (2002). *Principal component analysis* (2nd ed.). Springer.
- Keller, K. L. (1993). Conceptualizing, measuring, and managing customer-based brand equity. *Journal of Marketing*, 57(1), 1–22. <https://doi.org/10.1177/002224299305700101>
- Lathifah, S. N., & Azzahra, Z. F. (2025). AI-driven customers segmentation using K-Means clustering. *G-Tech: Jurnal Teknologi Terapan*, 9(1), 320–329. <https://doi.org/10.70609/gtech.v9i1.6202>
- Li, W. (2021). The role of trust and risk in citizens' e-government services adoption: A perspective of the extended UTAUT model. *Sustainability*, 13(14), Article 7671. <https://doi.org/10.3390/su13147671>
- Li, Y., & Lee, S. O. (2025). Navigating the generative AI travel landscape: The influence of ChatGPT on the evolution from new users to loyal adopters. *International Journal of Contemporary Hospitality Management*, 37(4), 1421–1447. <https://doi.org/10.1108/ijchm-11-2023-1767>
- Liu, G., & Ma, C. (2024). Measuring EFL learners' use of ChatGPT in informal digital learning of English based on the technology acceptance model. *Innovation in Language Learning and Teaching*, 18(2), 125–138. <https://doi.org/10.1080/17501229.2023.2240316>
- MacQueen, J. (1967). Some methods for classification and analysis of multivariate observations. In *Proceedings of the Fifth Berkeley Symposium on Mathematical Statistics and Probability* (pp. 281–297). University of California Press.
- Maraule, M., Duffett, R., & Edu, T. (2025). Modeling emoji online marketing on websites among young consumers: The moderation effect of age. *Future Business Journal*, 11, Article 91. <https://doi.org/10.1186/s43093-025-00509-7>
- Maru, C., & Vijay, T. S. (2024). The relationship between electronic word of mouth and brand: A systematic review and future research agenda. *International Journal of Consumer Studies*, 48(2), Article e13017. <https://doi.org/10.1111/ijcs.13017>
- Ordenes, F. V., & Silipo, R. (2021). Machine learning for marketing on the KNIME Hub: The development of a live repository for marketing applications. *Journal of Business Research*, 137, 393–410. <https://doi.org/10.1016/j.jbusres.2021.08.036>
- Park, C.-I., & Namkung, Y. (2022). The effects of Instagram marketing activities on customer-based brand equity in the coffee industry. *Sustainability*, 14(3), Article 1463. <https://doi.org/10.3390/su14031657>
- Pavlou, P. A. (2003). Consumer acceptance of electronic commerce: Integrating trust and risk with the technology acceptance model. *International Journal of Electronic Commerce*, 7(3), 101–134. <https://doi.org/10.1080/10864415.2003.11044275>
- Ping, J. W., Goh, K. Y., & Teo, H. H. (2010). Emerging consumers with advergames: An experimental evaluation of interactivity, relevancy and expectancy. *ICIS 2010 Proceedings*, 221. https://aisel.aisnet.org/icis2010_submissions/221/
- Poeppelbuss, J., Ebel, M., & Anke, J. (2022). Iterative uncertainty reduction in multi-actor smart service innovation. *Electronic Markets*, 32, 599–627. <https://doi.org/10.1007/s12525-021-00500-4>
- Punj, G., & Stewart, D. W. (1983). Cluster analysis in marketing research: Review and suggestions for application. *Journal of Marketing Research*, 20(2), 134–148. <https://doi.org/10.1177/002224378302000204>
- Rababa, B. W., Ali, A., & Mohammad, A. M. (2025). Understanding mobile banking adoption via the technology acceptance model: Evidence from Jordan. *Banks and Bank Systems*, 30(1), 23–37. [https://doi.org/10.21511/bbs.20\(1\).2025.03](https://doi.org/10.21511/bbs.20(1).2025.03)

- Rao, K. S., Rao, B., & Acharyulu, G. V. R. K. (2021). Examining ePWOM-purchase intention link in Facebook brand fan pages: Trust beliefs, value co-creation and brand image as mediators. *IIMB Management Review*, 33(4), 309–321. <https://doi.org/10.1016/j.iimb.2021.11.002>
- Ravšelj, D., Keržič, D., Tomaževič, N., Umek, L., Brezovar, N., A. Iahad, N. A., Abdulla, A. A., Akopyan, A., Segura, M. W. A., AlHumaid, J., Allam, M. F., Alló, M., Andoh, R. P. K., Andronic, O., Arthur, Y. D., Aydin, F., Badran, A., Balbontín-Alvarado, R., Saad, H. B., ... Aristovnik, A. (2025). Higher education students' perceptions of ChatGPT: A global study of early reactions. *PLoS One*, 20(2), Article e0315011. <https://doi.org/10.1371/journal.pone.0315011>
- Rosario, A. B., De Valck, K., & Sotgiu, F. (2020). Conceptualizing the electronic word-of-mouth process: What we know and need to know about eWOM creation, exposure, and evaluation. *Journal of the Academy of Marketing Science*, 48, 422–448. <https://doi.org/10.1007/s11747-019-00706-1>
- Sáez-Ortuño, L., Huertas-García, R., Forgas-Coll, S., & Puertas-Prats, E. (2023). How can entrepreneurs improve digital market segmentation? A comparative analysis of supervised and unsupervised learning algorithms. *International Entrepreneurship and Management Journal*, 19, 1893–1920. <https://doi.org/10.1007/s11365-023-00882-1>
- Sallam, M., Salim, N. A., Barakat, M., Al-Mahzoum, K., Al-Tammemi, A. B., Malaeb, D., Hallit, R., & Hallit, S. (2023). Assessing health students' attitudes and usage of ChatGPT in Jordan: Validation study. *JMIR Medical Education*, 9, Article e48254. <https://doi.org/10.2196/48254>
- Samala, N., Singh, S., Nukhu, R., & Khetarpal, M. (2019). Investigating the role of participation and customer-engagement with tourism brands (CETB) on social media. *Academy of Marketing Studies Journal*, 23(1), 1–16.
- Saveljeva, J. (2025). Trust and risk management interplay: A review in the digital context. In *Proceedings of the 11th International Conference on Information Systems Security and Privacy* (pp. 189–196). SciTePress. <https://doi.org/10.5220/0013344200003956>
- Shahzad, M. F., Xu, S., & Javed, I. (2024). ChatGPT awareness, acceptance, and adoption in higher education: The role of trust as a cornerstone. *International Journal of Educational Technology in Higher Education*, 21, Article 46. <https://doi.org/10.1186/s41239-024-00478-x>
- Shimul, A. S. (2022). Brand attachment: A review and future research. *Journal of Brand Management*, 29, 400–419. <https://doi.org/10.1057/s41262-022-00279-5>
- Tanninen, M., & Meyers, G. (2025). (Dis)trust in digital insurance: How datafied practices shift uncertainties and reconfigure trust relations. *The British Journal of Sociology*. <https://doi.org/10.1111/1468-4446.13223>
- Tseng, T. H., Hsieh, S. H., & Lee, C. T. (2021). How gamified branded applications drive marketing effectiveness? *Marketing Intelligence & Planning*, 39(5), 633–648. <https://doi.org/10.1108/MIP-09-2020-0407>
- Tseng, T. H., & Lee, C. T. (2018). Facilitation of consumer loyalty toward branded applications: The dual-route perspective. *Telematics and Informatics*, 35(5), 1297–1309. <https://doi.org/10.1016/j.tele.2018.03.002>
- Uddin, M. A., Talukder, M. A., Ahmed, M. R., Khraisat, A., Alazab, A., Islam, M. M., Aryal, S., & Jibon, F. A. (2024). Data-driven strategies for digital native market segmentation using clustering. *International Journal of Cognitive Computing in Engineering*, 5, 178–191. <https://doi.org/10.1016/j.ijcce.2024.04.002>
- Venkatesh, V., Thong, J. Y. L., Chan, F. K. Y., & Hu, P. J. H. (2016). Managing citizens' uncertainty in e-government services: The mediating and moderating roles of transparency and trust. *Information Systems Research*, 27(1), 87–111. <https://doi.org/10.1287/isre.2015.0612>
- Wang, G. (2025). Customer segmentation in the digital marketing using a Q-learning based differential evolution algorithm integrated with k-means clustering. *PLoS One*, 20(2), Article e0318519. <https://doi.org/10.1371/journal.pone.0318519>

Wedel, M., & Kamakura, W. A. (2000). *Market segmentation: Conceptual and methodological foundations* (2nd ed.). Springer/Kluwer.

Wise, K., Bolls, P. D., Kim, H., Venkataraman, A., & Meyer, R. (2008). Enjoyment of advergames and brand attitudes: The impact of thematic relevance. *Journal of Interactive Advertising*, 9(1), 27–36.
<https://doi.org/10.1080/15252019.2008.10722145>

Wu, J., Hu, L., He, X., & Zheng, X. (2024). A systematic literature review and bibliometric analysis based on member subscription services in retailing. *Electronic Commerce Research and Applications*, 63, Article 101344.
<https://doi.org/10.1016/j.elerap.2023.101344>

Wu, W.-Y., Do, T. Y., Nguyen, P.-T., Anridho, N., & Vu, M.-Q. (2020). An integrated framework of customer-based brand equity and theory of planned behavior: A meta-analysis approach. *The Journal of Asian Finance, Economics and Business*, 7(8), 371–381. <https://doi.org/10.13106/jafeb.2020.vol7.no8.371>

Xu, Z., Zhu, G., Metawa, N., & Zhou, Q. (2022). Machine learning based customer meta-combination brand equity analysis for marketing behavior evaluation. *Information Processing & Management*, 59, Article 102800.
<https://doi.org/10.1016/j.ipm.2021.102800>

Yazid, Y., & Kawiryan, H. (2023). How to improve brand image: The role of customer attitude, brand familiarity, brand awareness, and brand extension. *Asian Management and Business Review*, 3(2), 199–209.
<https://doi.org/10.20885/ambr.vol3.iss2.art7>

Žvanut, B., & Mihelič, A. (2024). Qualitative study on domestic social robot adoption and associated security concerns among older adults in Slovenia. *Frontiers in Psychology*, 15, Article 1343077.
<https://doi.org/10.3389/fpsyg.2024.1343077>

BRANDING THE ALGORITHM: AI BRAND EQUITY AND CONTINUED USE OF THE CHATGPT APP

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ABSTRACT

As generative artificial intelligence (AI) applications (apps) increasingly function as consumer-facing brands, understanding how users form brand evaluations of algorithmic systems has become a critical marketing issue. This study examines AI brand equity as a higher-order branding construct and investigates how it shapes continued use of the ChatGPT app among Generation Z (Gen Z) users in South Africa. Drawing on the stimulus-organism-response framework, the study conceptualises key service-related stimuli as drivers of internal brand-related evaluations, which influence behavioural outcomes. A quantitative, cross-sectional research design was employed, with data collected from 166 Gen Z users of the ChatGPT app. Data were analysed using SmartPLS 4, estimating a reflective higher-order construct model in which AI brand equity captures users' trust, attitudes, and perceived value associated with the ChatGPT brand. The findings demonstrate that AI brand equity plays a central mediating role, significantly shaping user satisfaction and continuance intention. Results further show that brand-based evaluations are more influential than purely functional perceptions in explaining sustained engagement with generative AI apps. By positioning ChatGPT as an algorithmic brand, rather than a neutral technology tool, this study extends branding theory into the domain of generative AI and offers actionable insights for marketers managing AI-driven brands in highly competitive digital environments.

Keywords: AI brand equity, ChatGPT, stimulus-organism-response, continuance intention, electronic word of mouth.

INTRODUCTION

Generative artificial intelligence (AI) has rapidly become embedded in everyday consumer and work practices, with OpenAI's ChatGPT emerging as one of the most widely adopted apps for information search, content creation, and learning support. The ChatGPT app, in particular, positions generative AI as a consumer-facing, always-on service, rather than a background computational tool. Users download the app, form impressions of its performance and interaction style, discuss it with peers, and decide whether to integrate it into their daily routines. In this sense, ChatGPT increasingly functions not only as an information system but also as an emergent AI brand competing for user attention, trust, and continued use (Camilleri, 2024b; Shahzad, Xu, An, & Javed, 2024).

Research on ChatGPT adoption has largely drawn on the technology acceptance model and the unified theory of acceptance and use of technology, emphasising functional beliefs, including perceived usefulness and ease of use. Recent extensions have incorporated trust and perceived risk to better explain generative AI adoption (Balaskas et al., 2025; Shahzad, Xu, An, & Javed, 2024). However, this literature continues to conceptualise ChatGPT primarily as a tool, offering limited insight into how users evaluate it as a brand characterised by familiarity, perceived benefits, brand attitudes, and awareness.

From a consumer perspective, brand equity reflects stored cognitive and affective evaluations that shape satisfaction, loyalty, and behavioural intentions. Consumer-based brand equity theory conceptualises brands as multidimensional assets comprising awareness, familiarity, perceived benefits, and favourable attitudes. For digital and technology brands, symbolic and experiential value may be as influential as functional performance (Vinerean et al., 2025). Despite growing evidence that ChatGPT use is socially visible and identity-relevant, the role of AI brand equity in shaping satisfaction and continued use remains underexamined in generative AI research.

Adoption and continued use of AI apps are further shaped by perceived control, perceived risk, and trust. Concerns about misinformation, privacy, and loss of agency heighten perceived risk and weaken favourable evaluations, while perceived control over interactions and trust in system reliability reduce uncertainty and foster positive responses (Balaskas et al., 2025; Shahzad, Xu, An, & Javed, 2024). Although these dynamics are well established in digital services research, their influence on AI brand equity and downstream behavioural outcomes in generative AI app contexts has received limited empirical attention.

A further gap concerns electronic word of mouth (eWOM). Prior studies have focused predominantly on active eWOM behaviours, while passive eWOM engagement, reading, and relying on others' experiences remains underexplored. This is particularly relevant in generative AI contexts, where users often engage quietly with online discussions, tutorials, and shared prompts as part of ongoing learning. Therefore, how AI brand equity and satisfaction translate into passive eWOM through continued app use remains unclear. Three gaps motivate this study: (1) generative AI apps are predominantly examined as functional tools, rather than as brands; (2) AI brand equity is rarely modelled as an internal organism state linking technological perceptions to behaviour; and (3) passive eWOM remains an underexamined behavioural response in AI adoption research.

To address these gaps, this study adopts the stimulus-organism-response (S-O-R) framework to examine ChatGPT app usage among South African Gen Z users. Perceived control, perceived risk, and trust are modelled as stimuli shaping internal organism states, namely AI brand equity, attitude towards using the ChatGPT app, and satisfaction, which drive continuance intention and passive eWOM engagement. AI brand equity is conceptualised as a higher-order construct comprising brand familiarity, perceived benefits, brand attitude, and brand awareness. Accordingly, this study tests a hierarchical S-O-R model that explains how technological perceptions translate into brand-related evaluations and sustained engagement with a generative AI app, offering new insight into how AI systems evolve from tools into brands that shape continued consumer behaviour.

Accordingly, this study is guided by the following research questions:

RQ1: To what extent do perceived control, perceived risk, and trust, as stimuli, influence AI brand equity and attitude towards using the ChatGPT app among South African Gen Z users?

RQ2: What is the mediating role of AI brand equity, conceptualised as a higher-order construct, in linking technological perceptions to satisfaction with the ChatGPT app?

RQ3: How do satisfaction and continuance intention translate into passive eWOM engagement in generative AI app contexts?

These research questions align the identified gaps with the proposed S-O-R framework and clarify how technological perceptions are translated into AI brand equity, satisfaction, continued use, and passive eWOM engagement.

THEORETICAL BACKGROUND: STIMULUS-ORGANISM-RESPONSE FRAMEWORK

The S-O-R framework explains how environmental cues shape internal cognitive and affective evaluations that drive behavioural outcomes (Mehrabian & Russell, 1974). Within digital and AI contexts, this framework has been shown to effectively capture S-O-R pathways that explain adoption, engagement, and loyalty in chatbot and AI-generated service environments (Rafiq et al., 2022; Shi et al., 2025; Uzir et al., 2021). Recent research on ChatGPT further demonstrates that perceived control, perceived risk, and trust operate as salient stimuli shaping brand-related attitudes, perceived benefits, and relational evaluations, which influence satisfaction, continued use, and eWOM behaviours (Wang et al., 2025).

In this study, perceived control, perceived risk, and trust in the ChatGPT app are modelled as core stimuli that shape two organism-level states: AI brand equity and attitude towards using the ChatGPT app. AI brand equity is conceptualised as a higher-order organism construct reflecting internally held consumer evaluations, including brand familiarity, perceived benefits, brand attitude, and brand awareness. These organism states influence satisfaction,

which functions as the central organism outcome driving continuance intention and passive eWOM engagement. By integrating AI brand equity into the S-O-R framework, this study extends its application to generative AI apps by capturing brand-based mechanisms that shape sustained user engagement.

Stimulus: Perceived Control, Perceived Risk, and Trust

Within AI services, user responses are strongly shaped by perceived control, perceived risk, and trust. Perceived control refers to the extent to which users feel able to guide and manage their interactions with ChatGPT. This includes the ability to edit prompts, regenerate responses, review conversation history, and understand how outputs are produced. When users perceive a high degree of control, uncertainty is reduced and evaluations of the technology and the associated brand are more favourable (Shahzad, Xu, & Javed, 2024).

Perceived risk reflects users' concerns about potential negative outcomes of using the ChatGPT app, such as misinformation, privacy violations, bias or unintended consequences. Elevated perceived risk tends to weaken positive beliefs and dampen favourable evaluations, inhibiting adoption and continued use (Chakraborty, 2025). Trust refers to the belief that the ChatGPT app is reliable, competent, and acts in users' interests. Prior research suggests trust is central to shaping acceptance and loyalty in AI-based services, particularly where outcomes are uncertain or opaque (Shahzad, Xu, & Javed, 2024).

In the ChatGPT app context, these three stimuli are expected to shape how users develop AI brand equity and form attitudes towards using the app. When users feel in control of the interaction and trust the app's functioning, they are more likely to perceive ChatGPT as a strong and favourable AI brand and to hold positive attitudes towards its use. In contrast, higher perceived risk is expected to weaken both AI brand equity and attitudes. Accordingly, the following hypotheses are proposed:

- *H1: Perceived control positively influences AI brand equity.*
- *H2: Perceived risk negatively influences AI brand equity.*
- *H3: Trust positively influences AI brand equity.*

The same stimuli are also expected to directly shape users' attitudes towards using the ChatGPT app. Higher perceived control and trust should foster more favourable attitudes, whereas perceived risk should undermine them (Chakraborty, 2025; Shahzad, Xu, & Javed, 2024). Thus:

- *H4: Perceived control positively influences attitude towards using the ChatGPT app.*
- *H5: Perceived risk negatively influences attitude towards using the ChatGPT app.*
- *H6: Trust positively influences attitude towards using the ChatGPT app.*

Together, these hypotheses position perceived control, perceived risk, and trust as key technological and service stimuli that initiate downstream brand-related, attitudinal, and satisfaction processes within the S-O-R framework.

Organism: Internal States and Mediating Processes

Within the S-O-R framework, the organism component captures internal cognitive and affective states that mediate the relationship between stimuli and behavioural responses. In AI adoption contexts, these states include brand-related evaluations, attitudes towards use, and satisfaction formed through direct interaction with the system (Chakraborty, 2025; Shahzad, Xu, An, & Javed, 2024).

In this study, the organism variables are AI brand equity, attitude towards using the ChatGPT app, and satisfaction with the ChatGPT app. AI brand equity is conceptualised as a higher-order organism construct reflecting internally held consumer evaluations, comprising brand familiarity, perceived benefits, brand attitude, and brand awareness. Attitude towards using the ChatGPT app captures users' immediate evaluative orientation towards engaging with the app. Together, these organism states are expected to shape satisfaction with the ChatGPT app, which reflects users' overall appraisal of their interaction experience. Accordingly, the following hypotheses are proposed:

- *H7: AI brand equity positively influences satisfaction with the ChatGPT app.*
- *H8: Attitude towards using the ChatGPT app positively influences satisfaction with the ChatGPT app.*

Therefore, satisfaction is positioned as the central organismic outcome that mediates the effects of brand-related and attitudinal evaluations on continuance intention and passive eWOM engagement.

Response: Continuance Intention and Passive Electronic Word of Mouth

The response component of the S-O-R framework captures the behavioural intentions that follow from internal evaluations. In digital and AI services, key responses include continuance intention and eWOM engagement (Shahzad, Xu, An, & Javed, 2024). In AI app contexts, satisfaction is widely recognised as a central driver of continued use. Users who are satisfied with the ChatGPT app are more likely to integrate it into their routines and commit to ongoing usage. Accordingly, the first response in the model is continuance intention and the following is hypothesised:

- *H9: Satisfaction positively influences intention to use the ChatGPT app.*

The second response is passive eWOM, conceptualised here as a general technology information seeking behaviour involving reading and relying on others' experiences, reviews, and shared tips. This form of engagement is relevant for Gen Z users of AI apps, who frequently consume tutorials, prompts, and peer content through platforms like Reddit, TikTok, and online forums as part of ongoing learning and optimisation. In high uncertainty and rapidly evolving AI contexts, satisfaction may encourage such engagement, although this relationship remains theoretically less settled. Hence, the following relationship is examined in an exploratory manner:

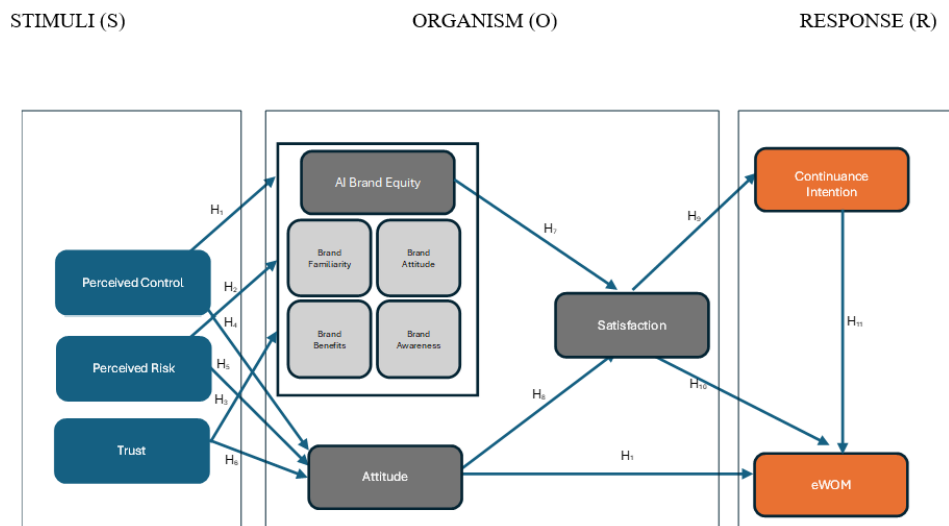
- *H10: Satisfaction positively influences passive eWOM engagement.*

Passive eWOM may also be driven by continuance intention, as users who plan to keep using the ChatGPT app are more likely to seek out information that supports effective and sustained use. Consequently:

- *H11: Intention to use the ChatGPT app positively influences passive eWOM engagement.*

These hypotheses position continuance intention and passive eWOM as complementary behavioural responses that reflect commitment to the app and ongoing information seeking in generative AI environments.

Figure 1: Conceptual model.



Source: Authors' own.

RESEARCH METHODOLOGY

This study adopted a quantitative, cross-sectional research design to test a hierarchical S-O-R model of ChatGPT app usage among South African Gen Z users. Data were collected via an online questionnaire and analysed using SmartPLS 4. AI brand equity was specified as a reflective higher-order construct.

Structural Model and Hypothesis Testing

Perceived control exerted significant positive effects on AI brand equity ($\beta = 0.296$, $p = 0.001$) and attitude towards using AI technologies ($\beta = 0.386$, $p < 0.001$), supporting H1 and H4. Conversely, perceived risk had significant negative effects on AI brand equity ($\beta = -0.193$, $p = 0.012$) and attitude towards using AI technologies ($\beta = -0.235$, $p < 0.001$), supporting H2 and H5. Trust also significantly and positively influenced AI brand equity ($\beta = 0.321$, $p < .001$) and attitude towards using AI technologies ($\beta = 0.330$, $p < 0.001$), supporting H3 and H6.

In turn, AI brand equity positively predicted satisfaction with the ChatGPT app ($\beta = 0.475$, $p < 0.001$), supporting H7, while attitude towards using AI technologies also had a positive effect on satisfaction ($\beta = 0.301$, $p < 0.001$), supporting H8. Satisfaction strongly predicted intention to use the ChatGPT app ($\beta = 0.714$, $p < 0.001$), supporting H9. However, satisfaction did not have a significant direct effect on eWOM engagement ($\beta = -0.008$, $p = 0.953$), leading to the rejection of H10. Instead, intention to use the ChatGPT app positively influenced eWOM ($\beta = 0.285$, $p = 0.021$), supporting H11 and indicating an indirect pathway from satisfaction to passive eWOM via continuance intention.

Table 1: Structural model and hypothesis testing results.

Hypothesis	Path	β	p	Interpretation	Result
H1	Perceived control $\rightarrow$ AI brand equity	0.296	0.001	Significant positive effect	Accepted
H2	Perceived risk $\rightarrow$ AI brand equity	-0.193	0.012	Significant negative effect	Accepted
H3	Trust $\rightarrow$ AI brand equity	0.321	< 0.001	Significant positive effect	Accepted
H4	Perceived control $\rightarrow$ attitude towards AI use	0.386	< 0.001	Significant positive effect	Accepted
H5	Perceived risk $\rightarrow$ attitude towards AI use	-0.235	< 0.001	Significant negative effect	Accepted
H6	Trust $\rightarrow$ attitude towards AI use	0.330	< 0.001	Significant positive effect	Accepted
H7	AI brand equity $\rightarrow$ satisfaction	0.475	< 0.001	Significant positive effect	Accepted
H8	Attitude towards using AI technologies $\rightarrow$ satisfaction	0.301	< 0.001	Significant positive effect	Accepted
H9	Satisfaction $\rightarrow$ intention to use ChatGPT	0.714	< 0.001	Strong positive effect	Accepted
H10	Satisfaction $\rightarrow$ eWOM	-0.008	0.953	Not significant	Rejected
H11	Intention to use ChatGPT $\rightarrow$ eWOM	0.285	0.021	Significant positive effect	Accepted

Source: Authors' own.

Model Explanatory and Predictive Power

Model quality was assessed using explanatory power (R^2), predictive relevance (Q^2 predict), effect sizes (f^2), and global fit indices. The results are summarised in Table 3. The model explained substantial variance in attitude towards using AI technologies ($R^2 = 0.555$), satisfaction with the ChatGPT app ($R^2 = 0.506$), and intention to use the ChatGPT

app ($R^2 = 0.510$), and moderate variance in AI brand equity ($R^2 = 0.407$). Explained variance for eWOM was comparatively low ($R^2 = 0.078$), which is consistent with prior technology adoption research.

All Q^2 predict values exceeded zero, indicating out-of-sample predictive relevance. Predictive relevance was strongest for attitude towards using AI technologies (Q^2 predict = 0.523), satisfaction (Q^2 predict = 0.455), and AI brand equity (Q^2 predict = 0.373); moderate for intention to use the ChatGPT app (Q^2 predict = 0.310), and weak but positive for eWOM (Q^2 predict = 0.020).

Effect size analysis showed a very large effect of satisfaction on intention to use the ChatGPT app ($f^2 = 1.040$); a medium effect of AI brand equity on satisfaction ($f^2 = 0.254$) and perceived control on attitude ($f^2 = 0.255$); and a small but meaningful effect for trust and perceived risk on AI brand equity and attitude respectively. The effect of satisfaction on eWOM was negligible ($f^2 = 0.000$), consistent with its non-significant structural path. Regarding model fit, the standardised root mean square residual (SRMR) value of 0.108 slightly exceeded conservative cut-off values, but remained acceptable for complex partial least squares structural equation modelling, while the normed fit index (NFI) value of 0.754 indicated a moderate level of fit. Together, these results supported the overall adequacy of the proposed model.

Table 3: Summary of model quality and predictive metrics.

Metric	Construct	Value
R-square (R^2)	AI brand equity	0.407
	Attitude towards using AI technologies	0.555
	eWOM	0.078
	Intention to use the ChatGPT app	0.510
	Satisfaction	0.506
Predictive relevance (Q^2_{predict})	AI brand equity	0.373
	Attitude towards using AI technologies	0.523
	eWOM	0.020
	Intention to use the ChatGPT app	0.310
	Satisfaction	0.455
Effect size (f^2)	AI brand equity → satisfaction	0.254
	Attitude towards using AI technologies → satisfaction	0.102
	Intention to use the ChatGPT app → eWOM	0.043
	Perceived control → AI brand equity	0.112
	Perceived control → attitude towards using AI technologies	0.255
	Perceived risk → AI brand equity	0.050
	Perceived risk → attitude towards using AI technologies	0.099
	Satisfaction → eWOM	0.000
	Satisfaction → intention to use the ChatGPT app	1.040
	Trust → AI brand equity	0.117
	Trust → attitude towards using AI technologies	0.165
Model fit	SRMR	0.108
	NFI	0.754

Source: Authors' own.

Importance Performance Map Analysis

An importance-performance map analysis (IPMA) was conducted for the target construct: intention to use the ChatGPT app. The results are presented in Table 4. Satisfaction emerged as the most important driver of intention to use the ChatGPT app (0.714), followed by AI brand equity (0.339) and attitude towards using AI technologies (0.215). Perceived control (0.183) and trust (0.180) displayed moderate importance and relatively high performance levels, indicating areas of consolidation, rather than immediate intervention. Contrastingly, perceived risk exhibited negative importance (-0.116) and the lowest performance score (39.79), identifying it as a key priority for managerial

intervention. Therefore, reducing perceived risk related to privacy, security, and algorithmic bias is likely to yield meaningful improvements in continued use intentions. A graphical IPMA output is provided in Appendix C.

Table 4: IPMA results for intention to use the ChatGPT app.

Construct	Importance (total effects)	Performance
Satisfaction	0.714	68.06
AI brand equity	0.339	56.94
Attitude towards using AI technologies	0.215	69.22
Perceived control	0.183	69.76
Trust	0.180	59.44
Perceived risk	-0.116	39.79

Source: Authors' own.

DISCUSSION

This study examines how perceived control, perceived risk, and trust shape AI brand equity, attitude towards using the ChatGPT app, satisfaction, continuance intention, and passive eWOM engagement within a hierarchical S-O-R framework. The findings support the proposed model: technological stimuli strongly explain brand-related and attitudinal organism states, which account for substantial variance in satisfaction and continuance intention. While significant, passive eWOM remains more weakly explained, reflecting its more distal and socially contingent nature. These results position ChatGPT not only as a functional AI tool, but as an emergent consumer-facing AI brand whose equity meaningfully conditions downstream evaluations and behaviours, extending prior work grounded primarily in technology acceptance perspectives (Balaskas et al., 2025; Camilleri, 2024b; Shahzad, Xu, & Javed, 2024).

Perceived control emerges as a robust driver of AI brand equity and attitude towards using the ChatGPT app. This finding reinforces the view that users' sense of agency in AI interactions is central to shaping favourable brand evaluations and usage-related attitudes. When users feel able to guide, refine, and correct AI outputs, they are more likely to interpret the system as competent and supportive, rather than opaque or threatening. This aligns with prior work showing that perceived control is particularly influential in affective and cognitive AI services, where user engagement extends beyond transactional task completion (Fan et al., 2024).

Trust similarly exerts strong positive effects on AI brand equity and attitude. Consistent with prior research on AI-enabled services, trust functions as a foundational condition for favourable brand and attitudinal outcomes, especially in contexts characterised by algorithmic opacity and information asymmetry (Nguyen et al., 2025; Shahzad, Xu, An, & Javed, 2024). The findings reinforce trust as a central mechanism through which users translate perceived AI competence into stable brand-related evaluations.

In contrast, perceived risk negatively influences AI brand equity and attitude towards using the ChatGPT app. Concerns related to misinformation, bias, and privacy appear to undermine not only adoption-related attitudes, but also the formation of favourable brand equity. This supports emerging evidence that perceived risk operates as a dampening force in generative AI contexts, even among digitally fluent users (Marjerison et al., 2025; Moon, 2024). At the organism level, AI brand equity and attitude towards using the ChatGPT app positively influence satisfaction, with AI brand equity emerging as the stronger antecedent. This finding extends prior AI adoption research by demonstrating that accumulated brand-level evaluations contribute more strongly to satisfaction than immediate usage attitudes alone. In turn, satisfaction is the dominant predictor of continuance intention, confirming its central role as the proximal driver of sustained AI use.

However, satisfaction does not directly predict passive eWOM engagement. Instead, continuance intention is the key antecedent of passive eWOM, suggesting that users engage with others' opinions, reviews, and shared experiences primarily when they anticipate ongoing use, rather than simply because they are satisfied. This finding aligns with prior work indicating that eWOM engagement is more closely tied to involvement, loyalty, and behavioural commitment than to satisfaction alone (Anastasiei et al., 2024; Vinerean et al., 2025).

Together, the findings extend the S-O-R framework by integrating AI brand equity as a higher-order organism state in a generative AI app context. The results demonstrate that brand-related evaluations critically mediate the relationship between technological perceptions and sustained behavioural engagement, offering a more holistic explanation of generative AI adoption than functionally orientated acceptance models alone.

MANAGERIAL IMPLICATIONS AND THEORETICAL CONTRIBUTION

Managerial Implications

IPMA identifies the drivers that most strongly influence intention to use the ChatGPT app and highlights where managerial effort will yield the greatest impact. By jointly considering importance and performance, IPMA supports focused, evidence-based prioritisation over broad improvement efforts (Sarstedt et al., 2024).

First, satisfaction is the most critical driver of continuance intention and should be treated as the primary design objective. This underscores the need to manage generative AI as an experience-centric service, with emphasis on output quality, ease of interaction, and visible recovery mechanisms when responses are inadequate. Sustained monitoring of satisfaction is essential for supporting ongoing use.

Second, AI brand equity is a key but underperforming driver, indicating significant opportunity for improvement. Managers should move beyond positioning ChatGPT as a neutral tool and actively cultivate it as a differentiated AI brand by communicating clear value propositions, maintaining consistency in tone and interface, and reinforcing its relevance for key user segments. Strengthening AI brand equity supports satisfaction and stabilises continuance intentions.

Third, perceived control and trust emerge as experiential strengths with relatively high performance. These should be consolidated through transparent interaction design, intuitive controls, consistent system performance, and clear communication about limitations and data governance. Together, control and trust form the experiential foundation that sustains positive brand and usage evaluations.

Finally, perceived risk functions as a hygiene factor with low performance and negative influence. Managers should proactively reduce risk perceptions through accessible communication about privacy, security, and ethical safeguards, as unmanaged risk can quickly undermine trust and continued use.

Overall, embedding IPMA as a recurring monitoring tool enables organisations to track shifting priorities as generative AI technologies and user expectations evolve, ensuring that resources remain focused on the drivers with the greatest impact on sustained engagement.

From a global managerial perspective, these findings offer strategic guidance for AI providers operating in increasingly competitive generative AI markets. Although the empirical context of this study is South African Gen Z users, the results suggest that managers should not rely solely on functional utility when seeking to sustain continued use. Instead, generative AI apps should be managed as consumer-facing brands whose long-term competitiveness depends on trust, perceived control, risk reduction, satisfaction, and accumulated brand value. Managers should therefore prioritise brand-building initiatives that extend beyond technical performance, including consistent ethical communication, transparent data practices, responsible innovation messaging, and culturally adaptive user interfaces. Such initiatives can strengthen AI brand equity across diverse user groups by reinforcing familiarity, perceived value, favourable brand attitudes, and trust.

The findings also suggest that perceived risk requires sustained managerial attention, particularly in markets where user confidence in AI technologies remains fragile. Privacy safeguards, clear data governance, misinformation controls, bias-mitigation practices, and accessible explanations of system limitations can help reduce uncertainty and protect brand evaluations. At the same time, perceived control should be strengthened through user-friendly customisation tools, clearer prompt guidance, editable interactions, feedback mechanisms, and visible options for correcting or regenerating outputs. These features can enhance satisfaction by allowing users to experience generative

AI systems as manageable and supportive, rather than opaque or unpredictable. Finally, organisations should integrate IPMA insights into cross-functional decision-making across product development, marketing, user experience, and AI ethics teams. This would support proactive brand management in rapidly evolving generative AI ecosystems, where continued use depends not only on technical capability, but also on users' confidence in the brand, their sense of control, and their perception that risks are being responsibly managed.

Theoretical Contribution

This study makes a clear theoretical contribution to branding literature by introducing and empirically validating the concept of AI brand equity within a generative AI context. While prior research on AI apps has largely focused on technology acceptance, system quality, or human-computer interaction, this study reframes generative AI as a brand entity that consumers evaluate through trust, attitudes, and satisfaction, consistent with established brand equity theory. By modelling AI brand equity as a higher-order construct, the study demonstrates how brand-based mechanisms operate even when the “brand” is algorithmic, rather than human- or corporate-led. Furthermore, by embedding AI brand equity within an S-O-R framework, the study advances understanding of how service stimuli translate into internal brand evaluations that drive continued use behaviour. This positioning extends traditional branding theory into AI-mediated consumption environments, offering a novel perspective on brand equity formation in digital platforms and contributing to emerging scholarship on algorithmic branding and AI-driven brand relationships.

CONCLUSION, LIMITATIONS, AND FUTURE RESEARCH

This study applies the S-O-R framework to examine how perceived control, risk, and trust shape AI brand equity, attitudes, satisfaction, and behavioural outcomes in the context of the ChatGPT app. The findings reveal a coherent process in which perceived control and trust strengthen AI brand equity and attitudes, while perceived risk weakens them. These organismic states enhance satisfaction, which emerges as the primary driver of continuance intention. Continuance intention, rather than satisfaction alone, translates into passive eWOM engagement, indicating that passive eWOM reflects behavioural commitment more than affective evaluation.

Theoretically, the study contributes by demonstrating that generative AI apps are experienced as brands, rather than mere tools, by integrating risk-trust-control dynamics into a hierarchical S-O-R model and by clarifying the distinct roles of satisfaction and continuance intention in driving passive eWOM. Practically, the findings highlight the need to manage generative AI as an experiential and brand-building platform, with satisfaction and AI brand equity as key levers for sustained use, supported by high perceived control, trust, and proactive risk management.

Several limitations should be noted. The cross-sectional, self-reported design limits causal inference and generalisability beyond the focal app and user group. The model also excludes other potentially relevant factors, such as social influence, perceived usefulness, or active eWOM. Future research could employ longitudinal or experimental designs, integrate behavioural usage data, compare multiple AI brands and contexts, and further differentiate between active and passive eWOM to deepen understanding of sustained engagement with generative AI services.

APPENDICES

APPENDIX 1: Variable of the study.

Construct	Item code	Item statement	Scale
Control	C1_1	I felt in control of what I was doing when I was using the ChatGPT app.	1 = Strongly disagree ... 5 = Strongly agree 1–5
	C1_2	I could easily control the information that was provided to me when I was using the ChatGPT app.	1–5
	C1_3	I felt I could control my use of the information I received from using the ChatGPT app.	1–5

Construct	Item code	Item statement	Scale
	C1_4	The level of information provided by the ChatGPT app helped me to feel in control when interacting with the app.	1–5
Perceived risk (Im et al., 2008)	PR_1	It is probable that the ChatGPT app would not be worth its effort.	1–5
	PR_2	It is probable that the ChatGPT app would frustrate me because of its poor performance.	1–5
	PR_3	Compared with other technologies, using ChatGPT has more uncertainties.	1–5
	PR_4	It is uncertain whether the ChatGPT app would be as effective as I think.	1–5
Trust (Chen & Barnes, 2007)	T_1	The ChatGPT app is trustworthy and honest.	1–5
	T_2	The ChatGPT app wants to keep promises and obligations.	1–5
	T_3	The information on the ChatGPT app is plentiful and of sufficient quality.	1–5
	T_4	The ChatGPT app is dependable.	1–5
Attitude (Ajzen, 1991)	ATT_1	All things considered, I find using the ChatGPT app to be a good idea.	1–7
	ATT_2	All things considered, I find using the ChatGPT app to be a positive thing.	1–7
	ATT_3	All things considered, I find using the ChatGPT app to be favourable.	1–7
Brand familiarity (Catalán et al., 2019; Ping et al., 2010)	BF_1	How familiar are you with the ChatGPT app brand?	1 = Not at all familiar ... 5 = Very familiar
	BF_2	How often have you used the ChatGPT app in the past six months?	1 = Not often ... 5 = Very often
	BF_3	How knowledgeable are you about the ChatGPT app?	1 = Not very knowledgeable ... 5 = Very knowledgeable
Brand attitude (Catalán et al., 2019; Wise et al., 2008)	BA_1	My attitude towards the ChatGPT app is: unfavourable/favourable.	1 = Unfavourable ... 7 = Favourable
	BA_2	Bad/Good	1–7
	BA_3	Negative/Positive	1–7
Brand benefits – symbolic (Tseng et al., 2021; Tseng & Lee, 2018)	BB_1	The ChatGPT app brand makes my life richer and more meaningful.	1 = Strongly disagree ... 5 = Strongly agree
			1–5
	BB_2	I can use (consume) the ChatGPT app brand to express who I am.	1–5
	BB_3	The ChatGPT app brand represents my deepest values.	1–5
	BB_4	The ChatGPT app helps me make a good impression on other people.	1–5
Brand awareness (Abou-Shouk & Soliman, 2021; Samala et al., 2019)	BAW_1	I would like to learn more about the ChatGPT brand.	1–5
	BAW_2	I pay attention to anything about the ChatGPT brand.	1–5
	BAW_3	Anything related to ChatGPT will grab my attention.	1–5
	BAW_4	I concentrate on the ChatGPT brand.	1–5
	BAW_5	Sharing experiences and recalling memories will help increase brand awareness of ChatGPT.	1–5

Construct	Item code	Item statement	Scale
Satisfaction	SAT_1	Overall, I am satisfied with the ChatGPT app I used.	1 = Strongly disagree ... 7 = Strongly agree
	SAT_2	The ChatGPT app exceeded my expectations.	1–7
	SAT_3	The ChatGPT app is close to my ideal interaction with a content generator tool.	1–7
Intention to use (Im et al., 2008)	IU_1	I predict I would use the ChatGPT app.	1 = Strongly disagree ... 5 = Strongly agree
	IU_2	The ChatGPT app would be one of my favourite technologies for my work.	1–5
	IU_3	I intend to use the ChatGPT app.	1–5
eWOM (Bialkova & Te Paske, 2020; Rao et al., 2021)	EWM_1	I regularly read online reviews and other online sources to determine which new technology developments make a good impression.	1–5
	EWM_2	I refer to online reviews and other online sources to choose new technology developments.	1–5
	EWM_3	I collect information using online reviews and other online sources before choosing new technology developments.	1–5
	EWM_4	I perceive information obtained from online reviews and online sources as very important when choosing new technology developments.	1–5

Source: Authors' own.

APPENDIX 2: Lower-order model HTMT.

	ATT	BATT	BAW	BBEN	BF	eWOM	INT	C	PR	SAT	T
ATT											
BATT	0.695										
BAW	0.564	0.542									
BBEN	0.426	0.462	0.676								
BF	0.571	0.595	0.493	0.367							
eWOM	0.248	0.247	0.349	0.291	0.226						
INT	0.782	0.746	0.652	0.515	0.653	0.299					
C	0.685	0.526	0.395	0.325	0.495	0.201	0.550				
PR	0.555	0.454	0.273	0.323	0.412	0.085	0.494	0.333			
SAT	0.683	0.636	0.588	0.515	0.574	0.210	0.789	0.698	0.494		
T	0.706	0.612	0.491	0.496	0.309	0.183	0.592	0.557	0.539	0.648	

Notes: ATT = attitude towards using AI technologies; BATT = brand attitude; BAW = brand awareness; BBEN = brand benefits; BF = brand familiarity; eWOM = electronic word of mouth; INT = intention to use the ChatGPT app; C = perceived control; PR = perceived risk; SAT = satisfaction; T = trust

Source: Authors' own.

APPENDIX 3: Lower-order model Fornell-Larcker criterion.

	ATT	BATT	BAW	BBEN	BF	eWOM	INT	C	PR	SAT	T
ATT	0.915										
BATT	0.638	0.939									
BAW	0.508	0.495	0.825								
BBEN	0.392	0.430	0.586	0.789							
BF	0.491	0.515	0.421	0.324	0.847						
eWOM	0.224	0.230	0.316	0.253	0.188	0.901					
INT	0.711	0.687	0.590	0.476	0.568	0.279	0.921				
C	0.612	0.480	0.347	0.295	0.422	0.186	0.492	0.889			

	ATT	BATT	BAW	BBEN	BF	eWOM	INT	C	PR	SAT	T
PR	-0.492	-0.397	-0.250	-0.275	-0.371	-0.070	-0.445	-0.293	0.762		
SAT	0.617	0.583	0.527	0.469	0.495	0.196	0.714	0.618	-0.451	0.911	
T	0.617	0.549	0.431	0.425	0.260	0.162	0.522	0.479	-0.438	0.566	0.823

Source: Authors' own.

APPENDIX 4: Higher-order model HTMT.

	AIBE	ATT	eWOM	INT	C	PR	SAT	T
AIBE								
ATT	0.786							
eWOM	0.379	0.248						
INT	0.895	0.782	0.299					
C	0.605	0.685	0.201	0.550				
PR	0.508	0.555	0.085	0.494	0.333			
SAT	0.806	0.683	0.210	0.789	0.698	0.494		
T	0.663	0.706	0.183	0.592	0.557	0.539	0.648	

Notes: AIBE = artificial intelligence brand equity

Source: Authors' own.

APPENDIX 5: Higher-order model lower Fornell-Larcker criterion.

	AIBE	ATT	eWOM	INT	C	PR	SAT	T
AIBE	0.772							
ATT	0.667	0.915						
eWOM	0.318	0.224	0.901					
INT	0.759	0.711	0.279	0.921				
C	0.506	0.612	0.186	0.492	0.889			
PR	-0.420	-0.492	-0.070	-0.443	-0.293	0.763		
SAT	0.675	0.617	0.196	0.714	0.619	-0.450	0.911	
T	0.547	0.617	0.163	0.521	0.479	-0.437	0.566	0.823

Source: Authors' own.

REFERENCES

- Abou-Shouk, M., & Soliman, M. (2021). The impact of gamification adoption intention on brand awareness and loyalty in tourism: The mediating effect of customer engagement. *Journal of Destination Marketing & Management*, 20, Article 100559. <https://doi.org/10.1016/j.jdmm.2021.100559>
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Anastasei, B., Dospinescu, N., & Dospinescu, O. (2024). Individual and product-related antecedents of electronic word-of-mouth. *Aslib Journal of Information Management*. <https://doi.org/10.1108/AJIM-04-2024-0353>
- Balaskas, S., Tsiantos, V., Chatzifotou, S., & Rigou, M. (2025). Determinants of ChatGPT adoption intention in higher education: Expanding on TAM with the mediating roles of trust and risk. *Information*, 16(2), Article 82. <https://doi.org/10.3390/info16020082>
- Bialkova, S., & Te Paske, S. (2021). Campaign participation, spreading electronic word of mouth, purchase: How to optimise corporate social responsibility, CSR, effectiveness via social media? *European Journal of Management and Business Economics*, 30(1), 108–126. <https://doi.org/10.1108/EJMBE-08-2020-0244>

- Camilleri, M. A. (2024a). Artificial intelligence governance: Ethical considerations and implications for social responsibility. *Expert Systems*, 41(7), Article e13406. <https://doi.org/10.1111/exsy.13406>
- Camilleri, M. A. (2024b). Factors affecting performance expectancy and intentions to use ChatGPT: Using SmartPLS to advance an information technology acceptance framework. *Technological Forecasting and Social Change*, 201, Article 123247. <https://doi.org/10.1016/j.techfore.2024.123247>
- Catalán, S., Martínez, E., & Wallace, E. (2019). Analysing mobile advergames effectiveness: The role of flow, game repetition and brand familiarity. *Journal of Product & Brand Management*, 28(4), 502–514. <https://doi.org/10.1108/JPBM-07-2018-1929>
- Chakraborty, D. (2025). From algorithms to adoption of AI-based online food delivery platforms: The role of technology fit and emotional trust in adoption. *British Food Journal*, 127(4), 2586–2607. <https://doi.org/10.1108/BFJ-02-2025-0143>
- Chen, Y.-H., & Barnes, S. (2007). Initial trust and online buyer behaviour. *Industrial Management & Data Systems*, 107(1), 21–36. <https://doi.org/10.1108/02635570710719034>
- Fan, Q., Dai, Y., & Wen, X. (2024). Is smarter better? A moral judgment perspective on consumer attitudes about different types of AI services. *Journal of Theoretical and Applied Electronic Commerce Research*, 19(3), 1637–1659. <https://doi.org/10.3390/jtaer19030080>
- Im, I., Kim, Y., & Han, H.-J. (2008). The effects of perceived risk and technology type on users' acceptance of technologies. *Information & Management*, 45(1), 1–9. <https://doi.org/10.1016/j.im.2007.03.005>
- Marjerison, R. K., Dong, H., Kim, J.-M., Zheng, H., Zhang, Y., & Kuan, G. (2025). Understanding user acceptance of AI-driven chatbots in China's e-commerce: The roles of perceived authenticity, usefulness, and risk. *Systems*, 13(2), Article 71. <https://doi.org/10.3390/systems13020071>
- Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology*. MIT Press.
- Moon, S.-J. (2024). Effects of perception of potential risk in generative AI on attitudes and intention to use. *International Journal on Advanced Science, Engineering and Information Technology*, 14(5), 1748–1755.
- Nguyen, K. T., Pham, N. T., Ngoc Thuy, V. T., & Pilík, M. (2025). Boosting customers' e-word of mouth in online shopping platforms: The role of artificial intelligence through a mixed-methods approach – a Vietnamese perspective. *Journal of Asia Business Studies*. <https://doi.org/10.1108/JABS-08-2024-0476>
- Ping, J. W., Goh, K. Y., & Teo, H. H. (2010). Emerging consumers with advergames: An experimental evaluation of interactivity, relevancy and expectancy. *ICIS 2010 Proceedings*, 221. https://aisel.aisnet.org/icis2010_submissions/221/
- Rafiq, F., Dogra, N., Adil, M., & Wu, J.-Z. (2022). Examining consumer's intention to adopt AI-chatbots in tourism using partial least squares structural equation modeling method. *Mathematics*, 10(13), Article 2190. <https://doi.org/10.3390/math10132190>
- Rao, K. S., Rao, B., & Acharyulu, G. V. R. K. (2021). Examining ePWOM-purchase intention link in Facebook brand fan pages: Trust beliefs, value co-creation and brand image as mediators. *IIMB Management Review*, 33(4), 309–321. <https://doi.org/10.1016/j.iimb.2021.11.002>
- Samala, N., Singh, S., Nukhu, R., & Khetarpal, M. (2019). Investigating the role of participation and customer-engagement with tourism brands (CETB) on social media. *Academy of Marketing Studies Journal*, 23(1), 1–16. [https://www.abacademies.org/articles/Investigating-the-role-of-participation-and-customer-engagement-with-tourism.-brands-\(CETB\)-on-social-media-1528-2678-23-1-185.pdf](https://www.abacademies.org/articles/Investigating-the-role-of-participation-and-customer-engagement-with-tourism.-brands-(CETB)-on-social-media-1528-2678-23-1-185.pdf)
- Sarstedt, M., Hair, J. F., Cheah, J. H., Becker, J. M., & Ringle, C. M. (2019). How to specify, estimate,

- Sarstedt, M., Richter, N. F., Hauff, S., & Ringle, C. M. (2024). Combined importance-performance map analysis (cIPMA) in partial least squares structural equation modeling (PLS–SEM): A SmartPLS 4 tutorial. *Journal of Marketing Analytics*, 12, 746–760. <https://doi.org/10.1057/s41270-024-00325-y>
- Shahzad, M. F., Xu, S., & Javed, I. (2024). ChatGPT awareness, acceptance, and adoption in higher education: The role of trust as a cornerstone. *International Journal of Educational Technology in Higher Education*, 21(1), Article 46. <https://doi.org/10.1186/s41239-024-00478-x>
- Shahzad, M. F., Xu, S., An, X., & Javed, I. (2024). Assessing the impact of AI-chatbot service quality on user e-brand loyalty through chatbot user trust, experience and electronic word of mouth. *Journal of Retailing and Consumer Services*, 79, Article 103867. <https://doi.org/10.1016/j.jretconser.2024.103867>
- Shi, W., Li, L., Zhang, Z., Li, M., & Li, J. (2025). Research on driving factors of consumer purchase intention of artificial intelligence creative products based on user behavior. *Scientific Reports*, 15, Article 17400. <https://doi.org/10.1038/s41598-025-01258-x>
- Tseng, T. H., Hsieh, S. H., & Lee, C. T. (2021). How gamified branded applications drive marketing effectiveness? *Marketing Intelligence & Planning*, 39(5), 633–648. <https://doi.org/10.1108/MIP-09-2020-0407>
- Tseng, T. H., & Lee, C. T. (2018). Facilitation of consumer loyalty toward branded applications: The dual-route perspective. *Telematics and Informatics*, 35(5), 1297–1309. <https://doi.org/10.1016/j.tele.2018.03.002>
- Uzir, M. U. H., Halbusi, H. A., Lim, R., Jerin, I., Hamid, A. B. A., Ramayah, T., & Haque, A. (2021). Applied artificial intelligence and user satisfaction: Smartwatch usage for healthcare in Bangladesh during COVID-19. *Technology in Society*, 67, Article 101780. <https://doi.org/10.1016/j.techsoc.2021.101780>
- Vinerean, S., Opreana, A., Budac, C., & Mihaiu, D. M. (2025). Does gender matter for electronic word-of-mouth interactions in social media marketing strategies? An empirical multi-sample approach. *Journal of Theoretical and Applied Electronic Commerce Research*, 20(2), Article 79. <https://doi.org/10.3390/jtaer20020079>
- Wang, S., Yuan, C., Moon, H., & Kim, K. H. (2025). Enhancing parasocial brand experience and brand equity: Unleashing the advantages of ChatGPT service. *International Journal of Consumer Studies*, 49(2), Article e70029. <https://doi.org/10.1111/ijcs.70029>
- Wise, K., Bolls, P. D., Kim, H., Venkataraman, A., & Meyer, R. (2008). Enjoyment of advergames and brand attitudes: The impact of thematic relevance. *Journal of Interactive Advertising*, 9(1), 27–36. <https://doi.org/10.1080/15252019.2008.10722145>

ARTIFICIAL INTELLIGENCE AND ORGANISATIONAL PERFORMANCE IN HEALTHCARE: A CRITICAL REVIEW

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ABSTRACT

Healthcare organisations worldwide continue to face growing pressures in achieving the quadruple aim of: improving population health, enhancing patient experience, supporting healthcare workforce wellbeing, and reducing the rising cost of care. These aims are fundamentally linked to organisational performance (OP) in healthcare settings. Although artificial intelligence (AI) has been widely researched and applied across several sectors, there remains limited understanding of its specific impacts on OP within healthcare. This paper critically reviews the application of AI to OP in healthcare organisations, with a specific focus on linking AI capabilities to core OP dimensions, such as efficiency, quality, workforce outcomes, and financial performance.

Keywords: Artificial intelligence, digital transformation, organisational performance, healthcare management.

INTRODUCTION AND RESEARCH BACKGROUND

Across sectors, artificial intelligence (AI) is increasingly being positioned as a transformational technology capable of reshaping organisational processes, decision making, and strategic outcomes (Holmström & Magnusson, 2025; Ozuem & Willis, 2025). The healthcare sector has applied AI as a transformational technology (Bajwa et al., 2021); however, the application of AI in the healthcare sector is characterised by complexities and challenges for all stakeholders (Alowais et al., 2023), including the multidimensional nature of healthcare performance (Hoffman et al., 2025). The application and adoption of AI therefore raise important questions regarding its contribution to organisational performance (OP) rather than isolated clinical outcomes alone. This paper addresses growing calls within management and healthcare services literature to advance beyond technology-centric evaluations to examining AI through a strategic performance perspective.

AI IN HEALTHCARE

AI has been applied across diverse healthcare disciplines, including disease diagnosis and prediction, clinical decision making, personalised treatment, drug discovery, and healthcare services management (Secinaro et al., 2021; Alowais et al., 2023). Empirical research has demonstrated successful AI deployment in specialised clinical and operational tasks, such as automated disease detection in radiology (Hosny et al., 2018; Sukegawa et al., 2020), neuroimaging in neurology (Fellous et al., 2019), and genomics and digital pathology in oncology (Cazzato et al., 2021; Huang et al., 2021). Additional applications include diagnosis and prevention in dermatology (Young et al., 2020), predictive and therapeutic support in cardiology (Busnatu et al., 2022), mental health monitoring and treatment (Carr, 2020), screening for diabetic retinopathy and glaucoma in ophthalmology (Gunasekeran et al., 2020), sepsis prediction and mortality forecasting (Mamandipoor et al., 2021), public health surveillance (Whitelaw et al., 2020), and the automation of administrative and logistical tasks (Bajwa et al., 2021). Many of these applications have reported

improvements in clinical accuracy, operational efficiency, and patient outcomes, which further reinforces the potential of AI to improve healthcare performance.

Since the inception of organisations, the concept of OP has attracted sustained scholarly and practitioner interest (Demeke & Tao, 2020). OP is a central concept in strategic management (Hamann & Schiemann, 2021) and, described as fundamental to competitive advantage (Birca, 2024; Išoraitė, 2018). Despite its importance, OP lacks a universally agreed definition; this is partly due to sectoral differences, varying performance elements, and divergent measurement approaches (Leitão et al., 2019; Demeke & Tao, 2020; AlShehhi et al., 2021). In healthcare, OP is particularly complex; it encompasses clinical quality, patient experience, workforce wellbeing, operational efficiency, and financial sustainability (Zurynski et al., 2022; Hoffman et al., 2025). Managers function within highly regulated environments while balancing quality-of-care priorities with cost confinement and productivity targets (Costa, 2026; Salmi et al., 2024). Consequently, understanding how emerging technologies such as AI influence these dimensions is strategically important to improving healthcare performance.

RESEARCH OBJECTIVES AND QUESTIONS

The objective of this research is to critically examine the contribution of AI to OP in healthcare organisations through strategic, operational, and human dimensions. This objective is conceptualised by the following research questions:

- i. How is OP operationalised and measured within AI-focused healthcare studies?
- ii. What are the AI applications most robustly associated with improvements in OP dimensions?
- iii. What organisational requirements enable the translation of AI into sustainable performance gains in healthcare settings?

AI AS A STRATEGIC RESOURCE

Evidence from the literature shows that organisations worldwide are relying on disruptive technologies as a strategic resource to improve their performance (Alhyasat et al. 2025; Olszak & Pałys, 2023; Tapera et al., 2025; Azemi & Ozuem, 2026). The fourth industrial revolution has positioned AI as a disruptive technology alongside big data, cloud computing, and the Internet of Things (Ganasegeran & Abdulrahman, 2019; Ozuem et al., 2024). A variety of AI technologies have been applied in healthcare that range from diagnostic support to capacity forecasting, revenue cycle optimisation, and workforce scheduling. When strategically aligned, these applications contribute to OP through cost reduction, output improvements, and risk mitigation. However, despite these opportunities, healthcare organisations remain slower adopters of AI relative to other sectors; this is due to regulatory constraints, ethical considerations, and legacy systems (Loh, 2018). The healthcare sector is a complex, expanding ecosystem that comprises a broad range of organisations involved in the provision, coordination, and financing of medical and health-related services (Martin, 2019). It includes hospitals, primary care providers, pharmaceutical and biotechnology firms, medical device manufacturers, and managed care organisations (NHS England, 2022). The healthcare sector is an essential pillar of global economies; it represents a key source of employment growth and economic productivity whilst simultaneously confronting intense pressure from growing demand and resource constraints (Costa, 2026). The sector faces severe financial, workforce, and operational challenges; for instance, recent research on the global health sector reported significant regional healthcare disparities, increases in inequities, and a projected health workforce shortage of 18 million health workers by 2030. A massive two-thirds of this global shortage is expected to be accounted for by low-income countries (Boniol et al., 2022). These issues affect optimal healthcare performance and require effective strategic capabilities (rather than purely technological innovations) at both an organisational and a sectoral level. With technological applications ranging from diagnostic support in remote areas to optimising hospital operations in under-resourced urban areas, AI can be perceived as a critical and strategic tool capable of solving the challenges of regional healthcare disparities, worker shortages, and associated financial implications (Bienefeld et al., 2024; Yu & Zhai, 2024). In the coming years, it is expected that the application of AI will progress from experimental pilot projects to a fundamental element of healthcare infrastructure as this will help to bridge the gap between high-demand areas and scarce medical resources.

AI APPLICATIONS AND OP

In order to gain a more comprehensive knowledge and understanding of the topic, and the implications for OP, it is important to undertake a critical review of empirical studies examining AI applications in healthcare. A significant proportion of healthcare AI research has applied artificial neural networks (ANNs) to clinical prediction and decision support (Khude & Shende, 2025; Mastoris & Sauer, 2020; Milenkovic et al., 2025) due to their ability to accurately replicate complex, non-linear relationships through learning by example (Dastres & Soori, 2021). Most of these studies report the outperformance of traditional statistical methods by ANNs in specific tasks, such as medical imaging and disease prediction. For example, Liang et al. (2023) applied ANN-based systems to the prediction of the efficacy of an oral therapy (EGFR-TKIs) for patients with advanced non-small cell lung cancer. The results demonstrated that the ANN-based systems significantly outperformed traditional statistical methods, which applied logistics regression, with high diagnostic accuracy and predictive reliability. Although these findings highlight significant benefits in clinical effectiveness, the organisational implications are mostly implied rather than clearly measured. Improved diagnostic accuracy may translate to less complex patient pathways and decreased resource wastage; however, few studies have conceptualised these outcomes by measurable OP terminology, such as productivity, profitability, or cost efficiency.

Support vector machines (SVMs) are machine learning algorithms that have strong disease classification and risk classification ability, particularly for small to medium data sets and non-linear relationships (Guido et al., 2024). In recent times, SVMs have been combined with deep learning, optimisation algorithms, or classifiers to create hybrid SVMs with improved diagnostic capacity (Manhrawy et al., 2026; Murad et al., 2025; Paduvilan et al., 2025). For example, Mohamed et al. (2023) applied a hybrid model composed of a SVM, multilayer perceptrons, and random forest algorithms to predict an individual's stage of pre-clinical anxiety, such as mild anxiety and moderate anxiety. They reported that the hybrid model had high prediction and recommendation accuracy. Although these techniques improve speed, consistency of decision making, output, and standardisation across healthcare organisations, a majority of studies fail to address the actual impact on OP. Recent advances in deep learning have been applied to medical imaging. For example, İn et al. (2022) applied a deep learning-based AI model to support pulmonologists' image-based detection of COVID-19 pneumonia; they reported higher diagnostic accuracy. However, this outcome may not translate to clinical efficacy, improved patient outcomes, or even financial benefits. From an OP viewpoint, these developments raise important questions regarding the translation of technological gains into sustainable organisational improvements in efficiency, financial performance, or sector outcomes.

In addition to diagnostic performance, research has focused on AI applications in operational healthcare domains. For instance, Gönel and colleagues (2020) applied an AI-based clinical biochemistry test eliminator to block unnecessary laboratory tests, such as a direct bilirubin test. Although the results indicated that AI can significantly improve operational and financial performance through the reduction of unnecessary laboratory tests, the OP focus was narrow and did not assess wider performance measures, such as diagnostic safety, clinician behaviour, patient outcomes, and governance. In another study, AlDhaen (2025) investigated the impact of AI adoption on patient safety in Gulf Cooperation Council hospitals, with operational efficiency as mediator and digital competence as moderator. They reported that AI can improve OP in hospital settings by enhancing operational efficiency, which translates to improved patient safety, particularly in the presence of staff with high digital competence. Although AlDhaen's (2025) study linked AI to OP through operational efficiency, its focus on performance ignored broader performance measures. Khare et al. (2025) applied a reinforcement learning AI-based framework to the management of patient flow in electronic health records, with reported robust performance gains in patient wait time, bed use, and scheduling accuracy. Although they explicitly linked AI adoption to operational efficiency, resource use, and care quality in a hospital setting, and demonstrated that AI-based patient flow optimisation can improve specific OP measures, their study had some limitations. For example, it was limited in methodological robustness and did not measure broader performance dimensions, such as clinical effectiveness, patient safety, workforce performance, patient satisfaction, or financial performance, which are all fundamental to balanced performance assessment.

Although the reviewed studies demonstrate that AI can improve operational and organisational efficiency, OP is largely under-conceptualised. There is a strong focus on evaluating AI performance in healthcare based on technical performance metrics (e.g., diagnostic speed, predictive accuracy, and sensitivity), and conversely a narrow focus on OP measures fundamental to healthcare like workforce wellbeing, financial gains, governance, compliance

and risk, innovation. Even in cases where research has integrated OP measures, analysis has been mostly limited to short-term efficiency benefits with limited insight into strategic alignment or financial sustainability.

Based on this premise, the literature provides fragmented evidence that is challenging for managers to translate into sector-level performance strategies. Additionally, there is a dearth of research that utilises longitudinal designs that have the capacity to capture delayed or cumulative impacts of AI on performance. It is unlikely that improvements due to OP from AI adoption will be immediate, as they are dependent on training investment, governance, and process development. Confidence in the long-term organisational benefits of AI is limited due to the lack of such longitudinal evidence. Brought together, these limitations underline a significant research gap: whilst AI technologies demonstrate strong technical and clinical potential, there is inadequate conceptualisation and empirical testing of the contributions of AI to OP in healthcare. It is imperative to address this gap by integrating AI performance evaluation using recognised OP frameworks and strategic management theory.

METHODOLOGY

This paper used a critical, structured narrative review to examine the application of AI to OP in the healthcare sector (Ali et al., 2023; Łoś et al., 2026; Ubalaeze Elechi et al., 2025). The search strategy involved searching peer-reviewed journal articles published between 2020 and 2025 through PubMed, Scopus, Web of Science, and Google Scholar. The search strings combined the terms AI, healthcare and organisational performance, application of AI to organisational performance in the healthcare sector, for instance: “*Artificial intelligence*” AND “*Healthcare*” AND “*Organisational performance*”; “*Application*” AND “*Artificial intelligence*” AND *Healthcare* AND “*Organisational performance*”. Additional papers were identified through the reference lists of included studies and relevant reviews.

The inclusion criteria for the critical review are as follows: primary studies from general healthcare settings, AI studies with OP outcomes, and those with organisational or management relevance. Studies excluded were non-primary studies from non-healthcare settings, studies without visible organisational or managerial outcomes, non-peer-reviewed studies, and studies not published in English. Additionally, titles and abstract screening was conducted against the criteria, which was followed by a full-text review of potentially eligible papers (Ozuem et al., 2025). Extraction covered research context, AI application, organisational outcomes, and management implications. Outcomes were mapped to the following OP measures from studies: quality, patient experience, workforce wellbeing, operational efficiency, and financial sustainability (Zurynski et al., 2022; Hoffman et al., 2025). The review adopted a critical viewpoint that evaluated reported benefits, limitations, and gaps in evidence relating to the contribution of AI to OP in healthcare (Ozuem et al., 2022).

DISCUSSION

There is an increasing link of AI to clinical accuracy as well as wider OP measures, such as patient safety, operational efficiency, and resource utilisation. The reviewed studies translated diverse AI techniques into measurable OP outcomes, whilst also emphasising limitations and implementation challenges. Liang et al.’s (2023) study, conducted in a clinical setting, applied an ANN-based decision support system to predict the effectiveness of an oral therapy for patients with lung cancer; the ANN-based system’s predictions were more accurate than logistic regression and had good external validation performance. Although based on treatment selection, this sort of prediction underscores OP by supporting improved resource allocation and potentially decreasing inefficient treatments and related costs (Liang et al., 2023). Similarly, Dastres and Soori (2021) highlighted the flexibility of ANN applications for imaging and robotics tasks, thereby strengthening their position as key enablers of advanced decision support in healthcare organisations.

Advancing beyond single models, Mohamed et al. (2023) achieved high predictive performance using a hybrid mental health prediction model composed of SVM, multilayer perceptrons, and random forest algorithms. This aligns with the broader review by Guido et al. (2024), which similarly reported successful applications of SVMs to diagnosis, prognosis, and task monitoring, with classification accuracy outperforming traditional statistical methods. Combined, these studies reinforce the high predictive accuracy of a range of AI techniques, such as ANNs, SVMs, and hybrid approaches, as a requisite rather than adequate condition, for organisational advantage. The technical review of the literature pays limited attention to downstream organisational measures, such as workflow disruption,

staff acceptance, or cost savings at the sector level; resonating with concerns about the technical-centric rather than the management-focused presentations of AI research raised in broader reviews (Khosravi et al., 2024).

In addition to the technical discussion undertaken, it is important to also elucidate the links between AI and OP from a management perspective. AlDhaen (2025) demonstrated that the application of AI technology in Gulf Cooperation Council hospitals improved patient safety, by enhancing operational efficiency, with associated benefits of higher diagnostic accuracy, decreased medication errors, and faster interventions. Operational efficiency was reported to be a part mediator of the AI–safety relationship, and staff’s digital competence consolidates these effects, which underscores that organisational capabilities and skills are critical in the achievement of AI’s benefits (AlDhaen, 2025). The study is concurrent with evidence presented from a meta-analysis that AI decreases medical errors and waiting times whilst augmenting bed occupancy; however, benefits are less in low-resource contexts that are characterised by more organisational constraints (Karcioğlu, 2025).

The study by Khare et al. (2025) provided more specific operational measures; they applied AI-based patient flow technology resulted in a 37.5% decrease in wait time, 29% improvement in bed occupancy efficiency, and increased accuracy for length-of-stay predictions when compared to traditional techniques. The results confirm wider findings that AI can improve scheduling, bed management, and resource allocation, and improve output and reduce congestion (Khare et al., 2025; Santamato et al., 2024). Likewise, evidence from AI-based operations management systems in Saudi Arabia demonstrated substantial improvements in operational efficiency, although this impact was mediated by staff’s attitudes, thereby emphasising the socio-technical nature of AI application, adoption, and implementation (Kumar et al., 2025). Brought together, the reviewed studies seem agreed on several facts. Firstly, diverse AI technologies have the capability to improve decision quality in healthcare, which is crucial for improved outcomes and more efficient treatment utilisation (Liang et al., 2023; Mohamed et al., 2023). Secondly, integration of AI into healthcare operations leads to measurable gains in operational efficiency and patient safety, mostly through mediating factors like workflow reform and staff expertise (AlDhaen, 2025; Khare et al., 2025). Thirdly, in congruence with other studies, organisational benefit is dependent on digital capability, incorporation of legacy systems, data quality, and consideration of staff’s views (AlDhaen, 2025; Khosravi et al., 2024). Overall, the critical review demonstrates that AI has positive impacts on OP in healthcare, especially through improved decision accuracy and operational efficiency, albeit these benefits are contextual and require calculated managerial strategies rather than just technical optimisation.

MANAGERIAL IMPLICATIONS

For healthcare managers, the review highlights the importance of aligning AI technologies explicitly with OP objectives instead of isolated clinical measures. AI should be viewed as a strategic capability requiring investment in people, processes, and governance rather than simply a software or technological acquisition. In addition, AI interventions should be clearly linked to key performance indicators that reflect performance in healthcare (e.g. error rates, wait times, output, and cost per case) (Karcioğlu, 2025; Santamato et al., 2024). Furthermore, to benefit from operational gains, healthcare managers should utilise comprehensive data infrastructure, systems interoperability, and cybersecurity (Guo et al., 2024; Santamato et al., 2024). As is the case with any high-risk technology, managers should utilise AI within robust governance and risk management frameworks with clear approval processes, monitoring, AI model validation, and ethical considerations (Bodnari & Travis, 2025; Ranjbar et al., 2024). Finally, as benefits depend largely on workforce capability, it is crucial to ensure digital competence, AI literacy, and application of change management principles. It is important to address growing concerns about job security and ensure fair applications across settings with varying resource levels (Saeed et al., 2025; Hazarika, 2020; Nair et al., 2024).

CONCLUSION AND FUTURE RESEARCH

This paper positions AI within an OP framework in healthcare. Although there is evidence that supports the potential of AI to improve efficiency and decision making, there exist substantial gaps in measurement and conceptualisation of its long-term impacts on performance. Future research on the topic should focus on utilising longitudinal designs and the incorporation of balanced performance frameworks, context-based research in diverse health systems/sectors, multi-site studies assessing sustainability of performance benefits, and comparative studies of diverse AI technologies and their organisational impacts.

REFERENCES

- AIDhaen, F. S. (2025). AI-Powered transformation of healthcare: Enhancing patient safety through AI interventions with the mediating role of operational efficiency and moderating role of digital competence—insights from the gulf cooperation council region. *Healthcare*, 13(6), 614. <https://doi.org/10.3390/healthcare13060614>
- Alhyasat, W., Alhyasat, E., & Khattab, S. A. (2025). Technology trends in strategic management in the AI era: Systematic literature review. *Human Systems Management*, 44(5). <https://doi.org/10.1177/01672533251322396>
- Alowais, S. A., Alghamdi, S. S., Alsuhebany, N., Alqahtani, T., Alshaya, A., Almohareb, S. N., Aldairem, A., Alrashed, M., Saleh, K. B., Badreldin, H. A., Yami, A., Harbi, S. A., & Albekairy, A. M. (2023). Revolutionizing healthcare: The role of artificial intelligence in clinical practice. *BMC Medical Education*, 23(1), 1–15. <https://doi.org/10.1186/s12909-023-04698-z>
- AlShehhi, N., AlZaabi, F., Alnahhal, M., Sakhrieh, A., & Tabash, M. I. (2021). The effect of organizational culture on the performance of UAE organizations. *Cogent Business & Management*, 8(1). <https://doi.org/10.1080/23311975.2021.1980934>
- Azemi, Y., & Ozuem, W. (2026). Paid search advertising across stages of the customer shopping journey: a shopping goal theory perspective. *Information Technology & People*, 39(8), 32–49. <https://doi.org/10.1108/ITP-03-2023-0223>
- Bajwa, J., Munir, U., Nori, A., & Williams, B. (2021). Artificial intelligence in healthcare: Transforming the practice of medicine. *Future Healthcare Journal*, 8(2), 188–194. NCBI. <https://doi.org/10.7861/fhj.2021-0095>
- Bienefeld, N., Keller, E., & Grote, G. (2024). AI to mitigate healthcare shortages: A qualitative analysis of current and future work conditions to enhance job satisfaction and wellbeing in critical care nurses and physicians (preprint). *Journal of Medical Internet Research*, 27(e50852), e50852–e50852. <https://doi.org/10.2196/50852>
- Birca, A. (2024). Performance management - source of competitive advantage and organizational sustainability. *Annals - Economy Series*, 61, 102–109. <https://ideas.repec.org/a/cbu/jrnlec/y2024v6ip102-109.html>
- Bodnari, A., & Travis, J. (2025). Scaling enterprise AI in healthcare: The role of governance in risk mitigation frameworks. *Npj Digital Medicine*, 8(1). <https://doi.org/10.1038/s41746-025-01700-4>
- Boniol, M., Kunjumen, T., Nair, T. S., Siyam, A., Campbell, J., & Diallo, K. (2022). The global health workforce stock and distribution in 2020 and 2030: A threat to equity and “universal” health coverage?. *BMJ Global Health*, 7(6), 1–8. <https://doi.org/10.1136/bmjgh-2022-009316>
- Busnatu, S., Bolocan, A., Petrescu, G., Abedi, V., & Niculescu, A. G. (2022). Citation. *J. Clin. Med*, 2022(8), 2265. <https://doi.org/10.3390/jcm11082265>
- Carr, S. (2020). “AI gone mental”: Engagement and ethics in data-driven technology for mental health. *Journal of Mental Health*, 29(2), 1–6. <https://doi.org/10.1080/09638237.2020.1714011>
- Cazzato, G., Colagrande, A., Cimmino, A., Arezzo, F., Loizzi, V., Caporusso, C., Marangio, M., Foti, C., Romita, P., Lospalluti, L., Mazzotta, F., Cicco, S., Cormio, G., Lettini, T., Resta, L., Vacca, A., & Ingravallo, G. (2021). Artificial intelligence in dermatopathology: New insights and perspectives. *Dermatopathology*, 8(3), 418–425. <https://doi.org/10.3390/dermatopathology8030044>
- Costa, M. (2026). *The 2026 global health care outlook*. Deloitte.com. <https://www.deloitte.com/uk/en/blogs/thoughts-from-the-centre/the-2026-global-health-care-outlook.html>
- Dastres, R., & Soori, M. (2021). Artificial neural network systems. *International Journal of Imaging and Robotics*, 21(2), 13–25. https://www.researchgate.net/publication/350486076_Artificial_Neural_Network_Systems
- Demeke, B., & Tao, C. (2020). International journal of academic multidisciplinary research (IJAMR) concept & perspectives of organizational performance measurement: Literature review. *International Journal of Academic Multidisciplinary Research (IJAMR)*, 4(8), 89–96. <http://ijeais.org/wp-content/uploads/2020/8/IJAMR200811.pdf>

- Fellous, J.-M., Sapiro, G., Rossi, A., Mayberg, H., & Ferrante, M. (2019). Explainable artificial intelligence for neuroscience: Behavioral neurostimulation. *Frontiers in Neuroscience*, 13. <https://doi.org/10.3389/fnins.2019.01346>
- Ganasegeran, K., & Abdulrahman, S. A. (2019). Artificial intelligence applications in tracking health behaviors during disease epidemics. In *Human Behaviour Analysis Using Intelligent Systems* (pp. 141–155). https://doi.org/10.1007/978-3-030-35139-7_7
- Gönel, A. (2020). Clinical biochemistry test eliminator providing cost-effectiveness with five algorithms. *Acta Clin Belg.*, 75(2), 123–127. <https://doi.org/10.1080/17843286.2018.1563324>
- Guido, R., Ferrisi, S., Lofaro, D., & Conforti, D. (2024). An Overview on the Advancements of Support Vector Machine Models in Healthcare Applications: A Review. *Information*, 15(4), 235. <https://doi.org/10.3390/info15040235>
- Gunasekeran, D. V., Ting, D. S. W., Tan, G. S. W., & Wong, T. Y. (2020). Artificial intelligence for diabetic retinopathy screening, prediction and management. *Current Opinion in Ophthalmology*, 31(5), 357–365. <https://doi.org/10.1097/icu.0000000000000693>
- Guo, H., Wu, Y., Zhao, R., Yang, X., Peyrodie, L., Nianga, J.-M., & Wang, Z. (2024). Leveraging AI for strategic management in healthcare: Enhancing operational and financial performance. *Journal of Intelligence and Knowledge Engineering*, 2(3), 1–20. <https://doi.org/10.62517/jike.202404301>
- Hamann, P. M., & Schiemann, F. (2021). Organizational performance as a set of four dimensions: An empirical analysis. *Journal of Business Research*, 127, 45–65. <https://doi.org/10.1016/j.jbusres.2021.01.012>
- Hazarika, I. (2020). Artificial intelligence: Opportunities and implications for the health workforce. *International Health*, 12(4), 241–245. <https://doi.org/10.1093/inthealth/ihaa007>
- Hoffman, J., Wenke, R., Angus, R. L., Shinnars, L., Richards, B., & Hattingh, L. (2025). Overcoming barriers and enabling artificial intelligence adoption in allied health clinical practice: A qualitative study. *Digital Health*, 11(11). <https://doi.org/10.1177/20552076241311144>
- Holmström, J., & Magnusson, J. (2025). Navigating the organizational AI journey: The AI transformation framework. *Business Horizons*, 69(1). <https://doi.org/10.1016/j.bushor.2025.01.002>
- Hosny, A., Parmar, C., Quackenbush, J., Schwartz, L. H., & Aerts, H. J. W. L. (2018). Artificial intelligence in radiology. *Nature Reviews Cancer*, 18(8), 500–510. <https://doi.org/10.1038/s41568-018-0016-5>
- Huang, B., Tian, S., Zhan, N., Ma, J., Huang, Z., Zhang, C., Zhang, H., Ming, F., Liao, F., Ji, M., Zhang, J., Liu, Y., He, P., Deng, B., Hu, J., & Dong, W. (2021). Accurate diagnosis and prognosis prediction of gastric cancer using deep learning on digital pathological images: A retrospective multicentre study. *EBioMedicine*, 73, 103631. <https://doi.org/10.1016/j.ebiom.2021.103631>
- Hunegnawu, A. K. (2019). Organizational learning: The only sustainable source of competitive advantage (an integrative critical review of competitive advantage theories in lieu of the theory of organizational learning). *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3459436>
- İn, E., Altıntop Geçkil, A., Kavuran, G., Şahin, M., Berber, N. K., & Kuluöztürk, M. (2022). Using Artificial Intelligence to Improve the Diagnostic Efficiency of Pulmonologists in Differentiating COVID-19 Pneumonia from Community-Acquired Pneumonia. *Journal of Medical Virology*, 94(8). <https://doi.org/10.1002/jmv.27777>
- Işoraitè, M. (2018). The Competitive Advantages theoretical aspects. *Ecoforum Journal*, 7(1). <https://ecoforumjournal.ro/index.php/eco/article/view/2092>
- Karcioğlu, U. B. (2025). The role of artificial intelligence in healthcare management on patient safety and operational efficiency: A meta-analytic evaluation. *Journal of Healthcare Management and Leadership*, 1(1), 8–21. <https://doi.org/10.35345/johmal.1670414>
- Khare, A., Reddy Penubaka, K. K., Chithrakumar, T., Geetha, M., Kamalavalli, K., & Bhagirath Jadhav, A. (2025). AI-Driven patient flow management in hospitals: Reducing wait times and enhancing care. *Journal of Neonatal Surgery*, 14(10S), 696–708. <https://doi.org/10.52783/jns.v14.2907>

- Khosravi, M., Zare, Z., Mojtabaeian, S. M., & Izadi, R. (2024). Artificial intelligence and decision-making in healthcare: A thematic analysis of a systematic review of reviews. *Health Services Research and Managerial Epidemiology*, 11(23333928241234863). NCBI. <https://doi.org/10.1177/23333928241234863>
- Khude, H., & Shende, P. (2025). AI-driven clinical decision support systems: Revolutionizing medication selection and personalized drug therapy. *Advances in Integrative Medicine*, 12(4), 100529. <https://doi.org/10.1016/j.aimed.2025.100529>
- Kumar, R., Singh, A., Ahmed Kassar, A. S., Humaida, M. I., Joshi, S., & Sharma, M. (2025). Impact of an artificial intelligence-driven operational management system on operational efficiency in health care organization in Saudi Arabia: a mediating role of staff attitude. *Frontiers in Public Health*, 13. <https://doi.org/10.3389/fpubh.2025.1558644>
- Leitão, J., Pereira, D., & Gonçalves, Â. (2019). Quality of work life and organizational performance: Workers' feelings of contributing, or not, to the organization's productivity. *International Journal of Environmental Research and Public Health*, 16(20), 3803. ncbi. <https://doi.org/10.3390/ijerph16203803>
- Liang, X., Guan, R., Zhu, J., Meng, Y., Zhu, J., Yang, Y., Cui, Y., Dai, J., Mao, W., Lv, L., Shen, D., & Guo, R. (2023). A clinical decision support system to predict the efficacy for egfr-tkis based on artificial neural network. *Journal of Cancer Research and Clinical Oncology*, 149(13), 12265–12274. <https://doi.org/10.1007/s00432-023-05104-3>
- Loh, E. (2018). Medicine and the rise of the robots: A qualitative review of recent advances of artificial intelligence in health. *BMJ Leader*, 2(2), 59–63. <https://doi.org/10.1136/leader-2018-000071>
- Łoś, A., Bartusik-Aebisher, D., Mytych, W., & Aebisher, D. (2026). Applications of artificial intelligence in selected internal medicine specialties: A critical narrative review of the latest clinical evidence. *Algorithms*, 19(1), 54. <https://doi.org/10.3390/a19010054>
- Mamandipoor, B., Frutos-Vivar, F., Peñuelas, O., Rezar, R., Raymondos, K., Muriel, A., Du, B., Thille, A. W., Ríos, F., González, M., del-Sorbo, L., del Carmen Marín, M., Pinheiro, B. V., Soares, M. A., Nin, N., Maggiore, S. M., Bersten, A., Kelm, M., Bruno, R. R., & Amin, P. (2021). Machine learning predicts mortality based on analysis of ventilation parameters of critically ill patients: multi-centre validation. *BMC Medical Informatics and Decision Making*, 21(1). <https://doi.org/10.1186/s12911-021-01506-w>
- Manhrawy, I. I. M., Fathi, H., Alsekait, D. M., Altawil, A., & Kelany, A. K. (2026). Hybrid feature selection and classification model using high-dimensional data based on a metaheuristic algorithm for brain cancer diagnosis. *Scientific Reports*, 16. <https://doi.org/10.1038/s41598-026-41573-5>
- Mastoris, I., & Sauer, A. J. (2020). Opening the “black box” of artificial intelligence for detecting heart failure. *ASAIO Journal*, 67(3), 322–323. <https://doi.org/10.1097/mat.0000000000001401>
- Milenkovic, A., Djordjevic, A., Jankovic, D., Petar Rajkovic, Kofi Edee, & Tatjana Gric. (2025). Healthcare AI for Physician-Centered Decision-Making: Case Study of Applying Deep Learning to Aid Medical Professionals. *Computers*, 14(8), 320–320. <https://doi.org/10.3390/computers14080320>
- Mohamed, E. S., Naqishbandi, T. A., Bukhari, S. A. C., Rauf, I., Sawrikar, V., & Hussain, A. (2023). A hybrid mental health prediction model using Support Vector Machine, Multilayer Perceptron, and Random Forest algorithms. *Healthcare Analytics*, 3, 100185. <https://doi.org/10.1016/j.health.2023.100185>
- Murad, S. H., Tayfor, N. B., Mahmood, N. H., & Arman, L. (2025). Hybrid genetic algorithms-driven optimization of machine learning models for heart disease prediction. *MethodsX*, 15, 103510. <https://doi.org/10.1016/j.mex.2025.103510>
- Nair, M., Svedberg, P., Larsson, I., & Nygren, J. M. (2024). A comprehensive overview of barriers and strategies for AI implementation in healthcare: Mixed-method design. *PLoS ONE*, 19(8), e0305949–e0305949. <https://doi.org/10.1371/journal.pone.0305949>
- NHS England. (2022). *What are integrated care systems?* NHS England. <https://www.england.nhs.uk/integratedcare/what-is-integrated-care/>

- Olszak, C., & Pałys, M. (2023). Disruptive technologies as a driver to organizational success. organizational culture perspective. *Proceedings of the 56th Hawaii International Conference on System Sciences*. <https://scholarspace.manoa.hawaii.edu/server/api/core/bitstreams/cc3d7b08-c3f2-48a7-b5d0-faa97a5b511f/content>
- Ozuem, W., Ranfagni, S., Willis, M., Salvietti, G., & Howell, K. (2024). Exploring the relationship between chatbots, service failure recovery and customer loyalty: A frustration–aggression perspective. *Psychology and Marketing*, 41(10), 2253–2273. <https://doi.org/10.1002/mar.22051>
- Ozuem, W., & Willis, M. (2025). *Digital marketing for value Co-creation: Models and approaches for online brand communities*. Sage.
- Ozuem, W., Willis, M., & Howell, K. (2022). Thematic analysis without paradox: Sensemaking and context. *Qualitative Market Research: An International Journal*, 25(1), 143–157. <https://doi.org/10.1108/qmr-07-2021-0092>
- Ozuem, W., Willis, M., Ranfagni, S., & Omeish, F. (2025). Thematic Analysis in an Artificial Intelligence-Driven Context: A Stage-by-Stage Process. *International Journal of Qualitative Methods*
- Paduvilan, A. K., Livingston, G. A. L., Kuppuchamy, S. K., Dhanaraj, R. K., Subramanian, M., Al-Rasheed, A., Getahun, M., & Soufiene, B. O. (2025). Attention-driven hybrid deep learning and SVM model for early alzheimer's diagnosis using neuroimaging fusion. *BMC Medical Informatics and Decision Making*, 25(1). <https://doi.org/10.1186/s12911-025-03073-w>
- Ranjbar, A., Eilin Wermundsen Mork, Ravn, J., Brøgger, H., Per Myrseth, Hans Peter Østrem, & Hallock, H. (2024). Managing risk and quality of AI in healthcare: Are hospitals ready for implementation? *Risk Management and Healthcare Policy*, Volume 17, 877–882. <https://doi.org/10.2147/rmhp.s452337>
- Saeed, M., Jalil, M. S., Dahwal, F. M., Mehedy, M. T. J., Snigdha, E. Z., mamun, A. al, & khan, M. N. (2025). The impact of AI on healthcare workforce management: Business strategies for talent optimization and IT integration. *The American Journal of Medical Sciences and Pharmaceutical Research*, 07(03), 136–156. <https://doi.org/10.37547/tajmspr/volume07issue03-15>
- Salmi, Q. A., Fannah, J. A., & Roodenbeke, E. de . (2024). The imperative of professionalising healthcare management: A global perspective. *Future Healthcare Journal*, 11(3), 100170–100170. <https://www.sciencedirect.com/science/article/pii/S2514664524015601>
- Santamato, V., Tricase, C., Faccilongo, N., Iacoviello, M., & Marengo, A. (2024). Exploring the impact of artificial intelligence on healthcare management: A combined systematic review and machine-learning approach. *Applied Sciences*, 14(22), 10144–10144. <https://doi.org/10.3390/app142210144>
- Secinaro, S., Calandra, D., Secinaro, A., Muthurangu, V., & Biancone, P. (2021). The role of artificial intelligence in healthcare: A structured literature review. *BMC Medical Informatics and Decision Making*, 21(1). <https://link.springer.com/article/10.1186/s12911-021-01488-9>
- Sukegawa, S., Yoshii, K., Hara, T., Yamashita, K., Nakano, K., Yamamoto, N., Nagatsuka, H., & Furuki, Y. (2020). Deep neural networks for dental implant system classification. *Biomolecules*, 10(7), 984. <https://doi.org/10.3390/biom10070984>
- Tapera, J., Hamunakwadi, P., Mashapure, R., Mthombeni, A., & Mutanda, B. (2025). Disruptive frugal digital innovation in africa. In *Chapter 11: Deployment of Frugal Disruptive Technologies and Modernised Digital Tools for Sustainable Competitive Advantage and Continuous Improvement of Organisational Performance*. Emerald Group Publishing. <https://doi.org/10.1108/978-1-83549-568-120251011>
- Ubalaeze Elechi, Enibokun Orobator, Udoh, K., Eziokwu Ngozi, Uzoma, C., Forson, K., Akanbi, O., & Tarawallie, M. (2025). Artificial Intelligence in Healthcare: A Narrative Review of Recent Clinical Applications, Implementation Strategies, and Challenges. *Journal of Healthcare Leadership*, Volume 17, 863–876. <https://doi.org/10.2147/jhl.s553748>

- Whitelaw, S., Mamas, M. A., Topol, E., & Spall, H. G. C. V. (2020). Applications of digital technology in COVID-19 pandemic planning and response. *The Lancet Digital Health*, 2(8), 435–440. [https://doi.org/10.1016/S2589-7500\(20\)30142-4](https://doi.org/10.1016/S2589-7500(20)30142-4)
- Young, A. T., Xiong, M., Pfau, J., Keiser, M. J., & Wei, M. L. (2020). Artificial intelligence in dermatology: A primer. *Journal of Investigative Dermatology*, 140(8), 1504–1512. <https://doi.org/10.1016/j.jid.2020.02.026>
- Yu, L., & Zhai, X. (2024). Use of artificial intelligence to address health disparities in low- and middle-income countries: A thematic analysis of ethical issues. *Public Health*, 234, 77–83. <https://doi.org/10.1016/j.puhe.2024.05.029>
- Zurynski, Y., Herkes-Deane, J., Holt, J., McPherson, E., Lamprell, G., Dammery, G., Meulenbroeks, I., Halim, N., & Braithwaite, J. (2022). How can the healthcare system deliver sustainable performance? A scoping review. *BMJ Open*, 12(5), e059207. <https://doi.org/10.1136/bmjopen-2021-059207>

FROM BROWSERS TO BELIEVERS: HOW AR FASHION RETAIL TRANSFORMS VIRTUAL TRY-ON CUSTOMER EXPERIENCES

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ABSTRACT

Augmented reality (AR) technologies are revolutionising online fashion retail, yet limited research examines Generation Z experiences in Global South contexts. This constructivist grounded theory study investigated how AR fashion retail technologies influence South African Gen Z purchase experiences through fifteen semi-structured interviews with participants actively engaging luxury sunglasses platform AR virtual try-on features. Hybrid thematic analysis integrated deductive codes from five theoretical frameworks with inductively derived themes. The study's primary contribution is a process-orientated constructivist grounded theory revealing four sequential phases: initial embodied encounter generating virtual presence; iterative trust construction through self-verified visual evidence; hedonic habituation enabling identity exploration; and expectation normalisation creating competitive imperatives. Findings demonstrate AR fundamentally reconceptualises South African Gen Z purchase experiences by replacing brand-mediated trust with consumer-generated certainty, transforming transactional shopping into experiential play, and shifting AR from competitive differentiator to market survival necessity. The study therefore establishes new baseline expectations for brand relevance in digitally-mediated, fashion retail, emerging market contexts.

Keywords: augmented reality, Generation Z, online fashion retail, South Africa, constructivist grounded theory.

INTRODUCTION AND CONTEXTUALISATION OF THE STUDY

The rapid advancement of digital technologies has transformed online retail, AR emerging as a pivotal innovation reshaping consumer experiences (Ibrahim & Nasr, 2025). AR superimposes digital information such as sounds, images, and three-dimensional models onto the physical world through smartphones, tablets, or AR glasses (Patnaik et al., 2024), revolutionising pre-purchase product interactions, particularly in fashion retail. The global AR market, valued at US\$83.65 billion in 2024, is projected to grow at 37.9% annually through 2030 (Grand View Research, 2025).

While early AR implementations addressed practical concerns regarding size, fit, and product attributes (Marelli et al., 2022), AR's impact transcends functional utility. Virtual try-on applications enable consumers to assess product fit, appearance, and aesthetic suitability without physical interaction, and is a critical barrier to online purchases (Chen et al., 2022). Beyond reducing perceived risk and return rates (Kovács & Keresztes, 2024; Schapsis et al., 2025), AR creates immersive entertainment value, facilitates identity exploration, and generates emotional product connections (Patnaik et al., 2024).

Generation Z (born 1997–2012), having matured with smartphone technology and social media AR filters, demonstrate innate digital fluency in technology-enabled shopping (Schapsis et al., 2025). Their habitual AR use significantly influences acceptance and adoption across purchase decision-making stages (Pandey & Pandey, 2025). As digital natives demanding seamless experiences, Gen Z exhibit distinct purchasing patterns characterised by digital engagement, authenticity-seeking, self-expression, and preference for brands enabling identity construction (Ofosu-Boateng & Jose, 2025). Fashion represents particularly significant terrain, as clothing and accessories function as visible markers of personal identity and social belonging (Kovács & Keresztes, 2024).

As a Global South market, South Africa exhibits distinct socio-economic, cultural, and technological dynamics differing from Western contexts dominating AR research, necessitating context-sensitive investigation (Gudyanga, 2024; Mateko, 2024). South African Gen Z demonstrate increasing purchasing power and digital engagement, positioning them as critical stakeholders in digital commerce evolution (Ngobeni & Makhitha, 2025).

Critical knowledge gaps persist regarding AR's influence on South African Gen Z purchase experiences (Mateko, 2024). While quantitative studies dominate (Ibrahim & Nasr, 2025), qualitative investigations exploring lived experiences and psychological processes underlying AR engagement remain scarce, creating problematic evidence gaps as retailers invest in AR infrastructure without context-specific validation. Although theoretical frameworks including Technology Acceptance Model (Davis, 1989), Uses and Gratifications Theory (Katz et al., 1973), Self-Congruity Theory (Sirgy, 1982), Uncertainty Reduction Theory (Berger & Calabrese, 1975), and Experiential Value Theory underpin AR consumer behaviour research, they undermine the complexities of South African Gen Z AR experiences. This study employed constructivist grounded theory (Charmaz, 2006) with hybrid thematic analysis (Fereday & Muir-Cochrane, 2006) with the main aim of *exploring how AR fashion retail technologies influence South African Gen Z purchase experiences, extending established frameworks while addressing identified research gaps*.

- AoE1: How do South African Gen Z perceive AR fashion technology usage and adoption?
- AoE2: How do South African Gen Z navigate trust when using AR fashion retail technologies?
- AoE3: What value does South African Gen Z obtain from using AR fashion retail technologies?
- AoE4: How do AR fashion retail technologies influence South African Gen Z purchase experiences?

METHODOLOGICAL APPROACH

This study applied CGT, deemed relevant for accurately representing participants' lived experiences (Charmaz, 2006) and acknowledging Global South context-specific realities that differ from Western contexts (Herber et al., 2025). Given the exploratory nature and Global South positioning, the study employed an interpretive orientation allowing context-specific realities to emerge, while integrating inductive insights and deductive theoretical constructs through reflexivity, iterative coding, and hybrid thematic analysis (Akhtar et al., 2024; Charmaz, 2014).

CGT employs flexible, iterative sampling strategies to develop theory grounded in participants' experiences and social contexts (Butler et al., 2018). The study targeted South African Gen Z (born in 1997–2012) who interacted with luxury fashion brands via AR. A non-probability, purposive sampling approach was used to recruit participants relevant to the study's niche focus (Kovács & Keresztes, 2024). To ensure appropriate engagement, participants were given access to an AR feature on a leading sunglasses e-commerce platform offering various luxury brands. Eligible participants met two inclusion criteria: (1) they belonged to the Gen Z cohort; and (2) they had actively used the AR tool on the platform to explore or enhance their luxury fashion purchase experiences.

Data collection in CGT is a dynamic, iterative process that emphasises the co-construction of meaning between researchers and participants (Metelski et al., 2021). Data were collected through online, semi-structured interviews to explore the psychological factors driving Gen Z's engagement with immersive AR retail experiences. This method was chosen for its ability to capture rich, in-depth insights into lived experiences that align with CGT (Charmaz, 2017). Online interviews offered flexibility and accessibility for digital-native participants, conducted via Microsoft Teams and Zoom due to their familiarity, ease of use, and secure recording features (Brites et al., 2024). Fifteen interviews, each lasting 30–45 minutes, were conducted until data saturation was reached (Hennink & Kaiser, 2022). Participants were recruited via social media and South African university networks. To analyse the data, hybrid-thematic analysis was employed following the Fereday and Muir-Cochrane (2006) framework:

- Step one – develop codebook: Deductive codes derived from the TAM (Davis, 1989), UGT (Katz et al., 1973), URT (Berger & Calabrese, 1975), SCT (Sirgy, 1982), and EVT (Holbrook & Hirschman, 1982), such as perceived usefulness, hedonic gratification, trust, and self-image.
- Step two – data familiarisation: Inductive approach identifying context-specific insights grounded in participants' lived experiences (Charmaz, 2014), yielding codes like virtual embodiment and transformative self-discovery.
- Step three – apply codes: Concurrent application of deductive and inductive codes, co-constructing reality through participant experiences via reflexive hybrid coding (Akhtar et al., 2024; Charmaz, 2017).
- Step four – theme identification: Clustering codes into categories revealing underlying AR experiences through convergence or divergence (Braun & Clarke, 2006).

- Step five – iterative review: Revisiting themes through three criteria, namely internal homogeneity, external homogeneity, and theory-data alignment (Fereday & Muir-Cochrane, 2006).
- Step six – validation and interpretation: Interpreting themes within theory, literature, and lived realities to advance theoretical understanding (Tang et al., 2010).

Rigour was maintained through the Lincoln and Guba (1985) trustworthiness criteria: credibility (peer debriefing, member checking with three participants), transferability (thick description), dependability (systematic methodology), and confirmability (preserved code-to-data linkages). The approach demonstrates well-documented and justified interpretive judgement grounded in systematic procedures, reflexive awareness, and participant reality, the crux of appropriate CGT application.

Ethical clearance was obtained from the University of Johannesburg's School of Consumer Intelligence and Information Systems Research and Ethics Committee (Ref: 2025SCiiS006) emphasising that all data collected and reported would be anonymised, consent was obtained, participation was voluntary, data would be encrypted and stored for up to five years in accordance with university policy and then destroyed, and findings could be obtained through academic research papers.

OVERVIEW OF LITERATURE

According to Charmaz (2014), literature should provide sensitising concepts, rather than predetermined frameworks. This study integrates five established frameworks addressing distinct yet interconnected dimensions of AR experiences, while remaining open to emergent, context-specific insights aligned with CGT principles. A brief discussion of these theoretical frameworks is presented next.

TAM (Davis, 1989) establishes that technology adoption depends on perceived usefulness and ease of use, providing foundational understanding of cognitive evaluation processes within AoE1 (perception and adoption). TAM's utilitarian benefits were extended by Kim, Chan, and Gupta (2007) who developed the value-based adoption mode (VAM) by incorporating perceived value that emphasises experiential benefits. As such, deductive codes included for this study include perceived usefulness, ease of use, behavioural intention, adoption barriers, technical accessibility, and interface intuitiveness, perceived enjoyment, explaining how Gen Z determine AR engagement (Lai et al., 2025).

URT (Berger & Calabrese, 1975) posits that communication reduces uncertainty and increases predictability. Applied to AR contexts, URT explains information-seeking strategies that mitigate online purchase risks (Reddy & Thanigan, 2023), primarily addressing AoE2 (navigating trust). Deductive codes encompass uncertainty reduction, information seeking, risk mitigation, trust building, and decision certainty, revealing psychological mechanisms through which Gen Z construct purchase confidence.

UGT (Katz et al., 1973) conceptualises users as active agents selecting media to satisfy specific needs. In AR fashion retail, UGT explains simultaneous gratifications across utilitarian, hedonic, and social dimensions (Ibáñez-Sánchez et al., 2022), relating to AoE3 (value derived). Deductive codes include hedonic gratification, utilitarian gratification, social gratification, and entertainment value.

SCT (Sirgy, 1982) proposes consumers prefer brands congruent with their actual or ideal self-concept. AR enables dynamic, real-time self-visualisation (Chen et al., 2022), addressing AoE4 (purchase experience). Deductive codes comprise self-image congruence, identity expression, ideal self-projection, and symbolic consumption.

EVT (Holbrook & Hirschman, 1982) emphasises consumption experiences generating value beyond functional utility, distinguishing extrinsic and intrinsic value (Mathwick et al., 2001). EVT spans AoE3 and AoE4, with deductive codes including perceived value, hedonic value, aesthetic experience, emotional engagement, and process enjoyment (Varshneya & Das, 2017).

FINDINGS

This presentation combines CGT principles with hybrid thematic coding to identify patterns from participant narratives. Meaning emerges through dynamic co-construction between participants, researcher, and the South African retail context, recognising multiple subjective realities rather than imposing singular truths (Fereday & Muir-Cochrane, 2006). Analysis proceeds iteratively through constant comparison: initial open and in vivo coding yields participant-driven themes that dialogue with deductive theoretical frameworks, creating refined codes that return to data for validation and modification. This process-oriented approach captures how participants actively engage with AR by preserving their authentic language as primary codes (Charmaz, 2006).

AoE1: South African Gen Z's Perceptions of AR Fashion Technology Usage and Adoption

AoE1 was predominantly *inductively derived* as evidenced in table 1, as the existing theoretical frameworks did not anticipate the findings presented.

Table 1: Summary of code classification for AoE1.

In vivo code	Evidence from data
Normalisation process (inductive)	"It feels like the new normal" (P5); "This is a step forward in online shopping" (P3)
Expectation shift (inductive)	"Now I expect other stores to also have AR"; "Raised the bar for me. I expect almost all the brands to kind of offer AR" (P5)
Competitive benchmarking behaviour (inductive)	"I skip brands that do not offer AR"; "Look for another brand that has the AR system" (P5)
Brand positioning judgement (inductive)	"I feel like they are behind"; "Feel like they're being outdated"; "Now it feels like they don't care about their customers" (P5)
Adoption pressure (inductive)	"More brands need to start using AR"; "Other brands should integrate this feature"; "If they can do it, any other brand can do it" (P5)
Market redefinition (inductive)	"Creates a whole new market for people who shop online" (P4)

Source: Own conceptualisation.

Findings reveal rapid normalisation whereby AR evolved from innovation to baseline expectation, fundamentally elevating competitive standards in online fashion retail. Participants engaged in competitive benchmarking behaviour driving brand positioning judgements, with non-adopting retailers perceived as "behind" (P5). This phenomenon creates industry-wide adoption pressure, establishing AR as competitive imperative rather than differentiator, representing fundamental restructuring of consumer expectations and competitive dynamics. These findings align with constructivist grounded theory's emphasis on process and change, revealing how consumer-technology interactions co-construct new industry standards that reshape competitive landscapes and redefine adequate customer experience. AR transitions from innovative technology to survival necessity, with adoption positioned as market expectation rather than optional enhancement for maintaining competitive relevance in digitally-mediated fashion retail contexts.

AoE2: South African Gen Z Navigating Trust when Using AR Fashion Retail Technologies

AoE2 represented a hybrid approach, integrating deductive codes with inductive codes emerging from participant narratives. Table 2 summarises the code classification for AoE2.

Table 2: Summary of code classification for AoE 2.

In vivo code	Evidence from data
Visual verification (inductive)	“I trusted it more than the pictures, because it showed me how it fits” (P6); “It made the product real for me, not just something on a screen” (P5)
Uncertainty elimination (deductive: URT)	“I didn’t need to guess anymore. I could identify the correct size without guessing” (P8); “I know without a doubt this is gonna [sic] work out” (P12)
Regret prevention (inductive)	“It helps with limiting the regret factor after buying” (P13); “I become satisfied with the thought of eliminating buyer’s remorse” (P7)
Decision confidence building (deductive: trust development frameworks)	“Seeing it on me gave me confidence to buy without second-guessing” (P5); “It made me trust my decision more, because I could see myself clearly” (P3)
Psychological security (inductive)	“It gives you some sort of comfort and security before you buy” (P15); “Having augmented reality really made me feel secure about buying the product” (P5)
Epistemic shift (inductive)	“You’re not blinded by just looking at the photo anymore” (P14); “At first, I didn’t trust it, but when I saw how real it looked, I was impressed” (P5)

Source: Own conceptualisation.

The findings revealed a fundamental shift in how consumers construct trust in online fashion retail. Participants consistently described moving from uncertainty, with AR functioning as personally verified visual evidence as the primary confidence-building mechanism. This process eliminates uncertainty. Thus, AR technology provides psychological security, while mitigating cognitive dissonance. This increased confidence in decision-making influences purchase readiness. These findings aligned with CGT’s emphasis on co-constructed meaning, revealing how Gen Z actively navigate trust by transforming AR from an unfamiliar technology into a credible verification tool through iterative engagement. This represents a shift from brand-mediated trust to self-verified sensory confirmation, fundamentally reshaping the psychological development and enforcement of online purchase confidence.

AoE3: Value that South African Gen Z Obtain from Using AR Fashion Retail Technologies

AoE3 demonstrated a hybrid approach. Table 3 summarises the code classification for AoE3.

Table 3: Summary of code classification for AoE3.

In vivo code	Evidence from data
Ludic exploration (inductive)	“It made the whole thing more fun, like I was playing with styles” (P5); “It makes it fun, like a game, but still useful. It feels like a game” (P8)
Hedonic gratification (deductive: UGT)	“The whole experience of like trying on was just fun and exciting. It makes shopping more exciting and enjoyable” (P1); “I was laughing and so happy. I was excited to use such technology” (P5)
Unlimited experimentation (inductive)	“The satisfaction is me being able to try on as many glasses as I want. From the comfort of my home, I have that ease of trying on many things” (P5); “I could switch styles instantly and see what worked” (P6)
Emotional engagement (deductive: EVT)	“I was so excited that I even took a screenshot and I had to post it because I felt like I belonged” (P10); “What was mind-blowing is the actual feeling of actually wearing them” (P14)
Entertainment primacy (inductive)	“I used AR just to play around when I was bored. It didn’t really make me buy, but it entertained me. For me, it’s more fun than practical” (P5)
Comfort-based creativity (inductive)	“I got to try it out without being out of my comfort zone” (P6); “It was fun to explore, like I was designing my own purchase” (P3)
Social shareability (deductive: social gratification, UGT)	“I laughed seeing myself in some of the styles. It gave me something to share on TikTok” (P5)

In vivo code	Evidence from data
Aspirational immersion (inductive)	“It's like they gave me a taste of their lifestyle” (P2)

Source: Own conceptualisation.

Findings reveal AR transforms online fashion retail from transactional shopping into ludic exploration. Hedonic gratification manifests through emotional responses including "happiness, excitement and laughter" (P5), creating affective brand associations independent of purchase outcomes. Technology enables unlimited experimentation reflecting digital abundance mentality, with entertainment challenging traditional goal-directed shopping assumptions. This comfort-based creativity provides safe spaces for exploring products consumers might consider future, facilitating self-expression and generating profound emotional engagement compelling social media documentation that extends brand reach. Aspirational immersion (experiencing trying certain brands) creates symbolic value transcending product features. These findings align with constructivist grounded theory's recognition of multiple realities, revealing how consumers co-construct AR engagement as intrinsically rewarding play (hedonic) rather than merely instrumental shopping (utilitarian). This represents fundamental reconceptualisation of online retail value, where hedonic experience builds brand relationships beyond immediate purchase intention, reshaping competitive dynamics around experiential entertainment instead of transactional efficiency alone.

AoE4: AR fashion retail technologies' influence on South African Gen Z purchase experiences

AoE 4 also demonstrated a hybrid approach. Table 4 summarises the code classification for AoE4.

Table 4: Summary of code classification for AoE4.

In vivo code	Evidence from data
Virtual embodiment (inductive)	“When I saw it on the AR model, I could see myself wearing it. It felt like I was in the store, even though I was just on my phone” (P2); “I was experiencing it. You know? I was there. I felt in the moment” (P7)
Psychological ownership (inductive)	“It's like you already have that item in your possession. It's like the stores wanted to come inside my house” (P5)
Self-discovery facilitation (deductive: possible selves framework)	“When I saw myself in this bold frame that I never thought I could pull off, it felt really good” (P2); “The moment of fulfilment was when I saw a different side of myself, it was like an enlightening to me” (P10)
Aspirational self-actualisation (deductive: self-expansion theory)	“It made me feel amazing in a way where, just imagine trying something on while you're not wearing that particular product” (P2)
Personalised recognition (inductive)	“I felt like someone designed those sunglasses for me. It feels like I'm understood better” (P7)
Reality-fantasy liminality (inductive)	“It's not the real product. It's just like how can I say it's a fantasy?” (P14)
Immersive presence (deductive: flow experience/EVT)	“It was cool seeing how the frame looked on my face in real time” (P1); “I felt like I was in the store, even though I was just on my phone” (P2)

Source: Own conceptualisation.

The findings revealed AR facilitates virtual embodiment, enabling profound presence-creating psychological ownership before physical purchase, blurring anticipation-acquisition boundaries. Technology enables self-discovery, with participants encountering unexpected identity expressions culminating in transformative moments that support aspirational self-actualisation. Participants experienced personalised recognition establishing intimate brand-consumer connections within reality-fantasy liminality, generating authentic emotional responses through real-time visualisation recreating retail environments. Aligned with CGT's emphasis on mutual understanding, consumers actively “become” part of technology-mediated interactions, rather than passively evaluating products. AR creates liminal spaces where self-concept expansion occurs through embodied cognition, fundamentally transforming fashion retail from transactional exchange into identity exploration and transformative self-discovery.

Theme Identification in Relation to Each AoE

The theme-identification process, step four of the Fereday and Muir-Cochrane (2006) framework, clustered codes across the four AoEs, revealing four overarching themes that comprehensively captured South African Gen Z's AR fashion retail experiences.

- **AoE1:** AR as a normalised expectation for online fashion shopping and competitive advantage creating industry-wide adoption pressure and fundamentally restructuring competitive dynamics in online fashion retail.
- **AoE2:** Trust co-creation through visual verification where participants move from “guessing” to “knowing” through personalised visual evidence.
- **AoE:** Hedonic immersion and experiential play that exist independently of purchase outcomes, challenging traditional goal-orientated retail assumptions.
- **AoE4:** Embodied virtual presence and self-actualisation reveals how AR creates liminal space for identity exploration between actual and possible selves, with participants experiencing.

Theoretical Integration and CGT Contribution

CGT offers a contextually grounded, process-orientated understanding of AR's transformative influence on purchase experiences, advancing theoretical knowledge and practical application in digital fashion retail. This grounded theory integrates and extends existing frameworks through South African Gen Z lived experiences, revealing five key theoretical advancements, presented in table 5.

Table 5: Advancement of existing theories.

Theory	Theoretical advancement
TAM	Identifies expectation normalisation as accelerated adoption dynamic unique to immersive technologies; AR exposure transforms technology from optional enhancement to market survival requirement within condensed timeframes. Gen Z early adopters function as expectation creators, generating industry-wide adoption pressure
UGT	Demonstrates AR creates simultaneous, non-competing gratifications; entertainment value coexists with purchase confidence building. Hedonic immersion functions as brand-building mechanism independent of conversion
URT	Reconceptualises from passive information reception to active construction; trust shifts from institutional credibility to self-verified sensory confirmation. Consumers claim authority over purchase certainty through experiential validation
SCT	Extends beyond static self-brand matching to conceptualise AR as creating liminal identity spaces enabling real-time self-concept expansion. Virtual embodiment enables transformative self-discovery bridging actual and ideal selves
EVT	Advances through simultaneous hedonic and utilitarian value; experiential engagement transforms from conversion distraction into strategic brand-building mechanism. Pre-purchase entertainment cultivates long-term loyalty independent of immediate transaction outcomes

Source: Own conceptualisation.

DISCUSSION

AR has rapidly become a standard expectation for South African Gen Z, moving beyond the TAM's gradual adoption patterns. As this generation uses AR on social media, AR is now essential for brand relevance, rather than differentiation (Schapsis et al., 2025), with non-adopting brands viewed as “outdated” (Mahajan et al., 2025). Despite Global South's technological challenges (Mateko, 2024), urban South African Gen Z show advanced AR familiarity like that of their global peers more than national constraints (Gudyanga, 2024), thus reshaping competitive dynamics (Pandey & Pandey, 2025).

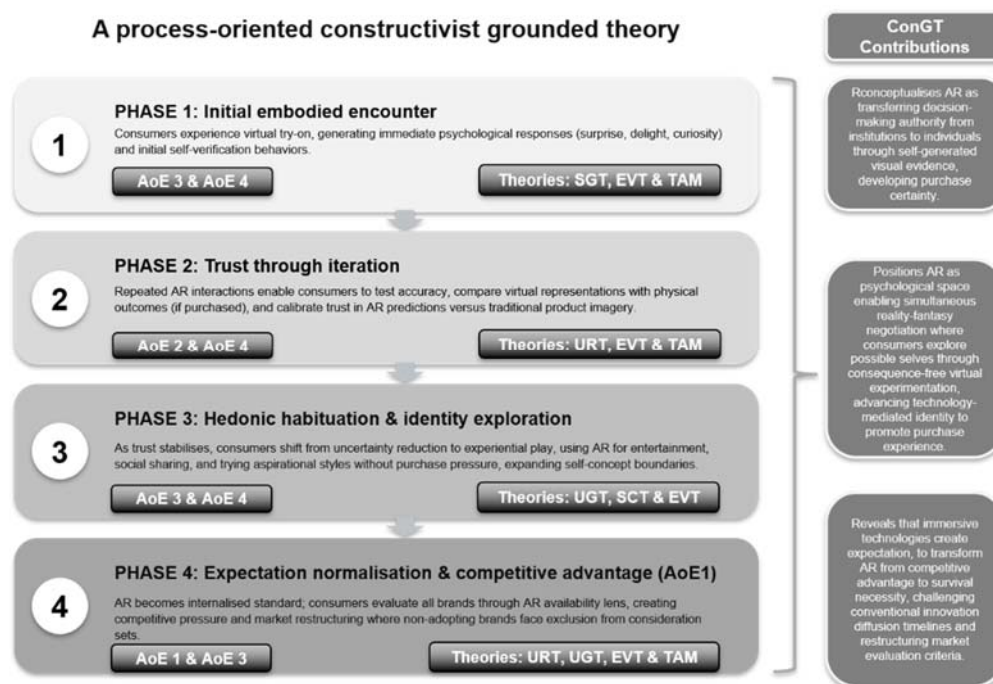
Findings reconceptualise trust from institutional credibility to self-verified sensory confirmation, challenging URT's external information seeking (Berger & Calabrese, 1975; Reddy & Thanigan, 2023). AR compensates for tactile deprivation while eliminating social anxiety (Shaban et al., 2024), enabling predictive certainty through pre-

purchase simulation, and reducing cognitive dissonance (McLean & Wilson, 2019; Riaz et al., 2021). Trust develops iteratively, which is critical for online fashion contexts where tactile purchase risk intensifies (Jessen et al., 2020; Marelli et al., 2022).

AR generates multidimensional value positioning shopping as playful exploration, rather than task completion (Ibáñez-Sánchez et al., 2022). Entertainment value exists independently of purchase outcomes, necessitating expanded metrics beyond conversion rates (Arghashi & Yuksel, 2022; Holbrook & Hirschman, 1982). Unlimited experimentation reflects Gen Z digital nativity, enabling consequence-free identity exploration valuable in South African contexts where fashion expresses self-identity (Ofosu-Boateng & Jose, 2025), with social shareability amplifying brand reach (Rauschnabel et al., 2019).

AR transforms purchase experiences into identity exploration through virtual embodiment, extending SCT into dynamic self-concept negotiation (Chen et al., 2022; Sirgy, 1982). Psychological ownership emerges pre-purchase, removing temporal boundaries between aspiration and actualisation (Hilken et al., 2018; Javornik, 2016). Self-discovery enables testing aspirational identities without social risk – significant in South African contexts where fashion denotes social class and self-expression among Gen Z (Barrera & Shah, 2023; Ofosu-Boateng & Jose, 2025). Reality-fantasy liminality generates authentic emotional responses reflecting Gen Z digital literacy (Flavián et al., 2021; Scholz & Smith, 2016), while ensuring personalised access (Wedel et al., 2020). Figure 1 illustrates CGT using the main themes, related AoEs, relevant theoretical frameworks, and contributions of this study.

Figure 1: CGT process and contributions of this study.



Source: Own conceptualisation.

MANAGERIAL IMPLICATIONS

AR has evolved from competitive differentiator to baseline expectation among South African Gen Z, necessitating immediate strategic implementation (Barrera & Shah, 2023). Four strategic imperatives emerge:

- Prioritise AR infrastructure investment over traditional advertising, emphasising availability across touchpoints to signal market relevance, while implementing competitive monitoring to maintain feature parity (Dwivedi et al., 2021; Rauschnabel et al., 2022).

- Recognise AR as a self-verification tool rather than persuasive marketing, prioritising accuracy through high-quality visualisation, while transparently communicating limitations and enhancing user control features (de Amorim et al., 2022; Papagiannidis et al., 2023).
- Leverage AR's intrinsic hedonic entertainment value, building brand affinity independent of immediate conversion through gamification and social sharing, while recalibrating metrics beyond conversion rates (Scholz & Smith, 2016; Umezurike et al., 2024).
- Address South Africa-specific considerations through diverse model representation reflecting demographic diversity, while accommodating varied smartphone capabilities (Arghashi & Yuksel, 2022; Lai et al., 2025).

LIMITATIONS OF STUDY AND SUGGESTIONS FOR FUTURE RESEARCH

This study's limitations present opportunities to advance AR fashion retail research. First, generalisability is limited by a single-platform sunglasses focus; future research could compare platforms and size-dependent products where fit uncertainty increases (Wedel et al., 2020). Second, transferability is limited by homogeneous South African Gen Z sampling; future cross-cultural and intergenerational studies comparing Global South and Global North markets would reveal how Western-dominated AR design aligns with non-Western aesthetics (Nyagadza et al., 2023). Third, the qualitative design emphasised depth over causality; future mixed-method studies combining qualitative insights with quantitative scales and longitudinal tracking could uncover correlations and evolution of Gen Z AR experiences over time.

CONCLUSION

The study demonstrates that AR fashion retail technologies reconceptualise South African Gen Z purchase experiences through a four-phased process: embodied encounter, iterative trust construction, hedonic habituation, and expectation normalisation. AR replaces brand-mediated trust with self-verified sensory confirmation, while transforming goal-directed shopping into experiential identity play. The findings extend the TAM, UGT, URT, SCT, and EVT by revealing AR as requirement, rather than innovation, creating expectation shifts restructuring competitive dynamics, while serving as an entertainment feature driving long-term engagement. AR's influence on South African Gen Z purchase experiences is multifaceted, advancing theoretical knowledge and practical application for retailers implementing AR in emerging markets.

REFERENCES

- Akhtar, A., Sullivan, P., Alam, Y., & Locke, A. (2024). Using hybrid qualitative analysis to explore lived experience of motherhood and postnatal depression: A thematic-dialogical approach. *Methods in Psychology*, 11(1), Article 100161. <https://doi.org/10.1016/j.metip.2024.100161>
- Arghashi, V., & Yuksel, C. A. (2022). Interactivity, inspiration, and perceived usefulness! How retailers' AR-apps improve consumer engagement through flow. *Journal of Retailing and Consumer Services*, 64(1), Article 102756. <https://doi.org/10.1016/j.jretconser.2021.102756>
- Barrera, K. G., & Shah, D. (2023). Marketing in the metaverse: Conceptual understanding, framework, and research agenda. *Journal of Business Research*, 155, Article 113420. <https://doi.org/10.1016/j.jbusres.2022.113420>
- Berger, C. R., & Calabrese, R. J. (1975). Some explorations in initial interaction and beyond: Toward a developmental theory of interpersonal communication. *Human Communication Research*, 1(2), 99–112. <https://doi.org/10.1111/j.1468-2958.1975.tb00258.x>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Brites, M. J., Maneta, M., Müller, M. S., & Amaral, I. (2024). Online semi-structured interviews to better capture generational media actions: The relevance of relaxed, participative and reflexive approaches. In Q. Gao, & J. Zhou (Eds.), *Human Aspects of IT for the Aged Population: 10th International Conference, ITAP 2024, Held as Part of the*

26th HCI International Conference, HCII 2024, Washington, DC, USA, June 29–July 4, 2024, Proceedings, Part I (pp. 3–12). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-61543-6_1

Butler, A. E., Copnell, B., & Hall, H. (2018). The development of theoretical sampling in practice. *Collegian*, 25(5), 561–566. <https://doi.org/10.1016/j.colegn.2018.01.002>.

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. Sage.

Charmaz, K. (2014). *Constructing grounded theory* (2nd ed.). Sage.

Charmaz, K. (2017). The power of constructivist grounded theory for critical inquiry. *Qualitative Inquiry*, 23(1), 34–45. <https://doi.org/10.1177/1077800416657105>

Chen, R., Perry, P., Boardman, R., & McCormick, H. (2022). Augmented reality in retail: A systematic review of research foci and future research agenda. *International Journal of Retail & Distribution Management*, 50(4), 498–518. <https://doi.org/10.1108/IJRDM-11-2020-0472>

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>

de Amorim, I. P., Guerreiro, J., Eloy, S., & Loureiro, S. M. C. (2022). How augmented reality media richness influences consumer behaviour. *International Journal of Consumer Studies*, 46(6), 2351–2366. <https://doi.org/10.1111/ijcs.12790>

Dwivedi, Y. K., Ismagilova, E., Hughes, D. L., Carlson, J., Filieri, R., Jacobson, J., Jain, V., Karjaluoto, H., Kefi, H., Krishen, A. S., Kumar, V., Rahman, M. M., Raman, R., Rauschnabel, P. A., Rowley, J., Salo, J., Tran, G. A., & Wang, Y. (2021). Setting the future of digital and social media marketing research: Perspectives and research propositions. *International Journal of Information Management*, 59, Article 102168. <https://doi.org/10.1016/j.ijinfomgt.2020.102168>

Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, 5(1), 80–92. <https://doi.org/10.1177/160940690600500107>

Flavián, C., Ibáñez-Sánchez, S., & Orús, C. (2021). The influence of scent on virtual reality experiences: The role of aroma-congruence. *Journal of Business Research*, 123(1), 289–301. <https://doi.org/10.1016/j.jbusres.2020.09.036>

Grand View Research. (2025). *Augmented reality market size, share & trends report 2030*. <https://www.grandviewresearch.com/industry-analysis/augmented-reality-market#:~:text=The%20global%20augmented%20reality%20market,37.9%25%20from%202025%20to%202030>.

Gudyanga, R. (2024). Research trends and gaps in the adoption of immersive reality technologies in African education systems. *International Journal of Learning, Teaching and Educational Research*, 23(11), 232–253. <https://doi.org/10.26803/ijlter.23.11.12>

Hennink, M., & Kaiser, B. N. (2022). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social Science & Medicine*, 292(1), Article 114523. <https://doi.org/10.1016/j.socscimed.2021.114523>

Herber, O. R., Bradbury-Jones, C., Okpokiri, C., & Taylor, J. (2025). Epistemologies, methodologies and theories used in qualitative Global North health and social care research: A scoping review protocol. *BMJ Open*, 15(7), Article e100494. <https://doi.org/10.1136/bmjopen-2025-100494>

Hilken, T., Heller, J., Chylinski, M., Keeling, D. I., Mahr, D., & de Ruyter, K. (2018). Making omnichannel an augmented reality: The current and future state of the art. *Journal of Research in Interactive Marketing*, 12(4), 509–523. <https://doi.org/10.1108/JRIM-01-2018-0023>

Holbrook, M. B., & Hirschman, E. C. (1982). The experiential aspects of consumption: Consumer fantasies, feelings, and fun. *Journal of Consumer Research*, 9(2), 132–140. <https://doi.org/10.1086/208906>

Ibáñez-Sánchez, S., Orús, C., & Flavián, C. (2022). Augmented reality filters on social media. Analyzing the drivers of playability based on uses and gratifications theory. *Psychology & Marketing*, 39(3), 559–578. <https://doi.org/10.1002/mar.21639>

- Ibrahim, M. M., & Nasr, R. I. (2025). Adopting augmented reality into retailing mix strategy: Generation Z's perspective in Egypt. *Future Business Journal*, 11(1), Article 13. <https://doi.org/10.1186/s43093-025-00431-y>
- Javornik, A. (2016). Augmented reality: Research agenda for studying the impact of its media characteristics on consumer behaviour. *Journal of Retailing and Consumer Services*, 30(1), 252–261. <https://doi.org/10.1016/j.jretconser.2016.02.004>
- Jessen, A., Hilken, T., Chylinski, M., Mahr, D., Heller, J., Keeling, D. I., & de Ruyter, K. (2020). The playground effect: How augmented reality drives creative customer engagement. *Journal of Business Research*, 116(2020), 85–98. <https://doi.org/10.1016/j.jbusres.2020.05.002>
- Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and gratifications research. *The Public Opinion Quarterly*, 37(4), 509–523. <https://doi.org/10.1086/268109>
- Kim, H. W., Chan, H. C., & Gupta, S. (2007). Value-based adoption of mobile internet: An empirical investigation. *Decision Support Systems*, 43(1), 111–126. <https://doi.org/10.1016/j.dss.2005.05.009>
- Kovács, I., & Keresztes, É. R. (2024). Digital innovations in e-commerce: Augmented reality applications in online fashion retail—a qualitative study among Gen Z consumers. *Informatics*, 11(8), Article 56. <https://doi.org/10.3390/informatics11030056>
- Lai, Z. J., Leong, M. K., Khoo, K. L., & Sidhu, S. K. (2025). Integrating technology acceptance model and value-based adoption model to determine consumers' perception of value and intention to adopt AR in online shopping. *Asia Pacific Journal of Marketing and Logistics*, 37(1), 1–19. <https://doi.org/10.1108/APJML-03-2024-0386>
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage.
- Mahajan, A. I., Taggar, R., & Gupta, S. (2025). Augmented reality in e-commerce: A dual value and barrier-based perspective on Gen Z's satisfaction and AR-integrated shopping behavior. *Journal of Retailing and Consumer Services*, 87, Article 104417. <https://doi.org/10.1016/j.jretconser.2025.104417>
- Marelli, D., Bianco, S., & Ciocca, G. (2022). Designing an AI-based virtual try-on web application. *Sensors*, 22(10), Article 3832. <https://doi.org/10.3390/s22103832>
- Mateko, F. M. (2024). Opportunities in emerging technologies for Southern Africa: How the Global South should adopt to take advantage? *The Electronic Journal of Information Systems in Developing Countries*, 90(5), Article e12321. <https://doi.org/10.1002/isd2.12321>
- Mathwick, C., Malhotra, N., & Rigdon, E. (2001). Experiential value: Conceptualization, measurement and application in the catalog and internet shopping environment. *Journal of Retailing*, 77(1), 39–56. [https://doi.org/10.1016/S0022-4359\(00\)00045-2](https://doi.org/10.1016/S0022-4359(00)00045-2)
- McLean, G., & Wilson, A. (2019). Shopping in the digital world: Examining customer engagement through augmented reality mobile applications. *Computers in Human Behavior*, 101(1), 210–224. <https://doi.org/10.1016/j.chb.2019.07.002>
- Metelski, F. K., Santos, J. L. G. d., Cechinel-Peiter, C., Fabrizzio, G. C., Schmitt, M. D., & Heilemann, M. (2021). Constructivist Grounded Theory: characteristics and operational aspects for nursing research. *Revista da Escola de Enfermagem da USP*, 55, Article e03776. <https://doi.org/10.1590/s1980-220x2020051103776>
- Ngobeni, K. M., & Makhitha, K. M. (2025). Drivers of augmented reality shopping adoption for high-involvement products in South Africa. *South African Journal of Information Management*, 27(1), Article a1924. <https://doi.org/10.4102/sajim.v27i1.1924>
- Nyagadza, B., Muzira, D. R., & Chuchu, T. (2023). Mobile fin-tech ecosystem shaping financial inclusion in Zimbabwean banking and financial services markets. In H. Chitimira, & T. V. Warikandwa (Eds.), *Financial inclusion and digital transformation regulatory practices in selected SADC countries: South Africa, Namibia, Botswana and Zimbabwe* (pp. 255–274). Springer International. https://doi.org/10.1007/978-3-031-23863-5_12

- Ofosu-Boateng, I., & Jose, L. M. (2025). Exploring the impact of brand authenticity on Generation Z consumer loyalty in Ghana's emerging market. *Open Journal of Social Sciences*, 13(9), 236–257. <https://doi.org/10.4236/jss.2025.139015>
- Pandey, P. K., & Pandey, P. K. (2025). Unveiling the transformative power of augmented reality in retail: A systematic literature analysis. *Journal of Strategy and Management*. <https://doi.org/10.1108/JSMA-05-2023-0101>
- Papagiannidis, S., Pantano, E., See-To, E. W. K., Dennis, C., & Bourlakis, M. (2017). To immerse or not? Experimenting with two virtual retail environments. *Information Technology & People*, 30(1), 163–188. <https://doi.org/10.1108/ITP-03-2015-0069>
- Patnaik, A., Patnaik, A. K., Panigrahy, T., Rout, M., & Patnaik, S. R. (2024). Exploring the evolution of virtual try-on technologies: A comprehensive review from a user-centric perspective. *Educational Administration: Theory and Practice*, 30(4), 8271–8287. <https://doi.org/10.53555/kuey.v30i4.2723>
- Rauschnabel, P. A., Babin, B. J., tom Dieck, M. C., Krey, N., & Jung, T. (2022). What is augmented reality marketing? Its definition, complexity, and future. *Journal of Business Research*, 142(1), 1140–1150. <https://doi.org/10.1016/j.jbusres.2021.12.084>
- Rauschnabel, P. A., Felix, R., & Hinsch, C. (2019). Augmented reality marketing: How mobile AR-apps can improve brands through inspiration. *Journal of Retailing and Consumer Services*, 49(1), 43–53. <https://doi.org/10.1016/j.jretconser.2019.03.004>
- Reddy, N. S., & Thanigan, J. (2023). Determinants of purchase intention, satisfaction, and risk reduction: The role of knowledge and information search among mortgage buyers. *Cogent Economics & Finance*, 11(2), Article 2266659. <https://doi.org/10.1080/23322039.2023.2266659>
- Riaz, M. U., Guang, L. X., Zafar, M., Shahzad, F., Shahbaz, M., & Lateef, M. (2021). Consumers' purchase intention and decision-making process through social networking sites: A social commerce construct. *Behaviour & Information Technology*, 40(1), 99–115. <https://doi.org/10.1080/0144929X.2020.1846790>
- Schapsis, C., Chiagouris, L., & Wingate, N. (2025). Decoding Generation Z's habits: The augmented reality shift from gimmick to utility in omni-digital shopping. *Journal of Product & Brand Management*, 34(1), 119–135. <https://doi.org/10.1108/JPBM-12-2023-4879>
- Scholz, J., & Smith, A. N. (2016). Augmented reality: Designing immersive experiences that maximize consumer engagement. *Business Horizons*, 59(2), 149–161. <https://doi.org/10.1016/j.bushor.2015.10.003>
- Shaban, A., Saraeva, A., Rose, S., & Clark, M. (2024). The invisible hand of touch: Testing a tactile sensation-choice satisfaction model in online shopping. *Journal of Sensory Studies*, 39(1), Article e12897. <https://doi.org/10.1111/joss.12897>
- Sirgy, M. J. (1982). Self-concept in consumer behavior: A critical review. *Journal of Consumer Research*, 9(3), 287–300. <https://doi.org/10.1086/208924>
- Tang, Z., Chen, X., & Xiao, J. (2010). Using the classic grounded theory approach to understand consumer purchase decision in relation to the first customized products. *Journal of Product & Brand Management*, 19(3), 181–197. <https://doi.org/10.1108/10610421011046166>
- Umezurike, S. A., Akinrinoye, O. V., Kufile, O. T., Onifade, A. Y., Otokiti, B. O., & Ejike, O. G. (2024). Augmented reality shopping experiences: A review of retail immersion technologies and outcomes. *International Journal of Management and Organizational Research*, 3(2), 83–94. <https://doi.org/10.54660/IJMOR.2024.3.2.83-94>
- Varshneya, G., & Das, G. (2017). Experiential value: Multi-item scale development and validation. *Journal of Retailing and Consumer Services*, 34(1), 48–57. <https://doi.org/10.1016/j.jretconser.2016.09.010>
- Wedel, M., Bigné, E., & Zhang, J. (2020). Virtual and augmented reality: Advancing research in consumer marketing. *International Journal of Research in Marketing*, 37(3), 443–465. <https://doi.org/10.1016/j.ijresmar.2020.04.004>

THE LEGAL CONSEQUENCES OF CUSTOMARY MARRIAGE: ANTENUPTIAL CONTRACTS AND COMMUNITY OF PROPERTY IN *MM v NIM*

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ABSTRACT

*This article examines the legal and proprietary consequences arising from the judicial recognition of customary marriages, with specific reference to the Gauteng Division High Court decision in *MM v NIM*. The case raised complex questions concerning the validity of a customary marriage concluded through the observance of customary rites, and the legal status of an antenuptial contract executed several years thereafter. The central inquiry is whether a customary marriage, once validly constituted under the Recognition of Customary Marriages Act 120 of 1998, may be retrospectively subjected to a different matrimonial property regime through private contractual arrangement. The article further considers the broader governance and legal-certainty implications of informal matrimonial regimes within plural legal systems.*

Employing a doctrinal legal research methodology, the study critically analyses statutory provisions, case law, and constitutional principles regulating customary marriage, contractual autonomy, and matrimonial property systems. Attention is given to the interaction between living customary law and statutory regulation, as well as the evidentiary approach adopted by courts when determining the existence of a customary marriage.

*The court in *MM v NIM* adopted a contextual and flexible approach, recognising the dynamic nature of customary law and emphasising the totality of the parties' conduct and intention. On a balance of probabilities, the court confirmed the existence of a valid customary marriage and held that the default regime of community of property applied. The antenuptial contract concluded post-marriage was declared void for failing to comply with statutory requirements governing postnuptial alterations.*

The article argues that the decision clarifies the proprietary consequences of customary marriage recognition and delineates the limits of contractual autonomy in plural legal systems. It further highlights the need for greater legal awareness regarding the economic and governance implications of matrimonial property regimes, particularly in contexts where informal or unregistered marriages may create significant proprietary risk and legal uncertainty.

Keywords: antenuptial contract, community of property, customary marriage, living customary law, matrimonial property, plural legal systems.

INTRODUCTION

Plural legal systems present complex challenges for legal certainty (Rautenbach, 2018), particularly where customary or informal matrimonial unions intersect with statutory regulation and proprietary consequences. In South Africa, the constitutional recognition of customary law has transformed the legal landscape governing marriage, property, and contractual autonomy. The *Recognition of Customary Marriages Act* 120 of 1998 formally acknowledges customary marriages as legally valid, provided that certain statutory requirements are met. However, uncertainty frequently arises regarding proof of such marriages, the consequences of non-registration, and the proprietary implications that follow from their recognition.

The Gauteng Division High Court decision in *MM v NIM* (2023) provides a significant judicial exposition of these issues. The matter concerned whether extensive observance of customary rites, absent immediate formal

registration, constituted a valid customary marriage, and whether an antenuptial contract concluded several years thereafter could retrospectively regulate the parties' matrimonial property regime. The dispute therefore required the court to reconcile living customary law, statutory requirements, and principles of contractual autonomy within the broader constitutional framework.

The case is particularly important because matrimonial property regimes have profound economic and governance consequences. The default regime of community of property exposes both spouses to joint and several liability, affects asset ownership, and may materially impact business interests, credit relationships, and estate planning. In plural legal systems, where informal unions may be recognised retrospectively by courts, proprietary risk and legal uncertainty can arise unexpectedly. Accordingly, judicial clarification of the legal consequences of customary marriage has implications beyond family law doctrine and extends into asset structuring, financial planning, and regulatory certainty.

This article addresses the following research questions:

1. Under what circumstances will a court recognise the existence of a valid customary marriage despite the absence of formal registration?
2. Can parties validly alter the matrimonial property consequences of a customary marriage through a postnuptial antenuptial contract without judicial approval?
3. How does the decision in *MM v NIM* clarify the relationship between living customary law, statutory regulation, and contractual autonomy?
4. What broader governance and proprietary implications arise from judicial recognition of informal matrimonial regimes in plural legal systems?

To answer these questions, the article employs a doctrinal legal research methodology grounded in the analysis of statutory provisions, judicial precedent, and constitutional principles. The discussion situates *MM v NIM* within the evolving jurisprudence on living customary law and examines the limits imposed by the *Matrimonial Property Act* 88 of 1984 and related legislation on postnuptial alterations of matrimonial property regimes.

The article argues that the decision affirms the constitutional status of customary marriage while simultaneously reinforcing the rigidity of statutory safeguards governing proprietary consequences. In doing so, the judgment delineates the boundaries of private contractual freedom and promotes greater certainty in the regulation of matrimonial property systems. The analysis further suggests that courts in plural legal systems must balance cultural recognition with the need for predictability and economic stability.

The structure of the article is as follows. First, the statutory and jurisprudential framework governing customary marriage and matrimonial property regimes is examined. Second, the factual and evidentiary issues in *MM v NIM* are analysed. Third, the proprietary and contractual implications of the judgment are evaluated. Finally, the article considers comparative and policy implications arising from the recognition of customary marriages within plural legal orders.

THEORETICAL AND JURISPRUDENTIAL FRAMEWORK

Living Customary Law and Constitutional Recognition

The constitutional recognition of customary law represents one of the most significant developments in South African private law (Republic of South Africa, 1996). Section 211 of the Constitution (Republic of South Africa, 1996) affirms the validity of customary law, subject to the Constitution and legislation, thereby embedding legal pluralism within the national legal framework. This recognition has required courts to move beyond rigid or codified conceptions of customary law and to engage with what has become known as “living customary law” (Himonga & Nhlapo, 2015) — the evolving practices and norms observed by communities. Judicial authority has consistently emphasised that customary law is dynamic and context-dependent, rather than static or formalistic.

Within the sphere of marriage, this evolution has been particularly pronounced. The *Recognition of Customary Marriages Act* (120 of 1998) formalised the legal status of customary marriages while simultaneously accommodating their flexible and culturally grounded nature. Section 3(1) requires that both parties must be over the

age of eighteen, must consent to the marriage, and that the marriage must be negotiated and entered into or celebrated in accordance with customary law. Courts have repeatedly cautioned against applying a mechanical checklist of rituals (Bennett, 2004), instead adopting a contextual approach that examines the totality of the parties' conduct, intention, and community recognition. This jurisprudential shift reflects a broader constitutional commitment to dignity, equality, and cultural recognition.

Proof and Recognition of Customary Marriage

A persistent doctrinal challenge concerns the evidentiary determination of whether a valid customary marriage has come into existence. The non-registration of a customary marriage does not invalidate it, yet it often complicates proof. Courts have therefore relied on circumstantial evidence, patterns of conduct, and community acknowledgement to determine marital status. The jurisprudence demonstrates a flexible evidentiary approach (Himonga & Nhlapo, 2015) grounded in probability rather than formal documentation.

This approach, while constitutionally responsive, introduces a degree of legal uncertainty. Where the existence of a customary marriage is recognised retrospectively, parties may become subject to proprietary consequences that they neither anticipated nor formally regulated. The recognition of customary marriage therefore operates not merely as a matter of status but as a trigger for significant legal and economic consequences.

Matrimonial Property Regimes and Statutory Regulation

The proprietary consequences of marriage in South African law are primarily governed by the *Matrimonial Property Act* (88 of 1984). In the absence of a valid antenuptial contract, spouses are automatically married in community of property. This regime entails the creation of a joint estate, shared ownership of assets, and joint liability for debts. While community of property promotes equality between spouses, it also exposes both parties to financial risk and restricts unilateral asset management.

The rigidity of this default system is reinforced by strict statutory requirements governing any deviation from it. Antenuptial contracts must be concluded prior to marriage and properly registered. Once a marriage has come into existence, a change to the matrimonial property system requires judicial approval in terms of section 21 of the *Matrimonial Property Act*. This provision serves a protective function (*Matrimonial Property Act* 88 of 1984), ensuring transparency, creditor protection, and procedural fairness. The statutory scheme thus reflects a balance between private autonomy and regulatory oversight.

Contractual Autonomy and Its Limits

A central theoretical tension in matrimonial property law concerns the scope of contractual autonomy. While private parties generally enjoy freedom of contract, family law imposes structural limitations designed to protect spouses, creditors, and the integrity of matrimonial regimes. The ability to regulate proprietary consequences through antenuptial agreements is therefore conditional rather than absolute.

Where parties attempt to alter their matrimonial property regime after marriage without judicial sanction, courts have consistently invalidated such arrangements. This reflects a broader principle that matrimonial property systems are not purely private arrangements but are embedded within a regulatory framework with public consequences. The intersection between contract law and family law therefore requires a careful balancing of autonomy, certainty, and protection.

Plural Legal Systems and Proprietary Certainty

In plural legal systems, the coexistence of customary and statutory marriage regimes complicates proprietary certainty. Informal or culturally recognised unions may later acquire full legal recognition, triggering default property consequences that significantly affect asset ownership, liability, and financial planning. This raises broader governance concerns, particularly in contexts involving business ownership, credit exposure, and estate planning.

The jurisprudence reveals an ongoing effort by courts to harmonise cultural recognition with legal predictability. While the flexible recognition of customary marriage advances constitutional values, it simultaneously underscores the importance of awareness and formal regulation to mitigate proprietary risk. The decision in *MM v NIM* must therefore be understood within this broader doctrinal and theoretical landscape, where living customary law, statutory safeguards, and contractual autonomy intersect.

CASE ANALYSIS: *MM v NIM*

Factual Context and Central Dispute

The dispute in *MM v NIM* (2023) arose from conflicting versions regarding the existence of a customary marriage and the proprietary consequences flowing from it. The plaintiff alleged that the parties had concluded a valid customary marriage in May 2011 following the observance of essential customary rites, including negotiations between families and the partial payment of lobolo. The defendant disputed the existence of a marriage, contending that the parties had merely cohabited and that no binding marital union had been established. Several years after the alleged marriage, the parties executed an antenuptial contract purporting to regulate their matrimonial property regime out of community of property. The central legal question was therefore twofold: whether a valid customary marriage had come into existence, and if so, whether the subsequent antenuptial contract could validly alter the proprietary consequences of that marriage.

Determination of a Valid Customary Marriage

In resolving the dispute, the court adopted a contextual and flexible approach consistent with the evolving jurisprudence on living customary law. Rather than applying a rigid checklist of formal requirements, the court examined the totality of the evidence, including the conduct of the parties, the role of their respective families, and documentary proof supporting the plaintiff's version. The court emphasised that the *Recognition of Customary Marriages Act* (120 of 1998) does not require full or immediate payment of lobolo, nor strict adherence to every ritual formality, provided that the marriage was negotiated, entered into, or celebrated in accordance with customary law.

Applying the principles governing mutually destructive versions (*MM v NIM*, 2023), the court evaluated credibility, probabilities, and corroboration. The plaintiff's version was found to be consistent, supported by contemporaneous evidence, and aligned with customary practice, whereas the defendant's denial was regarded as improbable when assessed against the broader factual matrix. On a balance of probabilities, the court concluded that a valid customary marriage had indeed come into existence in May 2011.

This aspect of the judgment reinforces the jurisprudential trend towards recognising living customary law (Himonga & Nhlapo, 2015) as a dynamic and context-sensitive system. By privileging substance over form, the court affirmed that customary marriage is grounded in social practice and intention rather than rigid formalism. At the same time, the decision illustrates the evidentiary flexibility courts are prepared to employ in determining marital status, even where formal registration is absent.

Proprietary Consequences and the Default Matrimonial Regime

Having established the existence of a valid customary marriage, the court turned to the proprietary consequences flowing from that status. In the absence of a valid antenuptial contract concluded prior to marriage, the default matrimonial property regime of community of property applied. This resulted in the creation of a joint estate encompassing the parties' assets and liabilities from the date of marriage.

The judgment highlights the far-reaching legal and economic implications of matrimonial property regimes. Community of property entails equal ownership of assets, shared liability for debts, and restrictions on unilateral financial decision-making. Where parties are unaware of the legal consequences of their marital status, significant proprietary exposure may arise, particularly in contexts involving business ownership, credit relationships, and asset management. The court's confirmation of the default regime therefore underscores the importance of legal certainty and awareness in plural legal systems.

Invalidity of the Postnuptial Antenuptial Contract

The central legal issue concerned the validity of the antenuptial contract executed in 2016, several years after the customary marriage had come into existence. The court held that the agreement constituted an impermissible attempt to alter the matrimonial property regime postnuptially without judicial approval. In terms of section 21 of the *Matrimonial Property Act* (88 of 1984), spouses may change their matrimonial property system only with leave of the court, subject to safeguards designed to protect creditors and ensure procedural fairness.

Because the parties had failed to obtain the requisite court approval, the antenuptial contract was declared void ab initio. This finding reinforces the principle that matrimonial property regimes are subject to statutory regulation and cannot be altered solely through private agreement once a marriage has been concluded. The decision thus delineates the limits of contractual autonomy in family law and affirms the protective function of statutory safeguards.

Doctrinal and Jurisprudential Significance

The judgment in *MM v NIM* (2023) contributes to the evolving jurisprudence on customary marriage in several respects. First, it confirms the flexible and contextual approach to determining the existence of a customary marriage, consistent with constitutional recognition of living customary law. Second, it underscores the rigidity of statutory requirements governing matrimonial property regimes, particularly the necessity of judicial oversight for postnuptial alterations. Third, the decision highlights the intersection between marital status and proprietary consequences, demonstrating how recognition of customary marriage may produce significant legal and economic effects.

Importantly, the case illustrates the broader tension between cultural recognition and legal certainty in plural legal systems. While the flexible recognition of customary marriage advances constitutional values of dignity and cultural identity, it simultaneously emphasises the need for awareness of the legal and proprietary consequences that follow from such recognition. The decision therefore serves as a doctrinal bridge between customary law, statutory regulation, and principles of contractual autonomy.

COMPARATIVE AND INTERNATIONAL PERSPECTIVES

Recognition of Informal and Customary Unions in Plural Legal Systems

The issues raised in *MM v NIM* (2023) are not unique to South Africa. Across plural legal systems, courts grapple with the recognition of informal, customary, or religious unions and the proprietary consequences that follow from such recognition. The central tension is consistent: how to reconcile cultural practices and social reality with statutory regulation and legal certainty.

In several African jurisdictions, customary marriages are recognised (Bennett, 2004) either constitutionally or legislatively, yet questions frequently arise concerning proof, registration, and property consequences. As in South Africa, non-registration does not necessarily invalidate the marriage, but it may complicate evidentiary determination and create uncertainty regarding proprietary regimes. Judicial approaches often reflect a balancing exercise between protecting cultural practices and ensuring clarity in asset ownership and liability structures.

Similar tensions are evident in jurisdictions recognising religious marriages or informal domestic partnerships. Courts in common law countries have increasingly acknowledged long-term cohabitation or customary unions for limited purposes, particularly in relation to maintenance, succession, or property distribution. However, such recognition frequently generates disputes where parties assumed that formal registration or contractual arrangement was necessary to trigger proprietary consequences. The retrospective recognition of marital or quasi-marital status can therefore produce unexpected economic effects.

Postnuptial Agreements and Regulatory Safeguards

Comparative jurisprudence also demonstrates that postnuptial agreements are typically subject to strict regulation (Rautenbach, 2018). In many common law jurisdictions, while prenuptial agreements have gained increasing recognition, postnuptial alterations of matrimonial property systems often require procedural safeguards to protect creditors and ensure informed consent. Courts commonly scrutinise such agreements to prevent prejudice, concealment of assets, or circumvention of statutory protections.

The reasoning in *MM v NIM* (2023) aligns with this broader international trend. By invalidating the antenuptial contract concluded after the existence of the customary marriage, the court reaffirmed that matrimonial property regimes are not purely private constructs but are embedded within a regulatory framework. This approach reflects a shared comparative principle: while contractual autonomy is valued, it is constrained in the matrimonial context to preserve transparency and economic stability.

Legal Certainty, Economic Risk, and Governance Implications

From a governance perspective, the recognition of informal matrimonial regimes has significant implications for asset structuring, financial planning, and commercial certainty. In jurisdictions where customary or informal unions may be retrospectively validated, individuals engaged in entrepreneurial or professional activities may face unanticipated joint liability or asset exposure. Creditors and financial institutions similarly encounter uncertainty when assessing ownership structures and risk profiles.

Comparative experience demonstrates that legal systems seek to mitigate these risks through clearer registration mechanisms, public record systems, or judicial oversight procedures. However, the tension between cultural recognition and economic predictability persists. The South African approach, as illustrated in *MM v NIM*, represents an attempt to strike this balance: flexible recognition of customary marriage combined with strict statutory control over proprietary alteration.

Broader Relevance of *MM v NIM*

The decision in *MM v NIM* therefore contributes to a wider international discourse on legal pluralism and proprietary certainty. It illustrates how courts in plural societies navigate the intersection of cultural legitimacy, statutory regulation, and economic consequence. While rooted in South African law, the case provides insight into the broader challenge of integrating informal matrimonial practices within formal legal and financial systems.

The comparative dimension underscores that the legal consequences of marriage—particularly in relation to property and liability—extend beyond family law and intersect with governance, commercial risk, and regulatory policy. As plural legal systems continue to evolve, judicial clarity regarding the proprietary effects of recognised unions remains essential to maintaining both cultural respect and economic stability.

POLICY AND PRACTICAL IMPLICATIONS

Legal Awareness and Risk Mitigation

The judgment in *MM v NIM* (2023) underscores the necessity of heightened legal awareness regarding the proprietary consequences of customary marriage. Individuals who observe customary rites without formal registration may nonetheless acquire full marital status with immediate proprietary consequences. The automatic application of community of property may significantly alter asset ownership, debt exposure, and financial planning.

From a risk management perspective, this creates potential vulnerability for individuals engaged in entrepreneurial or professional activities. Business owners operating under the assumption of separate estates may unknowingly expose personal and commercial assets to joint liability. The decision therefore highlights the importance of early legal advice and proactive matrimonial property planning in plural legal systems.

Implications for Legal Practitioners

For legal practitioners, *MM v NIM* reinforces the critical importance of verifying marital status before drafting antenuptial contracts or structuring asset transactions. Practitioners must conduct careful factual inquiry into whether customary rites have been observed and whether a valid marriage may already exist in law. The execution of an antenuptial contract after marriage, without judicial approval, is legally ineffective and may create false security for clients.

The case also emphasises the need for practitioners to advise clients on the statutory procedure for postnuptial alteration of matrimonial property regimes. Section 21 of the *Matrimonial Property Act* (88 of 1984) provides a lawful mechanism for change, but only through court oversight. Failure to comply with this requirement exposes parties to invalidity and subsequent litigation.

Financial Institutions and Creditors

The decision also carries implications for financial institutions and creditors. In jurisdictions recognising customary marriages without mandatory registration, determining the existence of a joint estate may require careful due diligence. Credit assessments, security agreements, and asset evaluations may be materially affected by retrospective recognition of marital status.

Clear regulatory guidance and improved registration practices may mitigate such uncertainty. However, until such systems achieve uniform compliance, financial actors must remain attentive to the potential proprietary consequences of customary unions.

Policy Considerations and Legal Certainty

At a policy level, *MM v NIM* illustrates the delicate balance between cultural recognition and economic predictability. While constitutional recognition of customary marriage advances dignity and equality, the absence of immediate formal registration mechanisms may generate uncertainty regarding proprietary regimes. Policymakers may therefore consider measures to enhance public awareness of the legal consequences of customary marriage and to streamline registration processes without undermining cultural authenticity.

The case further demonstrates that statutory safeguards governing matrimonial property alteration serve an essential protective function. Judicial oversight of postnuptial changes ensures transparency, creditor protection, and procedural fairness. The rigidity of this requirement, though occasionally burdensome, promotes long-term stability in asset management and commercial dealings.

Broader Governance Implications

Ultimately, the recognition of customary marriage is not confined to family law doctrine but intersects with governance, economic regulation, and legal risk management. In plural legal systems, courts must carefully navigate the integration of living customary practices within formal regulatory frameworks. The decision in *MM v NIM* affirms that while cultural recognition is constitutionally protected, proprietary consequences remain firmly embedded within statutory control.

The judgment therefore contributes to legal certainty by clarifying both the threshold for recognition of customary marriage and the limits of contractual autonomy. Its broader significance lies in reinforcing predictability within matrimonial property systems, thereby promoting stability in both private and commercial spheres.

CONCLUSION

The decision in *MM v NIM* (2023) represents a significant contribution to the evolving jurisprudence on customary marriage and matrimonial property regulation within South Africa's plural legal system. By affirming the flexible and contextual approach to the recognition of customary marriage, the court reinforced the constitutional commitment to

living customary law and cultural legitimacy. At the same time, the judgment made clear that the proprietary consequences of marriage remain firmly embedded within a statutory framework that limits private contractual autonomy.

The court's recognition of a valid customary marriage despite the absence of formal registration underscores that marital status is determined by substance rather than form. However, the immediate application of the default regime of community of property illustrates the far-reaching legal and economic consequences that flow from such recognition. The invalidation of the postnuptial antenuptial contract further confirms that matrimonial property regimes cannot be altered through private agreement once a marriage has come into existence without strict compliance with statutory safeguards.

The case therefore illuminates a central tension inherent in plural legal systems: the need to respect cultural practices while simultaneously ensuring legal certainty and economic predictability. While flexible recognition advances dignity and equality, it may also generate unforeseen proprietary exposure where parties are unaware of the legal consequences of their conduct. The statutory requirement of judicial oversight for postnuptial alteration serves as a critical stabilising mechanism, protecting creditors, ensuring transparency, and preserving the integrity of matrimonial property systems.

From a broader governance perspective, *MM v NIM* demonstrates that matrimonial property law extends beyond family relationships and intersects with asset management, credit risk, business ownership, and financial planning. In contexts where informal or customary unions may acquire full legal recognition, proactive legal awareness becomes essential to mitigate proprietary uncertainty. The decision thus contributes not only to doctrinal clarity but also to regulatory stability within plural legal orders.

Ultimately, the judgment affirms that customary marriage occupies a constitutionally protected and legally consequential status. At the same time, it delineates the boundaries of contractual freedom in the matrimonial context. By clarifying both recognition and regulation, *MM v NIM* strengthens predictability within South African matrimonial property law and offers insight into the broader challenges faced by plural legal systems seeking to harmonise cultural authenticity with economic certainty.

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REFERENCES

Bennett, T. W. (2004). *Customary law in South Africa*. Juta.

Claassens, A., & Mnisi, S. (2009). Rural women redefining land rights in the context of living customary law. *South African Journal on Human Rights*, 25(3), 491–516.

Deeds Registries Act 47 of 1937 (South Africa).

Himonga, C., & Nhlapo, T. (2015). African customary law and living law in South Africa. *Oxford Journal of Legal Studies*, 35(2), 1–25.

Matrimonial Property Act 88 of 1984 (South Africa).

Mbatha, L. (2011). Reforming the customary law of marriage and succession in South Africa. *Acta Juridica*, 2011, 264–280.

MM v NIM, Gauteng Division of the High Court (2023).

Rautenbach, C. (2018). Introduction to legal pluralism in South African law. *Potchefstroom Electronic Law Journal*, 21, 1–26.

Recognition of Customary Marriages Act 120 of 1998 (South Africa).

Republic of South Africa. (1996). *Constitution of the Republic of South Africa*. Government Printer.

CONTRACTUAL CERTAINTY VERSUS CONSTITUTIONAL JUSTICE: RETHINKING ANTENUPTIAL CONTRACTS IN SOUTH AFRICAN MATRIMONIAL PROPERTY LAW

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ABSTRACT

The principle of pacta sunt servanda has traditionally underpinned South African contract law and the enforcement of antenuptial contracts (ANCs) within matrimonial property regimes. However, the rigid application of contractual autonomy has increasingly come under constitutional scrutiny, particularly where it produces inequitable outcomes for economically vulnerable spouses. The Constitutional Court's decision in EB v ER NO and Others 2024 (2) SA 1 (CC) exposes a critical gap in the legal framework: the absence of clear mechanisms to reconcile contractual certainty with substantive fairness.

This article critically examines this tension by analysing the evolving constitutional approach to matrimonial property law and the limits it imposes on contractual autonomy. Adopting a doctrinal methodology, supported by comparative insights from selected international jurisdictions, the article evaluates the implications of this shift for both legal certainty and broader economic decision-making.

The findings demonstrate that while the constitutionalisation of matrimonial property law enhances the protection of vulnerable spouses, it introduces uncertainty that may affect financial planning, asset protection, and investment behaviour, particularly in entrepreneurial and high-value asset contexts. The article argues that the current framework remains underdeveloped and lacks sufficient doctrinal and statutory clarity.

It is proposed that a recalibrated legal framework be developed through the introduction of structured statutory guidelines, clearer judicial criteria, and strengthened legal awareness mechanisms. Such reforms are necessary to balance fairness with predictability while aligning South African matrimonial property law with constitutional imperatives and global legal developments.

Keywords: antenuptial contracts, legal certainty, constitutional justice, financial risk, matrimonial property, South Africa.

LEGAL FRAMEWORK GOVERNING ANTENUPTIAL CONTRACTS

The regulation of matrimonial property in South Africa is primarily governed by the *Matrimonial Property Act* 88 of 1984 and the *Divorce Act* 70 of 1979, which together establish the legal framework within which spouses may regulate their proprietary consequences (Heaton, 2014). These statutes recognise the ability of parties to determine the patrimonial consequences of their marriage through antenuptial contracts (ANCs), thereby giving effect to the principle of contractual autonomy within family law.

In the absence of a valid antenuptial contract, the default matrimonial property regime of community of property applies automatically. This regime entails the creation of a joint estate in which both spouses share equally in assets and liabilities. While community of property promotes formal equality between spouses, it also carries significant financial implications, including joint liability for debts and restrictions on independent asset management (Heaton, 2014). Consequently, antenuptial contracts serve as an important legal mechanism through which parties

may exclude community of property and structure their financial relationships in accordance with their individual preferences and risk considerations.

Antenuptial contracts must, however, comply with strict formal requirements. They must be executed prior to the conclusion of the marriage and registered in accordance with the *Deeds Registries Act* 47 of 1937. Once a marriage has been concluded, any alteration of the matrimonial property system requires judicial approval in terms of section 21 of the *Matrimonial Property Act*. This statutory requirement reflects the broader regulatory function of matrimonial property law, which extends beyond the interests of the parties to include the protection of creditors and the maintenance of legal certainty within proprietary systems.

Historically, South African courts have demonstrated a strong commitment to the enforcement of validly concluded antenuptial contracts, reflecting the enduring influence of *pacta sunt servanda*. This approach is evident in decisions such as *Barkhuizen v Napier*, 2007 (5) SA 323 (CC), where the Constitutional Court affirmed the importance of contractual autonomy while acknowledging that such autonomy is not absolute. The traditional judicial reluctance to interfere in contractual arrangements has been justified on the basis that certainty and predictability are essential to the functioning of both private law and economic relations.

However, this formalistic approach has been subject to increasing criticism. Scholars have argued that strict enforcement of antenuptial contracts may perpetuate structural inequality, particularly in circumstances where one party enters into the agreement from a position of weaker bargaining power or without full appreciation of its long-term consequences (Bonthuys & Albertyn, 2007). In many instances, antenuptial contracts are concluded in relational contexts characterised by trust, emotional dependency, or unequal access to financial information, thereby undermining the assumption of genuine contractual equality.

This tension highlights a fundamental challenge within matrimonial property law: the need to balance contractual autonomy with considerations of fairness and protection. While antenuptial contracts provide flexibility and certainty, their rigid enforcement may produce outcomes that are inconsistent with constitutional values, particularly where they fail to account for non-financial contributions or evolving socio-economic circumstances.

The existing legal framework therefore reflects a carefully structured but increasingly contested balance between private ordering and regulatory oversight. On the one hand, it preserves the principle of freedom of contract and enables parties to manage financial risk through tailored agreements. On the other hand, it imposes formal and judicial safeguards designed to ensure transparency, protect third parties, and prevent abuse.

It is within this context that recent constitutional developments, particularly the decision in *EB v ER NO and Others*, 2024 (2) SA 1 (CC), must be understood. These developments challenge the traditional dominance of contractual certainty and signal a shift toward a more interventionist, fairness-oriented approach. As will be demonstrated in the following section, this shift has significant implications for both the doctrinal foundations of matrimonial property law and its broader economic and governance consequences.

THE CONSTITUTIONAL SHIFT

The Constitutional Court's decision in *EB v ER NO and Others*, 2024 (2) SA 1 (CC) represents a significant recalibration of the relationship between contractual autonomy and constitutional justice within South African matrimonial property law. The judgment departs from the traditional position that antenuptial contracts should be enforced strictly in accordance with their terms, by recognising that such enforcement may, in certain circumstances, undermine constitutional values such as equality and dignity (Hutchison, 2018).

Central to the Court's reasoning is the recognition that marriage is not merely a contractual relationship, but a social and economic partnership characterised by both financial and non-financial contributions. In this regard, the Court explicitly acknowledged the economic value of caregiving, homemaking, and other forms of unpaid labour that have historically been excluded from formal property calculations (Bonthuys, 2016). By elevating these contributions to constitutional significance, the Court expanded the scope of redistribution and challenged the traditional prioritisation of financial inputs in determining proprietary outcomes.

This development reflects the broader constitutionalisation of private law in South Africa, whereby contractual relationships are no longer insulated from constitutional scrutiny (Hutchison, 2018). The Constitution requires that private law doctrines be interpreted and applied in a manner that promotes substantive equality and prevents the perpetuation of structural disadvantage (Republic of South Africa, 1996). As a result, contractual autonomy is no longer regarded as absolute but is subject to limitations where its enforcement would result in unjust or inequitable outcomes.

The decision in *EB v ER* thus signals a shift from a formalistic approach grounded in certainty toward a more context-sensitive model that prioritises fairness and substantive justice. This shift aligns with the principles of transformative constitutionalism, which seek to address historical patterns of inequality and reshape legal doctrines in accordance with constitutional values (Klare, 1998).

However, while the judgment represents progressive development, it also introduces new complexities. The expansion of judicial discretion in determining when redistribution is appropriate raises concerns regarding legal certainty and predictability. In the absence of clearly defined statutory criteria, courts are required to engage in fact-specific, context-driven assessments that may lead to inconsistent outcomes (Bonthuys & Albertyn, 2007).

The constitutional shift therefore, gives rise to a fundamental tension: while greater flexibility allows courts to achieve equitable results, it simultaneously undermines the predictability traditionally associated with contractual arrangements. This tension lies at the heart of the evolving jurisprudence on antenuptial contracts and underscores the need for a more structured legal framework.

Accordingly, *EB v ER* should not be understood merely as an isolated doctrinal development, but as part of a broader transformation of South African private law. It marks the movement toward a constitutional model in which contractual certainty must be balanced against the demands of fairness, equality, and socio-economic justice. The implications of this shift extend beyond family law and into broader questions of financial planning, asset protection, and economic governance, which will be explored in subsequent sections.

CRITICAL ANALYSIS OF *EB v ER*

Doctrinal Implications: Reconceptualising Contractual Autonomy

The decision in *EB v ER NO and Others*, 2024 (2) SA 1 (CC) represents a fundamental departure from the traditional understanding of contractual autonomy in South African private law. Historically, antenuptial contracts were regarded as binding expressions of party autonomy, enforceable in accordance with the principle of *pacta sunt servanda*. However, the Constitutional Court's approach introduces a more relational and context-sensitive understanding of contractual agreements, recognising that such agreements are often concluded within asymmetrical power dynamics.

This shift reflects the broader constitutionalisation of contract law, where private agreements are subject to constitutional norms and values (Hutchison, 2018). Contractual autonomy is no longer treated as absolute but is instead balanced against considerations of fairness, dignity, and equality. In this sense, *EB v ER* signals a move away from a purely formalistic model of contract enforcement toward a substantive model that interrogates the fairness of outcomes.

Economic Vulnerability and Gendered Inequality

A central strength of the judgment lies in its recognition of the economic consequences of non-financial contributions within marriage. South African family law has long been criticised for privileging financial contributions while overlooking the economic value of caregiving and domestic labour (Bonthuys, 2016). This has resulted in disproportionately adverse outcomes for women, who often sacrifice earning capacity in favour of family responsibilities.

By acknowledging these contributions, the Court aligns matrimonial property law with principles of substantive equality. However, the practical implementation of this recognition raises complex questions. Courts must

now determine how to quantify and evaluate non-financial contributions in a consistent and principled manner. Without clear guidelines, this may result in variability across cases and uncertainty for litigants.

The Risk of Judicial Overreach and Doctrinal Uncertainty

While the expansion of judicial discretion promotes equitable outcomes, it also introduces the risk of doctrinal indeterminacy. The absence of clearly defined criteria governing redistribution creates uncertainty regarding when and how courts will intervene in antenuptial contracts. This uncertainty is particularly problematic in a legal system that has traditionally prioritised predictability and stability in contractual relations (*Barkhuizen v Napier*, 2007 (5) SA 323 (CC)).

From a rule-of-law perspective, excessive reliance on discretionary decision-making may undermine consistency and lead to fragmented jurisprudence. Different courts may place varying weight on factors such as duration of marriage, economic disparity, or non-financial contributions, resulting in divergent outcomes. This lack of uniformity weakens the ability of parties to plan their financial affairs with confidence.

The Unresolved Legal Gap

Despite its progressive orientation, *EB v ER* does not provide a comprehensive framework for the exercise of judicial discretion. The judgment leaves several key questions unresolved, including:

- What threshold must be met before an antenuptial contract is set aside or adjusted?
- How should courts balance competing interests of fairness and certainty?
- What evidentiary standards should apply in assessing non-financial contributions?

The absence of clear answers to these questions reveals a significant gap in the current legal framework. While the Court has established the principle that fairness may justify intervention, it has not articulated a structured methodology for implementing this principle.

Balancing Fairness and Legal Certainty

The central tension emerging from *EB v ER* is the need to reconcile two competing imperatives: fairness and legal certainty. On the one hand, strict enforcement of antenuptial contracts may produce unjust outcomes, particularly where structural inequality exists. On the other hand, excessive flexibility undermines the predictability that underpins both contractual relations and economic decision-making.

This tension is not merely theoretical—it has practical implications for financial planning, asset protection, and investment behaviour. Where parties cannot predict how courts will treat antenuptial contracts, they may adopt more conservative strategies or incur additional legal costs to mitigate risk.

Comparative jurisprudence demonstrates that this tension can be managed through the development of structured legal frameworks that guide judicial discretion. In the absence of such frameworks, South African law remains in a transitional state, characterised by normative progress but doctrinal uncertainty.

Contribution of the Case to South African Private Law

Notwithstanding these challenges, *EB v ER* represents a significant development in South African private law. It affirms the constitutional imperative to address substantive inequality and ensures that matrimonial property law reflects the lived realities of marriage. At the same time, it exposes the limitations of the existing legal framework and highlights the need for legislative and doctrinal reform.

The case therefore performs a dual function: it advances the protection of vulnerable spouses while simultaneously revealing the structural weaknesses of a system that lacks clear guidance on the limits of contractual autonomy. This duality underscores the importance of developing a coherent framework capable of balancing fairness with predictability.

COMPARATIVE AND INTERNATIONAL PERSPECTIVE

The tension between contractual autonomy and substantive fairness in matrimonial property law is not unique to South Africa. Comparative jurisprudence demonstrates that many jurisdictions have grappled with similar challenges, particularly in reconciling private ordering with the need to protect economically vulnerable spouses. A comparative analysis of selected jurisdictions—most notably the United Kingdom and Canada—provides valuable insight into how this balance may be achieved through structured legal frameworks.

United Kingdom: Fairness as a Structured Limitation

In the United Kingdom, the legal status of prenuptial agreements was fundamentally clarified in *Radmacher v Granatino*, [2010] UKSC 42. The Supreme Court held that such agreements should generally be given effect, provided that they were entered into freely, with full appreciation of their implications, and that their enforcement would not be unfair (Miles, 2011).

Importantly, the UK approach does not reject contractual autonomy but subjects it to a structured fairness inquiry. Courts consider factors such as:

- the presence of informed consent;
- absence of undue pressure or exploitation;
- and whether enforcement would leave one party in a position of real need.

This framework provides a balance between flexibility and predictability. While courts retain discretion, that discretion is guided by identifiable principles, thereby reducing the risk of inconsistent outcomes. As a result, parties retain a reasonable degree of certainty regarding the likely enforceability of their agreements.

Canada: Statutory Guidance and Judicial Oversight

Canadian family law adopts a similarly interventionist approach but places greater emphasis on statutory regulation. Provincial legislation generally permits courts to set aside or vary domestic agreements where their enforcement would be unconscionable or inequitable (Thompson, 2013).

Unlike South Africa's current position, Canadian courts operate within clearly defined legislative frameworks that guide the exercise of judicial discretion. These frameworks typically require courts to consider:

- the circumstances under which the agreement was concluded;
- the disclosure of financial information;
- and the substantive fairness of the outcome.

The presence of statutory criteria enhances consistency and predictability, while still allowing courts to achieve equitable results. This model illustrates how legislative intervention can mitigate the risks associated with discretionary decision-making.

Comparative Insights: Managing the Certainty–Fairness Tension

A key insight from comparative analysis is that the tension between certainty and fairness is not resolved by prioritising one over the other, but by structuring the relationship between them. Both the United Kingdom and Canada recognise that strict enforcement of matrimonial agreements may produce unjust outcomes. However, rather than abandoning contractual certainty, these jurisdictions have developed frameworks that guide judicial intervention.

In contrast, South Africa's evolving jurisprudence, particularly following *EB v ER NO and Others*, 2024 (2) SA 1 (CC)—reflects a clear shift toward fairness, but lacks the structured doctrinal and statutory guidance found in comparable jurisdictions. This absence creates a risk of unpredictability, as courts are required to determine fairness on a case-by-case basis without clearly articulated criteria.

Implications for South African Law

The comparative experience suggests that South Africa is currently in a transitional phase. While the constitutionalisation of matrimonial property law aligns with global trends toward substantive fairness, the absence of a structured framework places the legal system at risk of inconsistency and uncertainty.

From a policy perspective, this gap has broader implications beyond family law. Uncertainty regarding the enforceability of antenuptial contracts may influence financial planning, asset structuring, and investment behaviour. In this regard, the development of clearer statutory and doctrinal guidelines is not merely a legal necessity but also an economic imperative.

Accordingly, comparative analysis supports the argument advanced in this article: that the future development of South African matrimonial property law should focus on creating a principled framework that balances fairness with predictability. Such a framework would align domestic law with international best practices while ensuring coherence within the constitutional order.

THEORETICAL FRAMEWORK

The evolution of South African matrimonial property law must be understood within a broader theoretical shift from classical contract theory toward a constitutionally grounded model of substantive fairness. This transformation reflects the increasing influence of constitutional values on private law and the recognition that formal contractual freedom may, in practice, entrench structural inequality.

Contractual Autonomy versus Constitutionalism

Classical contract theory is premised on the idea that agreements freely concluded between parties should be enforced, regardless of their distributive consequences. This approach prioritises certainty, predictability, and individual autonomy, and has historically underpinned the enforceability of antenuptial contracts (Hutchison & Pretorius, 2017).

However, the constitutional era has introduced a significant recalibration of this principle. Contractual autonomy is no longer regarded as absolute but must be exercised within the bounds of constitutional values, including dignity, equality, and fairness (Hutchison, 2018). This shift reflects the understanding that private agreements may perpetuate inequality where they are concluded within contexts characterised by unequal bargaining power or limited access to information.

The decision in *EB v ER NO and Others*, 2024 (2) SA 1 (CC) exemplifies this transformation by subjecting antenuptial contracts to constitutional scrutiny. The judgment confirms that contractual arrangements cannot be enforced where their effects are inconsistent with fundamental constitutional norms.

Substantive Equality

The concept of substantive equality lies at the heart of the constitutional approach to matrimonial property law. Unlike formal equality, which treats all parties as equal regardless of context, substantive equality requires an examination of the actual socio-economic conditions affecting individuals (Bonhuys, 2016).

In the context of marriage, this distinction is particularly significant. While antenuptial contracts may reflect formal agreement between parties, they often fail to account for disparities in economic power, earning capacity, and access to resources. Non-financial contributions, such as caregiving and domestic labour, are frequently excluded from traditional property calculations, resulting in unequal outcomes upon dissolution.

The recognition of these contributions in *EB v ER* represents an important step toward aligning matrimonial property law with substantive equality. However, the challenge lies in translating this principle into consistent and predictable legal outcomes.

Transformative Constitutionalism

The shift toward substantive fairness is further grounded in the principle of transformative constitutionalism, which seeks to use law as a tool to address historical and systemic inequality (Klare, 1998). This approach requires that legal doctrines be developed in a manner that promotes social justice and restructures entrenched patterns of disadvantage.

Within matrimonial property law, transformative constitutionalism demands that the legal system move beyond formal contractual analysis and engage with the lived realities of marriage. This includes recognising the economic impact of unpaid labour, addressing gendered inequalities, and ensuring that property regimes do not perpetuate disadvantage.

However, while transformative constitutionalism justifies greater judicial intervention, it also raises concerns regarding legal certainty. The challenge is therefore to develop a framework that gives effect to constitutional values without undermining the stability and predictability necessary for both legal and economic systems.

POLICY AND LEGAL REFORM

The constitutional shift reflected in *EB v ER* highlights the need for targeted legal reform to address the tension between fairness and certainty. While judicial intervention provides flexibility, it must be supported by clear legislative and policy frameworks to ensure consistency and predictability.

Development of a Structured Statutory Framework

A central reform requirement is the introduction of statutory guidelines governing the redistribution of assets in marriages subject to antenuptial contracts. Such a framework should provide clear criteria to guide judicial discretion, including:

- the duration of the marriage;
- the nature and extent of financial and non-financial contributions;
- disparities in earning capacity; and
- the extent to which enforcement would result in economic hardship.

The establishment of such criteria would enhance consistency in judicial decision-making while preserving the flexibility necessary to achieve equitable outcomes.

Antenuptial Contract Certification Mechanism

To address concerns relating to informed consent, a formal certification mechanism should be introduced. This would require legal practitioners to confirm that parties:

- have received independent legal advice;
- understand the legal and financial implications of the agreement; and
- have made full and transparent disclosure of assets.

Such a mechanism would strengthen the validity of antenuptial contracts and reduce the likelihood of subsequent disputes.

Judicial Guidelines and Doctrinal Clarity

In addition to legislative reform, there is a need for the development of judicial guidelines that provide interpretative clarity. These guidelines should articulate the circumstances under which courts may depart from contractual terms and establish a structured approach to assessing fairness.

The absence of such guidance currently contributes to uncertainty and inconsistent application of legal principles. Clear doctrinal standards would enhance predictability while maintaining the flexibility required by constitutional considerations.

Public Legal Awareness and Education

Finally, greater emphasis should be placed on public legal education. Many individuals enter into antenuptial contracts without a full understanding of their long-term implications. Public awareness initiatives, supported by legal aid institutions and academic bodies, could play a critical role in promoting informed decision-making.

BUSINESS, ECONOMIC AND GOVERNANCE IMPLICATIONS

The evolving legal framework governing antenuptial contracts has implications that extend beyond family law, influencing financial planning, business operations, and broader economic behaviour.

Matrimonial Property Regimes and Financial Risk

Antenuptial contracts are widely used as instruments for managing financial risk and protecting assets. The increasing possibility of judicial intervention introduces uncertainty into these arrangements, potentially exposing individuals to unforeseen redistribution claims and weakening asset protection strategies.

This uncertainty may have broader implications for financial planning, particularly for individuals with complex asset structures or significant liabilities.

Implications for Entrepreneurs and Professionals

Entrepreneurs and professionals frequently rely on antenuptial contracts to separate personal and business risk. Judicial redistribution may result in indirect exposure of business assets, thereby affecting enterprise stability and increasing litigation risk.

These developments may also complicate succession planning and long-term business continuity, particularly in family-owned enterprises.

Legal Certainty and Investment Confidence

Legal certainty is a critical factor in economic decision-making. Where contractual arrangements are subject to unpredictable judicial intervention, individuals and investors may adopt more conservative strategies, potentially reducing economic activity.

Comparative jurisdictions demonstrate that structured legal frameworks can mitigate these risks by providing greater predictability while preserving fairness.

Governance and Policy Integration

The evolving legal position underscores the need for greater integration between legal regulation and economic policy. Policymakers must ensure that matrimonial property law supports both constitutional objectives and economic stability. This requires:

- clearer statutory frameworks;
- predictable legal standards; and
- alignment between legal, economic, and governance considerations.

CONCLUSION

South African matrimonial property law is undergoing a significant transformation, driven by the constitutional imperative to promote substantive equality and protect vulnerable spouses. The decision in *EB v ER NO and Others*, 2024 (2) SA 1 (CC) represents a pivotal moment in this evolution, signalling a shift away from strict contractual enforcement toward a more flexible, fairness-oriented approach.

While this development enhances the capacity of the legal system to address inequality, it also introduces challenges relating to legal certainty and predictability. The absence of clear statutory and doctrinal guidance creates a risk of inconsistent outcomes and undermines the stability traditionally associated with contractual arrangements.

This article has argued that the future of South African matrimonial property law lies in achieving a principled balance between contractual autonomy and constitutional justice. This requires the development of structured legal frameworks that guide judicial discretion, promote consistency, and provide clarity to both individuals and legal practitioners.

Such reforms are not only necessary to ensure doctrinal coherence but are also essential from an economic and governance perspective. By aligning legal certainty with constitutional values, South Africa can develop a matrimonial property system that is both equitable and predictable, thereby supporting sustainable financial planning and broader economic stability.

AI Disclosure Statement: The author(s) declare that generative AI and AI-assisted technologies were used solely to improve the readability, language, grammar, and overall presentation of this manuscript. AI tools were also used in a limited capacity to assist with research organisation and analysis. All substantive academic content, legal analysis, interpretations, arguments, conclusions, and final editorial decisions remain the sole work and responsibility of the author(s). The manuscript was not fully generated by artificial intelligence.

REFERENCES

Barkhuizen v Napier, 2007 (5) SA 323 (CC).

Bonthuys, E. (2016). *The South African law of divorce and family law*. Juta.

Bonthuys, E., & Albertyn, C. (2007). Gender and the judiciary in South Africa. *South African Journal on Human Rights*, 23(1), 48–69.

Heaton, J. (2014). *South African family law* (4th ed.). LexisNexis.

Hutchison, D. (2018). Constitutionalisation of contract law. *Stellenbosch Law Review*, 29(1), 1–20.

Hutchison, D., & Pretorius, C. (2017). *The law of contract in South Africa* (3rd ed.). Oxford University Press.

Klare, K. E. (1998). Legal culture and transformative constitutionalism. *South African Journal on Human Rights*, 14(1), 146–188.

Miles, J. (2011). *Radmacher v Granatino* and the future of prenuptial agreements. *Law Quarterly Review*, 127, 21–25.

Radmacher v Granatino, [2010] UKSC 42.

Republic of South Africa. (1996). *Constitution of the Republic of South Africa*. Government Printer.

Thompson, M. (2013). Domestic contracts and fairness in Canadian law. *Canadian Family Law Quarterly*, 32(2), 145–167.

THE ROLE OF QUALITY MANAGEMENT PRACTICES AND SUPPLIER MANAGEMENT IN CORRECTIVE MAINTENANCE BACKLOG: A STRUCTURAL EQUATION MODELLING APPROACH

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ABSTRACT

This study examined the structural relationships between quality tools, ISO 9001:2015 quality management (QM) principles, maintenance documentation gaps, and supplier management in influencing corrective maintenance backlog. A quantitative explanatory research design was adopted, and data were collected through a structured questionnaire administered to employees at a power generation plant. A total of 204 responses were analysed using covariance-based structural equation modelling. The results indicate that quality tools have a significant positive effect on the implementation of QM principles and on supplier management practices. QM principles were also found to influence maintenance documentation practices. However, quality tools and QM principles did not demonstrate any significant effect on corrective maintenance gaps. Instead, supplier involvement showed a positive relationship with backlog levels, highlighting the influence of supplier coordination and spare parts logistics on maintenance performance. The findings suggest that corrective maintenance backlog is driven by indirect organisational and operational factors rather than by quality tools or standards alone. The study contributes to maintenance management literature by providing a systems-level perspective on how internal quality practices and external supplier dependencies interact to influence maintenance outcomes.

Keywords: quality management tools, ISO 9001:2015, corrective maintenance backlog, supplier management, maintenance documentation.

INTRODUCTION

Unplanned equipment failures significantly affect operational efficiency, asset reliability, and overall organisational performance. As a result, maintaining equipment reliability in increasingly complex and continuous production environments has become a critical determinant of sustainable operations (Al-Refaie & Almowas, 2023). Maintenance is therefore viewed as a strategic function aimed at restoring and maintaining the functionality of equipment, machinery, and infrastructure (Krupitzer et al., 2020). Within this context, maintenance is commonly implemented through corrective maintenance (CM) and preventive maintenance (PM), where CM restores functionality after failure, while PM focuses on preventing failures and extending equipment lifespan (Molęda et al., 2023; Ferreira et al., 2020).

However, despite the complementary nature of these strategies, many organisations continue to rely heavily on CM, resulting in reactive maintenance environments characterised by frequent breakdowns and increased operational disruptions (Zhu et al., 2019). In such situations, maintenance teams often become trapped in a continuous cycle of responding to equipment failures, thereby creating a “firefighting” environment where significant time and resources are dedicated to CM at the expense of PM activities (Scarf et al., 2024). This reactive approach can undermine the effectiveness of PM programmes and hinder the achievement of long-term maintenance objectives (Nunes et al., 2023). While ongoing performance improvement initiatives are necessary, Syamsundar et al. (2021) argue that to achieve optimal maintenance solutions, organisations should develop maintenance strategies that effectively integrate both CM and PM activities. Similarly, Al-Refaie and Almowas (2023) emphasise the importance of achieving an appropriate balance between CM and PM as a key component of an effective maintenance strategy, with the thrust being on reducing the levels of CM and improving PM practices to enhance overall maintenance

effectiveness. The widely accepted engineering maintenance standard ratio is approximately 20% CM and 80% PM (Hamasha et al., 2023). Failure to maintain this balance can have significant operational implications, particularly in terms of equipment reliability, system availability, and the accumulation of corrective maintenance backlogs. Hamasha et al. (2023) further note that when preventive maintenance activities are not implemented effectively, the frequency of equipment failures increases, which leads to a greater reliance on CM and a deviation from the recommended CM/PM ratio. Over time, this imbalance can result in growing corrective maintenance backlogs, reduced equipment reliability, and disruptions to operational processes (Syamsundar et al., 2021).

Management strategies that can support the optimisation of CM and PM performance include quality management principles aligned with contemporary managerial theory and practice (Farahani & Tohidi, 2021; Castillo-Martinez et al. 2021). These principles have been translated into international standards, providing guidelines to determine, measure, achieve, and improve operational objectives (Echour & Nbigui, 2021). Complementing these strategies are quality management tools which are widely used to monitor and improve both product and operational quality across industries (Wittenberger & Teplicka, 2024; Ferreira et al., 2020). Additionally, suppliers play a critical role in enhancing maintenance performance through the provision of specialised technical expertise, maintenance support services, and the supply of essential spare parts and components (Scarf et al., 2024). While previous studies have examined maintenance practices, supplier performance, and quality management systems separately, limited empirical research has examined how quality tools, ISO 9001:2015 QM principles, documentation practices, and supplier management interact simultaneously to influence corrective maintenance backlog (Farahani & Tohidi, 2021). Consequently, the mechanisms through which quality management systems affect maintenance performance remain insufficiently understood. Against this backdrop, the aim of this study was to examine the structural relationships between quality tools, QM principles, maintenance documentation gaps, and supplier management in influencing corrective maintenance backlog.

LITERATURE REVIEW

Quality Management System

ISO 9001:2015 is one of the most widely adopted quality management standards that provides a structured framework for standardising organisational processes through documented procedures, performance measurement, and continual improvement (Fonseca et al., 2023). Although ISO 9001 certification is not a legal requirement, Alshahrani and Husain (2023) highlight that it plays an important role in facilitating international business relationships and signaling a systematic approach to quality management. It is underpinned by seven quality management principles: customer focus, leadership, engagement of people, process approach, improvement, evidence-based decision making, and relationship management (Chiarini & Cherrafi, 2023). Aligning organisational practices with these principles requires a holistic approach that integrates both “hard” elements, such as quality tools, techniques, and systems, and “soft” elements, including behavioural and cultural factors (de Las Casas et al., 2025). However, the literature presents mixed evidence regarding ISO 9001 effectiveness, suggesting that its impact varies depending on implementation depth, organisational maturity, and contextual conditions (Gremyr et al., 2021; Bakhtiar et al., 2023).

Without the effective integration of these elements, certification risks becoming symbolic rather than operational (Limón-Romero et al., 2024). A key operational mechanism supporting the implementation of ISO 9001 principles is the use of quality tools. These tools enable organisations to translate quality management principles into practical activities by supporting process documentation, monitoring performance, and facilitating evidence-based decision making as highlighted by de Las Casas et al. (2025). Furthermore, the integration of quality tools into routine operations strengthens the functionality of quality management systems and enhances their strategic impact on organisational performance (García-Fernández et al., 2022). The commonly used quality tools, including check sheets, root cause analysis, process mapping, control charts, and benchmarking, provide systematic methods for analysing processes and identifying improvement opportunities (Bagodi et al., 2021; Sa et al., 2022). However, evidence suggests that quality tools rarely generate direct performance improvements on their own, as their primary value lies in enhancing process visibility, standardisation, and decision-making support rather than directly influencing complex operational outcomes (Esmaeeli et al., 2025). Their effective use embeds structured problem-solving and operational discipline within organisations, aligning closely with ISO 9001 requirements. Consequently, organisations that consistently apply quality tools are better positioned to realise the intended benefits of ISO 9001 implementation and long-term sustainability (de Las Casas et al., 2025).

Another important requirement of ISO 9001 is the management of documented information to ensure consistency, traceability, and accountability within quality management processes (Fonseca et al., 2023). Effective documentation management includes procedural records, work instructions, evidence of performance evaluations, and records of corrective actions (Gremyr et al., 2021). Properly maintained quality documentation supports compliance and contributes to improved operational control by making organisational processes transparent and verifiable (Chiarini & Cherrafi, 2023; Limón-Romero et al., 2024). Beyond supporting compliance and operational control, documentation systems are widely recognised as a key mediating mechanism linking quality management principles to operational outcomes, as they translate strategic quality intentions into executable organisational processes (Bakhtiar et al., 2023). Hence, the following hypotheses is provided:

H1: Quality tools have a significant effect on QM principles

H2: QM principles have a significant effect on documentation gaps

Supplier Management

Effective supplier management is integral to maintaining product and service quality across the value chain (Lambert & Enz, 2017). As supply chains become more complex, coordination and monitoring of suppliers become critical for operational efficiency (Kocoglu et al., 2022). However, supplier performance outcomes are highly context-dependent, with literature indicating that variability in coordination efficiency, lead times, and integration mechanisms strongly influences operational results (Vanichchinchai, 2022). This suggests that supplier management should be understood as a dynamic system embedded within organisational operations rather than a static procurement function. ISO 9001 provides structured mechanisms for supplier selection and evaluation, enabling organisations to assess supplier capability and ensure compliance with quality requirements (Karthi, 2022; Noshad & Awasthi, 2018; Limón-Romero et al., 2024). Supplier certification further strengthens these processes by supporting more reliable selection decisions and fostering long-term supplier relationships (Vanichchinchai, 2022; Benzaquen & Narro, 2023). Overall, these practices contribute to more stable value networks and improved supply chain reliability through stronger collaboration with suppliers (Kocoglu et al., 2022). However, certification on its own does not guarantee sustained supplier performance, since long-term outcomes depend on ongoing monitoring, communication effectiveness, and how well supplier processes are integrated with internal operational systems.

In maintenance-driven environments, supplier reliability becomes particularly important because maintenance depends on the timely availability of spare parts and technical materials (Zhang et al., 2021). Scarf et al. (2024) highlight that proactive supplier engagement improves spare parts availability and maintenance responsiveness, supporting smoother execution of maintenance activities and reducing downtime. In practice, close coordination between maintenance teams and suppliers is essential to ensure that required materials are available when needed (Vanichchinchai, 2022). That said, when coordination breaks down or lead times become inconsistent, maintenance execution is directly affected, which can contribute to corrective maintenance backlog and expose the operational dependence on external suppliers.

Another important component of effective supplier management is the use of quality tools, such as supplier scorecards, key performance indicators (KPIs), and supplier audits, which support organisations in managing interactions with external suppliers and service providers (Vaghani, 2024). When applied systematically, these tools provide clearer guidance to external partners regarding organisational expectations and performance benchmarks (Sharma & Joshi, 2023). García-Fernández et al. (2022) note that they facilitate communication and performance monitoring, thereby strengthening alignment between supplier outputs and organisational requirements (Sa et al., 2022). Importantly, these quality tools do not directly improve supplier capability. Instead, they enhance visibility, standardisation, and corrective feedback within the supplier management system, functioning as enabling mechanisms rather than direct performance drivers. Through their application, organisations can establish clear expectations, monitor compliance with agreed standards, and evaluate supplier performance relative to internal quality objectives (Noshad & Awasthi, 2018). This supports the view that quality tools strengthen supplier management indirectly through improved monitoring and decision-making within ISO 9001-based systems. Based on this, the following hypotheses is proposed:

H3: Supplier management have a significant effect on corrective maintenance backlog.

H4: Quality tools have a significant effect on supplier management.

Maintenance Backlog

Maintenance backlogs represent a critical challenge in maintenance management, as they are closely linked to how maintenance activities are planned, resourced, and executed (Esmaeeli et al., 2025). Ineffective planning and poorly executed interventions increase downtime, repeat failures, and incomplete work, thereby contributing directly to corrective maintenance backlogs (Monfared & Zio, 2025). Central to this issue is the management of equipment reliability, availability, and maintainability (RAM), which depends on the quality and frequency of maintenance interventions during the planning horizon (Sagharidooz et al., 2024). Maintenance backlog growth is also influenced by inefficiencies such as poor inventory management, delays in resource availability, ineffective data management, and underutilisation of resources (Gomaa, 2026). This indicates that corrective maintenance backlog is shaped by multiple operational and organisational factors rather than a single maintenance issue.

Although quality management system (QMS) principles have the potential to reduce maintenance backlogs, their effectiveness depends on how well they are integrated into organisational processes (Rathilall et al., 2024; Sa et al., 2022). Bakhtiar et al. (2023) found that operational improvements depend more on the integration of ISO 9001 practices into day-to-day activities than on certification alone. Consequently, organisations that implement ISO 9001 mainly for compliance purposes may experience limited operational benefits (Gremyr et al., 2021). This is because the social and technical components of a QMS are interdependent and must function together to achieve sustained improvement (El Manzani et al., 2019). As a result, ISO 9001 principles do not necessarily produce direct improvements in corrective maintenance backlog unless they are effectively integrated into maintenance operations (Castillo-Martinez et al., 2021).

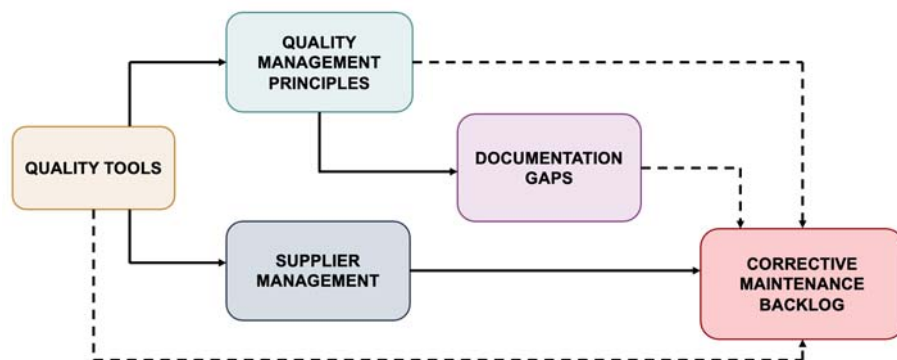
In addition to QMS principles, quality tools are widely used to improve process efficiency and support systematic problem-solving. These tools include root cause analysis, Pareto analysis, control charts, check sheets, and preventive maintenance scheduling tools. However, their direct effect on maintenance backlog is often limited unless they are integrated into broader organisational systems (Esmaeeli et al., 2025). García Fernández et al. (2022) note that such tools are most effective when supported by managerial commitment and a strong quality culture. Since corrective maintenance backlogs often arise from process inefficiencies, planning constraints, and resource limitations, quality tools alone are unlikely to reduce backlog levels without effective operational integration (Gomaa, 2026). This suggests that quality tools support maintenance improvement indirectly rather than functioning as direct drivers of backlog reduction. Corrective maintenance backlogs therefore arise from a combination of planning gaps, process inefficiencies, resource constraints, and weak integration of quality practices. This highlights the need to examine how quality tools and QMS principles influence maintenance performance outcomes. Hence, the following hypotheses is proposed:

H5: Quality tools have a significant effect on corrective maintenance backlog.

H6: QM principles have a significant effect on corrective maintenance backlog.

Based on the hypotheses developed from the literature, the study adopts the hypothesized conceptual framework as reflected in Figure 1.

Figure 1: Hypothesized conceptual framework.



Source: Authors (2026).

METHODOLOGY

Research Design and Approach

This study adopted a quantitative explanatory research design to examine the relationships between quality tools, QM principles, documentation gaps, supplier management, and corrective maintenance backlog. The explanatory design is appropriate for testing hypothesised relationships within a structured model (Amare et al., 2024). The study employed covariance-based structural equation modelling (CB-SEM), with constructs treated as latent variables measured through multiple indicators to ensure construct validity and reliability (Hair et al., 2018).

Population and Sampling

The target population comprised 263 employees at the selected power generation plant, including management, supervisory, professional, and technical staff involved in maintenance-related activities. A stratified random sampling approach was used to ensure representation across all job levels, which assisted in reducing sampling bias and improving representativeness (Creswell & Creswell, 2018). All eligible employees were invited to participate, and 204 usable responses were obtained and analysed. This sample size is considered adequate for CB-SEM analysis, depending on model complexity (Hair et al., 2018).

Research Instrument and Data Collection

Data were collected using a structured questionnaire measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Likert scales are widely used in SEM studies due to their suitability for measuring latent constructs (Hair et al., 2018). The questionnaire consisted of two sections: demographic information and 20 items measuring five constructs, namely quality tools, QM principles, documentation gaps, supplier management, and corrective maintenance backlog. Items were developed from established literature and aligned with ISO 9001:2015 principles. Some items were adapted to fit the power generation maintenance context while retaining theoretical meaning (Saha et al., 2021). Content validity was ensured through expert review prior to data collection.

Data collection was conducted in two phases at the selected power generation plant. The questionnaire was first distributed electronically using the QuestionPro survey platform via the university enterprise sub-account. However, the response rate was relatively low. To improve participation, a second phase was conducted using paper-based questionnaires personally administered by the researcher to eligible participants within the organisation. This mixed-mode approach is widely supported in organisational research, as personally administered questionnaires improve response rates and allow participants to seek clarification where necessary (Creswell & Creswell, 2018).

Data Analysis Methods

The data were analysed using CB-SEM in AMOS to test the hypothesised relationships among latent constructs. CB-SEM was selected due to its suitability for theory testing and its ability to assess measurement properties, overall model fit, and structural relationships simultaneously (Kline, 2023). The model fit was assessed using multiple goodness-of-fit indices rather than relying on a single statistic. These included the ratio of chi-square to degrees of freedom (CMIN/DF), the Normed Fit Index (NFI), the Comparative Fit Index (CFI), the parsimony ratio (PRATIO), and the Root Mean Square Error of Approximation (RMSEA). In line with commonly accepted guidelines, CMIN/DF values below 5 were considered acceptable, NFI and CFI values of 0.90 or higher indicated acceptable fit, PRATIO values closer to 1 suggested better model parsimony, and RMSEA values below 0.08 were interpreted as indicating acceptable model fit (Baharum et al. 2023; Amare et al. 2024).

The measurement model was evaluated using confirmatory factor analysis (CFA) to examine the relationships between the observed indicators and their corresponding latent constructs. Standardised factor loadings were assessed, with values of 0.60 or higher considered acceptable. Composite reliability (CR) was used to assess internal consistency reliability, with values of 0.70 or above regarded as satisfactory. The validity of measures was evaluated using convergent and discriminant validity. Convergent validity was assessed using average variance extracted (AVE), with values of 0.50 or higher indicating adequate convergence among the indicators, while

discriminant validity was evaluated to ensure that each construct was distinct from the others (Hair et al., 2018). Following the assessment of the measurement model, the structural model was analysed to test the hypothesised relationships among quality tools, QM principles, documentation gaps, supplier involvement, and corrective maintenance backlog. The standardised path coefficients were examined to evaluate the direction and strength of the relationships. Statistical significance was assessed at the 95% confidence level, with p-values less than 0.05 considered statistically significant (Kwak, 2023).

RESULTS

Demographic Profile of Participants

The basic demographic profile of the participants is presented in Table 1.

Table 1: Basic demographic profile of participants.

Demographic	Frequency	Percentage
Experience		
0 - 10	82	40.2
11 - 20	68	33.3
21 - 30	22	10.8
31 - 40	32	15.7
Occupation		
Manager	31	15.2
Engineer	35	17.2
Supervisor	29	14.2
Technician	73	35.8
Other	36	17.6
Gender		
Male	143	70.1
Female	61	29.9
Department		
Engineering	52	25.5
Maintenance	93	45.6
Operations	31	15.2
Other	28	13.7

Source: Authors (2026).

A total of 204 participants took part in the study, with most being male (143; 70.1%) and the remainder female (61; 29.9%). In terms of work experience, the largest group had between 0 and 10 years of experience (82; 40.2%), followed by those with 11–20 years (68; 33.3%). When looking at occupation, technicians made up the largest share (73; 35.8%), while engineers (35; 17.2%) and those in other roles (36; 17.6%) were also well represented. Managers (31; 15.2%) and supervisors (29; 14.2%) made up smaller proportions of the sample. Regarding department, almost half of the respondents were in maintenance (93; 45.6%), followed by engineering (52; 25.5%). operations (31; 15.2%) and other departments (28; 13.7%) were less represented. Overall, the sample shows a workforce dominated by males, with most participants being early to mid-career, and a strong presence of technical and maintenance roles.

Measurement Model Assessment

The CFA analysis confirmed that all items loaded satisfactorily onto their respective constructs, with standardized factor loadings exceeding the recommended threshold of 0.60. All factor loadings were statistically significant ($p < 0.001$), indicating strong convergent validity. Low loading items identified during the initial model assessment were removed to improve construct reliability and overall model fit. The final measurement model demonstrated acceptable construct representation and internal consistency across all latent variables. Table 2 presents a summary of the measurement model, including the number of items per construct and the range of standardised factor loadings.

Table 2: Measurement Model Summary (Reliability and Validity Measures).

Construct	No. of Items	St Loading Range	CR	AVE	Square Root of AVE
Q1.2 Quality Tools	6	0.694–0.850	0.909	0.626	0.791
Q2 QM Principles	6	0.644–0.801	0.862	0.512	0.716
Q3 Corrective Maintenance Backlog	3	0.608–0.722	0.684	0.421	0.649
Q4 Documentation Gaps	3	0.676–0.793	0.787	0.554	0.744
Q5 Supplier Management	2	0.838–0.923	0.874	0.777	0.881

Source: Authors (2026).

As can be seen in Table 2, the CR values for all constructs is above the acceptable threshold of 0.7 except for Q3 which is slightly lower at 0.684. However, this lower value is considered acceptable, particularly in exploratory studies where CR values above 0.6 may be deemed sufficient (Hair et al., 2018). In addition, the AVE values are above 0.5 for all constructs except Q3 (0.421), indicating weaker convergent validity for this construct.

Furthermore, discriminant validity was assessed using the Fornell–Larcker criterion. For each construct, the square root of the AVE was greater than its absolute correlations with all other constructs, indicating that each construct shares more variance with its own indicators than with other constructs (Fornell & Larcker, 1981 as cited in Hair et al., 2018). Therefore, the overall reliability and validity of the measurement model are considered adequate, thereby supporting the SEM results.

Structural Equation Model Fit

Following the validation of the measurement model, SEM was employed to test the hypothesised relationships among the latent constructs. The model fit was assessed using multiple goodness-of-fit indices, as reliance on the chi-square statistic alone is discouraged due to its sensitivity to sample size (Kline, 2023). The model fit indices are summarised in Table 3.

Table 3: Structural model fit indices.

Index	Recommended value	Actual value	Model fit
CMIN/DF	≤ 5.0	1.517	Good
NFI	≥ 0.90	0.875	Acceptable
CFI	≥ 0.90	0.952	Good
PRATIO	≥ 0.90	0.762	Acceptable
RMSEA	≤ 0.08	0.05	Good

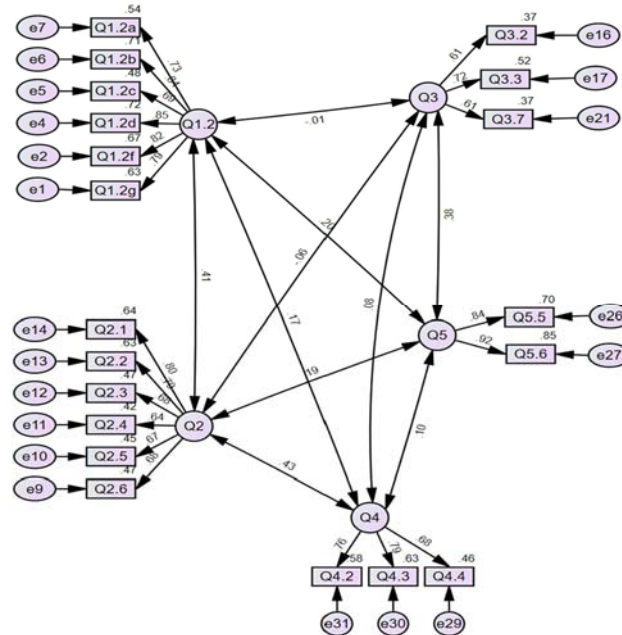
Source: Authors (2026).

The results indicate that the structural model exhibits an acceptable to good fit with the observed data. The CMIN/DF value of 1.517 is well below the recommended maximum threshold of 5. The CFI value of 0.952 indicates a good model fit. Although the NFI value of 0.875 and PRATIO value of 0.762 fall slightly below the recommended cut-off values, these indices are considered acceptable for newly developed or complex models. The RMSEA value of 0.05 further confirms good model fit. Overall, the fit indices suggest that the proposed structural model adequately represents the underlying relationships among quality tools, QM principles, documentation gaps, supplier management, and corrective maintenance backlog.

Structural Equation Model

The final structural equation model, including standardized path coefficients, is presented in Figure 2. The figure visually illustrates the significant and non-significant relationships among the constructs and supports the statistical results reported in Table 3.

Figure 2: Structural equation model with standardized path coefficients.



Source: Authors (2026).

The SEM highlights the central influence of QM principles and supplier involvement on maintenance outcomes, particularly regarding documentation practices and corrective maintenance backlog. The arrows in the diagram represent the direction and strength of the relationships between latent constructs and their measured indicators, with each indicator reflecting some degree of error. Overall, the model provides a clear visual summary of the structural relationships underlying the data.

Structural Model and Hypothesis Testing

The structural paths specified in the model were examined to test the proposed hypotheses. The standardized path coefficients (β), significance levels (p-values), and hypothesis testing outcomes are presented in Table 4.

Table 4: Structural path results and hypothesis testing.

Hypothesis	Structural path	Standardized path coefficient (β)	p-value	Result
H1	Quality tools $\rightarrow$ QM principles	0.414	< 0.001	Supported
H2	QM principles $\rightarrow$ Documentation gaps	0.43	< 0.001	Supported
H3	Supplier management $\rightarrow$ Corrective maintenance backlog	0.381	< 0.001	Supported
H4	Quality tools $\rightarrow$ Supplier management	0.2	0.017	Supported
H5	Quality tools $\rightarrow$ Corrective maintenance backlog	-0.014	0.873	Not supported
H6	QM principles $\rightarrow$ Corrective maintenance backlog	-0.057	0.531	Not supported

Source: Authors (2026).

The results indicate that Quality tools have a positive and significant effect on the implementation of ISO 9001:2015 QM principles, supporting H1. QM principles were also found to have a significant effect on maintenance documentation gaps, providing support for H2. Furthermore, supplier involvement has a significant effect on corrective maintenance backlog, supporting H3. In addition, quality tools were found to significantly influence supplier management, supporting H4. However, quality tools did not have a significant direct effect on corrective maintenance backlog (H5), and QM principles also did not demonstrate a significant direct effect on corrective maintenance backlog (H6). These findings suggest that corrective maintenance backlog is influenced more strongly through indirect pathways, particularly via supplier involvement and documentation practices, rather than through direct effects of quality tools or QM principles.

DISCUSSION

Role of Quality Tools in QM Principles

The SEM results indicate a statistically significant positive relationship between quality tools and the implementation of QM principles, thereby supporting H1. This suggests that the availability and effective utilisation of quality tools play an important role in enabling the implementation of structured quality management practices. Organisations that adopt appropriate quality tools are more likely to standardise operational processes, support preventive maintenance practices, and align organisational activities with ISO-based quality management frameworks (García-Fernández et al., 2022). The results therefore highlight the enabling role of quality tools in strengthening the operationalisation of QM principles within organisational systems. These findings are consistent with previous studies which emphasise that quality tools facilitate process standardisation, improve operational control, and support continuous improvement initiatives, thereby enhancing the effective implementation of ISO 9001-aligned quality management systems (Rathilal et al., 2024; Castello et al., 2020). It is also consistent with international studies in quality management, which similarly report that ISO 9001-based systems and quality tools tend to improve organisational performance indirectly rather than through direct operational outcomes, particularly in complex maintenance and engineering environments (Bakhtiar et al., 2023; García-Fernández et al., 2022). This reinforces the broader international consensus that quality management systems function primarily as enabling infrastructures that influence performance through intermediate organisational mechanisms rather than direct operational control.

However, quality tools did not exhibit a significant direct effect on corrective maintenance backlog, and therefore H5 was not supported. This indicates that although quality tools play an important role in supporting quality systems and principles, their presence alone does not necessarily lead to an immediate reduction in maintenance backlog levels. Instead, their impact appears to occur indirectly through organisational practices such as the implementation of quality management processes and the coordination of external resources (de Las Casas et al., 2025). This is consistent with Saida and Taibi (2021) who found that quality tools rarely produce immediate improvements in operational performance unless they are supported by appropriate managerial processes, documentation practices, and organisational alignment. The finding therefore reinforces the view that technical resources alone are insufficient to address complex maintenance challenges without the support of effective managerial and procedural systems.

QM Principles and Documentation Gaps

The results reveal a statistically significant relationship between QM principles and maintenance documentation gaps, supporting H2. This suggests that the adoption of QM principles is closely linked to how well maintenance documentation is managed. However, even in organisations that follow ISO standards, gaps in documentation can still occur, which may undermine maintenance planning, traceability, and continuous improvement efforts. For example, Bakhtiar et al. (2023) and Woods et al. (2024) found that operational documentation under ISO 9001, such as maintenance records, can sometimes be incomplete or inconsistently updated, reflecting a gap between formal requirements and actual practice. In addition, a compliance-focused approach to documentation can limit the full benefits of the ISO 9001:2015 standard, particularly in relation to effective maintenance and operational control (Myeda et al., 2023). Overall, these results highlight that while the QM principles provide a framework for quality management, the effectiveness of these principles depends heavily on consistent documentation practices. Without

ongoing attention to documentation, simply implementing ISO standards may not be sufficient to prevent maintenance-related gaps and the operational risks they create.

Interestingly, QM principles did not have a significant direct effect on corrective maintenance backlog, meaning H6 was not supported. This indicates that quality management standards may influence backlog outcomes indirectly, rather than through direct operational control. Bakhtiar et al. (2023) and Saida and Taibi (2021) have also found that simply adopting ISO 9001 does not automatically improve operational performance; improvements only occur when quality principles are actively integrated into day-to-day maintenance execution and monitoring. In practice, this means that following QM principles needs to be combined with strong documentation and effective execution processes in order to produce measurable improvements in maintenance performance.

Supplier Management and Corrective Maintenance Backlog

A significant positive relationship was found between supplier management and corrective maintenance backlog, thereby supporting H3. This finding is strongly supported by international maintenance and supply chain literature, which consistently identifies supplier reliability, lead time variability, and coordination efficiency as key determinants of maintenance performance across both developed and developing industrial contexts (Zhang et al., 2021; Scarf et al., 2024; Narayanan, 2025; Vanichchinchai, 2022). This indicates that supplier dependency is a universal operational constraint in maintenance systems rather than a context-specific issue.

Additionally, a significant positive relationship was found between quality tools and supplier management, supporting H4. This suggests that organisations rely on external suppliers for specialised or critical parts, highlighting the need to integrate internal systems with external support. As noted by Mohammed and Mandal (2023) and Sharma and Joshi (2023), when quality tools such as performance metrics, process standards, and documented procedures are well established, external partners receive clearer guidance regarding organisational expectations and performance benchmarks. Coordinating internal tracking, planning, and quality control tools with external parts supply is essential to manage availability constraints, lead times, and specialised components. This finding highlights that effective maintenance depends on both strong internal quality tools and well-managed external supplier integration. In practice, organisations must strategically manage supplier interactions and align them with internal quality and maintenance processes to ensure timely corrective maintenance and reduce backlog accumulation.

Indirect and Selective Drivers of Maintenance Performance

Collectively, the results indicate that corrective maintenance backlog is shaped by selective and indirect drivers, rather than uniform influences across all maintenance-related factors. Neither quality tools or QM principles exerted a significant direct effect on backlog levels. Instead, their impact appears to be mediated through organisational processes such as documentation practices and interactions with suppliers. As García-Fernández et al. (2022) note, relationships between quality practices and performance outcomes are often indirect, occurring through mediating variables such as operational processes or customer satisfaction rather than direct effects. Similarly, Alanazi (2020) shows that core quality factors influence performance via mediators like process management and measurement systems. In the maintenance context, the interactions between external supplier performance and internal systems further illustrate complex, indirect pathways affecting outcomes such as backlog (Zhang et al., 2021). These perspectives collectively highlight the conditional and interdependent nature of quality and maintenance systems and support the use of the SEM as an appropriate analytical approach for modelling such interdependencies.

CONCLUSION

This study investigated the structural relationships among quality tools, QM principles, maintenance documentation gaps, supplier management, and corrective maintenance backlog using SEM. From a theoretical perspective, the study makes three key contributions to quality and maintenance management literature. First, it empirically validates a multi-path structural model distinguishing between direct and indirect effects of ISO 9001-based systems on maintenance performance. Second, it demonstrates that quality tools and QM principles do not exert significant direct effects on corrective maintenance backlog, but instead operate through intermediate mechanisms such as documentation systems and supplier management structures. Third, it extends existing literature by providing empirical evidence that

maintenance performance in ISO 9001 environments is primarily shaped by system-level interactions rather than isolated quality interventions. The results show that while quality tools strongly support the adoption of QM principles, documentation gaps and reliance on external suppliers remain critical constraints on maintenance effectiveness. This reinforces the theoretical position that ISO 9001 functions as an enabling organisational framework rather than a direct performance improvement mechanism in maintenance-intensive environments.

LIMITATIONS AND FUTURE RESEARCH

This study was conducted within a specific organisational and operational context, which may limit the generalisability of the findings. Future research could extend the model by incorporating additional mediating or moderating variables, such as maintenance strategy, workforce competence, or digital maintenance systems. Further studies could also adopt longitudinal designs to examine how changes in suppliers impact corrective maintenance backlog over time. In addition, multi-group analyses across different industries or certification levels could also provide deeper insights into contextual variations in maintenance performance dynamics.

STUDY IMPLICATIONS

Maintenance managers should prioritise aligning quality tools with QM principles while strengthening documentation practices. Organisations should also critically evaluate their reliance on external suppliers, particularly for corrective maintenance spare parts and activities that contribute to backlog accumulation. From a managerial perspective, organisations should implement structured supplier performance monitoring systems that continuously track lead time reliability, delivery accuracy, and responsiveness, rather than relying on reactive procurement records or informal communication mechanisms. In addition, organisations should adopt predictive spare-parts forecasting systems integrated with maintenance scheduling frameworks to reduce dependency on emergency procurement, which has been identified as a key contributor to corrective maintenance backlog accumulation. Maintenance departments should also establish formal escalation protocols for delayed supplier deliveries to ensure that critical maintenance activities are not disrupted by procurement bottlenecks or supplier inefficiencies. From a strategic perspective, organisations should move beyond transactional supplier relationships and develop integrated supplier ecosystems. At a governance level, ISO 9001 should be repositioned from a compliance-oriented system to a performance-enabling framework that actively supports maintenance planning, supplier coordination, and operational decision-making processes. These results offer actionable insights for maintenance managers and policymakers.

REFERENCES

- Alanazi, M. H. (2020). The mediating role of primary TQM factors and strategy in the relationship between supportive TQM factors and organisational results: An empirical assessment using the MBNQA model. *Cogent Business & Management*, 7(1), 1771074.
- Al-Refaie, A., & Almowas, H. (2023). Multi-objective maintenance planning under preventive maintenance. *Journal of Quality in Maintenance Engineering*, 29(1), 50-70.
- Alshahrani, M. A., & Husain, K. S. (2024). The effectiveness of the implementation of ISO 9001 on SMEs performance: the case of an emerging economy. *International Journal of Quality & Reliability Management*, 41(1), 84-106.
- Amare, T., Singh, B., Kabeta, G., Jiru, M. G., & Lemu, H. G. (2024). Structural equation modeling of relationships among lean operational, financial performance, and customer satisfaction. *Indian Journal of Science and Technology*, 17(15), 1606-1620.
- Bagodi, V., Thimmappa Venkatesh, S., & Sinha, D. (2021). A study of performance measures and quality management system in small and medium enterprises in India. *Benchmarking: An International Journal*, 28(4), 1356-1389.

- Baharum, H., Ismail, A., Awang, Z., McKenna, L., Ibrahim, R., Mohamed, Z., & Hassan, N. H. (2023). The study adapted instruments based on Confirmatory Factor Analysis (CFA) to validate measurement models of latent constructs. *International Journal of Environmental Research and Public Health*, 20(4), 2860.
- Bakhtiar, A., Nugraha, A., Suliantoro, H., & Pujotomo, D. (2023). The effect of quality management system (ISO 9001) on operational performance of various organizations in Indonesia. *Cogent Business & Management*, 10(2), 2203304. 1-12.
- Benzaquen, J. B., & Narro, J. P. (2023). Total quality management in Peruvian goods companies during the COVID-19 pandemic. *Benchmarking: An International Journal*, 30(5), 1536-1561.
- Castello, J., De Castro, R., & Marimon, F. (2020). Use of quality tools and techniques and their integration into ISO 9001: A wind power supply chain case. *International Journal of Quality & Reliability Management*, 37(1), 68-89.
- Castillo-Martinez, A., Medina-Merodio, J. A., Gutierrez-Martinez, J. M., & Fernandez-Sanz, L. (2021). Proposal for a maintenance management system in industrial environments based on ISO 9001 and ISO 14001 standards. *Computer Standards & Interfaces*, 73, 103453.
- Chiarini, A., & Cherrafi, A. (2023). Integrating ISO 9001 and Industry 4.0. An implementation guideline and PDCA model for manufacturing sector. *Total quality management & business excellence*, 34(13-14), 1629-1654.
- Creswell, J. W., and Creswell, J. D. (2018). *Research Design: Quantitative, Qualitative, and Mixed Methods Approaches* (5th ed.). Sage Publications.
- de Las Casas, J. B., Pardo-Piñashca, E., & Pardo, C. P. (2025). The role of soft and hard TQM practices on stakeholder management: A SEM-ANN approach. *Quality Management Journal*, 1-20.
- Echour, S., & Nbigui, T. (2021). ISO 9001 Quality approach and performance literature review. *European Scientific Journal*, 17. 128-145.
- El Manzani, Y., Sidmou, M. L., & Cegarra, J. J. (2019). Does ISO 9001 quality management system support product innovation? An analysis from the sociotechnical systems theory. *International Journal of Quality & Reliability Management*, 36(6), 951-982.
- Esmaceli, E., Varmazyar, M., Hekmatshoar, V., Boroomandfar, P., & Feylizadeh, M. R. (2025). Managing maintenance backlogs: An integrated multi-criteria decision-making and optimization approach. *IEEE Access*, 13, 93346-93358.
- Farahani, A., & Tohidi, H. (2021). Integrated optimization of quality and maintenance: A literature review. *Computers & Industrial Engineering*, 151, 106924.
- Ferreira, S., Martins, L., Silva, F. J. G., Casais, R. B., Campilho, R. D. S. G., & Sá, J. C. (2020). A novel approach to improve maintenance operations. *Procedia Manufacturing*, 51, 1531-1537.
- Fonseca, L., Domingues, P., Nóvoa, H., Simpson, P., & Sá, J. D. G. (2023). ISO 9001: 2015: the view from the conformity assessment community. *Total Quality Management & Business Excellence*, 34(5-6), 558-579.
- García-Fernández, M., Claver-Cortés, E., & Tarí, J. J. (2022). Relationships between quality management, innovation and performance: A literature systematic review. *European Research on Management and Business Economics*, 28(1), 100172. 1-20.
- Gomaa, A. H. (2026). Enhancing shutdown maintenance performance using Lean Six Sigma: a case study. *International Journal of Lean Six Sigma*, 17(2), 743-781.
- Gremyr, I., Lenning, J., Elg, M., & Martin, J. (2021). Increasing the value of quality management systems. *International Journal of Quality and Service Sciences*, 13(3), 381-394.

Hair, J. F., Black, W. C., Babin, B. J. & Anderson, R. E. (2018). *Multivariate Data Analysis* (8th ed.). Cengage Learning EMEA.

Hamasha, M. M., Bani-Irshid, A. H., Al Mashaqbeh, S., Shwaheen, G., Al Qadri, L., Shbool, M., ... & Al-Bashir, A. (2023). Strategic selection of maintenance type under different conditions. *Scientific Reports*, 13(1), 15560.

Kartha, C. P. (2022). An empirical investigation of the impact of ISO 9001 certification: a comparative study. *International Journal of Business & Management Studies*, 3(02), 17-23.

Kline, R. B. (2023). *Principles and practice of structural equation modeling*. New York: Guilford Publications.

Kocoglu, I., Keskin, H., Cemberci, M., & Civelek, M. E. (2022). Effect of supply chain coordination on performance: a serial mediation model of trust, agility, and collaboration. *International Journal of Information Systems and Supply Chain Management (IJISSCM)*, 15(1), 1-15.

Krupitzer, C., Wagenhals, T., Züfle, M., Lesch, V., Schäfer, D., Mozaffarin, A., Edinger, J., Becker, C. & Kounev, S. (2020). A survey on predictive maintenance for industry 4.0. *arXiv preprint arXiv:2002.08224*. 1-16.

Kwak, S. (2023). Are only p-values less than 0.05 significant? A p-value greater than 0.05 is also significant!. *Journal of lipid and atherosclerosis*, 12(2), 89.

Lambert, D. M., & Enz, M. G. (2017). Issues in supply chain management: Progress and potential. *Industrial marketing management*, 62, 1-16.

Limón-Romero, J., García-Alcaraz, J. L., Sanchez-Lizarraga, M. A., Gastelum-Acosta, C., Báez-López, Y., & Tlapa, D. (2024). Implementing a quality management system based on ISO 9001: 2015 standard: Modeling the enablers' relationships. *Ieee Access*, 12, 195174-195187.

Mohammed, I. A., & Mandal, J. (2023). The Impact of Lead Time Variability on Supply Chain Management. *International Journal of Supply Chain Management*, 8(2), 41-55.

Molęda, M., Małysiak-Mrozek, B., Ding, W., Sunderam, V., & Mrozek, D. (2023). From corrective to predictive maintenance—A review of maintenance approaches for the power industry. *Sensors*, 23(13), 5970.

Monfared, M. A. S., & Zio, E. (2025). Maintenance planning: Reflections, lessons learned and a novel categorization. *Computers & Industrial Engineering*, 207, 111272. 1-21.

Myeda, N. E., Chua, S. J. L., & Aqillah, N. S. (2023). Adopting quality management (QM) principles in managing facilities management service delivery. *International Journal of Quality & Reliability Management*, 40(10), 2393-2419.

Narayanan, S. (2025). Optimizing Spare Parts Inventory and Logistics for Maximum Plant Uptime in the Energy Sector. *International Journal of Supply Chain Management*, 14(2), 74-84.

Noshad, K., & Awasthi, A. (2018). Investigating critical criteria for supplier quality development. *International Journal of Management Science and Engineering Management*, 13(3), 215-224.

Nunes, P., Santos, J., & Rocha, E. (2023). Challenges in predictive maintenance—A review. *CIRP journal of manufacturing science and technology*, 40, 53-67.

Rathilall, R., Ramchander, M., & Singh, K. (2024). An integrated sustainable QMS framework for the South African packaging industry. *South African Journal of Business Management*, 55(1), 1-12.

Rathilall, R., Singh, K., & Ramchander, M. (2024). Insights into the effects of ISO 9001: 2015 on quality and process improvement in the South African packaging industry: A leadership perspective. *Journal of Contemporary Management*, 21(1), 248-278.

Sá, J. C., Vaz, S., Carvalho, O., Lima, V., Morgado, L., Fonseca, L., Doiro, M., & Santos, G. (2022). A model of integration ISO 9001 with Lean six sigma and main benefits achieved. *Total Quality Management & Business Excellence*, 33(1-2), 218-242.

Sagharidooz, M., Soltanali, H., Farinha, J. T., Raposo, H. D., & de-Almeida-e-Pais, J. E. (2024). Reliability, availability, and maintainability assessment-based sustainability-informed maintenance optimization in power transmission networks. *Sustainability*, 16(15), 6489. 1-22.

Saha, R., Azeem, A., Hasan, K. W., Ali, S. M., & Paul, S. K. (2021). Integrated economic design of quality control and maintenance management: Implications for managing manufacturing process. *International Journal of System Assurance Engineering and Management*, 12(2), 263-280.

Saida, E., and Taibi, N. (2021). ISO 9001 Quality approach and performance literature review. *European Scientific Journal*, 17(1), 128-145.

Scarf, P., Syntetos, A., & Teunter, R. (2024). Joint maintenance and spare-parts inventory models: a review and discussion of practical stock-keeping rules. *IMA Journal of Management Mathematics*, 35(1), 83-109.

Sharma, M., & Joshi, S. (2023). Digital supplier selection reinforcing supply chain quality management systems to enhance firm's performance. *The TQM Journal*, 35(1), 102-130.

Syamsundar, A., Naikan, V. N. A., & Wu, S. (2021). Estimating maintenance effectiveness of a repairable system under time-based preventive maintenance. *Computers & Industrial Engineering*, 156, 107278.

Vaghani, B. M. (2024). Integrating quality at source into supplier management: A pathway to cost efficiency and regulatory compliance. *Journal of Current Science and Research Review* Volume, 2(2), 56-68.

Vanichchinchai, A. (2022). Investigating the impacts of ISO 9001 certification on lean manufacturing and supply chain relationship: an empirical analysis. *International Journal of Lean Six Sigma*, 13(1), 232-252.

Wittenberger, G., & Teplicka, K. (2024). The Synergy Model of Quality Tools and Methods and Its Influence on Process Performance and Improvement. *Applied Sciences*, 14(12), 5079. 1-23.

Woods, C., Hodkiewicz, M., & French, T. (2024). Semantic Quality Assurance of Industrial Maintenance Procedures. *IEEE Access*.

Zhang, S., Huang, K., & Yuan, Y. (2021). Spare parts inventory management: A literature review. *Sustainability*, 13(5), 2460. 1-23.

Zhu, T., Ran, Y., Zhou, X., & Wen, Y. (2019). A survey of predictive maintenance: Systems, purposes and approaches. *arXiv preprint arXiv:1912.07383*. 1-38.

THE IMPACT OF INTERNAL MARKETING ON EMPLOYEE HAPPINESS, TEAM COHESION, AND INDIVIDUAL PERFORMANCE

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ABSTRACT

This study examines the impact of internal marketing on employee happiness, team cohesion, customer orientation, and individual performance within organizations operating in the construction solutions sector. Data were collected from 200 employees and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). The findings indicate that internal marketing positively influences employee happiness and team cohesion, which subsequently enhance customer orientation and individual performance. Customer orientation also positively affects individual performance. The study contributes to internal marketing literature by integrating these constructs into a single framework and provides practical implications for managers seeking to improve employee well-being and organizational effectiveness.

Keywords: internal marketing; employee happiness; team cohesion; customer orientation.

INTRODUCTION

In increasingly competitive organizational environments, companies are challenged not only to improve operational efficiency but also to promote employee well-being, collaboration, and customer-oriented behaviours. Within this context, internal marketing has emerged as a strategic management approach capable of strengthening organizational performance by treating employees as internal customers and promoting their satisfaction, motivation, and engagement (Frye et al., 2020).

Previous literature suggests that internal marketing practices contribute positively to employee well-being, organizational commitment, and service quality, creating more collaborative and productive work environments (Conduit & Mavondo, 2001). Simultaneously, organizations increasingly recognize the importance of employee happiness and team cohesion as drivers of performance and customer orientation. Happier employees tend to be more motivated, productive, and committed to organizational goals (Fisher, 2010), while cohesive teams promote cooperation, communication, and knowledge sharing, contributing to superior organizational outcomes (Chung et al., 2018).

Despite growing interest in these topics, limited research has simultaneously examined the relationships between internal marketing, employee happiness, team cohesion, customer orientation, and individual performance. This study seeks to address this gap by analysing how internal marketing practices influence employee happiness and team cohesion and, consequently, how these variables affect customer orientation and individual performance. The study contributes to the literature by integrating internal marketing and organizational behaviour perspectives into a single conceptual model and by exploring these relationships in organizations operating in the construction solutions sector.

Although previous studies have examined the effects of internal marketing on employee attitudes and organisational outcomes, most research has focused on isolated relationships, such as the impact of internal marketing on job satisfaction or customer orientation. Limited attention has been given to understanding how internal marketing simultaneously influences employee happiness, team cohesion, customer orientation, and individual performance within an integrated framework. Moreover, empirical evidence from industrial contexts remains scarce, particularly within organisations operating in the construction solutions sector. This study addresses these gaps by integrating these constructs into a single model and extending internal marketing research beyond traditional service settings.

THEORETICAL BACKGROUND

This study is grounded in Internal Marketing Theory and Social Exchange Theory. Internal Marketing Theory suggests that employees should be viewed as internal customers whose needs and expectations must be satisfied to improve organisational effectiveness (Conduit & Mavondo, 2001). Through practices such as communication, support, and employee development, organisations can foster positive work attitudes and behaviours.

Additionally, Social Exchange Theory argues that employees tend to reciprocate favourable organisational treatment through positive attitudes and behaviours, including greater commitment, cooperation, customer orientation, and enhanced performance. This perspective provides a theoretical basis for understanding how internal marketing practices may influence employee happiness, team cohesion, and subsequent organisational outcomes.

Internal marketing assumes that employees should be treated as internal customers whose needs and expectations must be understood and satisfied to improve organizational effectiveness (Frye et al., 2020). Practices such as internal communication, management support, employee development, and compensation systems contribute to stronger organizational commitment, satisfaction, and positive work attitudes (Conduit & Mavondo, 2001). According to Isfahani et al. (2012), organizations that invest in internal marketing tend to develop more stable and positive organizational climates, strengthening employee involvement and motivation. Similarly, Arnett et al. (2002) and Gu and Siu (2009) demonstrated that employees who perceive stronger organizational support and internal communication are more likely to develop stronger organizational attachment and engagement.

Employee happiness reflects positive emotional and psychological states associated with work experiences and organizational life (Fisher, 2010). Previous research indicates that happy employees demonstrate higher motivation, stronger organizational commitment, and superior performance levels (Wright & Cropanzano, 2004). Rego et al. (2011) further argue that psychological well-being positively affects both individual and collective performance, while Jones (2010) suggests that happier employees tend to maximize their potential and productivity. In addition, Gavin and Mason (2004) emphasize that employees who perceive meaning and satisfaction in their work are more likely to demonstrate greater involvement and dedication toward organizational objectives.

Internal marketing can also strengthen team cohesion by promoting communication, trust, and cooperation among employees. Team cohesion refers to the degree to which team members feel united and motivated to work together toward common objectives (Chung et al., 2018). Cohesive teams generally present stronger interpersonal relationships, greater collaboration, and better coordination in task execution (Carron & Brawley, 2000). According to Ahronson and Cameron (2007), team cohesion contributes positively to organizational functioning by enhancing communication and reducing interpersonal conflicts. Furthermore, Chiniara and Bentein (2018) argue that cohesive work environments improve both individual and team performance through stronger social support and cooperation. Customer orientation is another important organizational outcome associated with positive internal organizational environments. Narver and Slater (1990) define customer orientation as an organizational culture focused on understanding and satisfying customer needs. Jaworski and Kohli (1993) demonstrated that organizations oriented toward customers and markets generally achieve superior organizational performance. Employees experiencing higher levels of well-being and working within cohesive teams are more likely to adopt customer-oriented behaviours and provide higher service quality (Smirnova et al., 2018). Additionally, Andrew (2011) argues that happier employees are more likely to establish positive relationships with customers and contribute to service excellence.

Based on the literature, this study proposes that internal marketing positively influences employee happiness and team cohesion, which in turn positively affect customer orientation and individual performance. Furthermore, customer orientation is expected to positively influence individual performance.

METHODOLOGY

This study adopts a quantitative, cross-sectional, and causal research design. Data were collected through a structured questionnaire distributed to employees working in companies specialized in the production and commercialization of construction solutions.

The questionnaire consisted of three sections. The first section explained the study objectives and guaranteed participant anonymity and confidentiality. The second section included measurement items for the latent variables using previously validated scales. The final section collected sociodemographic information. A pre-test was conducted with six employees to ensure clarity and adequacy of the questionnaire items. The final sample was obtained through non-probabilistic convenience sampling and included 200 valid responses. Regarding sample characteristics, 58% of respondents were male, and most participants were under 40 years old (78.5%). The majority had higher education qualifications (84.5%) and had worked in their organizations for more than four years.

Data analysis was conducted using SmartPLS. Prior to structural model estimation, exploratory factor analysis and common method bias assessment were performed. The Harman single-factor test indicated no significant common method bias. Multicollinearity analysis also revealed acceptable VIF values below the recommended threshold of 5. The assessment of the measurement model included reliability, convergent validity, and discriminant validity analysis. Subsequently, the structural model and path coefficients were evaluated using bootstrapping procedures with 5000 subsamples, following the recommendations of Hair et al. (2018).

RESULTS

The results demonstrated satisfactory psychometric properties for all constructs. Internal consistency reliability and convergent validity exceeded recommended thresholds, confirming the robustness of the measurement model. Discriminant validity was confirmed using both the Fornell-Larcker criterion and HTMT ratio analysis. The structural model results supported all proposed relationships.

Internal marketing showed a positive effect on employee happiness and team cohesion, indicating that organizations adopting effective internal marketing practices are more likely to create positive and collaborative work environments.

Employee happiness positively influenced both customer orientation and individual performance. These findings reinforce the idea that happier employees are more motivated, productive, and capable of developing positive relationships with customers.

Team cohesion also demonstrated a positive influence on customer orientation and individual performance. Cohesive teams appear to facilitate communication, collaboration, and coordination among employees, contributing to improved organizational outcomes.

Additionally, customer orientation positively influenced individual performance, suggesting that employees more focused on customer needs tend to achieve higher performance levels. Overall, the findings highlight the importance of internal organizational practices in shaping employee attitudes and behaviours that ultimately contribute to organizational effectiveness.

DISCUSSION

The findings support the argument that internal marketing constitutes an important mechanism for promoting positive employee attitudes and behaviours. The positive influence of internal marketing on employee happiness is consistent with previous studies suggesting that supportive organisational environments contribute to employees' well-being and engagement (Fisher, 2010; Rego et al., 2011). These results extend previous evidence by demonstrating that this relationship also holds within the construction solutions sector.

Similarly, the positive effect of internal marketing on team cohesion reinforces the importance of communication, trust, and employee support in fostering collaborative work environments. This finding aligns with Chiniara and Bentein (2018), who highlighted the role of positive organisational practices in strengthening team functioning.

The positive effects of employee happiness and team cohesion on customer orientation and individual performance suggest that organisations investing in employee well-being and collaboration may achieve both internal and external performance benefits. These findings support the happy-productive worker hypothesis and extend previous research by integrating employee happiness and team cohesion within a single explanatory framework. From an international perspective, the results are consistent with previous studies conducted in hospitality and service settings (Frye et al., 2020), suggesting that the benefits of internal marketing may extend across different sectors and organisational contexts.

CONTRIBUTIONS

This study contributes to the literature by integrating internal marketing, employee happiness, team cohesion, customer orientation, and individual performance into a single conceptual framework. The findings reinforce the importance of internal organizational environments in promoting both employee well-being and organizational performance. Furthermore, the study highlights the strategic role of people management practices in building sustainable competitive advantages through organizational culture and employee engagement.

From a practical perspective, the results suggest that organizations should invest in internal marketing practices that strengthen communication, employee support, and collaborative work environments. Organizations should implement internal communication programmes that facilitate information sharing and employee participation in decision-making processes, while human resource practices aimed at recognising employee contributions, promoting work-life balance, and supporting professional development may enhance employee happiness and engagement. Managers should also encourage team-building initiatives and cross-functional collaboration to strengthen team cohesion and improve customer-oriented behaviours. Furthermore, incorporating employee well-being indicators into performance management systems may help organizations monitor and foster a positive organizational climate, ultimately contributing to higher individual performance and organizational effectiveness.

LIMITATIONS AND FUTURE RESEARCH

Several limitations should be acknowledged. First, the use of convenience sampling may have introduced self-selection bias, as employees with more positive perceptions of their organisations may have been more willing to participate. Second, the cross-sectional design limits causal inference and does not allow the examination of changes in employee attitudes and behaviours over time. Third, although common method bias was assessed and found not to be problematic, the exclusive use of self-reported measures may still increase the risk of response bias.

Future research should adopt longitudinal designs and probabilistic sampling techniques to enhance the robustness and generalisability of the findings. Comparative studies across industries and cultural contexts would also contribute to a deeper understanding of the relationships examined in this study.

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REFERENCES

Ahronson, A., & Cameron, J. E. (2007). The nature and consequences of group cohesion in a military sample. *Military Psychology*, 19(1), 9–25. <https://doi.org/10.1080/08995600701323277>

- Andrew, O. C. (2011). Employee happiness and organizational performance. *African Journal of Business Management*, 5(9), 354–363.
- Arnett, D. B., Laverie, D. A., & McLane, C. (2002). Using job satisfaction and pride as internal-marketing tools. *Cornell Hotel and Restaurant Administration Quarterly*, 43(2), 87–96. <https://doi.org/10.1177/001088040204300209>
- Carron, A. V., & Brawley, L. R. (2000). Cohesion: Conceptual and measurement issues. *Small Group Research*, 31(1), 89–106. <https://doi.org/10.1177/104649640003100105>
- Chiniara, M., & Bentein, K. (2018). The servant leadership advantage: When perceiving low differentiation in leader–member relationship quality influences team cohesion, team task performance and service OCB. *The Leadership Quarterly*, 29(2), 333–345. <https://doi.org/10.1016/j.leaqua.2017.05.002>
- Chung, Y., Lount, R. B., Park, E., & Park, H. (2018). Friends with performance benefits: The effects of friendship network centrality on individual performance. *Group & Organization Management*, 43(6), 927–956. <https://doi.org/10.1177/1059601117704100>
- Conduit, J., & Mavondo, F. T. (2001). How critical is internal customer orientation to market orientation? *Journal of Business Research*, 51(1), 11–24. [https://doi.org/10.1016/S0148-2963\(99\)00044-2](https://doi.org/10.1016/S0148-2963(99)00044-2)
- Fisher, C. D. (2010). Happiness at work. *International Journal of Management Reviews*, 12(4), 384–412. <https://doi.org/10.1111/j.1468-2370.2009.00270.x>
- Frye, W. D., Kang, S., Huh, C., & Lee, M. J. (2020). What factors influence generation Y's employee retention in the hospitality industry? An internal marketing approach. *International Journal of Hospitality Management*, 85, 102352. <https://doi.org/10.1016/j.ijhm.2019.102352>
- Gavin, J. H., & Mason, R. O. (2004). The virtuous organization: The value of happiness in the workplace. *Organizational Dynamics*, 33(4), 379–392. <https://doi.org/10.1016/j.orgdyn.2004.09.005>
- Gu, Z., & Siu, R. C. S. (2009). Drivers of job satisfaction as related to work performance in Macao casino hotels. *International Journal of Contemporary Hospitality Management*, 21(5), 561–578. <https://doi.org/10.1108/09596110910967809>
- Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2018). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Sage.
- Isfahani, A. N., Nejati, M., & Najafi, M. (2012). The effect of internal marketing on employee retention in service organizations. *Interdisciplinary Journal of Contemporary Research in Business*, 4(3), 123–137.
- Jaworski, B. J., & Kohli, A. K. (1993). Market orientation: Antecedents and consequences. *Journal of Marketing*, 57(3), 53–70. <https://doi.org/10.1177/002224299305700304>
- Jones, J. R. (2010). Employee engagement and workplace happiness. *Business Psychology Review*, 25(2), 45–52.
- Narver, J. C., & Slater, S. F. (1990). The effect of a market orientation on business profitability. *Journal of Marketing*, 54(4), 20–35. <https://doi.org/10.1177/002224299005400403>
- Rego, A., Ribeiro, N., Cunha, M. P., & Jesuino, J. C. (2011). How happiness mediates the organizational virtuousness and affective commitment relationship. *Journal of Business Research*, 64(5), 524–532. <https://doi.org/10.1016/j.jbusres.2010.04.009>
- Smirnova, M., Naudé, P., Henneberg, S. C., Mouzas, S., & Kouchtch, S. (2018). The impact of market orientation on the development of relational capabilities and performance outcomes. *Industrial Marketing Management*, 69, 154–166. <https://doi.org/10.1016/j.indmarman.2017.08.009>
- Wright, T. A., & Cropanzano, R. (2004). The role of psychological well-being in job performance. *Organizational Dynamics*, 33(4), 338–351. <https://doi.org/10.1016/j.orgdyn.2004.09.002>

IMMIGRANT LABOR MARKET INTEGRATION IN PORTUGAL: EVIDENCE FROM ADMINISTRATIVE DATA (2012–2023)

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ABSTRACT

Portugal has shifted from a country of emigration to an important destination for international migrants, making immigrant labor market integration a relevant topic. This study examines the evolution of immigrant integration in Portugal between 2012 and 2023 using annual administrative employer–employee data from Quadros de Pessoal. The findings reveal a substantial expansion and diversification of the immigrant workforce, alongside improvements in educational attainment and participation in more specialized sectors. Immigrants remain more likely to experience precarious employment and occupational mismatch than Portuguese workers. The findings provide new insights into the changing patterns of immigrant labor market integration in Portugal over the last decade.

Keywords: immigration, labor market, integration, Portugal, occupational mismatch.

INTRODUCTION

Portugal's migration history has undergone a profound transformation over the last decades. Traditionally known as a country of emigration, Portugal gradually became an increasingly important destination for international migrants, particularly from the early 1990s onwards. In the decades following the Second World War, poverty, limited economic opportunities, and political instability led many Portuguese citizens to seek better living conditions abroad. However, this pattern began to change with the country's economic modernization and its accession to the European Economic Community in 1986.

Early immigration flows were dominated by migrants from Portuguese-speaking countries, reflecting historical, linguistic, and cultural ties. From the late 1990s onwards, Portugal also experienced a significant increase in immigration from Eastern Europe, particularly from Ukraine and Romania (Cabral & Duarte, 2011). More recently, migration flows from South and Southeast Asia have become increasingly relevant, while Brazil has consistently remained one of the main countries of origin for immigrants in Portugal, contributing to the growing diversification of the immigrant population (Martins et al., 2018). These demographic transformations have reshaped Portuguese population structure and labor-market dynamics, reinforcing the importance of understanding how immigrants are integrated into employment structures and economic activity.

At the same time, immigration continues to be a socially and politically sensitive topic in many European countries, including Portugal. Public debates frequently associate immigration with labor-market competition, pressure on wages, and reduced employment opportunities for native workers, despite the mixed empirical evidence regarding these effects (Martins et al., 2018). Understanding the actual position of immigrants within the labor market is therefore essential not only from an economic perspective but also for informing public policy and social debate.

This paper analyses the evolution of immigrant integration in the Portuguese labor market between 2012 and 2023. Using annual administrative employer–employee data, the study examines patterns related to immigrants’ countries of origin, educational attainment, sectoral employment distribution, occupational profiles, contract types and wage distributions. By adopting a long-term perspective, this research contributes to a better understanding of the changing role of immigration within the Portuguese economy. Beyond its national relevance, Portugal provides an especially informative case study because its migration trajectory reflects many of the characteristics traditionally associated with Southern European countries, where immigration emerged relatively late and was initially concentrated in low-skilled, labor-intensive sectors (Ghio et al., 2022). At the same time, Portugal increasingly faces demographic and labor-market challenges common across Europe, including population ageing, persistently low fertility rates, labor shortages, and growing pressure on social protection systems. Understanding how immigrant labor-market integration evolves contributes not only to the Portuguese debate but also to broader discussions on labor-market segmentation, immigrant integration.

LITERATURE REVIEW

Portugal has gradually shifted from a country traditionally associated with emigration to an important destination for international migrants, particularly since the 1990s. This pattern also happened in other countries (Privalko et al. 2025). This transformation has been associated with demographic ageing, labor shortages across several economic sectors, economic modernization, and increasing international mobility within Europe and beyond (Góis & Marques, 2018; Oliveira, 2023). As a consequence, immigration has become an increasingly important component of the Portuguese labor market, contributing to significant changes in workforce composition, sectoral employment patterns, and demographic structure.

The literature on immigration in Portugal highlights the strong influence of historical, linguistic, and cultural ties on migration flows. In earlier stages, migrants from former Portuguese colonies represented a significant proportion of the immigrant population, while later migration waves introduced a greater diversity of nationalities, particularly from Brazil, Ukraine, and Romania (Martins et al., 2018). More recently, migration flows from South and Southeast Asia have further contributed to the diversification of Portugal’s immigrant population.

At the same time, legislation and public policies have played a central role in shaping immigrant integration pathways, especially within the labor market. Policies related to the Schengen Area, family reunification, visa facilitation measures, and the recognition of foreign qualifications have influenced immigrants’ settlement patterns and employment trajectories within the Portuguese economy. Reforms associated with immigration law and the recognition of foreign academic qualifications (Law No. 23/2007; Decree-Law No. 66/2018) contributed to reducing administrative barriers and facilitating labor-market integration for specific immigrant groups. These measures have also contributed to the attraction of foreign labor and to the diversification of immigrant participation across different sectors of economic activity.

The literature also highlights the importance of educational attainment in shaping immigrant labor-market integration. According to human capital theory, higher levels of education should generally lead to better employment opportunities and higher wages (Becker, 1993). However, international evidence consistently shows that immigrants frequently experience occupational mismatch, as educational qualifications not always translate into equivalent labor-market outcomes (Chiswick & Miller, 2009). In many cases, immigrants remain concentrated in lower-skilled occupations despite possessing medium or high educational qualifications, language proficiency, labor-market segmentation, and limited access to professional networks.

Within the Portuguese context, previous studies indicate that immigrant workers remain predominantly concentrated in labor-intensive and service-oriented sectors, particularly construction, agriculture, tourism, hospitality, logistics, and administrative support services (Oliveira, 2023; OECD, 2023). These sectors often depend on foreign labor due to manpower shortages and lower attractiveness among native workers. Nevertheless, recent evidence also points to a gradual increase in immigration participation in more specialized sectors, including healthcare, information technology, and scientific activities, suggesting a progressive diversification of immigrant employment patterns in Portugal.

Alongside the growing demand for labor in traditionally low-skilled sectors, Portugal has also increasingly sought to attract highly qualified foreign workers. Demographic ageing, shortages in specialized professions, and the expansion of knowledge-intensive activities have contributed to implementation of policies aimed at facilitating the entry and integration of skilled immigrants, particularly in areas such as healthcare, engineering, information technology, and scientific research (OECD, 2023; Oliveira, 2023).

Recent reforms related to the recognition of foreign qualifications and visa facilitation have contributed to a gradual increase in the participation of highly educated immigrants in specialized sectors of the Portuguese economy. Simultaneously, the expansion of remote work and digital-nomad mobility has reinforced Portugal's attractiveness among international professionals and highly skilled workers. Despite the developments, several studies continue to highlight persistent challenges related to occupational mismatch and the underutilization of immigrants' qualifications within destination labor markets (Aleksynska & Tritah, 2013; OECD, 2023).

Despite the growing body of literature on immigration in Portugal, most existing studies focus either on specific immigrant groups or on isolated dimensions of labor-market integration. Longitudinal evidence examining the evolution of immigrants' countries of origin, educational profiles, and sectoral employment patterns over time remains relatively limited, particularly when using large-scale administrative data. This study seeks to contribute to the literature by analyzing the evolution of immigrant integration in the Portuguese labor market between 2012 and 2023, focusing on immigrants' origins, educational attainment, and employment sectors.

Based on the existing literature, three broad expectations guide the empirical analysis. First, immigration flows to Portugal are expected to remain strongly influenced by historical and linguistic ties with Portuguese-speaking countries, although increasing diversification of migration flows is anticipated over time. Second, immigrant workers are expected to remain predominantly concentrated in low- and medium-skilled educational categories, despite a gradual increase in highly educated immigrants. Third, immigrant labor is expected to remain largely concentrated in labor-intensive and service-oriented sectors, while progressively increasing its participation in more specialized economic activities in recent years.

METHODOLOGY

The present study is based on secondary annual administrative employer–employee data obtained from the Quadros de Pessoal database, provided by the Portuguese National Statistics Institute (INE). Considerable data engineering and preprocessing were required before the statistical analyses could be performed. The Quadros de Pessoal database is released annually as two separate files containing employer-level and employee-level information. For each year, these files were merged using the corresponding enterprise identifiers to create a unified employer–employee dataset. Subsequently, the annual datasets covering the period from 2012 to 2023 were integrated into a single database. Additional preprocessing included the harmonization of variable categories across years, the correction of inconsistencies arising from changes in coding schemes, the translation of categorical variables into English, and the construction of derived variables required for the subsequent statistical analyses. These procedures ensured the consistency, comparability, and quality of the data throughout the study period. The final analytical dataset comprises 35.8 million annual employment records corresponding to 5 636 027 distinct workers, containing information about demographic characteristics, nationality, educational attainment, occupation, economic activity, contract type, wages, and regional location. The availability of harmonized administrative data over a twelve-year period enables a comprehensive assessment of changes in immigrant labor-market integration, occupational distribution, employment conditions, and wage disparities between Portuguese and immigrant workers, thereby providing valuable evidence on labor-market segmentation within the Portuguese private sector (Martins et al., 2018).

According to the research objectives, additional variables were constructed to support the empirical analysis, including a CPLP variable identifying immigrant workers originating from Portuguese-speaking countries, and a binary Immigrant variable. Individuals were classified as immigrants whenever their reported nationality differed from Portuguese nationality. The dataset includes information on 846 092 distinct immigrant workers throughout the period under analysis. Because some workers acquired Portuguese nationality during the period under analysis, nationality classification was based on the information available for each yearly observation.

Wage information was analyzed using the variable *rbase*, corresponding to the worker's monthly base wage, excluding bonuses and overtime payments. Given the high variability typically associated with wage distributions, the logarithm of this variable was considered as part of the analysis. Furthermore, since the database includes information on the number of working hours, hourly base wages and their logarithmic transformations were also computed.

The methodological approach adopts a longitudinal and multidimensional perspective, combining descriptive statistical analysis with graphical analysis and proportion comparisons to identify changes in immigrant labor-market integration patterns over time. The study examines the evolution of immigrants' countries of origin, educational profiles, employment sectors, occupational distribution, and contract types between 2012 and 2023.

Additionally, statistical tests were conducted to evaluate differences between immigrant and Portuguese workers regarding educational attainment and occupational characteristics. Chi-square tests of independence and two-proportion tests were applied to assess differences in the distribution of qualification levels between the two groups throughout the period under analysis. To ensure consistency in the empirical analysis, observations with missing values in relevant variables were excluded whenever required.

RESULTS AND DISCUSSION

In recent years, immigration has become an increasingly debated issue across several European countries due to the growing inflow of foreign individuals seeking economic opportunities, improved living conditions, or refuge. This process has intensified public and political discussions regarding the long-term effects of immigration on social cohesion, public resources, and labor-market stability. The literature shows a mixed picture: immigration supports labor markets and growth in many countries, but it also strains local services and can intensify political backlash, especially when inflows rise quickly (Caselli, 2024, Dražanová, & Gonnot, 2023).

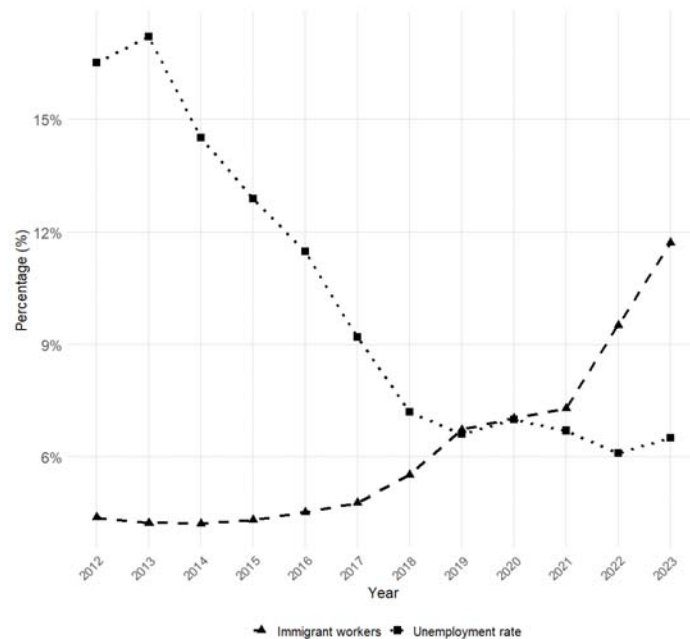
Nevertheless, the literature presents heterogeneous findings regarding the economic and social impacts of immigration. Several studies highlight the importance of immigration in addressing labor shortages, supporting demographic sustainability in ageing societies, and contributing to economic growth, particularly in countries experiencing workforce decline (OECD, 2023). At the same time, part of the literature also emphasizes that rapid increases in immigration may create challenges related to labor-market integration, housing availability, pressure on public services, and labor-market competition in specific low-skilled sectors (Borjas, 2003; Dustmann et al., 2013). These effects, however, are not uniform across countries or labor markets and often depend on factors such as the economic structure of the destination country, immigrants' qualification profiles, sectoral concentration, and migration policies. In addition, differences in methodological approaches and data sources may partially explain the divergence in empirical findings. Many studies rely on cross-sectional or survey-based data, which may limit the ability to capture long-term labor-market dynamics and occupational mobility patterns over time. In this context, longitudinal administrative datasets provide important advantages for analyzing the evolution of immigrant integration and labor-market outcomes (Martins et al., 2018).

Given the mixed evidence presented in the literature regarding the effects of immigration on labor-market outcomes, analyzing the Portuguese case may provide additional insight into these dynamics.

Figure 1 illustrates the evolution of the percentage of immigrant workers in total employment and the unemployment rate between 2012 and 2023. Over the period under analysis, the relative participation of immigrant workers increased steadily, while the unemployment rate generally followed a downward trend. This evidence

suggests that the growth of immigrant employment was not accompanied by increasing unemployment levels in the Portuguese labor market.

Figure 1: Trends in immigrant labor participation and unemployment rate in Portugal (2012–2023).



Source: Current Study Data Analysis.

Evolution of Immigrant Origins

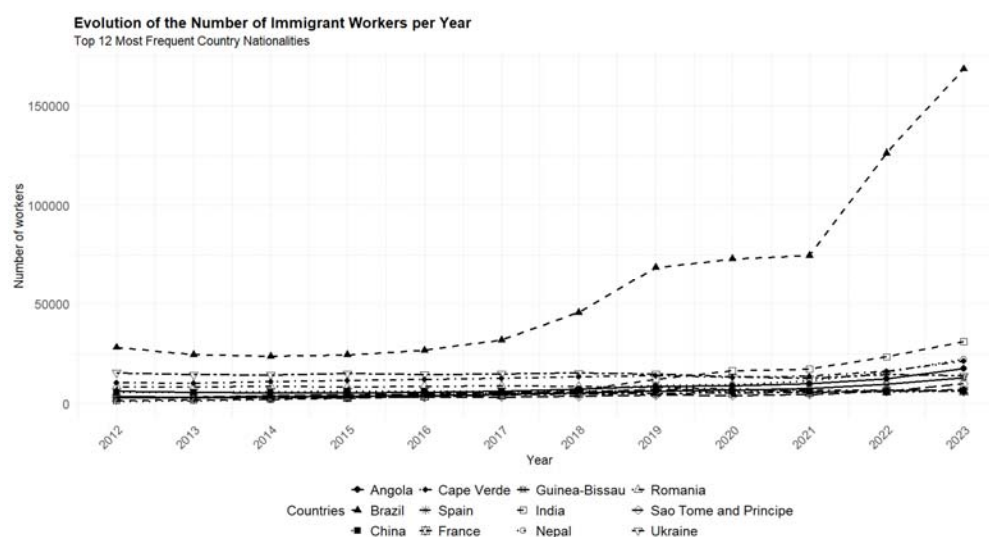
Portugal's transition from a country traditionally associated with emigration to a destination for immigrants occurred through different migration stages. Early immigration flows were predominantly composed of migrants from CPLP countries and former Portuguese colonies, while later migration waves introduced a broader diversity of nationalities. During the period under analysis, the main countries of origin of immigrant workers included Brazil, Ukraine, Cape Verde, India, Angola, Romania, Nepal, China, Guinea-Bissau, Spain, France, and São Tomé and Príncipe.

The literature suggests that immigration to Portugal has historically been strongly influenced by post-colonial ties and linguistic proximity, which helps explain the long-standing prominence of CPLP countries in migration flows (Baganha, Marques, & Góis, 2009; Góis & Marques, 2018). Although Brazil consistently represented the largest immigrant community throughout the period analyzed (Figure 2), immigrants originating from CPLP countries only represented the majority of immigrant workers in the final years of the period, accounting for approximately 54% and 57% of total immigrants in 2022 and 2023, respectively.

To test the hypothesis that the majority of immigrants come from CPLP countries, one-sided proportion tests were applied, using both the exact binomial test and its normal approximation. The null hypothesis was defined as $H_0: p=0.5$ against the alternative $H_A: p>0.5$. The results indicate that, from 2012 to 2021, the observed proportion of

immigrants from CPLP countries remained below 0.5, and therefore the null hypothesis was not rejected in those years. In contrast, in 2022 and 2023, the test led to the rejection of the null hypothesis ($p\text{-value} \approx 0$), providing strong statistical evidence that more than half of the immigrant population originated from CPLP countries.

Figure 2: Evolution of the number of immigrants by country (Top 12).



Source: Current Study Data Analysis.

Figure 2 also indicates a progressive diversification of immigrant origins in Portugal, reflecting a pattern frequently identified in the Southern European migration literature (Cebolla-Boado & Finotelli, 2015; Góis & Marques, 2018). The increasing presence of immigrants from Eastern Europe and, more recently, from South and Southeast Asia suggests that Portuguese migration dynamics have become increasingly diversified.

Educational Profiles of Immigrants

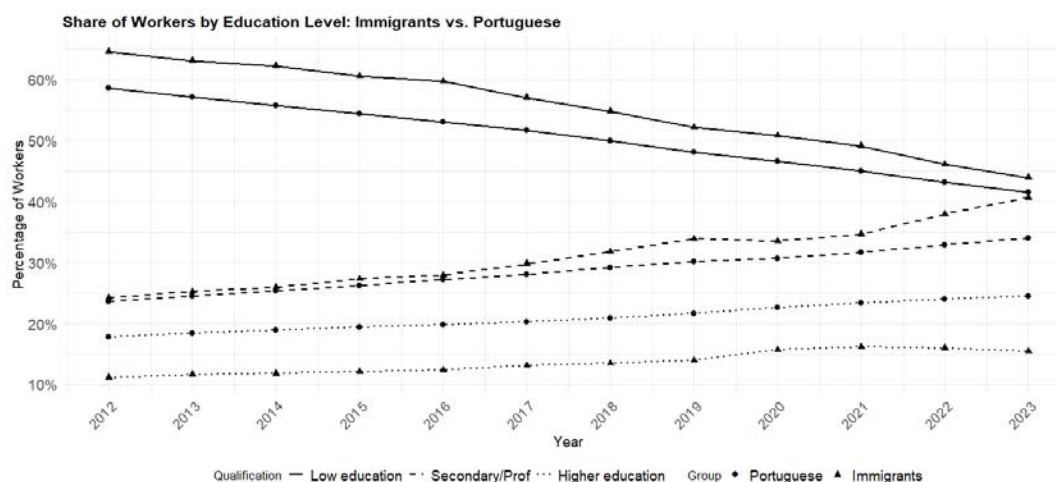
Educational attainment is a strong determinant of employment outcomes, with higher levels of education generally associated with greater labor-market participation, lower unemployment, and improved access to stable and higher-quality jobs (OECD, 2025). Previous research has also shown that immigrants frequently face labor-market penalties when compared with natives with similar qualifications. These penalties include lower occupational attainment, a higher probability of being overqualified for their jobs, weaker returns to education, and more constrained opportunities for occupational mobility (Reyneri & Fullin, 2011; Cebolla-Boado & Finotelli, 2015).

Nevertheless, the Southern Europe context cannot be understood as a uniform cluster. Within this context, Portugal has often been identified as one of the better-performing Southern European countries regarding immigrant integration policies, particularly in terms of labor-market access and social integration mechanisms.

Figure 3 shows a persistent predominance of workers with basic and secondary education throughout the period under analysis (2012–2023) for both immigrant and Portuguese workers. However, a gradual increase in the proportion of workers holding secondary/professional and tertiary education can be observed in more recent years, accompanied by a corresponding decline in the share of workers with only basic education.

In this context, the analysis first examined whether the distribution of educational attainment differed between immigrant and Portuguese workers over time. Chi-square tests of independence were performed for each year, under the null hypothesis that educational attainment and immigrant status were independent. The results indicate statistically significant differences throughout the period analyzed. However, the associated Cramér's V values remain below 0.1, suggesting that the strength of the association between immigrant status and educational attainment is relatively weak.

Figure 3: Distribution of education levels among immigrant and Portuguese workers over time.



Source: Current Study Data Analysis.

After this initial analysis, year-specific two-proportion tests were conducted to compare the proportion of workers with low educational attainment between immigrant and Portuguese workers. The null hypothesis assumed equal proportions in both groups ($H_0: p_{imm} = p_{pt}$), while the alternative hypothesis assumed a higher proportion among immigrants ($H_A: p_{imm} > p_{pt}$). The results of p-values close to zero for all years under analysis, indicating statistically significant differences between the two groups. Throughout the entire period from 2012 to 2023, immigrant workers consistently exhibited a higher proportion of low educational attainment compared with Portuguese workers. However, the magnitude of this difference gradually declined over time, decreasing from approximately 6 percentage points in the earlier years to around 2 percentage points by 2023. These results suggest a progressive convergence in the educational profiles of immigrant and Portuguese workers over the period analyzed.

Table 1: Percentage of workers with low educational attainment among Portuguese and immigrant workers.

Year	Portuguese (%)	Immigrant (%)	Difference (p.p.)
2012	58.6	64.6	6.0
2015	54.4	60.6	6.2
2018	50.0	54.8	4.8
2021	45.0	49.1	4.1
2023	41.6	43.9	2.3

Source: Current Study Data Analysis.

Since tertiary education is generally associated with improved labor-market outcomes, individuals with higher educational attainment are more likely to obtain stable employment contracts than workers with lower education levels (OECD, 2025). In this context, the relationship between educational attainment and contract type was also examined in the present study.

The results reported in Table 2 indicate that workers holding tertiary education generally exhibit a higher proportion of permanent contracts when compared with workers in lower educational categories. In 2012, approximately 76.8 % of workers with higher education held permanent contracts, compared with 75.1 % among workers with low education. Although the proportion of permanent contracts declined over time among workers with lower levels of education, workers with higher education continued to display the highest levels of employment stability in 2023, with 78.9% holding permanent contracts. These findings suggest that higher educational attainment remains strongly associated with greater employment stability in the Portuguese labor market.

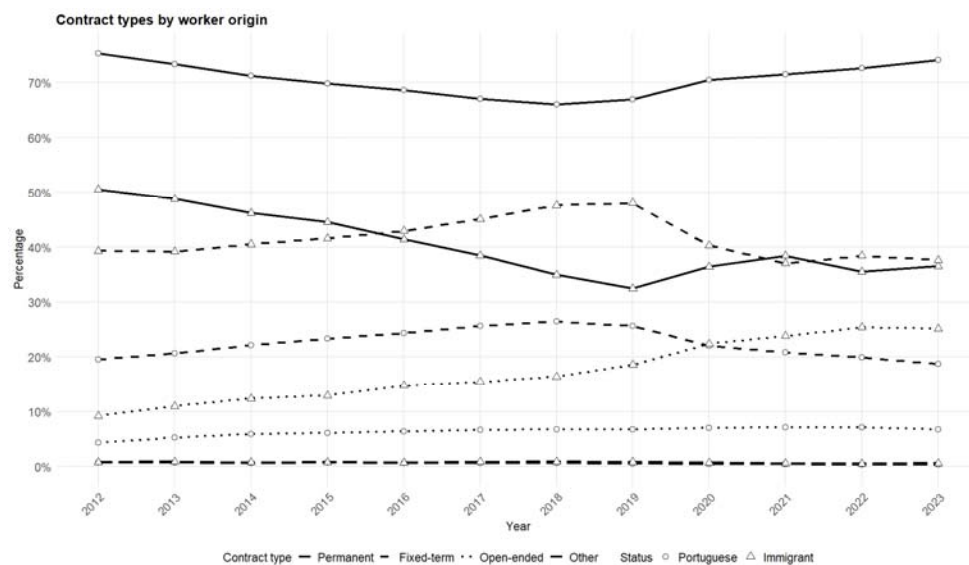
The values presented in Table 2 refer to all workers included in the dataset. However, important differences emerge when immigrant and Portuguese workers are analyzed separately. As illustrated in Figure 4, the proportion of permanent contracts is substantially lower among immigrant workers when compared with Portuguese workers. Moreover, precarious employment arrangements, particularly fixed-term and open-ended contracts, are more common among immigrants.

Table 2: Percentage distribution of employment contract types according to educational attainment in 2012 and 2023.

Year	Education level	Permanent	Fixed-term	Open-ended	Other
2012	Low education	75.1	19.5	4.7	0.7
2012	Secondary/Prof	70.6	23.7	5.1	0.6
2012	Higher education	76.8	18.9	3.4	0.8
2023	Low education	68.4	20.4	10.8	0.4
2023	Secondary/Prof	65.1	25.3	9.3	0.4
2023	Higher education	78.9	15.4	5.1	0.52

Source: Current Study Data Analysis.

Figure 4: Evolution of employment contract types among immigrant and Portuguese workers (2012–2023).



Source: Current Study Data Analysis.

Table 3 further confirms that, even among workers with higher educational attainment, immigrants exhibit considerably lower proportions of permanent contracts than Portuguese workers. In 2023, only 60.59% of immigrant workers with higher education held permanent contracts, compared with 78.9% observed in the overall workforce. These results suggest that higher educational attainment alone may not fully eliminate labor-market disparities between immigrant and Portuguese workers.

Table 3: Distribution of employment contract types among immigrant workers according to educational attainment in 2012 and 2023.

Year	Education level	Permanent	Fixed-term	Open-ended	Other
2012	Low education	48.43	40.97	9.80	0.80
2012	Secondary/Prof	49.47	40.25	9.37	0.90
2012	Higher education	68.44	25.05	5.90	0.61
2023	Low education	30.55	36.76	31.88	0.81
2023	Secondary/Prof	34.32	43.09	22.09	0.50
2023	Higher education	60.59	25.55	13.34	0.52

Source: Current Study Data Analysis.

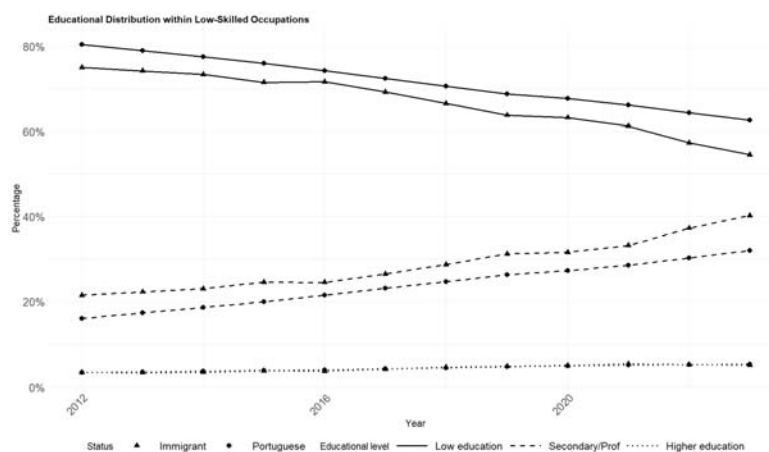
Occupational Distribution

Immigrant labor in Portugal remains largely concentrated in labor-intensive and service-oriented sectors characterized by persistent labor shortages and limited national workforce availability. Foreign workers are particularly represented in subordinate professional activities and occupations associated with low- and medium-skilled labor, often involving demanding working conditions, low wages, and irregular schedules (Lopes & Sousa, 2024). Nevertheless, recent years have shown a gradual diversification of immigrant employment patterns. According to Oliveira (2023), immigrants are increasingly employed in sectors such as healthcare, logistics, and urban services, reflecting growing links between labor-market specialization and regional economic dynamics. While healthcare and logistics activities are expanding mainly in metropolitan areas, agriculture and hospitality continue to play a dominant role in peripheral and seasonal regions.

The definition of low-skilled occupations may influence the conclusions of labor-market analyses. According to the ISCO-08 (International Standard Classification of Occupations), occupations involving simple and routine manual tasks are generally classified within skill level 1, commonly associated with elementary occupations. In the present study, low-skilled occupations were defined as occupations whose modal educational attainment corresponded to basic education during the last five years of the period under analysis.

Based on this criterion, low-skilled occupations were predominantly concentrated in labor-intensive and service-oriented activities, including agricultural work, construction, cleaning services, food preparation, personal services, machine operation, and other elementary occupations. Figure 5 presents the evolution of educational attainment within low-skilled occupations among immigrant and Portuguese workers between 2012 and 2023. Immigrant workers employed in low-skilled occupations consistently exhibit higher proportions of secondary education when compared with Portuguese workers in similar occupations.

Figure 5: Evolution of educational levels in low-skilled occupations among immigrant and Portuguese workers (2012-2023).



Source: Current Study Data Analysis.

This pattern is consistent with the literature on occupational mismatch and overqualification among immigrant workers, suggesting that immigrants may be employed in occupations below their educational qualifications (Aleksynska & Tritah, 2013; Alaverdyan & Zaharieva, 2022).

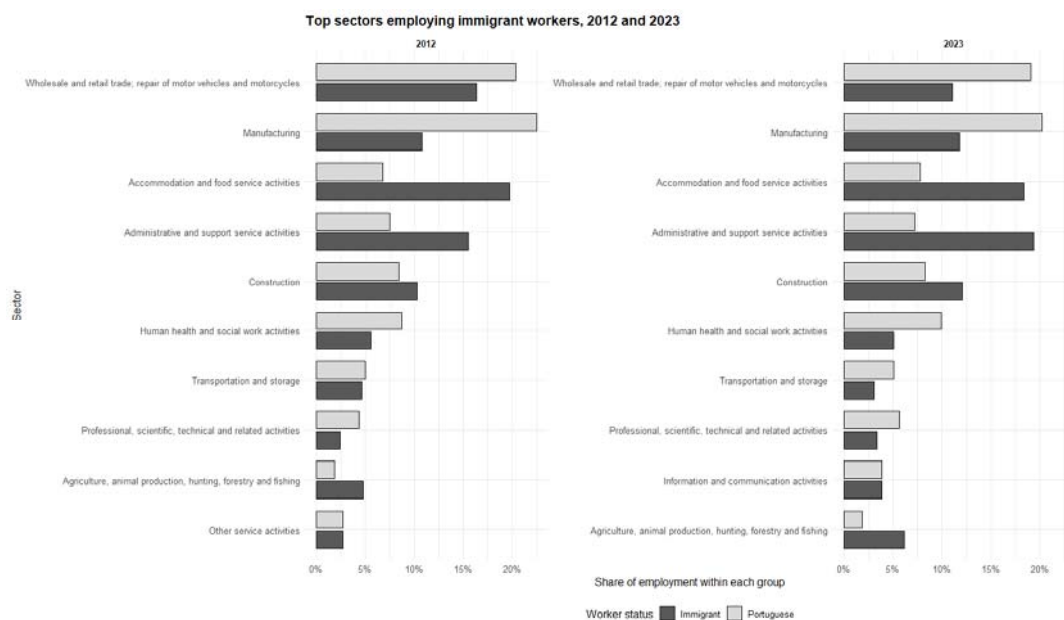
Among the sectors employing the largest number of immigrant workers in 2012 and 2023, the percentage distribution of immigrant and Portuguese workers was computed in order to compare the relative importance of these sectors within each group. Figure 6 presents the employment distribution across the main sectors for immigrant and Portuguese workers in both years.

The results indicate that, in 2023, Administrative and Support Service Activities, Accommodation and Food Services, Construction and Manufacturing represented the most important sectors for immigrant workers, employing approximately 19.3%, 18.4%, 12.1% and 11.8% of the immigrant workforce, respectively. These findings are consistent with the strong expansion of tourism, real estate, and urban services in Portugal during the last decade, which contributed to increased labor demand in these sectors (INE, 2024). Portugal's manufacturing labor shortage can be partly attributed to population ageing, although it also reflects skill mismatches, working conditions, and broader labor-market frictions.

The results also suggest a gradual diversification of immigrant employment patterns over time. Between 2012 and 2023, the sector Information and Communication Activities gained increasing relevance among immigrant workers, accounting for nearly 4% of both immigrant and Portuguese employment in 2023. This pattern may reflect the growing participation of immigrants in more specialized and knowledge-intensive sectors of the Portuguese economy.

Another important aspect concerns the substantial increase in the number of immigrant workers registered in the database, rising from 114,742 in 2012 to 413,734 in 2023. Consequently, even sectors displaying relatively modest percentage shares may correspond to a considerable number of workers in absolute terms. For example, immigrant employment in the agricultural sector increased from approximately 5,511 workers in 2012 to 25,590 in 2023. At the same time, previous studies and institutional reports have highlighted the existence of irregular migrant labor and labor exploitation within some segments of the Portuguese agricultural sector (Pereira et al, 2021). Therefore, the number of immigrant workers effectively employed in these activities may be higher than the figures captured in official administrative records.

Figure 6: Employment distribution across top sectors for immigrant and Portuguese workers (2012 and 2023).



Source: Current Study Data Analysis.

Overall, the results suggest that immigrant integration in the Portuguese labor market became increasingly diversified between 2012 and 2023. Although immigrant workers remain strongly concentrated in labor-intensive and service-oriented sectors, the results also indicate a gradual increase in educational attainment and participation in more specialized economic activities. While recent policy reforms have facilitated the recognition of foreign qualifications and improved access to the Portuguese labor market, the persistence of occupational mismatch suggests that formal recognition alone is insufficient to ensure effective labor-market integration. These findings indicate that additional barriers, such as language proficiency, limited professional networks, or employers' recognition of foreign experience, may continue to constrain immigrants' access to jobs that fully reflect their qualifications.

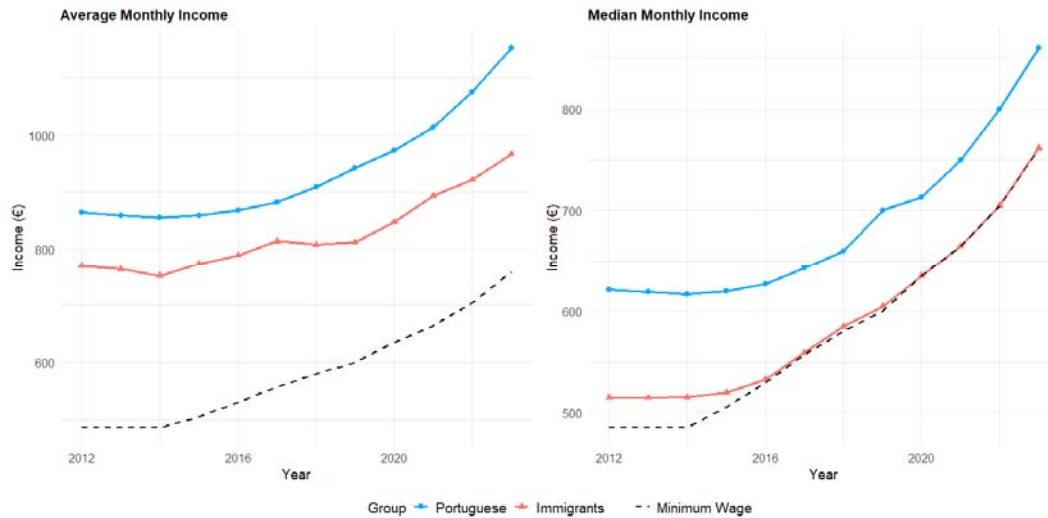
Wage Distribution

During the period between 2012 and 2023, base wages increased substantially in Portugal, reflecting both overall wage growth and successive increases in the national minimum wage. Figure 7 presents the evolution of the mean and median monthly base wage for Portuguese and immigrant full-time workers, together with the national minimum wage (SMN).

The analysis was based on the variable *rbase*, corresponding to the monthly base wage, excluding missing and zero values and considering only full-time workers. At this stage, differences related to education, occupation, sector, and other job characteristics were not taken into account. The dashed line in the figure represents the evolution of the national minimum wage based on official data from DGAEP.

As illustrated in the figure, substantial differences can be observed between the mean and median values of *rbase* for both immigrant and Portuguese full-time workers, suggesting the presence of wage asymmetries. Moreover, both the mean and median wages of Portuguese workers remain consistently higher than those observed for immigrant workers throughout the entire period under analysis. These differences are particularly evident in the case of median wages, where immigrant workers tend to exhibit values considerably closer to the national minimum wage, especially during the last years.

Figure 7: Average and median monthly base wage for immigrants and Portuguese.



Source: Current Study Data Analysis.

Portuguese labor market continues to rely heavily on immigrant labor to address persistent workforce shortages in sectors characterized by difficult working conditions and limited national labor supply. Nevertheless, the growing participation of immigrants in healthcare, information and communication activities, and other specialized sectors points to a gradual transformation of immigration patterns in Portugal. Finally, the results highlight the complexity of immigrant labor-market integration processes. While immigrant participation has increased substantially over time without clear evidence of increasing unemployment levels, significant differences remain regarding contract stability, occupational concentration, and potential overqualification patterns among immigrant workers.

CONCLUSION

This study examined the evolution of immigrant integration into the Portuguese labor market between 2012 and 2023, showing that immigration has become a structural pillar of the Portuguese economy. The findings reveal an unprecedented expansion and diversification of the foreign workforce over the last decade. Contrary to the perception of a long-standing dominance of immigrants from Portuguese-speaking countries, citizens from the Community of Portuguese Language Countries (CPLP) only became the majority group in the final two years under analysis (2022 and 2023), while immigrants from other origins represented the dominant share throughout most of the period studied. Although there has been a remarkable increase in highly qualified immigrants employed in specialized sectors such as healthcare, information technology (IT), and scientific activities, the majority of immigrant workers remain concentrated in labor-intensive sectors, including accommodation and food services, construction, and administrative support activities. The results also indicate that overqualification and contractual precariousness disproportionately affect immigrants, even among those with higher education qualifications. This suggests that, despite recent policy efforts to facilitate the recognition of foreign qualifications, significant barriers remain in translating immigrants' education and skills into jobs that adequately reflect their competencies.

The main theoretical and empirical contribution of this research lies in the long-term analysis of administrative employer–employee data covering the period 2012–2023, supported by administrative data from Quadros de Pessoal covering more than a decade. The findings contribute to the literature by documenting how immigrant labor market integration has evolved in Portugal during a period of profound demographic and economic change. More broadly, the Portuguese case illustrates the transition experienced by several Southern European countries, where immigration was initially concentrated in low-skilled and labor-intensive sectors but has gradually diversified in response to changing labor-market needs. At the same time, the results highlight challenges that extend well beyond Southern Europe. Population ageing, persistently low fertility rates, labor shortages, and increasing pressure on social protection systems have made immigrant labor an increasingly important component of economic sustainability across Europe. Despite this growing reliance on immigrant workers, the persistence of occupational

mismatch and employment disparities suggests that structural barriers continue to limit the full utilization of immigrant human capital.

From a public policy and business management perspective, the results highlight that attracting immigrants must be accompanied by effective measures aimed at improving the quality of labor market integration. For policymakers, strengthening the recognition of foreign qualifications, promoting language training, and designing regionally adapted labor market strategies are essential steps. For employers and organizations, immigrant talent should be viewed as a long-term structural asset rather than merely a temporary solution to labor shortages in low-skilled occupations. Allocating highly qualified immigrants to positions that better match their actual competencies may help reduce “brain waste”, while simultaneously increasing productivity, job satisfaction, and long-term talent retention.

This research also presents some limitations inherent to the administrative database used. Since the analysis relies on Quadros de Pessoal, it captures only formal private-sector wage employment, excluding informal work, self-employment, unemployment, and other forms of labor market participation. This limitation is particularly relevant in sectors such as agriculture, where informal employment is believed to be substantial. Furthermore, the absence of variables related to geographical mobility, language proficiency, length of residence in Portugal, and experiences of discrimination also limits a deeper understanding of the social barriers affecting integration. In addition, the dataset presented several inconsistencies and missing values, which in many cases required the exclusion of observations from the analysis.

As a direction for future research, it would be relevant to apply longitudinal modelling techniques capable of analyzing individual trajectories over time. Although this study examined the evolution of immigrant integration across the years, the statistical techniques employed did not focus on changes occurring at the individual level. Future studies could therefore investigate how different covariates influence labor market outcomes throughout an individual’s trajectory. It would also be important to further explore the extent of informal and precarious work among immigrant communities in Portugal.

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REFERENCES

- Alaverdyan, S., & Zaharieva, A. Immigration, social networks and occupational mismatch, *Economic Modelling*, Volume 114, 2022, 105936, ISSN 0264-9993, <https://doi.org/10.1016/j.econmod.2022.105936>
- Aleksynska, M., & Tritah, A. (2013). Occupation–education mismatch of immigrant workers in Europe: Context and policies. *Economics of Education Review*, 36, 229–244. <https://doi.org/10.1016/j.econedurev.2013.06.001>
- Baganha, M. I., Marques, J. C., & Góis, P. (2009). Imigrantes em Portugal: Uma síntese histórica. *Ler História*, 56. <https://doi.org/10.4000/lerhistoria.1979>
- Becker, G. S. (1993). *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education* (3rd ed.). Chicago: University of Chicago Press. <http://dx.doi.org/10.7208/chicago/9780226041223.001.0001>
- Banco de Portugal, Boletim Económico, Março 2025, ISSN (online) 2182-0368, https://www.bportugal.pt/sites/default/files/documents/2025-03/be_mar25.pdf
- Borjas, George. (2003). The Labor Demand Curve Is Downward Sloping: Reexamining The Impact Of Immigration On The Labor Market. *The Quarterly Journal of Economics*. 118. 1335-1374. <http://doi.org/10.1162/003355303322552810>

- Cabral, S., & Duarte, C. (2010). Employment and wages of immigrants in Portugal. Banco de Portugal Working Paper. <https://www.bportugal.pt/sites/default/files/anexos/papers/wp201031.pdf>
- Cabral, S., & Duarte, C. (2014). Nominal and real wage rigidity: Does nationality matter? *IZA Journal of European Labor Studies*, 3(1), 1–20. <https://doi.org/10.1186/2193-9012-3-13>
- Cabral, S., & Duarte, C. (2016). Lost in translation? The relative wages of immigrants in the Portuguese labour market. *International Review of Applied Economics*, 30(1), 27–47. <https://doi.org/10.1080/02692171.2015.1070129>
- Caselli, F. (2024). Migration into the EU: Stocktaking of Recent Developments and Macroeconomic Implications. IMF Working Papers. <https://doi.org/10.5089/9798400289552.001>;
- Cebolla-Boado, H., & Finotelli, C. (2015). Is there a North–South divide in integration outcomes? A comparison of the integration outcomes of immigrants in Southern and Northern Europe. *European Journal of Population*, 31(1), 77–102. <https://doi.org/10.1007/s10680-014-9327-8>
- Chiswick, B. R., & Miller, P. (2009). The international transferability of immigrants' human capital. *Economics of Education Review*, 28(2), 162–169. <https://doi.org/10.1016/j.econedurev.2008.07.002>
- Christian Dustmann, Tommaso Frattini, Ian P. Preston, The Effect of Immigration along the Distribution of Wages, *The Review of Economic Studies*, Volume 80, Issue 1, January 2013, Pages 145–173, <https://doi.org/10.1093/restud/rds019>
- Dražanová, L., & Gonnot, J. (2023). Attitudes toward immigration in Europe: Cross-regional differences. *Open Research Europe*, 3. <https://doi.org/10.12688/openreseurope.15691.1>
- Ghio, D., Bratti, M., & Bignami, S. (2023). Linguistic Barriers to Immigrants' Labor Market Integration in Italy. *International Migration Review*, 57(1), 357–394. <https://doi.org/10.1177/01979183221107923>
- Góis, P., & Marques, J. C. (2018). Retrato de um Portugal migrante: A evolução da emigração, da imigração e do seu estudo nos últimos 40 anos. e-cadernos CES, (29). <https://doi.org/10.4000/eces.3307>
- INE (Instituto Nacional de Estatística), Estatísticas do Turismo: 2023, Lisboa: INE, 2024. ISSN 0377-2306. ISBN 978-989-25-0683-8, <https://www.ine.pt/xurl/pub/439494299>
- Lopes, S., & Sousa, A. (2024). Relatório de Migrações e Asilo 2023. AIMA I.P. – Direção de Planeamento, Estudos e Estatística. <https://aima.gov.pt/media/pages/documents/92dd0f02ea-1726562672/rma-2023.pdf>
- Martins, P., Piracha, M., Varejão, J., Do immigrants displace native workers? Evidence from matched panel data, *Economic Modelling*, Volume 72, 2018, Pages 216–222, ISSN 0264-9993, <https://doi.org/10.1016/j.econmod.2018.01.019>
- OECD/European Commission (2023), Indicators of Immigrant Integration 2023: Settling In, OECD Publishing, Paris, <https://doi.org/10.1787/1d5020a6-en>
- OECD (2025), Education at a Glance 2025: OECD Indicators, OECD Publishing, Paris, <https://doi.org/10.1787/1c0d9c79-en>
- Oliveira, C. R. (2023). Indicadores de Integração de Imigrantes 2023: Relatório Estatístico Anual 400, 2023. <https://books.google.pt/books?id=zK7qEAAAQBAJ&lpg=PP1&hl=pt-PT&pg=PP1#v=onepage&q&f=false>
- Pereira, C., Pereira, A., Budal, A., Dahal, S., Daniel-Wrabetz, J., Meshelemiah, J., Carvalho, J., Ramos, M., Carmo, R., Pires, R., 'If you don't migrate, you're a nobody': Migration recruitment networks and experiences of Nepalese farm workers in Portugal, *Journal of Rural Studies*, Volume 88, 2021, Pages 500–509, ISSN 0743-0167, <https://doi.org/10.1016/j.jrurstud.2021.04.019>
- Privalko, I., McGinnity, F., Curristan, S., & Enright, S. (2025). How Do Migrants Fare in the Irish Labor Market? Country of Origin

, Gender, Asylum and Ethnicity Effects. *Journal of Immigrant & Refugee Studies*, 23(2), 268–291.
<https://doi.org/10.1080/15562948.2023.2196664>

Reyneri, E., & Fullin, G. (2011). Labour market penalties of new immigrants in new and old receiving West European countries. *International Migration*, 49(1), 31–57. <https://doi.org/10.1111/j.1468-2435.2009.00593.x>

INNOVATION PATTERNS SUPPORTED BY PUBLIC FUNDING IN A LOW-DENSITY TOURISM TERRITORY: EVIDENCE FROM PROVERE INATURE (CENTRO2020)

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ABSTRACT

This study examines which innovation practices are supported by public funding in firms within the PROVERE iNature strategy (CENTRO2020). It addresses a gap by linking innovation typologies with public subsidies, particularly in tourism. Based on the Oslo Manual (2018), it analyses product and process innovation. Using data from 12 projects (2016–2020), the study applies statistical analysis in SPSS. Results show broad support for innovation, especially product-service and process innovations in marketing, production, ICT, and management. Firms combine innovation types. Despite limitations, findings suggest funding promotes diversified portfolios and provides evidence for regional policies, tourism development, and subsidy evaluation.

Keywords: innovation; public funding; Oslo Manual; tourism; SMEs.

INTRODUCTION

Innovation is repeatedly identified as a central source of competitiveness, firm renewal, and territorial development. At the firm level, innovation helps organizations create new value (Ostos & Montoya-Ramírez, 2025), sustain growth, and respond to changing market conditions. At the regional level, it contributes to employment, resilience, and the broader economic and social progress of communities (Baregheh et al., 2009; Fagerberg, 2006; Castellacci, (2012). In low-density territories, where demographic decline, weak scale economies, and limited access to specialized resources can constrain entrepreneurial activity, innovation becomes even more critical. In such contexts, collaboration and collective action are often necessary to make innovation less episodic and more embedded in local development dynamics (Madureira et al., 2013; Shi & Wang, 2026).

European and national policy instruments have long attempted to address these structural constraints through direct support for innovation. In Portugal, much of this support has been channeled through European structural funds and regional operational programs. Public subsidies are justified by the presence of market failures surrounding innovation, including uncertainty, spillovers, and financing gaps that are especially acute for small and medium-sized firms. Direct grants can reduce risk, help firms undertake more ambitious projects, and enable innovation outputs that might not emerge in the absence of public support (Bronzini & Piselli, 2016; Le & Jaffe, 2017; Nie, et al., 2026).

The current research investigates innovation patterns in the PROVERE iNature consortium, a collective efficiency strategy oriented toward the valorization of endogenous resources and nature-based tourism in Portugal's

Centro region. The main goal is to understand what innovation practices are supported by public funding. The analytical relevance of that question lies in the fact that most previous studies examine either complementarities among innovation types or the effects of subsidies on innovation and performance, but rarely both together. This omission is particularly notable in tourism and service-intensive sectors, where innovation is often incremental, intangible, and difficult to capture through conventional metrics (Bernini & Pellegrini, 2013; Witell et al., 2016; So & Li (2023).

The article pursues three objectives. First, it identifies whether the supported firms concentrate their innovative activities in specific types or distribute them across multiple categories. Second, it examines whether repeated mixed patterns of innovation can be observed. Third, it explores whether those patterns are associated with selected firm characteristics: age, size, turnover, and indebtedness. In doing so, the paper offers an empirical contribution to debates on innovation architecture and a practical contribution to the design of regional support instruments.

LITERATURE REVIEW AND POLICY CONTEXT

The conceptual foundation of this study is the Oslo Manual, the main international reference for defining and measuring innovation. The 2018 edition reorganized innovation into two broad types: product innovation and business process innovation. Product innovation comprises goods and services, while business process innovation includes production of goods and services, distribution and logistics, marketing and sales, information and communication systems, administration and management, and product/business process development (OECD & Eurostat, 2018). This updated architecture is particularly useful when studying service sectors because it moves beyond the narrower technological bias of earlier measurement frameworks.

Innovation is a heterogeneous phenomenon. Firms innovate through new products, altered processes, managerial changes, organizational arrangements, and new market-facing practices (Stundziene, et al., 2024). This heterogeneity makes it difficult to establish a single best-practice model transferable across organizations and sectors (Pavitt, 2006). It is also one reason why mixed or complementary patterns of innovation have attracted growing scholarly attention. Rather than choosing between product and process innovation, firms may combine them in ways that reinforce each other. Larrea et al. (2021) organized innovation research into three distinct perspectives: economic, market, and organizational phenomena. Complementarities can improve adoption, learning, and performance because one innovation activity may increase the return to another (Battisti & Stoneman, 2021; Doran, 2012; Milgrom & Roberts, 1995). Tejada & Moreno (2013) examined 125 Andalusian hotel SMEs and found that “diverse categories of innovation – product, process, marketing and organizational – are explained by different sets of variables,” suggesting that firms employ varied innovation approaches simultaneously. Similarly, Camacho & Rodríguez (2008) confirmed “a high degree of heterogeneity, in relation to innovation patterns, exists among service firms and among service industries.” The evidence supports multiple simultaneous innovation types rather than single-approach strategies, but specific portfolio composition data is limited. These issues are especially salient in services and tourism. The available evidence partially supports understanding service tourism innovation as mixed portfolios, though sources use different terminology to describe this concept. The research shows strong support for heterogeneous, multi-dimensional innovation patterns in tourism services. Services often innovate through new experiences, redesigned service delivery, new combinations of digital tools and customer interaction, and changes in management or commercialization. Such innovations are frequently incremental, intangible, and co-produced with users, which complicates measurement and comparison (Toivonen & Tuominen, 2009; Witell et al., 2016). In tourism, the context-specific nature of experience creation, combined with the relative visibility and imitability of many innovations, makes the distinction between product and process innovation particularly fluid (Decelle, 2006; Guisado-González et al., 2014).

A second line of literature relevant to this paper concerns the role of public funding. Direct subsidies are commonly justified by the gap between the social returns and private returns to innovation, by firms’ financing constraints, and by the high uncertainty associated with innovative activity (OECD & Eurostat, 2018). Empirical evidence generally suggests that direct support can positively affect innovation outputs, although effects vary by sector, firm size, and the type of support instrument used. Bronzini and Piselli (2016), for example, found that subsidies increased innovation outputs and were particularly important for smaller firms and riskier projects. Le and Jaffe (2017) reported that an innovation subsidy significantly increased the probability that a firm would introduce

goods or services new to the world. A broader review by Dvouletý et al. (2021) also supports the relevance of grants, while noting the heterogeneity of outcomes and the need for careful evaluation.

Tourism-specific evidence remains comparatively scarce, which strengthens the relevance of the present study. Bernini and Pellegrini (2013) argued that empirical evidence on public support in tourism was limited even though the sector often depends strongly on regional development programs. More recent work still points to the importance of subsidies for tourism firms, especially where investments relate to upgrading quality, productivity, and resilience in destination-specific settings (Srhoj et al., 2021). Yet there is still limited evidence on how public funding shapes not merely the existence of innovation, but the configuration of innovation categories inside funded projects.

The policy context of the paper is Portugal 2020 and, more specifically, the CENTRO2020 regional operational program. Portuguese innovation policy has relied heavily on European resources, and recent strategies have increasingly promoted collaboration, networks, and collective efficiency approaches (ANI, 2020). PROVERE, the Program for the Valorization of Endogenous Resources, was designed to foster territorial development based on place-specific assets and collective strategies. The PROVERE iNature initiative focused on the Centro region and emphasized natural heritage, tourism, and the creation of value through coordinated action among firms and institutions. This setting is particularly suitable for examining innovation patterns because it combines low-density territorial conditions, service-intensive activities, and direct public support oriented towards regional competitiveness.

METHODOLOGY

The study follows a quantitative design based on secondary data. The unit of analysis is the funded project submitted by private firms belonging to the PROVERE iNature consortium. The final sample comprises 12 approved projects financed between 2016 and 2020. These projects were selected because they represented the universe of private consortium firms with approved support in the period under analysis. The empirical strategy combined documentary coding of project applications with firm-level financial and structural data obtained from the SABI database. The variables selected to measure innovation were Product/Goods, Product/Services, Process/Production, Process/Distribution and logistics, Process/Marketing and sales, Process/Information and communication systems, Process/Administration and management and Process/Product and business process development. Innovation activities described in the applications were coded through content analysis using the categories defined by the Oslo Manual 2018. Two product categories were considered: goods and services. Six process categories were used: production of goods and services, distribution and logistics, marketing and sales, information and communication systems, administration and management, and product/business process development. For each case, occurrences of each category were recorded, allowing the author to calculate both the number of identified innovations and the proportion of firms presenting each category.

In addition to innovation variables, the study included firm characteristics that the literature frequently associates with subsidy allocation and innovation behavior: age, size, average turnover, turnover growth, average indebtedness, and change in indebtedness. Descriptive statistics were first used to characterize the firms and the distribution of innovation categories. Pearson correlations were then applied to explore pairwise relations among innovation categories and between those categories and firm characteristics. Exploratory factor analysis was used to investigate whether a smaller number of latent dimensions could summarize recurring combinations of innovation categories. Finally, cluster analysis was conducted to identify groups of firms with similar profiles across innovation and firm-level variables.

The current research explicitly treated the multivariate analyses as exploratory rather than confirmatory. This caution is justified by the small sample size. The analysis nevertheless remains meaningful for two reasons. First, the sample covers the full set of relevant approved cases in the consortium. Second, the purpose of the paper is not to claim population-level causal inference but to identify patterns, regularities, and plausible associations that can inform future research and policy evaluation. The methodological rigor of the paper therefore lies in transparent operationalization, consistent coding from original applications, and the combined use of descriptive and multivariate techniques appropriate to an exploratory study.

RESULTS

The sample is strongly oriented toward services and tourism. Seven of the 12 firms belong to accommodation activities, while the remaining cases are distributed across food industries, wood and cork, waste treatment, retail trade, and sports or recreational activities. The descriptive statistics portray a group of relatively small firms operating in a regionally embedded service economy. On average, the firms were 10.5 years old and employed 9.25 workers. Average turnover for the 2018-2020 period was EUR 476,573.29, and average indebtedness was 53.88 percent. Turnover growth was positive on average, at 171 percent over the reference period, while indebtedness grew only slightly on average. Compared with the broader Portuguese context, the sample included younger firms and firms with somewhat larger employment structures, reflecting both the small number of cases and the characteristics of the support calls that favored business creation and job generation.

The first important result concerns the overall weight of innovation types. Across the 12 funded projects, the coding process identified 90 innovation occurrences. Business process innovation accounted for 65.56 percent of all occurrences, while product innovation accounted for 34.44 percent. This means that process innovation was approximately twice as frequent as product innovation, which is broadly consistent with Portuguese innovation statistics and with the service orientation of the sample. Yet the category-level distribution is more revealing than the aggregate split between product and process innovation.

The single most frequent category was product innovation in services, with 30 occurrences or 33.33 percent of all identified innovations. It was followed by process innovation in marketing and sales, with 19 occurrences or 21.11 percent. Production of goods and services represented 15 occurrences, information and communication systems 12, administration and management 11, and distribution and logistics 2. Product innovation in goods appeared only once, and product/business process development was absent altogether. Five of the eight innovation categories were present in at least half of the firms. The most common categories in terms of firm incidence were product/services, present in 83.33 percent of firms, and process/marketing and sales, present in 75 percent (Table1). Production, information and communication systems, and administration and management each appeared in at least half of the cases as well.

The second core result is the breadth of innovation portfolios. Only one firm, corresponding to 8.33 percent of the sample, focused exclusively on process innovation. All others, or 91.67 percent, combined product and process innovation within the same funded project. At the category level, every firm innovated in at least two categories, and none innovated in a single category only. The most common pattern was the simultaneous presence of four categories, observed in 58.33 percent of the firms. Two-category combinations represented 16.77 percent of the cases, and three-category combinations 25.00 percent (Table1).

Three repeated category patterns across the sample were also identified: (1) product/services with production and information and communication systems; (2) product/services with production, marketing and sales, and information and communication systems; and (3) product/services with marketing and sales, information and communication systems, and administration and management. Across these repeated combinations, two elements were constant: product/service innovation and information and communication systems. This recurrence suggests a systematic link between the design of new or improved services and the organizational or digital infrastructures needed to deliver them.

The correlation analysis further supports the idea that some categories move together. The strongest positive association was between product innovation in goods and process innovation in production of goods and services ($r = .874$). Product innovation in goods also correlated positively with distribution and logistics ($r = .674$). A moderate negative relation emerged between production and administration/management ($r = -.576$). These results suggest that the categories more closely tied to tangible production and logistics behave differently from those linked to managerial support processes. When the analysis shifted from innovation categories alone to the broader set of standardized variables, suggestive relations between specific innovation categories and firm characteristics, were found, but these patterns were not strong enough to support definitive statistical claims.

Table 1: Innovation incidence across funded projects.

Innovation category	Occurrences	% of all occurrences	% of firms
<i>Product/Goods</i>	1	1.11	8.33
<i>Product/Services</i>	30	33.33	83.33
<i>Process/Production</i>	15	16.68	58.33
<i>Process/Distribution and logistics</i>	2	2.22	16.67
<i>Process/Marketing and sales</i>	19	21.11	75.00
<i>Process/Information and communication systems</i>	12	13.33	50.00
<i>Process/Administration and management</i>	11	12.22	50.00
<i>Process/Product and business process development</i>	0	0.00	0.00

The exploratory factor analysis was conducted only on innovation categories. Its adequacy statistics require caution: the KMO value was .435, below the conventional threshold of .60, although Bartlett's test of sphericity was significant (chi-square = 34.390; df = 21; $p = .033$). Factor analysis was considered as a tentative and primarily descriptive. Even so, two factors with eigenvalues above 1 were retained, together explaining 64.96 percent of the variance. In the rotated solution, product innovation in goods, production, and distribution/logistics loaded mainly on Factor 1, which was labeled the production factor. Product innovation in services, marketing and sales, and information and communication systems loaded mainly on Factor 2, labeled the systems factor. Administration and management displayed a more ambiguous pattern and did not fit cleanly. Reliability diagnostics reinforced the need for caution: Cronbach's alpha was negative for the initial model and remained weak after excluding one problematic variable. The factor solution should therefore be read as a useful map of association rather than as a stable scale.

The cluster analysis produced a more interpretable structure. The final solution retained two clusters with 8 and 4 cases, respectively. The distance between final cluster centers was 3.261. Because the cluster procedure was designed to maximize between-group difference, the resulting F tests are descriptive rather than inferential. Even so, they help show which variables contributed most to the partition. Firm size was the most clearly differentiating variable ($p = .020$), while average turnover ($p = .087$) and average indebtedness ($p = .052$) were close to conventional significance thresholds. The final cluster centers indicate that Cluster 2 concentrated older and larger firms, with higher average turnover, lower indebtedness, and somewhat higher levels and quantities of innovation. Cluster 1, by contrast, comprised comparatively smaller and younger firms with lower turnover, higher indebtedness, and lower overall innovation intensity. This result is important because it suggests that the most meaningful differences across cases may not lie in a single innovation category, but in the broader combination of firm scale, financial structure, and innovation portfolio.

The research then translated these results into direct answers to its research questions. In relation to whether innovation was concentrated or transversal, the answer was unequivocally transversal. Product/service innovation was the most prominent category, but it was usually accompanied by process innovations in marketing and sales, production, information and communication systems, and administration and management. Regarding complementarities, the repeated combinations centered on product/services and information and communication systems strongly suggest patterned co-occurrence, even if the small sample prevents stronger causal claims. With respect to firm characteristics, younger and smaller firms appeared more oriented toward marketing and sales and administration and management innovations, whereas firms with higher turnover were more closely associated with production and information and communication systems. Lower indebtedness tended to coincide with information and communication systems and, to a lesser extent, marketing and sales, while higher indebtedness was more associated with administration and management and with product/services. Table 2 summarizes the exploratory multivariate results.

Table 2: Summary of exploratory multivariate results.

Analysis	Main result	Interpretation
<i>Pearson correlation</i>	$r = .874$ between product/goods and process/production; $r = .674$ between product/goods and distribution/logistics	Tangible product innovation is most strongly tied to operational and logistical process changes.
<i>Factor analysis</i>	KMO = .435; Bartlett $p = .033$; two factors explain 64.96% of variance	Exploratory evidence suggests a production factor and a systems factor, but adequacy is weak.
<i>Rotated factor structure</i>	Factor 1: product/goods, production, logistics; Factor 2: product/services, marketing/sales, ICT systems	Mixed innovation portfolios have a patterned structure rather than random co-occurrence.
<i>Cluster analysis</i>	Two clusters ($n = 8$ and $n = 4$); size most differentiating variable ($p = .020$)	Older, larger, higher-turnover, lower-debt firms tend to exhibit broader innovation intensity.

DISCUSSION

The findings support four broader interpretations. First, public funding in this setting appears to mobilize innovation in a broad rather than narrow manner. The supported projects did not typically fund isolated technological interventions. Instead, they combined new or improved services with changes in commercialization, operations, digital support systems, and organizational processes. This is consistent with the systemic view of innovation emphasized by Edwards-Schachter (2018) and with the broader shift in innovation research away from isolated product breakthroughs toward interacting organizational and market-facing changes.

Second, the results are especially coherent with the service and tourism profile of the consortium. The dominance of product/service innovation and marketing and sales is not surprising in a territorial strategy centered on tourism and endogenous assets. Firms in accommodation and related activities compete through the creation of differentiated experiences, improved service bundles, better communication with markets, and enhanced digital interfaces. In this sense, the recurrence of information and communication systems across mixed patterns is particularly meaningful. It suggests that digital and informational infrastructures are not peripheral add-ons, but central enablers that connect service redesign, customer access, and internal coordination.

Third, the evidence partly aligns with and partly complicates the existing literature on innovation complementarities. The study is consistent with research arguing that firms often seek more than one innovation type at once and that product and process innovation need not be substitutes (Battisti & Stoneman, 2021; Lin et al., 2016). Yet the patterns observed here are not generic. They are highly shaped by sector and territory. The most repeated combinations are not simply 'product plus process'; they specifically join service innovation with selected process categories, especially information and communication systems and, in some cases, production or marketing and sales. This helps refine the discussion on complementarity by showing that the composition of mixed innovation portfolios matters.

Fourth, the study suggests that firm heterogeneity matters for understanding publicly supported innovation. The two-cluster solution, even though exploratory, indicates that larger firms with higher turnover and lower indebtedness may be better positioned to mobilize broader innovation portfolios. At the same time, the evidence that younger and smaller firms were associated with marketing/sales and administrative innovation is relevant for policy because those categories may represent accessible pathways for innovation in firms that lack the scale for more extensive operational transformation. This point also resonates with the policy literature that emphasizes differentiated subsidy effects across firm profiles and the need to understand not just whether a grant worked, but for whom and through which innovation channels (Bronzini & Piselli, 2016; Dvouletý et al., 2021).

The study also has implications for the evaluation of regional collective efficiency strategies. If support programs are assessed only through narrow indicators such as patents or the presence of a single innovation type, they may miss the more realistic pattern through which innovation unfolds in service-based local economies. In PROVERE iNature, innovation was embedded in bundles of actions that linked service design, commercialization,

organizational adaptation, and digitalization. A policy framework that recognizes these mixed portfolios is likely to be better aligned with the actual behavior of SMEs in tourism and low-density regions.

At the same time, the evidence should not be overstated. The current research itself is careful in acknowledging that the factor analysis has weak adequacy statistics and that the small sample limits inference. The study cannot determine the long-term causal impact of each supported innovation category on firm performance. Nor can it separate the effect of the subsidy from the preexisting capabilities of firms that were able to obtain support. What it does provide, however, is a disciplined and empirically grounded picture of the innovation architecture embedded in funded projects. For a field where such evidence remains scarce, particularly under the Oslo Manual 2018 classification and in tourism-oriented contexts, that contribution is valuable.

CONCLUSION AND IMPLICATIONS

The current research goal was to understand what innovation practices are supported by public funding. Using 12 approved projects from the PROVERE iNature consortium under CENTRO2020, the study showed that public funding supported innovation in a broad and combined way. Process innovation represented roughly two-thirds of all identified occurrences, but the most frequent individual category was product innovation in services. Almost all firms combined product and process innovation, every firm innovated in at least two categories, and the most common profile involved four categories simultaneously. Repeated patterns showed the persistent co-occurrence of product/service innovation and information and communication systems. Exploratory multivariate analysis suggested two latent dimensions, labeled production and systems, and two firm clusters differentiated mainly by size, turnover, and indebtedness.

The article makes three main contributions. Empirically, it provides one of the rare analyses linking direct public support to the architecture of innovation categories defined in the Oslo Manual 2018. Conceptually, it shows that innovation patterns in tourism and low-density regions are better understood as mixed portfolios than as isolated interventions. The research reinforces previous studies that show that innovation is a heterogeneous phenomenon (Stundziene, et al., 2024, Larrea et al., 2021, Tejada & Moreno 2013, Camacho & Rodríguez 2008). Innovation involves and combines more than one innovation category. Practically, the research suggests that firms innovate by using different categories of innovation. Public funding should be designed to capture different sorts of tourism service innovation. Policymakers should evaluate funded projects in ways that reflect and integrated diverse character of service innovation.

The study's limitations are clear. The sample is small, the time horizon does not allow post-project performance evaluation, and the design does not identify causal treatment effects. Future research should therefore revisit the same firms after a longer period, examine the degree of implementation of the proposed innovations, and test whether mixed innovation portfolios outperform single-category strategies. More comparative work across regions and programs would also help determine whether the patterns found in PROVERE iNature are specific to this collective efficiency strategy or indicative of broader mechanisms in publicly funded SME innovation.

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REFERENCES

- Amara, N., Landry, R., & Doloreux, D. (2009). Patterns of innovation in knowledge-intensive business services. *The Service Industries Journal*, 29(4), 407–430. <https://doi.org/10.1080/02642060802307847>
- Agência Nacional de Inovação. (2020). Relatório nacional de inovação. https://www.ani.pt/media/6211/relatorio_bienal_portugues_junho_2021.pdf

- Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. *Management Decision*, 47(8), 1323–1339. <https://doi.org/10.1108/00251740910984578>
- Battisti, G., & Stoneman, P. (2021). Complementarities in the sourcing, use and exploitation of managerial and technological innovations. *Economics of Innovation and New Technology*. Advance online publication. <https://doi.org/10.1080/10438599.2021.1924697>
- Bernini, C., & Pellegrini, G. (2013). Is subsidising tourism firms an effective use of public funds? *Tourism Management*, 35, 156–167. <https://doi.org/10.1016/j.tourman.2012.06.012>
- Bronzini, R., & Piselli, P. (2016). The impact of R&D subsidies on firm innovation. *Research Policy*, 45(2), 442–457. <https://doi.org/10.1016/j.respol.2015.10.008>
- Čadil, J., Mirošník, K., & Rehák, J. (2017). The lack of short-term impact of cohesion policy on the competitiveness of SMEs. *International Small Business Journal*, 35(8), 991–1009. <https://doi.org/10.1177/0266242617695382>
- Camacho, J. A., & Rodríguez, M. (2008). Patterns of innovation in the service sector: Some insights from the Spanish innovation survey. *Economics of Innovation and New Technology*, 17(5), 459–471. <https://doi.org/10.1080/10438590701362874>
- Castellacci, F. (2012). Innovation and regional growth in the European Union. *Regional Studies*, 46(8), 1101–1102. <https://doi.org/10.1080/00343404.2012.709737>
- Decelle, X. (2006). A dynamic conceptual approach to innovation in tourism. In OECD (Ed.), *Innovation and growth in tourism* (pp. 85–106). OECD Publishing. <https://doi.org/10.1787/9789264025028-7-en>
- Doran, J. (2012). Are differing forms of innovation complements or substitutes? *European Journal of Innovation Management*, 15(3), 351–371. <https://doi.org/10.1108/14601061211243675>
- Dvouletý, O., Srhoj, S., & Pantea, S. (2021). Public SME grants and firm performance in the European Union: A systematic review of empirical evidence. *Small Business Economics*, 57(1), 243–263. <https://doi.org/10.1007/s11187-019-00306-x>
- Edwards-Schachter, M. (2018). The nature and variety of innovation. *International Journal of Innovation Studies*, 2(2), 65–79. <https://doi.org/10.1016/j.ijis.2018.08.004>
- Fagerberg, J. (2006). Innovation: A guide to the literature. In J. Fagerberg, D. C. Mowery, & R. R. Nelson (Eds.), *The Oxford handbook of innovation* (pp. 1–26). Oxford University Press.
- Guisado-González, M., Guisado-Tato, M., & Rodríguez-Domínguez, M. M. (2014). Testing the relationship between product innovation and process innovation: A comparative analysis of tourism and manufacturing sectors. *European Journal of Tourism Research*, 8(1), 66–82.
- Instituto Nacional de Estatística. (2022). Inquérito comunitário à inovação – 2020. Instituto Nacional de Estatística, I.P.
- Larrea, G., Altin, M., Köseoglu, M. A., & Okumus, F. (2021). An integrative systematic review of innovation research in hospitality and tourism. *Tourism Management Perspectives*, 37, Article 100789. <https://doi.org/10.1016/j.tmp.2021.100789>
- Le, T., & Jaffe, A. B. (2017). The impact of R&D subsidy on innovation: Evidence from New Zealand firms. *Economics of Innovation and New Technology*, 26(5), 429–452. <https://doi.org/10.1080/10438599.2016.1213504>
- Lin, C.-L., Lin, H.-L., & Lin, E. S. (2016). Is there a complementary relationship between product and process innovation on productivity in Taiwanese manufacturing firms? *Hitotsubashi Journal of Economics*, 57(2), 139–173. <https://doi.org/10.15057/28221>

- Madureira, L., Gamito, T. M., Ferreira, D., & Portela, J. (2013). Inovação em Portugal rural: Detetar, medir e valorizar. *Princípios*.
- Milgrom, P., & Roberts, J. (1995). Complementarities and fit: Strategy, structure, and organizational change in manufacturing. *Journal of Accounting and Economics*, 19(2–3), 179–208. [https://doi.org/10.1016/0165-4101\(94\)00382-F](https://doi.org/10.1016/0165-4101(94)00382-F)
- Nie, R., Gao, C., & Shen, A. (2026). How government innovation subsidies facilitate concurrent improvements in the quantity and quality of firm innovation? *Digital Economy and Sustainable Development*, 2(1), 1–22. <https://doi.org/10.1007/s44265-026-00079-8>
- Organisation for Economic Co-operation and Development, & Eurostat. (2018). Oslo manual 2018: Guidelines for collecting, reporting and using data on innovation (4th ed.). OECD Publishing. <https://doi.org/10.1787/9789264304604-en>
- Ostos, J., & Montoya-Ramírez, M. (2025). Factors that influence value creation and value capture in companies: Evidence in an emerging market. *Journal of Economics, Finance and Administrative Science*. Advance online publication. <https://doi.org/10.1108/JEFAS-08-2023-0223>
- Pavitt, K. (2006). Innovation processes. In J. Fagerberg, D. C. Mowery, & R. R. Nelson (Eds.), *The Oxford handbook of innovation* (pp. 86–114). Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780199286805.003.0004>
- Shi, X., & Wang, J. (2026). A study on collaboration innovation: Perspectives of innovative ecosystems of value co-creation using evolutionary game theory. *PLOS ONE*, 20(3), e0339295. <https://doi.org/10.1371/journal.pone.0339295>
- So, K. K. F., & Li, X. (R.). (2023). Service innovation and emerging technologies in tourism and hospitality. *Journal of Hospitality & Tourism Research*, 47(6), 1051–1076. <https://doi.org/10.1177/19389655231166819>
- Srhoj, S., Vitezić, V., & Walde, J. (2021). Do small public grants boost tourism firms' performance? *Tourism Economics*. Advance online publication. <https://doi.org/10.1177/1354816621994436>
- Stundziene, A., Pilinkiene, V., Vilkas, M., Grybauskas, A., & Lukauskas, M. (2024). The challenge of measuring innovation types: A systematic literature review. *Journal of Innovation & Knowledge*, 9(4), Article 100620. <https://doi.org/10.1016/j.jik.2024.100620>
- Tejada, P., & Moreno, P. (2013). Patterns of innovation in tourism small and medium-size enterprises. *The Service Industries Journal*, 33(7–8), 749–758. <https://doi.org/10.1080/02642069.2013.740469>
- Tidd, J., & Bessant, J. (2009). *Managing innovation: Integrating technological, market and organizational change* (4th ed.). John Wiley & Sons.
- Toivonen, M., & Tuominen, T. (2009). Emergence of innovations in services. *The Service Industries Journal*, 29(7), 887–902. <https://doi.org/10.1080/02642060902749492>
- Witell, L., Snyder, H., Gustafsson, A., Fombelle, P., & Kristensson, P. (2016). Defining service innovation: A review and synthesis. *Journal of Business Research*, 69(8), 2863–2872. <https://doi.org/10.1016/j.jbusres.2015.12.055>

POLICING THE DIGITAL AGE: SECURITY, PRIVACY, AND HUMAN RIGHTS IN NETWORKED SOCIETIES

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ABSTRACT

The rapid expansion of digital technologies has fundamentally transformed contemporary policing practices, creating new opportunities for crime prevention, intelligence gathering and public security management while simultaneously generating significant concerns regarding privacy, accountability and human rights. This article examines how networked technologies are reshaping security governance and redefining the relationship between policing, privacy and democratic oversight in contemporary societies. The study is motivated by the increasing reliance on data intensive policing technologies and the growing need to critically assess their implications for democratic governance in contexts where legal and regulatory frameworks often struggle to keep pace with technological innovation. Drawing on governance theory, securitisation theory and, critical perspectives on surveillance and datafication, the article adopts a qualitative research design that integrates critical political theory, socio-legal analysis and systematic policy review. Data were collected through an extensive review of academic literature, international human rights instruments, legislative frameworks and policy documents from selected democratic jurisdictions. This methodological approach provides a comprehensive understanding of digital policing as a sociotechnical system shaped by interactions among state institutions, private technology companies, and transnational regulatory actors.

The findings reveal that contemporary policing increasingly relies on algorithmic risk assessment, biometric identification, predictive analytics, digital surveillance and platform-based intelligence systems. While these technologies are frequently justified as necessary responses to evolving security threats, they also generate concerns regarding proportionality, transparency, accountability, discrimination, and democratic oversight, particularly for marginalised and overpoliced communities. The article contributes to existing scholarship by conceptualising digital policing as a form of networked governance that transcends traditional institutional boundaries and by highlighting the limitations of fragmented regulatory regimes in safeguarding fundamental rights. The study argues for adaptive, rights centred regulatory frameworks grounded in legality, necessity, proportionality, data minimisation and meaningful public participation to ensure an appropriate balance between security imperatives and human rights protections in the digital age.

Keywords: digital policing, networked governance, digital surveillance, human rights.

INTRODUCTION

The rapid development of digital technologies has fundamentally transformed contemporary policing practices across the globe. Advances in artificial intelligence, biometric identification systems, predictive analytics, social media surveillance, facial recognition technologies and data-driven policing platforms have reshaped the operational environment of law enforcement agencies. These developments have generated new opportunities for crime prevention, intelligence gathering and public security management. However, they have also intensified concerns regarding privacy, accountability, democratic oversight and the protection of human rights. The emergence of networked societies has enabled policing institutions to increasingly rely on interconnected technological systems that collect, process and analyse large volumes of personal data. As Lyon (2018) argues, surveillance has become deeply embedded within everyday governance structures, creating what is often described as a “surveillance society”. In this environment, digital policing extends beyond traditional law enforcement activities and becomes integrated into broader systems of governance, security and social regulation. The expansion of digital policing has accelerated in response to global security threats such as cybercrime, terrorism, transnational organised crime, misinformation, and political unrest. Governments frequently justify enhanced surveillance and data-driven policing as necessary responses

to these evolving threats. Nevertheless, critics argue that such practices often undermine constitutional protections, reinforce structural inequalities and disproportionately target marginalised communities (Zuboff, 2019). Concerns have also emerged regarding algorithmic bias, opaque decision-making systems and the growing influence of private technology corporations in public security governance.

This paper explores how digital technologies are transforming policing practices and examines the implications of these transformations for privacy, accountability and human rights. The study situates digital policing within broader debates concerning governance, securitisation and surveillance capitalism. The paper further evaluates the adequacy of existing legal and policy frameworks in regulating digital policing practices within democratic societies. The study contributes to existing literature in several ways. First, it reconceptualises digital policing as a form of networked governance involving state institutions, private technology actors and transnational regulatory mechanisms. Second, it highlights the limitations of fragmented legal frameworks in addressing the complexities of data-driven policing. Third, the paper advances a human rights centred approach to digital governance grounded in the principles of legality, necessity, proportionality, transparency and accountability.

LITERATURE REVIEW

Digital Policing and Technological Transformation

Digital policing refers to the use of advanced information and communication technologies in law enforcement activities, including surveillance, intelligence gathering, predictive policing, biometric identification and algorithmic decision-making (Manning, 2008). The integration of digital technologies into policing has transformed traditional law enforcement from reactive crime control to proactive risk management. Scholars argue that modern policing increasingly relies on datafication, where social behaviours, movements and interactions are converted into measurable data that can be monitored and analysed (van Dijck, 2014). Predictive policing systems, for example, use historical crime data and machine learning processes to identify individuals or areas considered “high risk”. Proponents argue that these technologies improve efficiency and resource allocation, while critics contend that they reproduce existing social inequalities and discriminatory policing patterns (Brayne, 2021; Eubanks, 2018; Ferguson, 2017).

Research conducted by Ferguson (2017) demonstrates that predictive policing systems often rely on historically biased crime data, resulting in the disproportionate targeting of poor and racialised communities. Similarly, Eubanks (2018) argues that automated governance systems frequently reinforce systemic inequalities by embedding historical biases within algorithmic infrastructures. On the other hand, some scholars maintain that digital technologies can improve policing effectiveness and accountability when implemented within appropriate legal and ethical frameworks. Brayne (2021) notes that digital technologies may enhance crime detection, investigative efficiency, and inter-agency cooperation. Body-worn cameras, for instance, have been promoted as tools for improving police transparency and reducing misconduct.

Surveillance, Privacy and Human Rights

The expansion of digital surveillance constitutes one of the most significant concerns associated with contemporary policing. Surveillance technologies now operate across physical and digital spaces through facial recognition systems, mobile phone tracking, social media monitoring and biometric databases. Foucault’s (1977) concept of disciplinary power remains influential in understanding modern surveillance systems. Foucault argued that surveillance functions as a mechanism of social control by shaping individual behaviour through the perception of constant observation. Contemporary scholars extend this argument by demonstrating how digital technologies intensify surveillance capacities beyond the physical limitations of traditional policing.

Lyon (2018) argues that digital surveillance has become normalised within modern societies and increasingly operates through automated systems that continuously monitor individuals. Similarly, Zuboff (2019) introduces the concept of “surveillance capitalism” to explain how personal data is commodified and exploited by both corporations and governments. The growth of digital surveillance raises serious human rights concerns, particularly regarding the rights to privacy, freedom of expression, freedom of association, and protection from discrimination. International

legal instruments such as the Universal Declaration of Human Rights (1948) and the International Covenant on Civil and Political Rights (1966) recognise privacy as a fundamental human right. Several studies support concerns regarding the discriminatory impact of surveillance technologies. Buolamwini and Gebru (2018) found that facial recognition systems demonstrate higher error rates when identifying women and people of colour, thereby increasing the risk of wrongful identification and discriminatory policing outcomes. However, some scholars argue that surveillance technologies can contribute positively to public safety when accompanied by strong accountability mechanisms. For example, Ratcliffe (2016) suggests that intelligence-led policing and digital surveillance can improve crime prevention strategies if subjected to democratic oversight and legal safeguards.

Governance and Accountability in Networked Societies

The governance of digital policing involves complex interactions between governments, technology corporations, regulatory bodies, and civil society organisations. Contemporary policing no longer operates solely through state institutions but increasingly depends on partnerships with private technology firms responsible for designing surveillance systems, cloud infrastructures, and algorithmic tools. Loader and Walker (2007) argue that security governance has shifted towards pluralised and networked forms of regulation involving both public and private actors. This transformation creates challenges regarding accountability, transparency, and democratic legitimacy. Research further indicates that many governments struggle to regulate rapidly evolving technologies effectively. Bennett and Raab (2020) observe that legal frameworks often lag behind technological developments, resulting in regulatory gaps that undermine data protection and accountability. Studies examining data protection frameworks such as the European Union's General Data Protection Regulation (GDPR) suggest that robust legal mechanisms can strengthen accountability and individual rights. Nonetheless, critics argue that enforcement remains inconsistent and insufficient in addressing transnational data flows and algorithmic governance (Kuner *et al.*, 2020).

THEORETICAL AND CONCEPTUAL FRAMEWORK

Governance Theory

This study is informed by governance theory, which emphasises the diffusion of power and authority across multiple institutional actors rather than exclusively within the state. Governance theory is particularly relevant in analysing digital policing because contemporary security practices increasingly involve collaborations between governments, private technology companies, intelligence agencies and transnational regulatory bodies. Rhodes (1997) conceptualises governance as networks of interdependent actors engaged in collective decision-making processes. Within digital policing, governance extends beyond conventional law enforcement structures to include algorithm developers, data brokers, telecommunications firms, and digital platform providers. The governance framework assists in understanding how digital policing operates as a sociotechnical system shaped by interactions between technological infrastructures, policy frameworks, and institutional interests. It also highlights the challenges associated with fragmented accountability structures where responsibility for rights violations becomes diffused across multiple actors.

Securitisation Theory

The study further draws on securitisation theory developed by the Copenhagen School. According to Buzan, Wæver and de Wilde (1998), securitisation occurs when political actors frame specific issues as existential threats requiring extraordinary measures. Digital policing technologies are frequently justified through securitisation narratives centred on terrorism, cybercrime, violent extremism, and public disorder. These narratives enable governments to expand surveillance powers and data collection practices in the name of national security. Securitisation theory assists in explaining how emergency-oriented security discourses normalise intrusive surveillance measures and reduce public resistance to digital monitoring practices. It further demonstrates how security narratives may weaken democratic accountability by prioritising state security over civil liberties.

Surveillance Capitalism and Datafication

The concept of surveillance capitalism developed by Zuboff (2019) provides an important analytical lens for examining the commodification of personal data within digital policing systems. Surveillance capitalism refers to the extraction and monetisation of behavioural data by corporations for predictive and commercial purposes. Digital policing increasingly relies on privately owned technologies and commercial data infrastructures, creating blurred boundaries between public security functions and corporate interests. Datafication processes transform human behaviour into measurable data that can be monitored, analysed, and monetised. This framework highlights the growing influence of commercial technology actors in shaping public security governance and raises concerns regarding democratic accountability, transparency, and data ownership.

Conceptual Framework

The conceptual framework of this study positions digital policing as a networked governance system operating through the intersection of technology, security, and regulation. The framework identifies four interconnected dimensions:

1. Technological Infrastructure – including artificial intelligence, biometric surveillance, predictive analytics, and digital data systems.
2. Security Governance – involving state institutions, private corporations, and transnational security actors.
3. Human Rights Protections – including privacy, freedom of expression, due process, and data protection rights.
4. Regulatory Mechanisms – consisting of legal frameworks, oversight institutions, and accountability systems.

The framework demonstrates how digital policing simultaneously advances security objectives while generating tensions regarding privacy, accountability, and democratic governance.

RESEARCH BACKGROUND

The digital transformation of policing has intensified over the past two decades due to rapid technological innovation and the increasing interconnectedness of societies. Following the September 11 attacks in the United States, governments across the world expanded surveillance powers and intelligence-sharing mechanisms to combat terrorism and transnational crime. Technological developments such as facial recognition systems, biometric databases, automated licence plate readers, drone surveillance and predictive policing software have become increasingly common within democratic states. Countries such as the United States, the United Kingdom, China, and South Africa have adopted various forms of digital policing technologies to improve public security management.

In South Africa, digital policing initiatives have expanded through the use of Closed-Circuit Television (CCTV) surveillance, cybercrime legislation, biometric identification systems and social media monitoring. The enactment of legislation such as the Cybercrimes Act 19 of 2020 and the Protection of Personal Information Act (POPIA) demonstrates attempts to regulate aspects of digital governance and data protection. However, concerns remain regarding the effectiveness of oversight mechanisms, the protection of privacy rights, and the potential abuse of surveillance technologies. Civil society organisations and legal scholars have raised concerns regarding unlawful interception practices, excessive state surveillance, and inadequate transparency in digital policing operations.

Globally, several controversies have intensified public debate regarding digital policing and human rights. Revelations by Edward Snowden regarding mass surveillance programmes conducted by the United States National Security Agency highlighted the scale of state surveillance activities and the involvement of private technology companies in data collection processes. Similarly, the use of facial recognition technologies by police agencies has generated significant criticism due to concerns regarding racial bias, misidentification, and disproportionate targeting of marginalised communities. Studies conducted in the United States and the United Kingdom found that facial recognition systems often produce inaccurate results, particularly for women and racial minorities (Buolamwini & Gebru, 2018). Despite these concerns, governments continue to invest heavily in digital policing technologies due to perceived security benefits and the growing complexity of modern crime environments. This creates an urgent need for critical scholarship examining how digital policing affects democratic governance and human rights protections.

RESEARCH METHODOLOGY

Research Design

This study adopted a qualitative research design to examine the relationship between digital policing, security governance, privacy and human rights. The qualitative approach was appropriate because the study sought to analyse legal, theoretical and policy oriented dimensions of digital policing rather than generate statistical measurements. The interdisciplinary nature of the study enabled the integration of insights from criminology, political science, law, sociology, and surveillance studies. This approach facilitated a comprehensive understanding of digital policing as a sociotechnical and governance phenomenon.

Data Collection

The study relied on secondary data obtained through a systematic review of academic literature, legal frameworks, policy documents, international treaties and institutional reports. Academic sources included peer-reviewed journal articles, books and scholarly reports examining surveillance technologies, digital governance, predictive policing and human rights. Legal documents analysed included international human rights instruments such as the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights, the European Union General Data Protection Regulation and relevant national legislation. Policy documents and institutional reports from organisations such as the United Nations, Amnesty International, Human Rights Watch and the European Commission were also examined.

Data Analysis

Data were analysed using thematic content analysis. This method enabled the identification of recurring themes and patterns relating to surveillance, governance, accountability, privacy, and human rights. The analysis focused on how digital policing technologies are justified within security discourses and how regulatory frameworks address associated risks and rights implications. Themes emerging from the analysis included:

- Algorithmic governance and automation;
- Expansion of surveillance infrastructures;
- Datafication and interoperability;
- Human rights concerns and discrimination;
- Regulatory fragmentation; and,
- Accountability and oversight challenges.

ETHICAL CONSIDERATIONS

As the study relied exclusively on publicly available secondary sources, no direct human participation was involved. Nevertheless, ethical considerations relating to academic integrity, objectivity and responsible interpretation of evidence were maintained throughout the research process.

FINDINGS AND DISCUSSION

The findings reveal that digital policing increasingly operates through interconnected technological systems characterised by automation, interoperability and continuous data extraction. These developments have transformed policing from reactive law enforcement into proactive risk management and predictive governance. One major finding is that algorithmic decision making systems often reproduce existing social inequalities. Predictive policing tools rely heavily on historical crime data, which may reflect discriminatory policing patterns. Consequently, communities that have historically experienced over policing are more likely to be identified as high risk areas, reinforcing cycles of surveillance and criminalisation. These findings align with Ferguson's (2017) argument that predictive policing systems can perpetuate structural inequalities. Similarly, Eubanks (2018) demonstrates that automated governance systems disproportionately disadvantage marginalised populations.

The study further found that biometric surveillance technologies such as facial recognition systems present significant risks to privacy and civil liberties. Concerns regarding inaccuracy, racial bias and mass surveillance were consistently identified across the literature. However, some studies challenge overly pessimistic perspectives regarding digital policing. Ratcliffe (2016) argues that intelligence-led policing can improve crime prevention and operational effectiveness when subjected to democratic oversight and legal safeguards. Similarly, Brayne (2021) suggests that data driven policing technologies may strengthen investigative efficiency and inter-agency coordination. The findings also reveal substantial weaknesses in current regulatory frameworks. Many legal systems struggle to regulate rapidly evolving technologies effectively, resulting in fragmented accountability structures and inconsistent enforcement mechanisms.

The study demonstrates that existing governance frameworks often fail to provide meaningful transparency regarding algorithmic decision making and data processing practices. This creates significant challenges for democratic accountability and public trust. Importantly, the findings indicate that private technology corporations play an increasingly influential role in shaping digital policing infrastructures. This raises concerns regarding the commercialisation of public security functions and the growing dependence of governments on proprietary technologies.

CONTRIBUTION TO EXISTING LITERATURE

This paper contributes to existing literature in several important ways. First, the study advances the conceptualisation of digital policing as a form of networked governance rather than merely a technological extension of traditional policing. Existing studies often focus narrowly on surveillance technologies or predictive policing tools in isolation. This paper instead demonstrates how digital policing operates through interconnected relationships between state institutions, private corporations and transnational governance structures. Second, the paper contributes to scholarship on surveillance and human rights by integrating governance theory, securitisation theory and surveillance capitalism into a unified analytical framework. This interdisciplinary approach provides a more comprehensive understanding of how security narratives, technological infrastructures, and economic interests intersect within contemporary policing systems. Third, the study highlights the limitations of fragmented regulatory frameworks in addressing the complexities of data driven policing. While existing literature frequently examines individual laws or technologies, this paper demonstrates the broader governance challenges created by rapidly evolving digital infrastructures. Fourth, the study contributes to policy debates by advancing a rights centred framework grounded in legality, necessity, proportionality, transparency and accountability. This framework provides practical guidance for policymakers seeking to balance security objectives with democratic protections. Finally, the paper contributes to African scholarship on digital governance by contextualising global debates within democratic and developing state environments such as South Africa, where digital policing technologies are expanding within contexts of structural inequality and institutional capacity challenges.

CONCLUSION

The digital transformation of policing has fundamentally altered the relationship between security, governance and human rights within networked societies. While digital technologies offer important opportunities for crime prevention, intelligence gathering and public safety management, they also create substantial risks related to privacy violations, discrimination, algorithmic bias and democratic accountability. This paper demonstrates that digital policing increasingly operates through networked governance structures involving state institutions, private corporations and transnational actors. These developments challenge traditional understandings of accountability and require more adaptive and rights-centred regulatory responses.

The findings reveal that existing legal and policy frameworks remain fragmented and often inadequate in addressing the complexities of algorithmic governance and mass data collection. The study further shows that marginalised communities are disproportionately affected by data driven policing practices, reinforcing concerns regarding structural inequality and over policing. To address these challenges, policymakers must strengthen democratic oversight mechanisms, improve transparency regarding algorithmic systems and ensure compliance with international human rights standards. Regulatory frameworks should prioritise principles of legality, necessity, proportionality, data minimisation, and public participation. Eventually, the future of digital policing will depend on the ability of democratic societies to balance legitimate security objectives with the protection of fundamental rights

and freedoms. Without meaningful accountability and oversight, digital policing risks entrenching surveillance practices that undermine democratic governance and social justice.

REFERENCES

- Bennett, C. J., & Raab, C. D. (2020). *The Governance of Privacy: Policy Instruments in Global Perspective* (2nd ed.). MIT Press.
- Brayne, S. (2021). *Predict and Surveil: Data, Discretion, and the Future of Policing*. Oxford University Press.
- Buolamwini, J., & Gebru, T. (2018). Gender shades: Intersectional accuracy disparities in commercial gender classification. *Proceedings of Machine Learning Research*, 81, 1–15.
- Buzan, B., Wæver, O., & de Wilde, J. (1998). *Security: A New Framework for Analysis*. Lynne Rienner Publishers.
- Eubanks, V. (2018). *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor*. St Martin's Press.
- Ferguson, A. G. (2017). *The Rise of Big Data Policing: Surveillance, Race, and the Future of Law Enforcement*. New York University Press.
- Foucault, M. (1977). *Discipline and Punish: The Birth of the Prison*. Pantheon Books.
- International Covenant on Civil and Political Rights. (1966).
- Kuner, C., Bygrave, L. A., & Docksey, C. (2020). *The EU General Data Protection Regulation (GDPR): A Commentary*. Oxford University Press.
- Loader, I., & Walker, N. (2007). *Civilizing Security*. Cambridge University Press.
- Lyon, D. (2018). *The Culture of Surveillance: Watching as a Way of Life*. Polity Press.
- Manning, P. K. (2008). *The Technology of Policing: Crime Mapping, Information Technology, and the Rationality of Crime Control*. New York University Press.
- Ratcliffe, J. H. (2016). *Intelligence-Led Policing* (2nd ed.). Routledge.
- Rhodes, R. A. W. (1997). *Understanding Governance: Policy Networks, Governance, Reflexivity and Accountability*. Open University Press.
- Universal Declaration of Human Rights. (1948).
- van Dijck, J. (2014). Datafication, dataism and dataveillance: Big data between scientific paradigm and ideology. *Surveillance & Society*, 12(2), 197–208.
- Zuboff, S. (2019). *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. PublicAffairs.

COMPARATIVE STUDY OF TRADITIONAL TIME SERIES MODELS AND MACHINE LEARNING ALGORITHMS FOR STOCK PRICE FORECASTING

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ABSTRACT

This study examines the effectiveness of traditional time series (TS) models and machine learning (ML) techniques in forecasting stock price movements within the South African financial market. Investors rely heavily on market data to form expectations about future price trends; however, the increasing volume, complexity, and nonlinearity of financial information continue to challenge the accuracy of conventional forecasting approaches. While models such as ARIMA and GARCH have been widely applied and provide useful baseline predictions, their limitations in capturing nonlinear patterns and asymmetric volatility reduce their predictive reliability in dynamic market conditions.

To address this, this study compares the forecasting performance of traditional econometric models with advanced ML algorithms using South African stock price data. The analysis demonstrates that ML-based approaches, particularly the ANFIS, outperform traditional models in terms of predictive accuracy. This superiority is attributed to their ability to model complex nonlinear relationships and adapt to irregular volatility structures inherent in financial time series.

The findings contribute to the growing body of literature by providing empirical evidence from an emerging market context, highlighting the practical advantages of ML-driven forecasting frameworks. From a managerial perspective, the results suggest that investors, portfolio managers, and financial analysts can enhance decision-making processes by integrating ML models into their forecasting strategies, thereby improving risk assessment and portfolio optimization in volatile environments.

Future research should extend this analysis across multiple firms and sectors, incorporate macroeconomic variables and market sentiment indicators, and explore hybrid modeling approaches that combine ANFIS with deep learning techniques. Such extensions may further improve forecasting robustness and provide deeper insights into the evolving dynamics of financial markets.

Keywords: ARIMA, ANFIS, GBM, GRNN.

INTRODUCTION

Volatility and trends are fundamental elements in understanding the underlying behavior of financial assets. Volatility reflects the degree of uncertainty or risk in asset returns, while trends describe the persistent directional movements of prices over time (Engle & Patton, 2007). Accurate modeling of both components is essential for investors, policymakers, and analysts, as it enables better decision-making in areas such as portfolio optimisation, risk

assessment, and derivative pricing (Tsay, 2010). Moreover, financial time series often exhibit both linear and nonlinear characteristics linear patterns may capture short-term dependencies and proportional relationships, whereas nonlinear dynamics account for asymmetric reactions, regime shifts, and complex market interactions (Dou et al., 2023; Dong & Zhou, 2024). Recognising and modeling this interplay between linearity and nonlinearity is crucial for effectively capturing, forecasting, and interpreting market behavior in environments characterised by uncertainty and rapid fluctuations

Stock prices serve as vital indicators of economic performance and investor confidence. They represent the collective assessment of a firm's value and are influenced by a diverse range of factors, including macroeconomic conditions, corporate fundamentals, global events, and market sentiment (Malkiel, 2019). The complex and nonlinear nature of these interactions causes stock price movements to exhibit distinctive patterns such as volatility clustering, asymmetry, and sudden structural breaks that challenge conventional modeling techniques (Cont, 2001). Consequently, developing accurate and adaptive forecasting models remains one of the most significant challenges in financial econometrics and computational finance.

Traditional statistical models such as the Autoregressive Integrated Moving Average (ARIMA) have been extensively employed for time series forecasting because of their structured approach and interpretability (Box et al., 2016). ARIMA effectively captures linear dependencies and long-term trends; however, it often falls short in representing nonlinear and heteroskedastic behaviors characteristic of financial data. To address volatility dynamics, researchers have developed extensions from the Generalised Autoregressive Conditional Heteroskedasticity (GARCH) family particularly the Threshold GARCH (TGARCH) and Exponential GARCH (EGARCH) models which are designed to capture asymmetric volatility responses and leverage effects (Bollerslev, 1986; Nelson, 1991; Zakoian, 1994). These models provide a more refined understanding of market risk by quantifying the impact of positive and negative shocks on volatility.

Nevertheless, traditional statistical models such as ARIMA, TGARCH, and EGARCH rely on predetermined functional forms and distributional assumptions, which may limit their flexibility in capturing complex, nonlinear relationships inherent in modern financial data. In contrast, recent advancements in machine learning (ML) have introduced more adaptable and data-driven techniques. Models such as the Generalised Regression Neural Network (GRNN), Adaptive Neuro-Fuzzy Inference System (ANFIS), and Gradient Boosting Model (GBM) offer enhanced capabilities for recognizing hidden patterns and nonlinear dependencies within financial time series (Specht, 1991; Jang, 1993; Friedman, 2001). These methods can learn directly from historical data, reducing the need for strict assumptions and improving predictive accuracy under volatile or nonstationary conditions.

This study aims to conduct a comprehensive comparison of six forecasting approaches ARIMA, TGARCH, EGARCH, GRNN, ANFIS, and GBM in predicting stock price movements. By evaluating their performance under varying market conditions, the study seeks to identify the strengths and weaknesses of each model in handling linearity, nonlinearity, and volatility. The findings are expected to contribute to a better understanding of how traditional econometric and modern ML models perform in stock price forecasting, ultimately providing valuable insights for investors, traders, and financial analysts seeking more robust predictive tools.

The study is structured into five main sections. Section 2 covers the literature review, while Section 3 outlines the research methodology. Section 4 presents the discussion of the results, and Section 5 provides the conclusion of the study.

LITERATURE REVIEW

Kim & Parnichkun (2017) evaluated GRNN, ANFIS, and MLP for predicting real-time coagulant dosage across varying turbidity levels. They discovered MLP achieved highest overall accuracy, especially for high turbidity; ANFIS produced consistent, robust performance in low turbidity zones; and GRNN showed strong accuracy only in extreme high-turbidity conditions, indicating a niche strength in edge cases.

Dwivedi & Surana (2024) employed GARCH, TGARCH, and EGARCH models to model the volatility dynamics of Bitcoin, Litecoin, Ethereum, and XRP. The objective was to examine how past shocks and volatility affect current returns and exploring asymmetries in their volatility behavior. The results indicated that Bitcoin shows

minimal influence from past volatility and lacks significant asymmetry, while Litecoin exhibits a strong sensitivity to negative shocks, as highlighted by the TGARCH model. Ethereum demonstrates complex volatility patterns with significant negative impacts from past values, particularly under the EGARCH model. XRP, although displayed some influence from past volatility, is less reactive to market fluctuations compared to the other cryptocurrencies. The findings underscored the heterogeneous nature of cryptocurrency volatility, suggesting the need for tailored risk management strategies for investors and contributing valuable insights to the literature on financial market volatility.

Ondo & Owolawi (2025) compared GRNN, ANFIS, CFNN, and FFNN, using Particle Swarm Optimization (PSO), for forecasting photovoltaic (PV) output current in South Africa. The models were evaluated using hourly irradiance and temperature data collected in 2023 from several locations in South Africa. The study found that all models demonstrated improved accuracy when optimized with PSO, indicating their effectiveness in forecasting PV output current.

Cheruiyot et al. (2024) analysed inflation in Kenya from 1960 to 2017 using annual time series data and employed both ARIMA and GARCH approaches. The study identified the ARIMA (2, 2, 1) and ARIMA (1, 2, 0) models, along with the GARCH (1, 1) model, based on minimum AIC and Theil's U criteria. Diagnostic tests reveal that the Consumer Price Index (CPI) series is integrated of order 2 (I (2)), with stationary residuals for both ARIMA models, indicating their stability. The results suggest a continued rise in annual inflation in Kenya, leading to three significant policy implications aimed at helping policymakers restore and maintain price stability in the country.

Srihari (2024) forecasted stock prices and analysed return volatility for India's top three socially responsible companies using ARIMA and GARCH models. The study employed monthly and daily closing stock price data from Yahoo Finance, covering the period from August 1, 2012, to July 29, 2022. The results indicated that the ARIMA (9, 1, 9) model is suitable for HDFC Ltd, ARIMA (10, 1, 7) for Reliance Industries Ltd, and ARIMA (2, 1, 2) for ICICI Bank Ltd. The forecasts for July 2023 predict stock prices of INR 2,613.78 for HDFC Ltd, INR 3,073.75 for Reliance Industries Ltd, and INR 857.73 for ICICI Bank Ltd. Furthermore, Reliance Industries Ltd is the least volatile $\sigma^2 = 0.9270$ while HDFC Ltd is the most volatile $\sigma^2 = 0.9665$, with ICICI Bank Ltd being moderately volatile $\sigma^2 = 0.9507$. The findings of this research concluded that GARCH models, particularly the GARCH (1,1) model, provide more accurate estimates for volatility forecasting.

Salehi (2024) employed GBMs, including XGBoost and LightGBM, with an ANFIS to forecast cryptocurrency price volatility. The aim was to improve forecasting accuracy by leveraging ensemble models alongside fuzzy inference systems. The results showed that the ANFIS-GBM hybrid approach outperformed other methods, providing more reliable volatility predictions. Chen & Wang (2019) focused on Chinese stock market data to compare GRNN and ANFIS models in stock price forecasting. Both models showed good predictive capability, but GRNN demonstrated slightly better generalisation on unseen data, while ANFIS offered clearer interpretability of the relationships among variables.

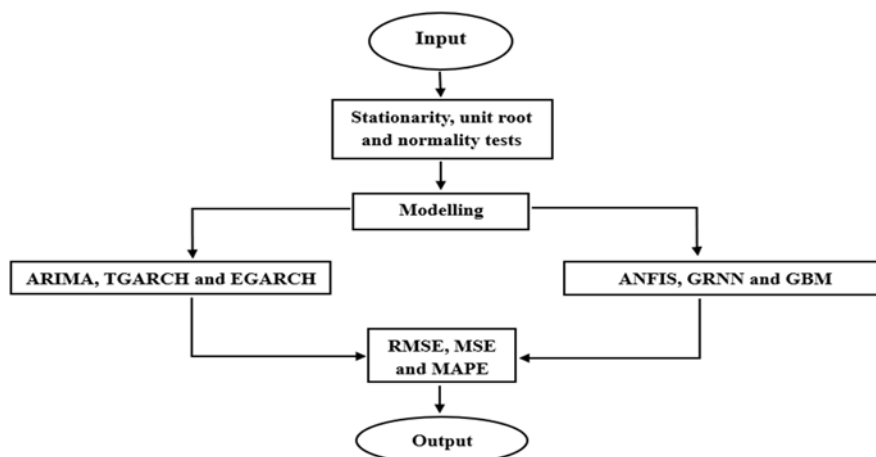
Huang et al. (2022) explored Feed-forward Neural Network (FNN), Random Forest (RF), and ANFIS using 22 years of quarterly Stock financial data. The goal was to determine how well these models can support investment decision-making. The study also incorporated feature selection using the Random Forest algorithm and employed bootstrap aggregation to enhance prediction performance. The findings revealed that the RF model delivered the most accurate results, while feature selection significantly improved the performance of both FNN and ANFIS. Moreover, the ensemble approach outperformed all individual models as well as the benchmark Dow Jones Industrial Average (DJIA) over the test period, highlighting the potential of machine learning in supporting fundamental investment strategies.

Lastly, Lee & Kim (2021) studied the Korean stock market using GBM to forecast stock price movements. The analysis compared GBM against traditional linear statistical models and neural networks with varying architectures. The results indicated that GBM significantly outperformed both the traditional models and neural networks in prediction accuracy by effectively capturing nonlinear relationships within the financial time series data. GBM implemented as a median-regression model achieved a 2.89% average monthly hedged return (equivalent to 34.68% annually) with a Sharpe ratio of 0.93, demonstrating its strong predictive capability and portfolio performance compared to the competing models.

RESEARCH METHODOLOGY

The study uses quantitative and secondary data. The daily time series data of Nedbank closing stock price from the period 2nd January 2020 to 4th April 2025 is observed, comprising 1316 observations sourced from (<https://expert.iress.co.za/>). The data is also publicly available on the Johannesburg Stock Exchange (<https://www.jse.co.za/indices>). The choice of data range was solely based on the availability of the data from the source. The study will use R version 3.6.1 and Python as programming languages. Figure 1 summarises the research methodology of the study.

Figure 1: Research Methodology flow chart.



Testing for Data Characteristics

Understanding data characteristics is essential for choosing appropriate analytical methods. Therefore, this study utilises the Autocorrelation Function (ACF) and Partial Autocorrelation Function (PACF) to assess stationarity. The Kolmogorov-Smirnov (KS) test is applied to evaluate normality, the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, are employed to examine the presence of unit roots in the data

Autocorrelation Function (ACF)

The ACF was first introduced by Yule (1907) as a measure of the correlation (or linear relationship) between a time series and its lagged values. In other words, it quantifies how a value at time t relates to values at earlier times, such as $t - 1$, $t - 2$. The ACF is used to identify patterns in the data that repeat over time, and it can indicate if a time series exhibits a seasonal pattern or other time-dependent relationships (Galton, 1877). For a given lag k , the autocorrelation is computed as:

$$\rho_k = \frac{\sum_{t=1}^{n-k} (y_t - \bar{y})(y_{t+k} - \bar{y})}{\sum_{t=1}^n (y_t - \bar{y})^2} \quad (1)$$

where y_t is the stock price at time t , $\bar{y}$ is the mean of the stock price and k is the lag. At lag k : The correlation between the stock price and its lagged version at lag k is denoted as ρ_k , where k is the number of periods between the current and lagged observations.

Partial Autocorrelation Function (PACF)

The concept of the PACF was formalized by Yule (1927), building upon earlier work on autocorrelation and regression models. However, the PACF itself, as a distinct concept in time series analysis, was more formally developed within the context of modern statistical models, particularly by (Kolmogorov, 1933; Wiener, 1949; Galton, 1888; Markov,

1906 and Brockwell & Davis, 2002) who contributed to the development of ARMA models and modern time series methods. The PACF can be defined as:

$$\phi_{kk} = \text{Corr}(Y_t, Y_{t-k} \mid Y_{t-1}, Y_{t-2}, \dots, Y_{t-(k-1)}) \quad (2)$$

where Y_t is the current value of the stock price, Y_{t-k} is the value of the stock price at lag k , $\text{Corr}(Y_t, Y_{t-k})$ is the raw correlation between Y_t and Y_{t-k} , $Y_{t-1}, Y_{t-2}, \dots, Y_{t-(k-1)}$ is the intervening time point and ϕ_{kk} is the partial correlation between Y_t and Y_{t-k} after adjusting for the intervening lags.

Normality

The concept of normality has its origins, but Gauss (1809) is typically credited with its formal introduction, especially in relation to statistical theory. To assess the normality of the data in the present study, the Shapiro & Wilk (1965) test is employed. This test is specifically designed to evaluate whether a given sample originates from a normally distributed population.

H_0 : The sample follows the normal distribution.

H_1 : The sample does not follow the normal distribution.

The expression for this test is formulated as:

$$W = \frac{(\sum_{i=1}^n a_i x_{(i)})^2}{\sum_{i=1}^n (x_i - \bar{x})^2} \quad (3)$$

where $x_{(i)}$ are the ordered sample values, $\bar{x}$ is the sample mean, a_i are constraints derived from the expected values of order statistics of a standard normal distribution. N is the sample size. If the resulting p-value is less than the chosen significance level (e.g., 0.05), the null hypothesis of normality is rejected, suggesting the data do not follow a normal distribution.

Unit Root

The detection and understanding of unit roots are fundamental to accurate time series modeling and forecasting, particularly in fields such as economics and finance where long-term relationships and the persistence of shocks play a key role (Dickey & Fuller, 1979; Phillips & Perron, 1988). The study employed Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests to examine the presence of unit root.

Augmented Dickey Fuller (ADF) Test

The ADF test is an extension of the Dickey-Fuller (DF) test and accounts for more complex autoregressive processes by including lagged differences of the dependent variable. This adjustment makes the ADF test more robust, especially in the presence of serial correlation, which is common in time series data (Dickey & Fuller, 1979). The hypothesis is:

H_0 : The time series has a unit root.

H_1 : The time series does not have a unit root.

The formulation is expressed as:

$$\Delta y_t = \alpha + \beta_t + \gamma y_{t-1} + \sum_{i=1}^p \delta_i \Delta y_{t-i} + \varepsilon_t \quad (4)$$

where y_t is the stock price at time t . $\Delta y_t (y_t - y_{t-1})$ is the first difference of the stock price. α is the constant. β_t represents a deterministic trend, γ is the coefficient on the lagged value y_{t-1} (which test for unit root). δ_i are the coefficients of the lagged difference terms Δy_{t-i} for $i = 1, 2, \dots, p$ where p is the number of lags. ε_t is the error term. $H_0: \gamma = 0$ would suggest that the stock price has a unit root. If the test statistic for γ is significantly negative, the study rejects H_0 and concludes that the stock price does not have a unit root.

Estimation Techniques

This study employs six models, namely, ARIMA, TGARCH, EGARCH, GRNN, ANFIS and GBM to assess their effectiveness in financial time series analysis. Each model is discussed in detail in the following subsections.

ARIMA Model

The ARIMA model was introduced by Box & Jenkins (1970). It is particularly useful for conditions where the data is non-stationary, meaning it has trends, cycles, or other patterns that change over time. ARIMA helps make predictions about future values based on the past values and errors in the data. The general equation for the ARIMA model is:

$$y_t = \alpha + \sum_{i=1}^p \phi_i y_{t-i} + \sum_{j=1}^q \theta_j \epsilon_{t-j} + \epsilon_t \quad (5)$$

where y_t is the value of the stock price at time t . α is the intercept, ϕ_i is the coefficient for the autoregressive (AR) terms and θ_j is the coefficient for moving average (MA) terms while p is the number of AR lags; q is the number of MA lags, ϵ_t is the error term. $\sum_{i=1}^p \phi_i y_{t-i}$ are how past value influences the current value and $\sum_{j=1}^q \theta_j y_{t-j}$ is how past errors influence the current value.

TGARCH model

The TGARCH model was introduced by Bollerslev (1986). It was an extension of the Autoregressive Conditional Heteroskedasticity (ARCH) model, which had been introduced by Engle (1982). The TGARCH model is an extension of the standard GARCH model that allows for asymmetries in volatility. Specifically, the TGARCH model differentiates the effect of positive and negative shocks on future volatility, capturing the phenomenon where negative returns (bad news) tend to have a larger impact on volatility than positive returns (good news). The TGARCH model has two equations. The conditional mean for return is computed using:

$$r_t = \mu + \epsilon_t \quad (6)$$

where r_t is the return at time t , μ is the mean of the return and ϵ_t is error term at time t . The second equation is a conditional variance for volatility given as:

$$\sigma_t^2 = \alpha_0 + \alpha_1 \epsilon_{t-1}^2 + \gamma_1 I(\epsilon_{t-1} < 0) \epsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2 \quad (7)$$

where σ_t^2 is the conditional variance at time t , α_0 is a constant term, α_1 is the coefficient for the squared lagged residual (ϵ_{t-1}^2), capturing the impact of previous shocks on current volatility, β_1 is the coefficient for the lagged conditional variance (σ_{t-1}^2), capturing the persistence of past volatility, γ_1 is the threshold parameter that measures the asymmetry in volatility response and $I(\epsilon_{t-1} < 0) \epsilon_{t-1}^2$ is an indicator function which takes the value 1 when the previous shocks ϵ_{t-1} is negative (bad news) and 0 otherwise (good news).

EGARCH model

The EGARCH model, introduced by Engle & Ng (1993), is another extension of the GARCH family that model's volatility in a way that captures asymmetric effects (leverage effects) and allows for conditional variances that are always positive without imposing any restrictions on the parameters. Contrasting the GARCH and TGARCH models, the EGARCH model is logarithmic in form, meaning that the conditional variance is modeled as a log function of past returns and past volatilities. The EGARCH equation can be expressed as:

$$\ln(\sigma_t^2) = c_0 + \alpha_1 \left(\frac{\epsilon_{t-1}}{\sigma_{t-1}} \right) + \beta_1 \ln(\sigma_{t-1}^2) \quad (8)$$

where σ_t^2 is the conditional variance for volatility at time t , $\ln \sigma_t^2$ is the log of the conditional variance which ensures that the conditional variance is always positive, c_0 is a constant term, α_1 is the coefficient for the standardized innovation $\left(\frac{\epsilon_{t-1}}{\sigma_{t-1}} \right)$, β_1 is the coefficient for the lagged log-variance $\ln(\sigma_{t-1}^2)$.

GRNN model

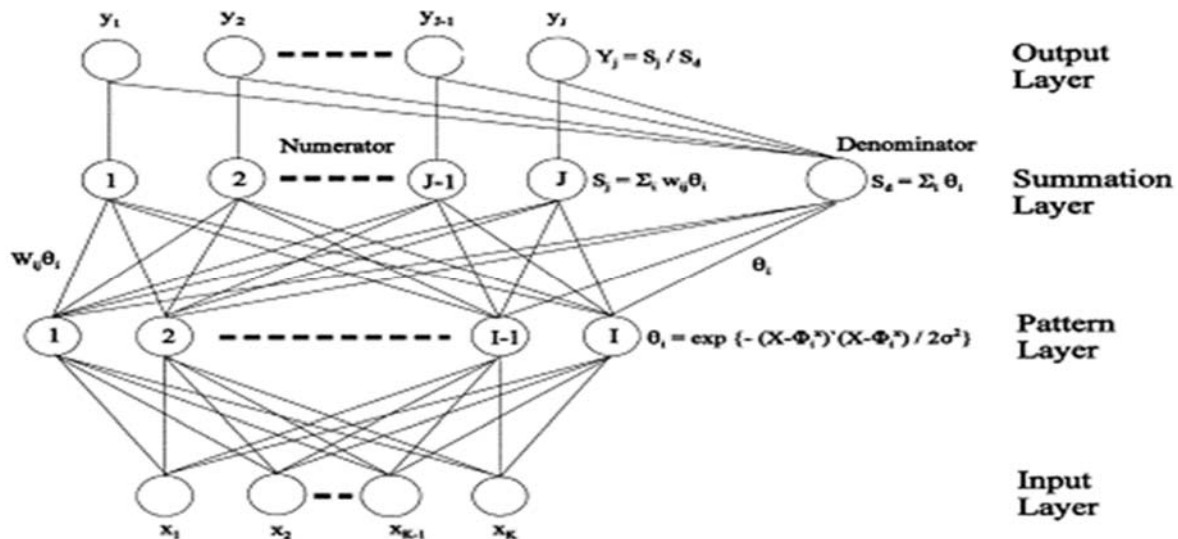
The GRNN is a type of neural network introduced by Specht (1991) as an extension of the Probabilistic Neural Network (PNN) to perform regression rather than classification. It is a memory-based, non-parametric model used primarily for function approximation tasks. GRNN operates on the principle of kernel regression, where the predicted output for a given input is computed as a weighted average of observed outputs, with the weights determined by a Gaussian kernel function centered at each training point. The GRNN can be written as:

$$\hat{y}(x) = \frac{\sum_{i=1}^N y_i \exp\left(-\frac{\|x-x_i\|^2}{2\sigma^2}\right)}{\sum_{i=1}^N \exp\left(-\frac{\|x-x_i\|^2}{2\sigma^2}\right)} \quad (9)$$

where $\hat{y}(x)$ is the predicted output for the new input vector x . y_i is the known (target value) corresponding to the i th training sample x_i , x_i is the i th input vector in the training dataset. $\|x - x_i\|^2$ is the squared Euclidean distance between the input x and training sample x_i . This measure how “close” the new input is to each training point. $\exp\left(-\frac{\|x-x_i\|^2}{2\sigma^2}\right)$ is the gauss kernel function that converts the distance into a weight, the closer x is to x_i , the higher the weight will be. σ is the smoothing parameter that control the width of the gaussian kernel, a small σ makes the network more sensitive.

Figure 2 shows the GRNN design’s schematic drawing and the explained operational logic. Martínez et al. (2021) It should be emphasized that any model with multivariate/univariate outputs can use the network construct that is shown.

Figure 2: GRNN Architecture (Adapted from Martínez et al. (2021:7)).



GBM

GBM was introduced by Friedman (2001). The GBM is an iterative machine learning technique that builds an additive model by combining weak learners typically decision trees to minimize a given loss function. The process begins by initialising the model with a constant prediction that minimises the total loss across all training examples:

$$F_0(x) = \arg \min_{\gamma} \sum_{i=1}^n L(y_i, \gamma) \quad (10)$$

At each iteration m , the algorithm computes the negative gradient of the loss function with respect to the current models output this is known as the pseudo-residual and is given by:

$$r_{im} = -\left[\frac{\partial L(y_i, F(x_i))}{\partial F(x_i)}\right]_{f(x)=F_{m-1}(x)} \quad (11)$$

where a new weak learner $h_m(x)$ is then trained to predict these residuals. Once this model is trained, the algorithm calculates an optimal step size γ_m by solving equation (10) and (11) as:

$$\gamma_m = \arg \min_{\gamma} \sum_{i=1}^n L(y_i, F_{m-1}(x_i) + \gamma h_m(x_i)) \quad (12)$$

which determines how much of the new learner should be added to the model. The model is then updated by adding the scaled learner to the current model as:

$$F_m(x) = F_{m-1}(x) + \nu \cdot \gamma_m h_m(x) \quad (13)$$

where ν is the learning rate that controls the contribution of each weak learner. This process is repeated for M iterations, and the final model is the sum of the initial prediction and all subsequent updates:

$$F_M(x) = F_0(x) + \sum_{m=1}^M \nu \cdot \gamma_m h_m(x) \quad (14)$$

ANFIS Model

An ANFIS, was developed by Jang (1993). The working procedure of the ANFIS controller consists of two main stages: first, an initial fuzzy system is produced, establishing the framework for subsequent operations. Secondly, training methods are utilised to adjust the parameters of this fuzzy system through iterative training. These parameters are converged to minimise the error rate, ultimately aiming for zero error. To streamline the descriptions, the study considers a fuzzy inference system with two inputs (x and y) and one output (z). For a first order Sugeno fuzzy model, a standard rule set comprising base fuzzy *if – then* rules can be articulated as follows:

$$w_i = \mu_{A_i}(x) + \mu_{B_i}(y), \quad (15)$$

$$\bar{w}_i = \frac{w_i}{w_1 + w_2}, i = 1, 2. \quad (16)$$

Rule 1:

if x is A_1 and y is B_1 , then $f_1 = p_1x + q_1y + r_1$,

Rule 2:

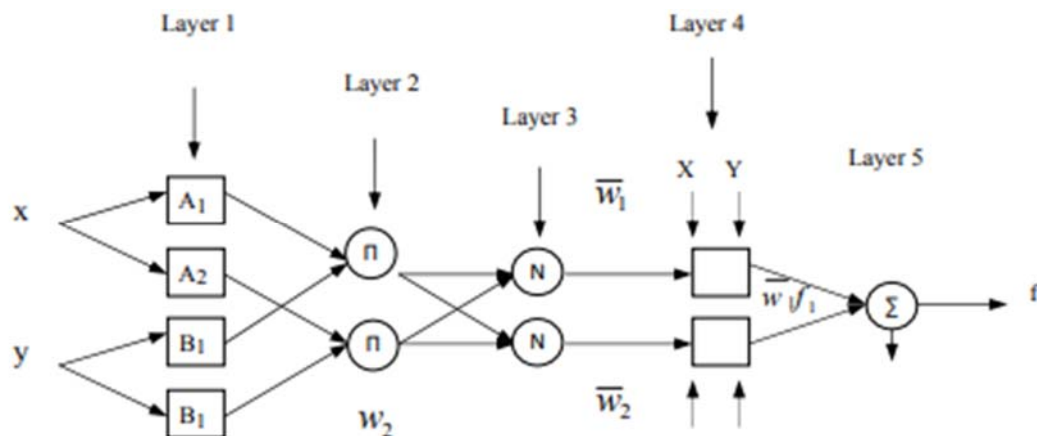
if x is A_2 and y is B_2 , then $f_2 = p_2x + q_2y + r_2$,

Then:

$$\text{output} = \frac{w_1 \cdot f_1 + w_2 \cdot f_2}{w_1 + w_2} = \bar{w}_1 f_1 + \bar{w}_2 f_2 \quad (17)$$

where x is the input to node i , $\mu_{A_i}(x)$ is the membership functions of A_i , A_i is the linguistic label associated with node functions, w_i is the firing strength of the i^{th} rule, $\bar{w}_i$ is the ratio of the i^{th} rule firing strength to the sum of all rules firing strength, (p_i, q_i, r_i) is the parameter set and f_i is the consequent value. Figure 3 presents the architecture of the ANFIS.

Figure 3: ANFIS Architecture (Adapted from Babuška & Verbruggen (2003:3)).



Model Performance Evaluation

The current study employs root mean squared error (RMSE), mean squared error (MSE) and mean absolute percentage error (MAPE) to gauge the performance of the models. The RMSE gives a sense of how far the predicted values are from the actual values on average. The MSE quantifies the average of the squared differences between the predicted values and the actual value. MAPE measures the accuracy of predictions as a percentage of the actual values. The expressions of the three evaluation measures are as follows respectively:

$$RMSE = \sqrt{\frac{1}{n} \sum_{t=1}^n (y_t - \hat{y}_t)^2} \quad (18)$$

$$MSE = \frac{1}{n} \sum_{t=1}^n (y_t - \hat{y}_t)^2 \quad (19)$$

$$MAPE = \frac{1}{n} \sum_{t=1}^n \left(\frac{|y_t - \hat{y}_t|}{y_t} \right) * 100 \quad (20)$$

where y_t is the actual value at time t , $\hat{y}_t$ is the predicted value at time t , n is the total number of observations, $|y_t - \hat{y}_t|$ is the absolute error and $\frac{|y_t - \hat{y}_t|}{y_t}$ is the percentage error.

RESULTS AND DISCUSSION

This section of the study presents the findings from the data analysis and provides a discussion of the results. Table 1 displays the descriptive statistics, which summarise and explain the dataset used in the study.

Table 1: Descriptive Statistics for the Nedbank Closing Stock prices.

Data: Nedbank Closing stock Prices	Descriptive Statistics
Mean	19736.9453
Median	20905.5000
Maximum	30815
Minimum	7320
Standard deviation	151.0618
Skewness	-0.2182
Kurtosis	-0.5333
Observation	1316

Table 1 presents the descriptive statistics of the Nedbank closing stock prices. The data reveal a minimum value of 7320 Rand and a maximum of 30815 Rand. The mean closing price is 19736.9453 Rand, which is lower than the median value of 20905.5000 Rand. This indicates a negatively skewed distribution, suggesting that lower stock prices occurred more frequently or were more extreme, thereby pulling the mean below the median. Additionally, the kurtosis value is below 3, signifying a platykurtic distribution. This implies that the price distribution is relatively flat and exhibits lighter tails than a normal distribution, with fewer extreme deviations from the mean. A graphical representation of the actual data is shown in Figure 4.

Figure 4 shows the daily closing stock prices of Nedbank from 02/01/2020 to 04/04/2025, revealing key trends and fluctuations throughout the observed period. A gradual decline is evident during the mid-2020 to 2021 period, reflecting a sustained downward movement. Also, a sharp upward shift is observed beginning in mid-2023 through 2024, indicating a significant surge in stock prices. This increase is followed by a period of relative stabilisation, which eventually gives way to a downward trend in the latter half of 2024 and continuing into 2025. The data exhibit clear signs of non-stationarity characterised by changing means and evolving trends over time. Moreover, considerable volatility is present throughout the entire period, as reflected by pronounced fluctuations in stock prices. The first differenced dataset is presented in Figure 5.

Figure 4: Graphical representation of the actual data.

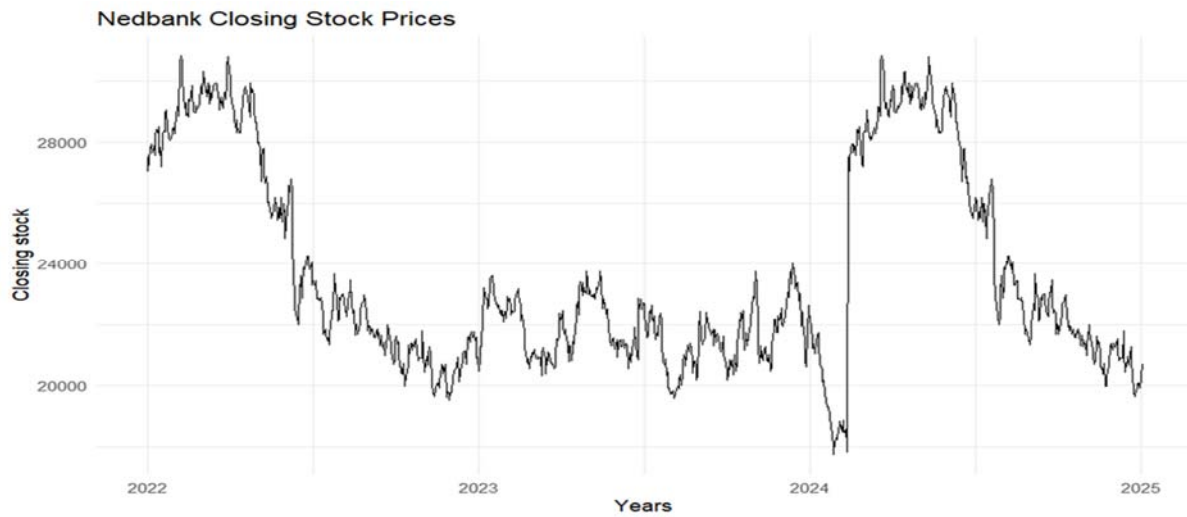


Figure 5: First difference of Nedbank closing stock prices.

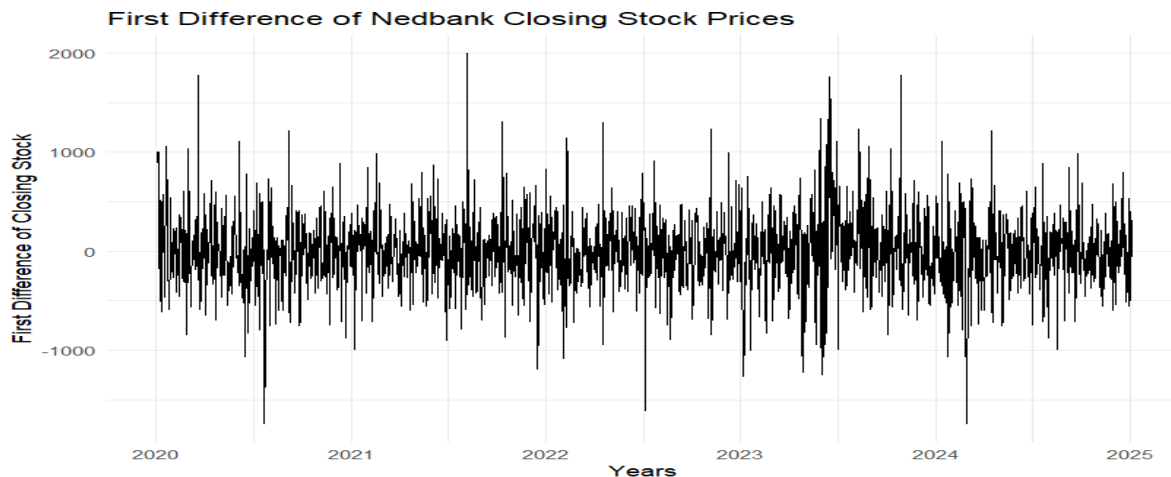


Figure 5 demonstrates the first differencing of the dataset is stationary, with values revolving around a zero mean. The variance also becomes stable, indicating consistency over time. Following this, Figure 6 presents the Autocorrelation Function (ACF) and Partial Autocorrelation Function (PACF) plots of the first-differenced series.

After applying the first differenced to the data, the ACF and PACF plots show that most of the spikes fall within the confidence interval, indicating that the Nedbank closing stock is stationary. The closing stock series was then tested for normality, and the results are presented in Table 2

Figure 6: ACF and PACF of the first differenced Nedbank closing stock price.

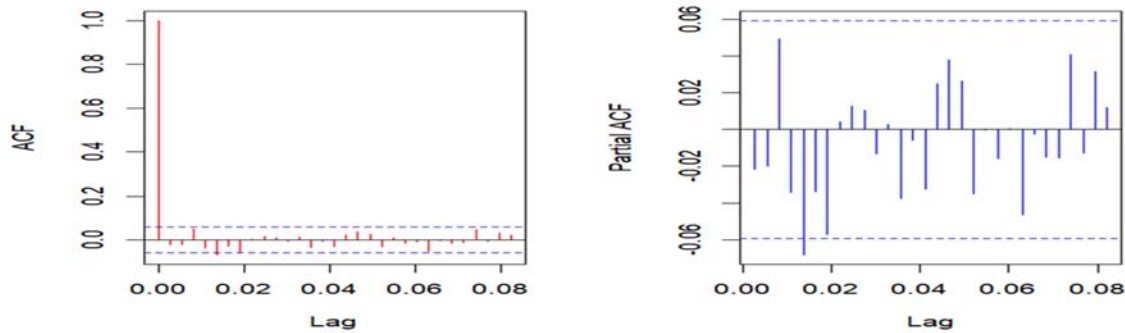


Table 2: Normality test results for original and 1st difference dataset.

NORMALITY TESTS	VARIABLE	VALUE	P-VALUE
SHAPIRO-WILK	Ned_OR	$W = 0.9478$	0.0000
	Ned_1 st _Diff	$W = 0.9995$	0.9299

Note: Ned_OR = original data and Ned_1st_Diff = 1st difference dataset

Table 2 displays the results of normality tests for the original data (Ned_OR) and its first difference (Ned_1st_Diff). The Shapiro-Wilk test for Ned_OR shows a SW statistic of 0.9478 with a p-value of 0.0000, which indicates that the study rejects the null hypothesis. In contrast, the Shapiro-Wilk test for Ned_1st_Diff resulted in a SW statistic of 0.9995 and a p-value of 0.9299, which is greater than the 0.05 threshold, meaning the study fails to reject the null hypothesis and accept that the first difference data is normally distributed. Table 3 summarizes the results of the formal unit root test.

Table 3: Unit root test results on the original and 1st difference dataset.

STATIONARITY TEST	VARIABLE	LEVEL OF SIGNIFICANCE	P-VALUE
ADF TEST	Ned_OR	1%, 5% and 10%	0.7611
	Ned_1 st _Diff		0.0000***

Note: Significance code: 0 '***' and 0.001 '**'

Ned_OR = original data and Ned_1st_Diff = 1st difference dataset

Table 3 shows that the variable Ned_1st_diff becomes stationary after taking the first difference. This conclusion is based on the test statistics, which are lower than the critical values at the significance levels. Additionally, the p-value is very small, confirming strong evidence to reject the null hypothesis that a unit root is present. This means the series does not follow a random walk and is now suitable for time series modelling. To improve processing performance in a variety of data-intensive applications as proposed by Picard & Berk, (1990), the current study split 70% of data into training set and 30% of data into testing set as depicted in Table 4.

Table 4: Data Splitting.

Models	Series	Training set	Testing set
ARIMA, TGARCH, EGARCH, GRNN, GBM and ANFIS	2020/02/01 – 2025/04/04	(70% OF DATA) 921	(30% OF DATA) 395

This section outlines the model estimation process, which includes the testing and training of both traditional TS and ML models in the study.

Table 5: Competing ARIMA models.

Model	Lags	Estimate	Standard error	AIC
ARIMA(1, 1, 1)	AR (1)	0.0654	0.0234	18876.08
	MA(1)	-1.0000	0.0026	
ARIMA(2, 1, 1)	AR(2)	0.0151	0.0235	18877.83
	MA(1)	-1.0000	0.0025	
ARIMA(3, 1, 1)	AR(3)	0.0505	0.0235	18877.47
	MA(1)	-1.0000	0.0024	
ARIMA(4, 1, 1)	AR(4)	-0.0461	0.0235	18877.53
	MA(1)	-1.0000	0.0025	
ARIMA(5, 1, 1)	AR(5)	-0.0100	0.0235	18879.51
	MA(1)	-1.0000	0.0026	

Table 5 presents the three competing ARIMA models. Among them, ARIMA (1,1,1) is selected as the best-fitting model, as it has the lowest AIC value, indicating a superior fit to the data compared to the other models. To model the volatility, the study employed the GARCH-type models. The results of the TGARCH model are presented in Table 6.

Table 6: Results of the TGARCH (1,1) parameters estimate.

Parameters	Estimate	Std. error	t-statistics	P-value
Mu	8.425	8.370	-1.007	0.314
Omega	24.982	7020.800	3.558	0.000***
Alpha1	0.111	0.026	4.252	0.000***
Beta1	0.722	0.069	10.345	0.000***
Gamma1	-0.035	0.028	-1.252	0.211
AIC	-5.608			

Note: “***” denotes significant level at 0.05

According to the results in Table 6, the μ is not statistically significant, suggesting no strong baseline level in the series. Omega, Alpha1, and Beta1 are all highly significant, indicating that both long-run variance and past shocks play an important role in shaping current volatility, with strong persistence over time. Gamma1, however, is not significant, providing little evidence of asymmetric effects in the volatility process. The AIC value of -5.6079 signals a relatively good fit. The parameter estimate results of EGARCH are summarized in Table 7.

Table 7: Results of the EGARCH (1,1) parameters estimate.

Parameters	Estimate	Std. error	t-statistics	P-value
Mu	7.453	0.004	1980.773	0.000***
Omega	0.075	0.016	4.714	0.000***
Alpha1	0.310	0.011	27.204	0.000***
Beta1	0.992	0.003	322.275	0.000***
Gamma1	0.392	0.022	18.045	0.000***
AIC	-5.196			

Note: “***” denotes significant level at 0.05

Table 7 indicates that every parameter in the model is statistically significant at the 5% level. The positive estimate of Omega reflects the underlying volatility level. Alpha1, being positive, shows that past shocks have a direct effect on current volatility, while the large and positive Beta1 highlights strong persistence in volatility dynamics. Gamma1’s positive sign suggests that volatility responds more intensely to unfavorable shocks than favorable ones, capturing leverage effects. The AIC value of -5.196 signals a relatively strong model fit, supporting the suitability of the EGARCH specification. The results of the GRNN architecture are presented in Figure 7.

Figure 7: GRNN architecture.

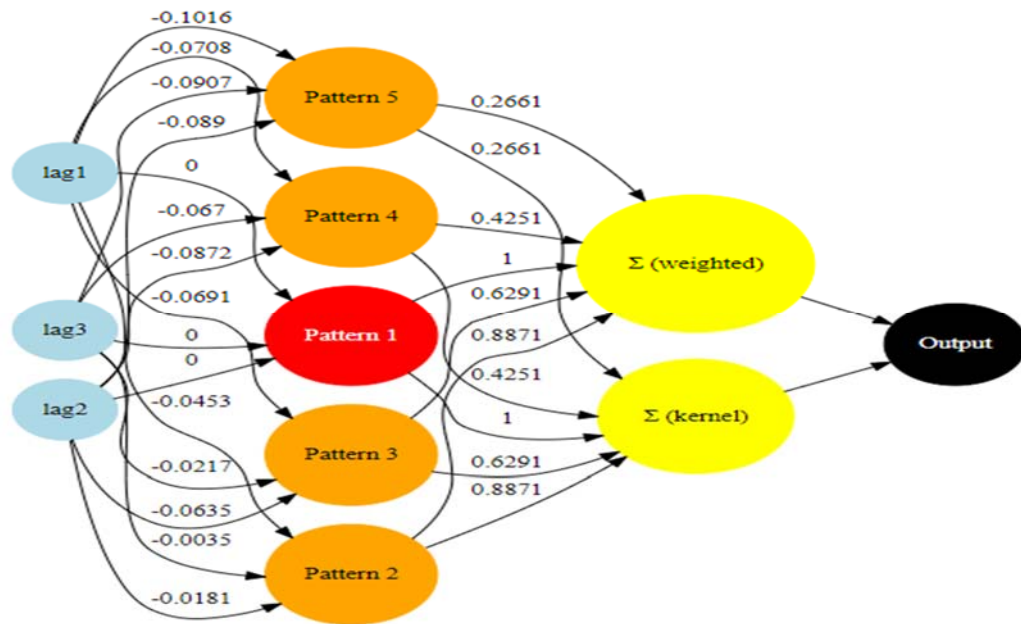


Figure 7 illustrates the GRNN architecture and shows that the network successfully learns the underlying relationships between past observations and the target variable, allowing it to generalise effectively from the training data. The network also shows how each input feature contributes to every pattern neuron, and in turn, how each pattern neuron contributes to the summation layers. Smaller differences between the input and the pattern neurons indicate higher similarity, which is reflected by stronger kernel weights. The greater the kernel weight, the more influence that pattern neuron has on the final output. To highlight this, the most influential pattern neuron identified by having the highest kernel weight is marked in red (Pattern 1), indicating its dominant role in shaping the prediction. The results of the GBM feature importance are presented in Figure 8.

Figure 8: GBM feature importance.

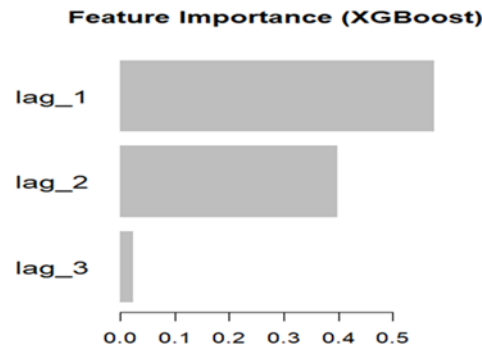


Figure 8 presents the feature importance rankings from the Gradient Boosting, where the three lags are evaluated for their contribution to predicting the stock price. As shown, lag 1 is identified as the most important lag, demonstrating its significant. Figure 9 shows the GBM tree via important lag.

Figure 9: GBM tree via important lag.

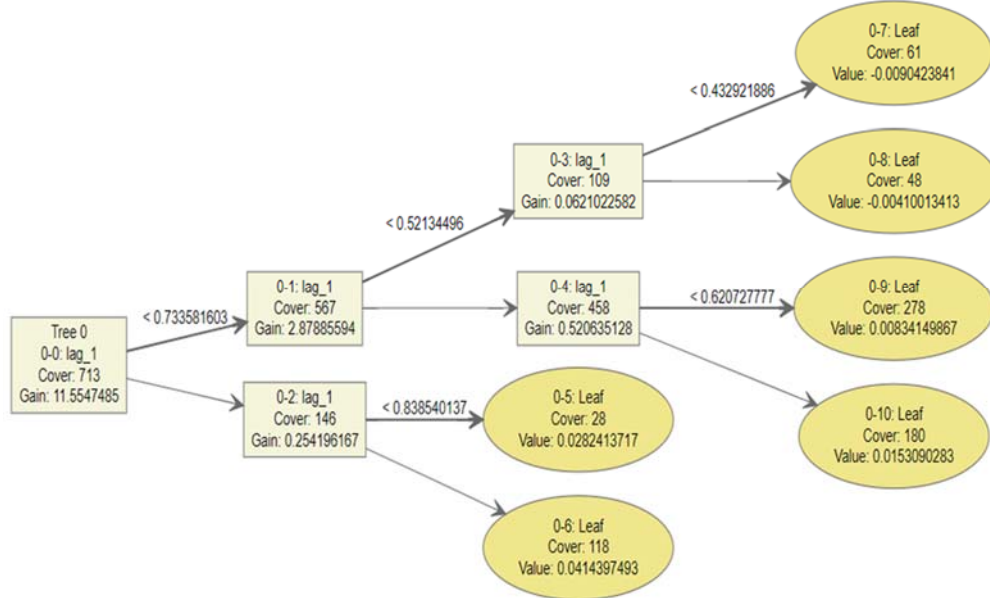


Figure 9 presents a GBM decision tree, illustrating that lag_1 is the most influential predictor in the model. Every split in the tree is based exclusively on lag_1, highlighting its dominant role in determining the target variable. The root node, which splits at lag_1 < 0.7336, yields the highest gain (11.5547), indicating a substantial reduction in prediction error. Subsequent nodes enhance the decision boundaries using various thresholds of lag_1, capturing its nonlinear relationship with the response. The leaf nodes represent final prediction values, ranging from -0.0090 to 0.0414, and their corresponding cover values reflect the number of observations reaching each terminal node. Moreover, the absence of other lag features in the tree confirms that lag_1 is statistically the most impactful lag in this GBM model. Figure 10 shows the ANFIS architecture.

Figure 10: ANFIS architecture.

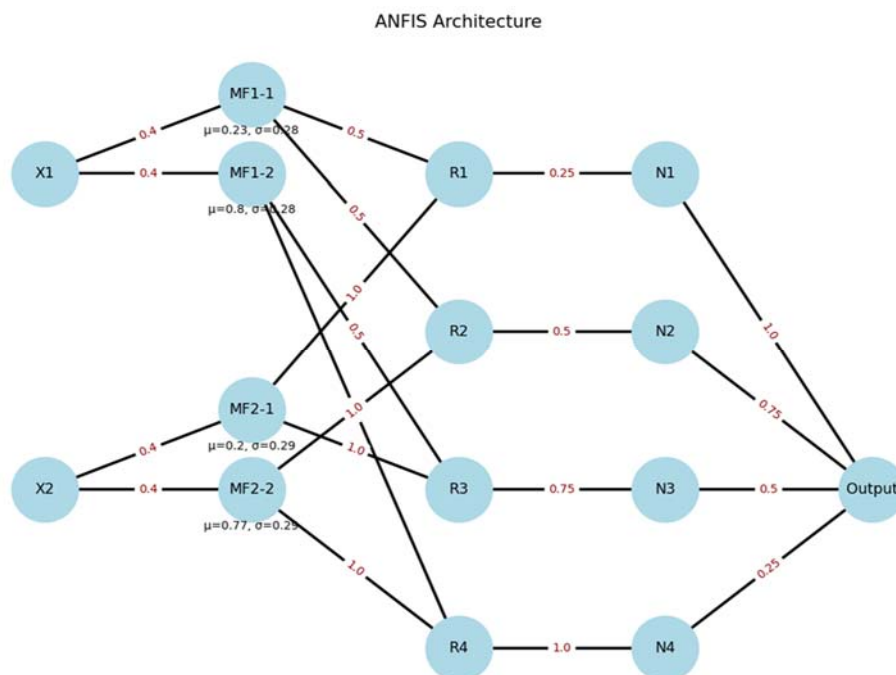


Figure 10 displays the structure of the ANFIS system. The network shows that the most contributing paths are (R3 → N3 → Output and R2 → N2 → Output) because they have the same cumulative weight of 0.375. However, the route R3 → N3 → Output stands out because it has the highest activation strength, with a weight of $0.75 \times 0.5 = 0.3750$. The Gaussian membership functions for Input variables 1 and 2 results are presented in Figure 11.

Figure 11: Gaussian membership functions for Input variables 1 and 2.

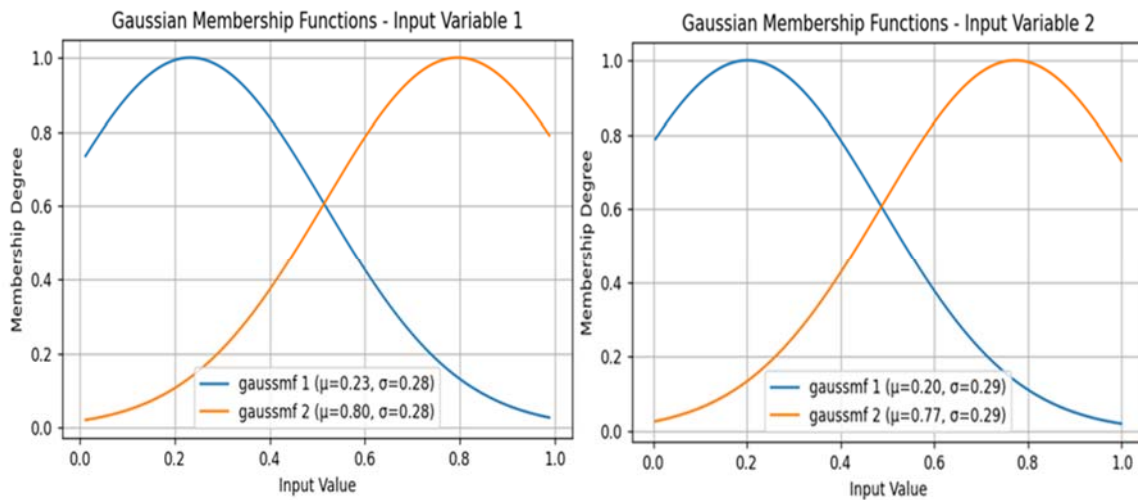


Figure 11 displays the Gaussian membership functions for Input Variables 1 and 2. The first function is centred at 0.23 and the second at 0.80, both with a standard deviation of 0.28. Together, they form two distinct yet smoothly overlapping regions that divide the input space in a meaningful way. The mid-range overlap supports gradual rule activation, helping the fuzzy system respond more appropriately to different input values. The performance of the six models was compared, and the results are presented in Table 8.

Table 8: Model performance.

Model	RMSE	MSE	MAPE
ARIMA (1,1,1)	369.908	136832.200	Inf
TGARCH (1,1)	0.037	0.001	NaN
EGARCH (1,1)	0.037	0.001	NaN
GRNN	0.195	0.038	Inf
GBM	0.187	0.035	Inf
ANFIS	0.018	0.000	11.72%

Note: “NaN” stands for Not a Number and “Inf” stands for infinity. Some MAPE values could not be calculated because some actual values were zero, making the metric undefined.

Table 8 compares the performance of six forecasting models using RMSE, MSE, and MAPE. Among them, ARIMA (1,1,1) shows the weakest performance, with both RMSE and MSE far higher than the other models. TGARCH (1,1) and EGARCH (1,1) achieve identical RMSE and MSE values, indicating similar accuracy, though both return undefined MAPE due to the nature of the data. The machine-learning models show varying results: GRNN and GBM produce moderate errors but still higher than the best-performing model. ANFIS stands out with the lowest RMSE and MSE, along with a reasonable MAPE of 11.72%, making it the most accurate and reliable model of the six. Overall, ANFIS provides the strongest predictive performance for the Nedbank closing stock price

CONCLUSION

The study evaluated six models, namely, ARIMA (1,1,1), TGARCH (1,1), EGARCH (1,1), GRNN, GBM, and ANFIS, to model Nedbank's closing stock price. Among these, ARIMA (1,1,1) delivered the weakest performance, with the highest RMSE and MSE, suggesting that a purely linear univariate model fails to capture the complex volatility in financial time series. This finding aligns with existing literature that highlights the limitations of linear models in handling nonlinear and heteroskedastic financial data. On the other hand, the asymmetric GARCH models, TGARCH (1,1) and EGARCH (1,1), offered more accurate volatility modeling; however, their MAPE could not be defined given the characteristics of the data, which limits their comparative interpretability. GRNN and GBM demonstrated reasonable forecasting performance, but they were still outperformed. The overall results showed ANFIS achieved the lowest RMSE and MSE, along with a reasonable MAPE of 11.72%, making it the most reliable and accurate of the six models. These findings resonate with prior studies by (Orozco-Castañeda et al., 2024; Mohamed et al., 2025; Kazak et al., 2025; & Aldaarmi, 2015), which also report the superiority of hybrid and neuro-fuzzy systems in financial forecasting.

Critically, when compared with existing studies on related themes, the results reinforce the growing consensus that hybrid artificial intelligence models outperform traditional econometric and standalone machine learning models in capturing both nonlinear dependencies and structural market dynamics. While GARCH-type models remain valuable for volatility clustering and risk estimation, their inability to incorporate complex nonlinear relationships reduces their predictive power relative to models such as ANFIS. Similarly, although ML models such as GRNN and GBM can model nonlinearities, they may lack the interpretability and rule-based adaptability inherent in neuro-fuzzy systems. This positions ANFIS as a balanced approach that integrates learning capability with interpretability, an advantage highlighted in recent empirical research.

Economically, the results emphasise that models capable of capturing nonlinearities and asymmetric volatility, such as ANFIS, provide meaningful advantages for stock price forecasting and risk management. From a strategic perspective, financial institutions and asset managers can leverage such models to enhance decision-making under uncertainty, particularly in emerging markets where volatility patterns are often more pronounced. Improved predictive accuracy can translate into better capital allocation, more efficient pricing of financial assets, and stronger resilience against market shocks. Furthermore, the adoption of advanced forecasting tools such as ANFIS may contribute to increased market efficiency by reducing information asymmetry and improving the speed at which new information is incorporated into asset prices. At a broader economic level, this can support financial stability by enabling more proactive risk monitoring and management.

For investors, portfolio managers, and market analysts, deploying ANFIS can lead to more robust and reliable predictions, particularly in periods of high market uncertainty. More accurate forecasts contribute to improved portfolio optimisation, enhanced risk mitigation strategies, and better-informed market positioning. In addition, institutional investors could integrate such models into algorithmic trading systems to exploit short-term inefficiencies while maintaining long-term strategic positioning.

These results highlight that model capable of capturing nonlinear relationships and volatility asymmetries, such as ANFIS, offer substantial advantages for stock price forecasting and risk management. Given the growing complexity of financial markets, future research should explore even more advanced machine learning and hybrid models, for example, combining ANFIS with deep learning architectures such as LSTM or transformer-based models to further boost forecasting performance. Additionally, incorporating explainable AI techniques could enhance model transparency and trust, which is crucial for real-world financial applications.

However, the study relies on data from a single company, which may restrict the generalisability of the conclusions. It also excludes macroeconomic or sentiment-driven variables that could further refine predictions. Future work could extend this analysis to multiple firms across different sectors and markets, integrate macroeconomic indicators (such as interest rates, inflation, and exchange rates), and include sentiment analysis derived from news or social media data. Moreover, comparative studies across developed and emerging markets could provide deeper insights into model robustness under varying economic conditions.

AI Declaration: *AI was used to improve the readability, language, grammar, and spelling of the manuscript as part of the writing process and to analyze and draw insights from data as part of the research process.*

REFERENCES

- Aldaarmi, A. A. A. (2015). An electronic financial system adviser for investors: The case of Saudi Arabia (Doctoral dissertation, Brunel University London).
- Babuška, R., & Verbruggen, H. B. (2003). Adaptive fuzzy systems and control: Design and stability analysis. Springer.
- Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of Econometrics*, 31(3), 307–327.
- Box, G. E. P., & Jenkins, G. M. (1970). Time series analysis: Forecasting and control. Holden-Day.
- Box, G. E. P., Jenkins, G. M., Reinsel, G. C., & Ljung, G. M. (2016). Time series analysis: Forecasting and control (5th ed.). John Wiley & Sons.
- Brockwell, P. J., & Davis, R. A. (2002). Introduction to time series and forecasting (2nd ed.). Springer.
- Chen, X., & Wang, Y. (2019). A comparative study of GRNN and ANFIS models for stock market prediction. *International Journal of Computational Intelligence*, 15(3), 203–214.
- Cheruiyot, B. K., Onyango, R. O., Mogesi, M. B., Kisina, M. M., & Arani, M. M. (2024). Forecasting inflation in Kenya using ARIMA model. *African Scientific Annual Review*, 1(Mathematics 1), 86–105.
- Cont, R. (2001). Empirical properties of asset returns: Stylized facts and statistical issues. *Quantitative Finance*, 1(2), 223–236.
- Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association*, 74(366a), 427–431.
- Dong, Z., & Zhou, Y. (2024). A novel hybrid model for financial forecasting based on CEEMDAN-SE and ARIMA-CNN-LSTM. *Mathematics*, 12(16), Article 2434.
- Dou, W. W., Fang, X., Lo, A. J., & Uhlig, H. (2023). Macro-finance models with nonlinear dynamics. *Annual Review of Financial Economics*, 15, 407–432.
- Dwivedi, M. P., & Surana, L. (2024). Decoding cryptocurrency volatility: A comparative GARCH, TGARCH, and EGARCH analysis of Bitcoin, Litecoin, Ethereum, and XRP. *Library Progress International*, 44(3), 12172–12186.
- Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. *Econometrica*, 50(4), 987–1007.
- Engle, R. F., & Ng, V. K. (1993). Measuring and testing the impact of news on volatility. *Journal of Finance*, 48(5), 1749–1778.
- Engle, R. F., & Patton, A. J. (2007). What good is a volatility model? In *Forecasting volatility in the financial markets* (pp. 47–63). Butterworth-Heinemann.
- Friedman, J. H. (2001). Greedy function approximation: A gradient boosting machine. *Annals of Statistics*, 29(5), 1189–1232.
- Galton, F. (1877). On the common division of labour in the statistical sciences. *Journal of the Statistical Society of London*, 40(4), 51–83.

- Galton, F. (1888). Co-relations and their measurement, chiefly from anthropometric data. *Proceedings of the Royal Society of London*, 45, 135–145.
- Gauss, C. F. (1809). *Theoria motus corporum coelestium*. Werke.
- Huang, X., Li, Y., & Wu, Y. (2022). Forecasting financial markets using hybrid neuro-fuzzy systems. *Expert Systems with Applications*, 195, 116591.
- Jang, J.-S. R. (1993). ANFIS: Adaptive-network-based fuzzy inference system. *IEEE Transactions on Systems, Man, and Cybernetics*, 23(3), 665–685.
- Kazak, H., Kumar, S., Gündüz, M. A., Akcan, A. T., & Bilgiç, H. H. (2025). Metaheuristic-optimized ANFIS and ANN models for stock price forecasting: Evidence from the Borsa Istanbul 100 index. *Discover Artificial Intelligence*, 5(1), 272.
- Kim, K., & Parnichkun, M. (2017). Real-time coagulant dosage prediction using GRNN, ANFIS, and MLP models across varying turbidity levels. *Environmental Science and Pollution Research*.
- Kolmogorov, A. N. (1933). *Foundations of the theory of probability*. Dover Publications (1950 edition).
- Lee, J., & Kim, S. (2021). Gradient boosting machine for stock price forecasting in the Korean market. *Journal of Computational Finance*, 9(1), 45–60.
- Malkiel, B. G. (2019). *A random walk down Wall Street* (12th ed.). W. W. Norton & Company.
- Markov, A. A. (1906). Extension of the limit theorems of probability theory to a sum of variables dependent on each other. *Mathematical Notes of the Academy of Sciences of the USSR*, 3, 5–28.
- Martínez, F., Frías-Bustamante, M. P., Martínez-Rodríguez, A. M., & Conde-Sánchez, A. (2021). Using the general regression neural network method to calibrate the parameters of a sub-catchment. *Water*, 13(8), 1089.
- Mohamed, Z. E., Refaie Ali, A., & Dabour, W. (2025). Optimizing adaptive neuro-fuzzy inference system model based on chaotic Harris Hawks algorithm for stock prediction. *Scientific Reports*, 15(1), 32529.
- Nelson, D. B. (1991). Conditional heteroskedasticity in asset returns: A new approach. *Econometrica*, 59(2), 347–370.
- Ondo Ekogha, E., & Owolawi, P. A. (2025). Comparative analysis of supervised learning techniques for forecasting PV current in South Africa. *Forecasting*, 7(1), 1.
- Orozco-Castañeda, J. M., Alzate-Vargas, S., & Bedoya-Valencia, D. (2024). Evaluating volatility using an ANFIS model for financial time series prediction. *Risks*, 12(10), 156.
- Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, 75(2), 335–346.
- Picard, R. R., & Berk, K. N. (1990). Data splitting. *The American Statistician*, 44(2), 140–147.
- Salehi, S. (2024). Comparative analysis of machine learning techniques for cryptocurrency price prediction. *Journal of Information and Organizational Sciences*, 48(2).
- Shapiro, S. S., & Wilk, M. B. (1965). An analysis of variance test for normality (complete samples). *Biometrika*, 52(3–4), 591–611.
- Smirnov, N. (1948). On the estimation of the discrepancy between empirical distribution functions in two samples. *Bulletin of Moscow University*.

Specht, D. F. (1991). A general regression neural network. *IEEE Transactions on Neural Networks*, 2(6), 568–576.

Srihari, G., Kusuma, T., Chetanraj, D. B., Kumar, J. S., & Aluvala, R. (2024). Predictive modeling of return volatility in sustainable investments: An in-depth analysis of ARIMA, GARCH, and ARCH techniques. *Investment Management & Financial Innovations*, 21(1), 213.

Tsay, R. S. (2010). *Analysis of financial time series* (3rd ed.). John Wiley & Sons.

Wiener, N. (1949). *Extrapolation, interpolation, and smoothing of stationary time series*. MIT Press.

Yule, G. U. (1907). On the theory of correlation. *Philosophical Transactions of the Royal Society A*, 206(1), 1–57.

Yule, G. U. (1927). *The statistical study of mortality and other biometric data*. Imperial College Press.

Zakoian, J.-M. (1994). Threshold heteroskedastic models. *Journal of Economic Dynamics and Control*, 18(5), 931–955.

USER GENERATED CONTENT AND CONSUMER TRUST IN THE SOUTH AFRICAN FASHION INDUSTRY: A QUALITATIVE INQUIRY

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ABSTRACT

In digital fashion industry, user-generated content (UGC) is becoming more and more important in influencing consumer trust and decision-making. However, a few studies have looked at how UGC affects trust in emerging markets. The purpose of this study is to investigate how consumer trust in the South African fashion sector is shaped by user-generated content. Based on a constructivist worldview, the study uses an exploratory, qualitative research design. The study investigates how consumers evaluate the credibility of fashion-related user-generated content (UGC), guided by the Source Credibility Model and supported by the ideas of homophily, parasocial interaction, and similarity attraction. Eighteen South African customers from all nine provinces participated in semi-structured interviews to gather data, which was then subjected to thematic analysis. The findings indicate that UGC strongly influences consumer trust through authenticity, transparency, expertise, relatability, and community validation. Participants expressed greater trust in content produced by everyday consumers and micro-influencers than in highly curated brand or celebrity content. There were clear platform-specific trust dynamics: YouTube was seen as a source of thorough and reliable reviews, Instagram as aesthetically inspiring, Facebook as community-focused, and TikTok as quick and approachable. Regular content production and engaged audience participation further strengthened trust. By using the Source Credibility Model to examine the South African fashion sector, this study offers qualitative insights from an understudied rising industry. By emphasising platform-specific and culturally grounded trust dynamics in user-generated content, it expands on previous research.

Keywords: consumer trust, fashion industry, South Africa, Source Credibility Model, social media platforms, user-generated content.

INTRODUCTION

Marketing is defined by Nieuwenhuizen (2024) as a strategic process designed to generate interest among potential customers in a company's products or services. This process involves various elements such as product and consumer research, promotional activities, sales strategies, and the distribution of offerings. These components work together to create a comprehensive approach that aligns customer needs with the organisation's value proposition (Nieuwenhuizen, 2024). According to Rosnerova and Hraskova (2021) marketing plays a crucial role in the commercial management of a business by helping to attract new clients while also maintaining and nurturing relationships with existing ones. This dual function highlights marketing's responsibility not only for customer acquisition but also for retention and relationship building, both of which are central to sustainable business growth (Rosnerova & Hraskova, 2021). Marketing's ultimate goal is to build and reinforce customer loyalty toward the company's brands, ensuring continued engagement and long-term success (Nieuwenhuizen, 2024).

However, Zsigmondová et al. (2021) highlights that within the realm of marketing, consumers often face difficulties in fully trusting the authenticity and credibility of the products or services being advertised. This scepticism is particularly prevalent in environments saturated with advertising content, where exaggerated claims and influencer promotions can lead to consumer doubt (Zsigmondová et al., 2021). The study further argues that in today's rapidly evolving marketing landscape, businesses face the ongoing challenge of establishing and maintaining genuine connections with their consumers. According to Karunasingha and Abeysekera (2022) at the core of this challenge lies a crucial element: consumer trust.

Consumer trust can be defined as the confidence a customer places in a brand's reliability, integrity, and ability to meet expectations, particularly in the absence of complete information (Gökerik, 2024). Scholars such as Wang et al. (2023) distinguish between two key dimensions of trust: cognitive trust and affective trust. According to these researchers' cognitive trust refers to the belief in the brand's competence, reliability, and ability to deliver on its promises. In contrast, affective trust stems from emotional connections, feelings of care, and the sense that the brand has the consumer's best interests at heart. Both types of trust play a crucial role in shaping consumer attitudes and behaviours (Wang et al., 2023). Sung et al. (2023) views trust as the foundation of any meaningful relationship between a brand and its audience. Sung et al. (2023) denotes that when consumers trust a brand, they are more likely to believe in the quality and value of its offerings, share positive word of mouth, and remain loyal even in the face of competitive alternatives. Building and maintaining consumer trust requires transparency, authenticity, and a customer centric approach. Research by Sung et al. (2023) confirms that social media has been able to bridge this gap.

Although the importance of user-generated content (UGC) in fashion marketing has been studied, emerging markets, especially those in Africa, have received less attention. Few studies have looked into how South African customers interact with user-generated content (UGC) in the fashion sector and how this affects trust. By providing qualitative insights into how UGC affects customer trust in South African fashion brands, our study closes this gap. According to Mujianto et al. (2025) and Silvhiany et al. (2021), social media refers to a range of digital platforms and technologies that allow users to create, share, and exchange information, ideas, opinions, and multimedia content within virtual communities and networks. These platforms have redefined how brands communicate, offering direct channels of interaction that bypass traditional media filters (Silvhiany et al, 2021).

Carvill and Taylor (2015) and (Silvhiany et al, 2021) highlighted that Instagram, Facebook, and TikTok, enable real time interaction and active user participation, allowing individuals and organizations to reach and engage with broad audiences. Halligan and Shah (2010) explain that, in the context of marketing, social media has become an essential tool for brands to connect with consumers, foster relationships, promote products or services, and collect valuable feedback. One powerful method for achieving customer trust is through User Generated Content (UGC). This form of content is perceived as more authentic and relatable than traditional advertising because it reflects the unfiltered opinions and real-life experiences of actual users (Geng & Chen, 2021). Lariba (2023) defines UGC as a social media marketing tool that encompasses any content created by consumers or fans, including reviews, testimonials, social media posts, photos, and videos.

By integrating UGC into marketing strategies, businesses can highlight authentic, real-life experiences with their products or services. This does not only boost the brand's credibility but also strengthens consumer trust (Ozuem et al., 2024). UGC reinforces social proof and offers relatable insights that traditional advertising may lack, especially in markets where consumers are wary of polished corporate messaging (Al Rawabdeh et al., 2021) According to Ozuem et al. (2024) this authenticity is valuable in the fashion industry, where personal style and real life encounters play a central role in consumer decision making. The dynamics of consumer trust in the context of South Africa's fashion sector have received little attention, despite the abundance of study on user-generated content (UGC) in developed markets. In order to close this gap, this study focuses on the elements that affect consumer confidence in user-generated content (UGC) from a South African perspective, where social media usage and cultural circumstances are very different from those in Western countries (Ozuem et al., 2024).

The main of objective of this study is to examine how user-generated content (UGC) influences consumer trust in South African fashion brands. To achieve the main objective the secondary research objectives are:

- To investigate consumer perceptions of different types of UGC and their impact on trust.
- To identify the social media platforms most commonly used for fashion-related UGC.
- To provide practical recommendations for fashion brands and content creators to leverage UGC effectively.

LITERATURE REVIEW

This section provides the theoretical framework and the empirical insights of UGC.

Theoretical Framework

This study is based on well-established theories of marketing and communication that describe how audiences assess and react to message sources in digital contexts. The main theoretical underpinning of this study is the Source Credibility Model put out by Ohanian (1990), which asserts that an audience's attitudes and behavioral intentions are greatly influenced by a source's reliability, knowledge, and attractiveness. Homophily Theory, Parasocial Interaction Theory, and Similarity Attraction Theory provide additional support for this concept in order to contextualise source credibility within social media and fashion influencer environments. These alternative viewpoints clarify the relational and psychological processes that improve audiences' perceptions of credibility through perceived emotional connection and likeness between influencers and viewers. When combined, these ideas offer a thorough foundation for comprehending how influencer traits affect customer reactions in digital marketing scenarios pertaining to fashion.

Source Credibility Model

The Source Credibility Model developed by Ohanian (1990) serves as the foundational theory for this study. In this study, the Source Credibility Model will be used as an interpretive framework to explore how consumers assess the credibility of fashion-related user-generated content on social media platforms. The model's three key dimensions will guide the development of interview questions and thematic analysis. By applying the Source Credibility Model in a qualitative context, the research aims to uncover nuanced insights into consumer experiences and judgments within South Africa's digital fashion landscape. According to Ohanian (1990), source credibility comprises three dimensions: trustworthiness, expertise, and attractiveness. These dimensions influence how audiences evaluate message sources, affecting attitudes and behavioural intentions.

Attractiveness

In the context of source credibility, Garg and Bakshi (2024) define attractiveness as the perceived appeal, likability, and the ability to relate to the communicator. Empirical studies have confirmed the importance of attractiveness in shaping consumer attitudes. Wang and Scheinbaum (2018) found that influencer attractiveness significantly enhanced brand attitude and purchase intention. These findings affirm the relevance of attractiveness in fashion contexts, where visual cues, self-image, and aspirational appeal play a major role in content engagement.

Trustworthiness

Source credibility also encompasses the dimension of trustworthiness, which Garg and Bakshi (2024) define as the perceived reliability of the source and the extent to which the source is seen as motivated to convey valid arguments without bias. Empirical research consistently identifies trustworthiness as the most influential dimension of source credibility. Wang and Scheinbaum (2018) found trustworthiness to be the most significant predictor of brand attitude and purchase behavior. Audiences prioritise authenticity and sincerity when forming trust in influencers (Wiedmann & von Mettenheim, 2020).

Expertise

According to Ekström & Eriksson, (2024), expertise refers to creators who are perceived as knowledgeable and reliable sources of information. Garg and Bakshi (2024) argue that content produced by experts is generally seen as more trustworthy. Ismagilova et al. (2020) found that expertise consistently enhanced message credibility, perceived value, and information adoption. However, Wiedmann and von Mettenheim (2020) observed that expertise had less impact on trust formation than trustworthiness.

By placing the Source Credibility Model (Ohanian, 1990) in the context of the South African fashion sector, where user-generated content (UGC) is essential to fostering consumer trust, this study expands on the model. This research shows that consumers in emerging markets value authenticity and community validation in user-generated content (UGC), in contrast to earlier studies that concentrate on Western contexts. This further supports the necessity for brands to take local socio-cultural dynamics into account when interacting with audiences (Wang et al., 2023).

Homophily, Parasocial Interaction, and Similarity Attraction

Homophily refers to the perceived similarity between the source and receiver, and it enhances trust by reinforcing relatability (Sokolova & Kefi, 2020). Parasocial interaction theory explains one sided emotional bonds that audiences

form with content creators (Chung & Cho, 2017). Similarity attraction theory suggests that perceived similarities values, lifestyle, or background enhance persuasive effectiveness (Ha & Lam, 2023).

Empirical Insights on UGC

User generated content includes reviews, ratings, social media posts, testimonials, blogs, unboxing videos, memes, and community discussions (Santos, 2021; Naeem & Ozuem, 2022; Agrawal et al., 2024). Research suggests that UGC builds credibility by offering authentic, peer driven insights (Lariba, 2024). Consumer trust is stronger when UGC aligns with emotional and cognitive forms of trust (Irshad et al., 2020; Wang et al., 2023).

User-Generated Content in the Fashion Industry

In the fashion context, visual content such as Instagram outfit posts, TikTok styling videos, and Pinterest mood boards is particularly dominant (Madhura & Panakaje, 2022). Visual UGC generates higher levels of engagement, especially among younger consumers (Ekström & Eriksson, 2024). Instagram and TikTok are especially influential in the South African fashion scene, particularly among urban youth (Ngcobo, 2023). In South Africa's fashion industry, leveraging user-generated content has become a strategic tool for enhancing brand trust and increasing consumer engagement. Hashtag challenges and influencer-led UGC campaigns foster community engagement and peer-to-peer influence. Digital storytelling through hauls, unboxings, and memes has proven particularly effective on platforms like TikTok and Instagram. By incorporating real consumer voices, South African fashion businesses can foster credibility and build lasting emotional connections.

METHODOLOGY

This study adopts a qualitative, exploratory research design to explore how user-generated content (UGC) influences consumer trust in South Africa's fashion industry. Rooted in the constructivist paradigm, the research embraces interpretivist assumptions, emphasizing meaning-making and contextual understanding over quantification. This paradigm posits that reality is socially constructed and that knowledge is best understood through individuals' experiences and interpretations (Wisker, 2017). Viewing the research through a constructivist lens enables a nuanced understanding of how South African fashion consumers interpret UGC on platforms such as Instagram, TikTok, and Facebook, and how these interpretations inform their trust in fashion brands (Bothma, 2014).

Primary data were collected through semi-structured interviews, which provided a balance between consistency and flexibility (Pretorius, 2024). While a core set of open-ended questions guided the interviews, the format allowed for probing deeper into emerging themes and following participants' narratives as they unfolded (Pretorius, 2024). Interviews were conducted either in person or via video call, depending on participant preference and availability. All interviews were audio-recorded with participants' informed consent and were transcribed for analysis. This study's exploratory, qualitative design offers a deeper knowledge of South African customers' subjective experiences and how user-generated material affects consumers' trust in fashion businesses. This study directly connects with the lived experiences of varied customers across South Africa's provinces, in contrast to quantitative studies that frequently ignore cultural nuances. This improves the generalizability of findings in the emerging market setting.

The target population comprised South African consumers aged 18 to 60 who are active social media users and regularly engage with fashion-related user-generated content (UGC). The study involved eighteen participants drawn from all nine provinces of South Africa. Consistent with the purposive sampling approach, individuals were selected based on their active presence on social media and their ongoing engagement with user-generated content. To ensure confidentiality and minimise vulnerability, real names were replaced with pseudonyms.

Data were analysed using thematic analysis, a method well-suited for identifying, analysing, and interpreting patterns of meaning within qualitative data (Naeem et al., 2023). Ethical considerations were central to every stage of the research process. Informed consent was obtained from all participants prior to data collection, participants' confidentiality and anonymity were protected by assigning pseudonyms, and ethical clearance was obtained from the

University of Fort Hare ethics committee. Data were stored digitally on password-protected devices and will be permanently deleted after the required academic period.

FINDINGS

Participant Profile

Table 1: Demographic Breakdown of Participants.

Pseudo Names of Participants	Age Distribution	Gender Breakdown	Location Analysis	Profession
Participant 1	21	Female	East London (EC)	University student (Business Management)
Participant 2	27	Male	Johannesburg, Gauteng	Working professional, (Marketing Assistant)
Participant 3	24	Female	Durban, KwaZulu – Natal	Graduate intern (Public relations)
Participant 4	22	Female	Cape Town, Western Cape	Student (Media and communications)
Participant 5	26	Male	Johannesburg Gauteng	Freelance content creator
Participant 6	30	Male	Polokwane, Limpopo	Working professional (Sales Representative)
Participant 7	45	Female	Pietermaritzburg, KwaZulu – Natal	Pietermaritzburg, KwaZulu – Natal
Participant 8	29	Female	Port Elizabeth (Gqeberha), Eastern Cape	Working professional (Graphic Designer)
Participant 9	38	Male	Bloemfontein Free State	Accountant
Participant 10	33	Male	East London, Eastern Cape	Small business owner (Streetwear Boutique)
Participant 11	20	Male	Mthatha, Eastern Cape	University student (Business Management)
Participant 12	25	Female	Pretoria, Gauteng	Working professional (Digital marketing Assistant)
Participant 13	23	Female	Butterworth, Eastern Cape	University student (Education)
Participant 14	36	Female	Durban, KwaZulu – Natal	Human Resource Manager
Participant 15	19	Female	Soweto, Gauteng	University student (First year, Media studies)
Participant 16	44	Male	Kimberley, Northern Cape	Lecturer
Participant 17	22	Male	Alice, Eastern Cape	University student (Economics)Sales
Participant 18	29	Female	Cape Town, Western Cape.	Working professional (Interior Designer)

Participants ranged in age from nineteen to forty-five and represented a balanced mix of genders and geographic locations. Their professional backgrounds varied across several fields, reflecting the study's intention to include a diverse group of social media users. This demographic overview provides context for interpreting the findings and establishes the breadth of perspectives represented in the study.

Overview of Thematic Development

The thematic analysis produced four interrelated themes that illustrate how participants understand, engage with, and evaluate UGC in the South African fashion environment. These themes illuminate not only how UGC is consumed but also how it shapes perceptions of brand credibility, authenticity, and trustworthiness. Each theme is presented in narrative form, supported by the underlying codes and insights generated during analysis.

Brand Strategies and Content Communication

The first theme highlights how participants interpret the communication styles and content strategies embedded within UGC. Participants consistently described UGC as more compelling and trustworthy when it offered detailed information, transparent evaluations, and visual clarity. They gravitated toward content that provided in-depth product testing, long-form reviews, and realistic try-ons, noting that these forms of communication allowed them to form expectations grounded in real experiences rather than marketing idealizations.

Participant 12: "I think UGC plays a huge role in shaping how I view fashion brands. When I see real people showing how clothes fit and move, it's more convincing than ads."

The importance of visual appeal was strongly emphasized, with many participants expressing a preference for clear, well-lit videos and images that enable them to assess fabric quality, fit, and styling versatility. Content style played a central role in shaping trust, particularly when the communication appeared unscripted, direct, and free from overt promotional cues. Participants valued what they described as "genuine expression," where creators appeared honest, relatable, and unfiltered.

Participant 15: "When it looks natural- like they filmed in their bedroom or outside, not in a studio. Also, when they tag the brand and show the real product without filters."

An important finding within this theme relates to the strategic use of UGC by fashion brands themselves. Participants perceived brands that actively showcase consumer content as more transparent and consumer-oriented. Such practices were interpreted as signals of openness and inclusion, reinforcing the perception that the brand values real experiences and honest customer voices. In this way, UGC becomes not only a mode of communication but also a brand strategy that strengthens relational ties between brands and consumers.

Participant 6: "Engage more with everyday consumers, not just influencers. Ask customers to share their stories or photos concerning your brand."

Platform Preferences

The second theme explores the social media platforms that participants most frequently engage with for fashion-related UGC and the reasons behind these preferences. Participants were highly active on TikTok, Instagram, Facebook, and YouTube, each platform serving a distinct purpose in their content consumption journeys. TikTok was described as a fast-paced and highly relatable environment where everyday consumers and micro-influencers share authentic and trend-driven content. Participants appreciated the platform's algorithm for exposing them to diverse fashion voices, styles, and body types. They characterised TikTok as a space where fashion feels accessible and reflective of real life, making it particularly influential in shaping their perceptions of authenticity.

Participant 17: "TikTok mostly. It's easy to see quick reviews and find local fashion pages."

Instagram, in contrast, was associated with aesthetic appeal and curated style inspiration. Participants used Instagram to explore outfits, follow local influencers, and browse brand-curated UGC. The platform's visual orientation and organizational features, such as saved collections, made it ideal for developing personal style ideas and tracking fashion trends.

Participant 3: "I mostly engage with TikTok and Instagram. TikTok feels more personal. While Instagram is good for inspiration."

Participant 4: *“TikTok and Instagram. TikTok is fun and fast paced, while Instagram has a polished look that’s nice for fashion inspiration.”*

Facebook maintained relevance as a community-driven platform where longer reviews, discussions, and affordability-focused content thrive. Participants often relied on Facebook groups to access consumer experiences, evaluate the reliability of local boutiques, and gather honest opinions from everyday users.

Participant 6: *“Facebook feels more community- based. Instagram influencers sometimes seem too commercial, while Facebook users share genuine opinions.”*

Finally, YouTube played a key role in providing in-depth and long-form content. Participants turned to YouTube for extended reviews, try-on hauls, and detailed demonstrations, noting that longer content enhanced cognitive trust by offering clarity, context, and thorough analysis.

Participant 14: *“YouTube creators tend to go deeper, so I trust them more. Instagram sometimes feels too curated.”*

Primary data were collected through semi-structured interviews, which provided a balance between consistency and flexibility (Pretorius, 2024). While a core set of open-ended questions guided the interviews, the format allowed for probing deeper into emerging themes and following participants’ narratives as they unfolded (Pretorius, 2024). Interviews were conducted either in person or via video call, depending on participant preference and availability. All interviews were audio-recorded with participants’ informed consent and were transcribed for analysis. This study's exploratory, qualitative design offers a deeper knowledge of South African customers' subjective experiences and how user-generated material affects consumers' trust in fashion businesses. This study directly connects with the lived experiences of varied customers across South Africa's provinces, in contrast to quantitative studies that frequently ignore cultural nuances. This improves the generalizability of findings in the emerging market setting.

Figure 1: Platform Preferences for Fashion-Related UGC.

Platform	Role in trust formation
TikTok	Fast, relatable, trend-driven
Instagram	Aesthetic inspiration
Facebook	Community discussions
YouTube	In-depth reviews

Figure 1 shows the preference of participants on what they value and trust the most and their view on the different social media platforms. Participants see TikTok as a fast and relatable trend-driven platform, Instagram is seen as aesthetic inspiration, Facebook is seen as a platform for community discussions and YouTube for in-depth reviews.

Trust Dynamics

The third theme captures the ways in which participants construct trust within digital fashion spaces. Trust emerged as a multidimensional process grounded in authenticity, transparency, consistency, and social validation. Participants repeatedly described authenticity as the foundation of trust, emphasizing that they rely more heavily on content created by everyday consumers, micro-influencers, and local reviewers than on highly polished brand ambassadors or celebrities. Transparency featured prominently in participants’ interpretations, particularly when content creators openly acknowledged product flaws, inconsistencies, or limitations. Participants expressed a strong preference for reviews that highlight both strengths and weaknesses, arguing that such honesty signals reliability and integrity. This aligns with broader trust theories that position transparency as central to establishing credibility within digital environments.

Participant 1: *“When the person isn’t over promoting a brand and gives honest opinions, including both positives and negatives.”*

Participants also emphasised the value of consistency over time. When creators consistently shared informative, honest, and relevant fashion content, participants developed long-term trust and were more likely to rely on their recommendations. This trust was often reinforced through parasocial dynamics, where repeated exposure to a creator cultivated a sense of familiarity and perceived relational closeness.

Participant 18: *“Consistency – creators who post regularly and stay true to their style are more believable.”*

Social validation played an important role in reinforcing trust judgments. Participants frequently turned to comment sections, shares, and community discussions to verify claims made in UGC. When multiple users expressed similar experiences or opinions, participants interpreted this as evidence of reliability, thus strengthening their overall trust in both the content and the brand.

Participant 6: *“Comments sections help a lot. When many people share similar experience, it proves the products quality.”*

Participant 5: *“Engagement levels – I checked if the creators responds to comments and whether followers agree with their reviews.”.*

UGC Perceptions

The fourth theme captures the more interpretive and emotional dimensions of how participants perceive UGC and integrate it into their fashion-related decision-making processes. Many participants described UGC as relatable because it originates from people who look like them, live in similar environments, or face comparable financial and lifestyle realities. This sense of relatability enhanced the perceived authenticity of UGC and made it easier for participants to judge whether products would suit their own lives.

Participants also described UGC as highly influential, particularly when it demonstrated affordability, practicality, and versatility. They expressed greater confidence in purchasing decisions when UGC showcased real-life application, everyday styling options, or the durability of a product. As a result, UGC often served as a catalyst for exploring unfamiliar brands or revisiting previously overlooked ones.

UGC further shaped perceptions of brand authenticity. Participants tended to view brands that incorporate UGC into their marketing strategies as more inclusive, human, and grounded in real consumer experiences. In contrast, brands perceived as overly curated or disconnected from consumer realities were viewed with skepticism. Finally, participants revealed varied preferences regarding content style. While many valued unedited and unfiltered UGC for its honesty, others enjoyed polished content for inspiration and aesthetic appeal. This indicates that consumers do not reject polished content outright but instead situate it within a broader desire for balance between aspiration and authenticity.

Participant 1: *“I actually trust UGC more than brand adverts because it feels real. One time, I saw a TikTok of someone styling Mr Price outfits, and it changes how I saw the brand – it looked trendy and affordable.”*

Participant 2: *“I see UGC as more credible than normal ads. I remember watching a YouTube review about a sneaker drop from Nike SA, and it helped me decide to buy because the reviewer gave honest feedback about comfort and fit.”*

DISCUSSION AND FINDINGS

The following section presents the study findings derived from the collected data. This includes a detailed presentation and interpretation of the results in relation to the research objectives. The findings will be presented in a clear and structured manner, highlighting key patterns, participant responses, and emerging themes that contribute to an understanding of the influence of user-generated content in the South African fashion industry.

Consumer Perceptions of Different Types of UGC and Their Impact on Trust

The interviews revealed that participants consistently perceived UGC as more authentic and credible than brand-driven advertising (Lariba, 2023). Many respondents emphasised that they trusted content that felt “real,” “unfiltered,” and reflective of lived consumer experience rather than strategically curated promotional messaging. For example, several participants highlighted that they trusted UGC when creators shared both positive and negative feedback, as this signalled honesty and transparency rather than commercial bias. This finding aligns with the principle of trustworthiness in the Ohanian (1990) model, which states that credibility increases when a source appears sincere and unbiased. Moreover, Ozuem et al. (2024) similarly argue that consumers perceive peer-generated content as more genuine because it originates from relatable individuals rather than corporate entities. Comparable results were also reported by Villagra et al. (2023), who found that UGC fosters interpersonal trust by presenting authentic product experiences rather than idealised representations.

Many participants highlighted the importance of knowledge in building trust in UGC. Respondents stated that they were more inclined to trust users who demonstrated understanding about fabric quality, style suitability, durability, and fashion trends. This reflects the expertise dimension of the Ohanian Model (1990), which emphasises that consumers assign greater credibility to sources perceived as competent and informed. Furthermore, studies such as Wang et al. (2023) similarly found that audiences rely on informed content creators who provide detailed and accurate insights that extend beyond surface-level impressions. Interestingly, this study found that expertise manifested in different forms depending on the user. Some respondents valued technical fashion knowledge, while others valued practical knowledge derived from actual product use. This demonstrates that experiential expertise based on personal ownership and usage was often considered more powerful than professional or technical expertise.

The study revealed that participants trusted user-generated content more when they identified with the creator, whether through age, aesthetics, social background, or lifestyle. Younger participants, in particular, preferred relatable peers and micro-influencers who appeared as everyday people rather than celebrities or aspirational figures. These findings align with similarity-attraction theory (Chen, 2020), which suggests that consumers are more likely to trust individuals who resemble them in meaningful ways. They also connect to parasocial interaction theory (Chung & Cho, 2017), where repeated exposure to relatable online personalities fosters a sense of personal relationship and emotional intimacy. The interviews revealed a clear preference for user-generated content from everyday users and micro-influencers over high-profile celebrities. Participants felt that influencers with large followings often appeared too commercial, overly curated, or motivated by sponsorships, which reduced their authenticity. In contrast, micro-influencers and ordinary consumers posting casually were seen as genuine and relatable. These findings align with Mujianto et al. (2025), who highlight that consumers increasingly value transparency and sincerity in peer-generated content over polished promotional messaging.

The study revealed that trust in user-generated content extends beyond the creator to include audience interactions, such as comments, likes, replies, duets, and shared experiences. Participants reported that when multiple users confirmed similar experiences, such as commenting on fit or quality, it strengthened the credibility of the content. These observations align with Villagra et al. (2023), who note that dialogic communication and collective engagement enhance reliability and social proof. While participants generally trusted user-generated content, the study also uncovered significant skepticism and critical filtering. Some respondents questioned content that appeared overly polished, highly edited, or emotionally manipulative, while others distrusted creators who seemed to be performing for views or engaging in paid partnerships. This study adds a nuanced insight regarding age differences in skepticism. A striking finding was the role of UGC in shaping not just purchasing behaviour but also fashion identity, style expression, and belonging within South African youth culture. Participants often viewed UGC as a form of inspiration, creativity, and self-presentation rather than a direct “buying trigger.”

Social Media Platforms are Most Commonly Used for Fashion-Related UGC

The study revealed that participants perceive trust in user-generated content differently depending on the social media platform. TikTok was described as authentic, spontaneous, and real, whereas Instagram was seen as polished and sometimes overly edited. YouTube, in contrast, was regarded as serious and informative due to its long-form reviews. These observations align with research by Ozuem et al. (2024), who argue that platform affordances influence how users interpret authenticity and intention. Beyond confirming these trends, the study highlighted a nuanced pattern in

platform-specific engagement. Participants tended to use TikTok for casual inspiration and relatable fashion ideas, Instagram for aspirational aesthetics, and YouTube for purchase-enabling research and evaluation. The study confirms that authenticity, expertise, relatability, and community validation are central to consumer trust in UGC (Ohanian, 1990; Chen, 2020; Chung & Cho, 2017). It also reveals unique South African dynamics: local cultural relevance, socio economic relatability, and platform specific trust patterns.

The semi-structured interviews used in this study with consumers from several areas in South Africa reveal regional differences in the ways that UGC affects trust. The detailed, individualized replies obtained here provide fresh perspectives on how consumers from various socioeconomic and cultural backgrounds understand user-generated content (UGC), whereas other research has focused on internet surveys or focus groups. For fashion marketers in emerging economies who target both urban and rural communities, this analytical approach has important ramifications.

The findings of this study cast doubt on conventional ideas of source reliability, especially with regard to the "attractiveness" dimension. The study's participants prioritized relatability over aesthetic appeal, which is an important change for fashion firms aiming to reach younger, more socially conscious consumers in emerging economies. By highlighting the increasing significance of authenticity and emotional connection in building brand trust, this insight builds upon Ohanian's (1990) model.

CONCLUSION AND RECOMMENDATIONS

User generated content is a central driver of consumer trust in the South African fashion industry. Trust is shaped by honesty, transparency, consistency, and community validation. UGC influences consumer behaviour, fashion identity, and cultural meaning making. The findings provide a foundation for enhancing brand communication, consumer engagement, and future research in participatory digital environments. The findings of this study show that UGC plays a central role in shaping consumer trust, especially within South Africa's socially connected and culturally expressive digital landscape. Fashion brands are encouraged to embrace authentic UGC, including critical or negative reviews, as a valuable source of consumer insight. Brands should widen their UGC collaborations beyond polished influencers to include ordinary South Africans whose voices carry cultural authenticity and community trust. Brands are further encouraged to develop transparency-driven UGC campaigns that invite honest consumer participation.

Content creators should maintain transparency, acknowledge product limitations and avoid performativity praise. Creators are also encouraged to balance entertainment with substance by incorporating practicality, affordability, and real-life usability in their content. As UGC becomes more professionalised, consumers will also require heightened digital literacy to distinguish between organic content and strategically crafted promotional material. Social media platforms play an influential role in shaping how UGC is consumed. Platforms should invest in features that promote transparency and facilitate community discussion. Consumers are encouraged to engage critically with UGC by evaluating multiple sources, exploring comment sections and distinguishing between authentic reviews and promotional content. Future studies should examine plus size consumer experiences, urban rural UGC engagement differences, the impact of UGC training programmes, socio economic influences, and longitudinal changes in trust.

By demonstrating how UGC affects customer trust in a particular cultural context of South Africa, this study significantly adds to the marketing literature. This study provides useful conceptual insights for fashion marketers aiming at emerging markets by identifying platform-specific trust dynamics and revealing the impact of authenticity and community validation in trust creation.

AI Use Declaration: *The authors declare that AI was used to improve the readability, language, grammar, and spelling of the manuscript as part of the writing process and not to analyze and draw insights from data as part of the research process.*

REFERENCES

- Al-Abdallah, G., & Wright, S. (2025). Cultural influence on digital trust and peer engagement in online consumer communities. *Journal of Consumer Behaviour*, 24(2), 145–162. <https://doi.org/10.1002/cb.2031>
- Al-Rawabdeh, H. O., Ghadir, H., & Al-Abdallah, G. (2021). The effects of user generated content and traditional reference groups on purchase intentions of young consumers: A comparative study on electronic products. *International Journal of Data and Network Science*, 5(4), 691-702. <https://doi.org/10.5267/j.ijdns.2021.7.012>
- Bothma, C. (2014). *E-marketing in the South African context*. Juta, Limited.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Carvill, M., & Taylor, D. (2015). *The Business of Being Social 2nd Edition: A practical guide to harnessing the power of Facebook, Twitter, LinkedIn, YouTube and other social media networks for all businesses*. Hachette UK.
- Chen, C. C. (2020). How is the interpersonal charisma of online bloggers formed? A perspective of the similarity-attraction theory. *International Journal of Organizational Innovation (Online)*, 13(2), 225-241.
- Chung, S., & Cho, H. (2017). Fostering parasocial relationships with celebrities on social media: The role of content type and audience engagement. *Computers in Human Behavior*, 72, 1–11. <https://doi.org/10.1002/mar.21001>
- Ekström, E., & Eriksson, F. (2024). Building trust in the digital age: Key concepts influencing consumer trust in user-generated content.
- Garg, M., & Bakshi, A. (2024). Exploring the impact of beauty vloggers' credible attributes, parasocial interaction, and trust on consumer purchase intention in influencer marketing. *Humanities and Social Sciences Communications*, 11(1). <https://doi.org/10.1057/s41599-024-02760-9>
- Gökerik, M. (2024). Consumer cynicism in influencer marketing: An impact analysis on purchase intention and brand loyalty. *İnsan ve Toplum Bilimleri Araştırmaları Dergisi*, 13(1), 404-421. <https://doi.org/10.15869/itobiad.1422438>
- Ismagilova, E., Slade, E. L., Rana, N. P., & Dwivedi, Y. K. (2020). The effect of electronic word of mouth communications on intention to buy: A meta-analysis. *Information Systems Frontiers*, 22(5), 1203-1226. <https://doi.org/10.1007/s10796-019-09924-y>
- Lariba, C. (2023). The role of user-generated content in shaping brand perceptions. *International Journal of Public Relation and Communication*, 1(1), 25-37.
- Madhura, K., & Panakaje, N. (2022). Social media as a promotional tool in the fashion industry: A case study on meta platforms Inc. *International Journal of Case Studies in Business, IT and Education (IJCSBE)*, 6(1), 351-365. <https://doi.org/10.5281/zenodo.6539695>
- Mujianto, H., Zakiah, K., & Yuningsih, A. (2025, June). The Impact of Micro-Influencers on Consumer Trust in Digital Business. In *Jogjakarta Communication Conference (JCC)* (Vol. 3, No. 1, pp. 40-50).
- Naeem, M., Ozuem, W., Howell, K., & Ranfagni, S. (2023). A step-by-step process of thematic analysis to develop a conceptual model in qualitative research. *International journal of qualitative methods*, 22, 16094069231205789. <https://doi.org/10.1177/16094069231205789>
- Ngcobo, T. (2023). *The use of Instagram as a communication tool in the Durban fashion industry* (Doctoral dissertation).

Ohanian, R. (1990). Construction and validation of a scale to measure celebrity endorsers' perceived expertise, trustworthiness, and attractiveness. *Journal of Advertising*, 19(3), 39–52. <https://doi.org/10.1080/00913367.1990.10673191>

Ozuem, W., Willis, M., Ranfagni, S., Rovai, S., & Howell, K. (2024). The nature and determinants of user-generated content for dissatisfied customers: evidence from second-hand luxury fashion brands. *Qualitative Market Research: An International Journal*, 27(5), 866-891. <https://doi.org/10.1108/QMR-01-2024-0016>

Pretorius, L. (2024). Demystifying research paradigms: Navigating ontology, epistemology, and axiology in research. *The Qualitative Report*, 29(10), 2698-2715. <https://doi.org/10.46743/2160-3715/2024.7632>

Silvhiany, S., Huzaifah, S., & Ismet, I. (2021). Critical digital literacy: EFL students' ability to evaluate online sources. *Indonesian Journal of EFL and Linguistics*, 6(1), 249. <http://dx.doi.org/10.21462/ijefl.v6i1.364>

Squire, C., Thompson, P., & Li, Y. (2023). Community engagement and trust in online peer reviews. *Journal of Interactive Marketing*, 60, 45–61. <https://doi.org/10.1016/j.intmar.2022.11.003>

Villagra, N., Reyes-Menéndez, A., Clemente-Mediavilla, J., & Semova, D. J. (2023). Using algorithms to identify social activism and climate skepticism in user-generated content on Twitter. *Profesional de la Información*, 32(3), 1-17. <https://doi.org/10.3145/epi.2023.may.15>

Wang, Y., Li, J., & Zhang, H. (2023). The role of expertise in evaluating user-generated content. *Journal of Business Research*, 161, 114–128. <https://doi.org/10.1016/j.jbusres.2023.113928>

Wang, S. W., & Scheinbaum, A. C. (2018). Enhancing brand credibility via celebrity endorsement: Trustworthiness trumps attractiveness and expertise. *Journal of advertising research*, 58(1), 16-32. <https://doi.org/10.2501/JAR-2017-042>

Wiedmann, K. P., & Von Mettenheim, W. (2021). Attractiveness, trustworthiness and expertise—social influencers' winning formula?. *Journal of Product & Brand Management*, 30(5), 707-725. <https://doi.org/10.1108/JPBM-06-2019-2442>

Wisker, G. (2017). *The postgraduate research handbook: Succeed with your MA, MPhil, EdD and PhD*. Bloomsbury Publishing.

MEASURING ENVIRONMENTAL SUSTAINABILITY IN SMART TOURISM DESTINATIONS: A MULTI-DIMENSIONAL ENVIRONMENTAL PRESSURE ASSESSMENT FRAMEWORK FROM THE GRECO PROJECT

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ABSTRACT

This study presents a Multi-Dimensional Environmental Pressure Assessment Framework developed within the GreCO project to evaluate environmental sustainability in Smart Tourism Destinations. The framework introduces the Environmental Pressure Index (EPI), which integrates behavioral and structural environmental dimensions, including waste management, water consumption, mobility, and visitor concentration. Using data collected from SMEs and local communities, the framework establishes baseline environmental pressure levels and identifies key sustainability challenges. The findings indicate moderate environmental pressure across stakeholder groups and highlight the need for targeted interventions in biodiversity conservation and water management. The proposed approach supports evidence-based governance and sustainable destination management.

Keywords: Smart Tourism Destinations, environmental sustainability, Environmental Pressure Index (EPI), sustainable destination management, GreCO project.

INTRODUCTION

Tourism destinations increasingly face the challenge of balancing economic development with environmental sustainability (Shekhar, 2024). While tourism contributes significantly to local economies, employment generation, and regional competitiveness, it also exerts considerable pressure on natural resources, ecosystems, and local communities through increased consumption of water and energy, waste generation, transport-related emissions, and visitor concentration. These pressures are particularly visible in destinations pursuing rapid growth and intensified tourism activity, making sustainability measurement an essential component of destination governance.

In recent years, the concept of Smart Tourism Destinations (STDs) has emerged as an approach that combines technological innovation, governance mechanisms, stakeholder engagement, and data-driven decision-making to improve destination performance and sustainability outcomes (Abdelmalak, 2024). Beyond digital transformation, smart tourism emphasizes the capacity of destinations to monitor, evaluate, and manage environmental impacts through integrated indicators and evidence-based planning. Consequently, environmental sustainability within smart tourism destinations requires not only the implementation of sustainable practices but also the development of reliable frameworks capable of measuring environmental pressures and supporting adaptive management.

Although several sustainability assessment models and indicator systems have been developed for tourism contexts, existing approaches often present limitations. Many frameworks prioritize broad sustainability outcomes without sufficiently capturing the operational environmental pressures generated by tourism activities or distinguishing between structural destination conditions and stakeholder-driven behaviors. Furthermore, environmental assessments frequently focus on isolated indicators rather than adopting multidimensional perspectives that reflect the complexity of tourism systems.

To address these limitations, there is a growing need for assessment approaches that integrate multiple dimensions of environmental pressure and generate measurable indicators that support monitoring, comparison, and policy intervention. Environmental pressure assessment enables destinations to move beyond descriptive sustainability goals and establish concrete baselines, targets, and performance evaluation mechanisms. Such approaches are particularly relevant in smart tourism contexts, where data collection and environmental monitoring can support continuous improvement and strategic decision-making.

Within this context, the GreCO Project proposes a structured framework for measuring environmental sustainability in tourism destinations through a Multi-Dimensional Environmental Pressure Assessment Framework. The framework aims to operationalize environmental sustainability by developing an Environmental Pressure Index (EPI) that captures the main environmental dimensions associated with tourism activity. The proposed approach combines destination-level indicators with stakeholder participation measures to generate a more comprehensive understanding of environmental performance.

The objective of this study is therefore to present and apply a multidimensional methodology for assessing environmental pressure in smart tourism destinations and to demonstrate how this approach can support sustainability monitoring, target setting, and evidence-based destination management. By providing an integrated assessment model, the study contributes to strengthening environmental governance within tourism ecosystems and advancing practical tools for sustainable destination development.

DESTINATION MANAGEMENT PRACTICES

Spatial planning and the development in general, can become unsustainable, if no detailed or thorough analysis and adequate research are undertaken. These should be focused on redefining the existing models and standards for establishing and executing tourism activities in certain areas (Risteskia et al., 2012). Tourism service providers produce such services and products as are attributed by the provided tourism needs in the consumers, as the latter somehow 'unite' themselves as a result of some shared and distinctive needs. Considering the geographic principle of the tourism market determination, tourist destinations can be characterized as the spatial integrities within which all transactions are taking place and are realized (Risteskia et al., 2012).

It is clear, though, that the growth and development of the tourist markets, or complementarily the growth in the number and size of tourist locations, or in other words – the economic growth of the entire tourist industry, will create tremendous impacts upon the economy, in the cultural identity, in addition to the surrounding physical environment. Globally, this calls for proper developmental planning of tourist locations and tourist places (Risteskia et al., 2012). Simultaneously, it can be said openly and unambiguously, that development in general, and spatial planning, can become unsustainable, if no research or no proper analysis, at least in detail, are made. They would be aimed at redrawing the current standards or models used in setting up or carrying out tourism activities in a given area (Risteskia et al., 2012).

There is a need for a qualitative and systemic destination management, in order to make a tourism destination competitive and sustainable. It presupposes a long term process of change management, comprising optimal economic development of a destination, a higher standard of living, ecological protection, social and cultural protection of heritage with the purpose of economic and general development of a tourism destination (Pearce, 2015).

Destination management is an activity at a micro regional level, where all stakeholders bear individual and organisational obligation to take a step further and make efforts in doing things in a way, in order to create future vision in the policy and development at a macro regional scale (Vanhove, 2011). The most basic aim of destination management is therefore effective harmonization, coordination of conduct and objectives of individual interest and influential groups (Krcic Miočić et al., 2016).

ENVIRONMENTAL SUSTAINABLE ACTIONABLE PLANS AND STRATEGIES

Despite the growing body of literature on sustainable tourism and destination management, important limitations remain in the way environmental sustainability is currently measured and operationalized within tourism destinations (Khan et al., 2021). Existing frameworks, including destination sustainability indicators and environmental benchmarking systems, have contributed significantly to monitoring environmental performance; however, many approaches continue to emphasize aggregated outcomes rather than the mechanisms that generate environmental pressure. As a result, environmental assessments often overlook the interaction between stakeholder behavior, local governance practices, and destination-level environmental conditions. This limitation becomes particularly important in urban and smart tourism contexts, where environmental impacts emerge through complex relationships between tourism demand, infrastructure capacity, and stakeholder decision-making.

Furthermore, current tourism sustainability frameworks frequently adopt broad environmental dimensions without sufficiently distinguishing between behavioral environmental contributions (such as recycling, energy-saving practices, and water conservation) and structural environmental pressures (such as congestion, mobility intensity, and spatial concentration of visitors). International approaches such as the European Tourism Indicator System (ETIS) and sustainability-oriented destination monitoring frameworks provide valuable benchmarking tools but offer limited guidance regarding the integration of stakeholder-level indicators into a unified environmental pressure assessment model. Consequently, there remains a need for methodologies capable of translating environmental sustainability objectives into measurable and actionable indicators that support evidence-based destination governance.

Responding to this gap, the present study proposes a Multi-Dimensional Environmental Pressure Assessment Framework developed within the GreCO project. Rather than evaluating sustainability exclusively through environmental outcomes, the framework introduces the Environmental Pressure Index (EPI) as a mechanism for measuring the intensity and distribution of environmental pressures across stakeholder groups. By combining behavioral indicators with structural environmental dimensions and aligning measurement with destination-level KPIs, this study contributes to advancing environmental assessment practices in smart tourism destinations and supports the development of more adaptive and participatory sustainability governance models.

The positive impact that tourism has on various aspects of human activity and environment can not be denied. There are, however, many negative perceptions of the tourist destinations in terms of their manifestations of enormous negative impacts on the local environment, culture, and way of life. This has resulted in highlighting a path of more sustainable tourism development. It demands the engagement of many stakeholders for this multi-faceted process to become a reality (Risteskia et al., 2012).

In addition, stakeholders can voluntarily engage in exchange interaction in order to follow sustainable tourism as a valuable alternative (Eslami et al., 2019). Local society tends to drop their involvement in such an exchange, if they assume related risks of sustainable tourism are higher than the benefit.

Humans exert a more substantial impact in several ways in the physical environment, e.g., pollution, contamination, overpopulation, deforestation, use of fossil fuels and driving leading to soil erosion, air and water pollution, climate change, etc. UNO Agenda for 2030 “Sustainable Development and its Sustainable Development Goals” (SDGs) echoes the shared assumption that a good environment and human health are entwined as part of fulfilling basic human rights, i.e., right to life, health, food, water, sanitation, good quality of life, and biodiversity in order to lead healthy lifestyles and ensure wellbeing for everyone at all ages (SDG3)—which encompasses air quality relying on terrestrial ecosystems (SDG15), oceans (SDG14), cities (SDG11), water, cleanliness, hygiene (SDG6) (Scharlemann et al. 2020).

Systematic environmental branding would also be a natural means of addressing the environmental awareness of the destination/tourist product. Environmental brand would both convey environmental information to the customer, as well as instill trust in buying among the customer, while assist managers of the destination in addressing the environmental expectation and perceptions of visitors (Mihalič, 2000).

For the destination, from a tourist's point of view, the two dimensions of environmental management are inter-reliant. On the one hand, environmental impacts of tourism (and travel) negatively impact the environmental quality of the destination, while on the other hand, environmental management of the environmental quality demands a reduction in negative environmental impacts of tourism (and, more generally, of all economic activity). At the same time, there exists a crucial difference between the two, from the consumer's point of view. It is most frequently assumed that a tourist being environmentally conscious behaves in an ecologically responsible way. In this case, the data on environmental impacts would become a precondition for his selection of an environmentally responsible destination (Mihalič, 2000).

The Environmental Pillar of the GreCO project represents a foundational element in shaping a sustainable tourism future for the Municipality of Elliniko–Argyroupoli. As a response to rising pressures of overtourism, urban expansion, and environmental degradation, the pillar emphasizes the need for a holistic, data-driven, and stakeholder-inclusive approach. In line with the EU's Sustainable Tourism and Urban Development priorities (Christou et al., 2025), the GreCO project actively integrates environmental KPIs to assess, monitor, and reduce the ecological footprint of tourism development across the municipality. Environmental sustainability within GreCO is not viewed as part of a broader urban tourism strategy. Real-time environmental monitoring, the strategic dispersion of tourism flows, and the promotion of eco-conscious behaviors of strategic dispersion of tourism flows, and the promotion of eco-conscious behaviors comprise the project's core practices of the project.

Moreover, the project ensures that the environmental goals are implemented not only through policy but also through measurable KPIs that reflect the level of engagement and performance of each stakeholder group. By embedding these indicators within the final stakeholder questionnaire, GreCO promotes an ecosystem of shared responsibility and co-created environmental management. Through stakeholder education, participatory planning, and the development of greener infrastructure, GreCO aims to transform environmental sustainability from a compliance task into a long-term commitment through the collective engagement of all stakeholders in the tourism ecosystem.

Key Environmental Indicators

Within the Environmental Pillar, specific KPIs have been identified to quantify stakeholder performance, progress, and readiness to adopt sustainable tourism practices. These KPIs formulated based on both literature and EU Databases ETIS, allowing for structured data collection and benchmarking.

KPI 9 (Reduction in Tourism-related Pressures), relevant to locals, NGOs, SMEs, and cultural entities, measures the degree to which tourism-related pressures—such as overcrowding, pollution, and mobility congestion—have been alleviated through stakeholder action. This includes strategies like route dispersion, support for eco-mobility, and green infrastructure implementation. The target value is set at 15% reduction from a baseline of zero, reflecting that data will be available upon the project's first full implementation cycle. This indicator was carefully designed to align with GreCO's participatory approach. The environmental KPI was structured to reflect the different roles and impacts of stakeholder groups, ensuring inclusivity. Their presence within the final stakeholder questionnaire provides both quantitative and qualitative insights, enabling GreCO to track progress, adjust policy measures, and promote adaptive management based on real-time evidence.

The environmental KPIs were measured through a well-structured methodology rooted in the final stakeholder questionnaire. This approach ensures direct alignment between stakeholder perception and the project's KPIs. Each KPI response was coded and mapped to its respective indicator, allowing for both individual and group-level analysis. Where applicable, stakeholders were asked to estimate their environmental pressures, their perception of pollution, and the extent to which they adopted sustainable behaviors—such as recycling or participation in green certification programs.

Environmental Sustainability Levels by Stakeholder Group

SMEs

Small and Medium Enterprises play a crucial role in implementing green practices at the operational level. However, preliminary data indicate varying levels of readiness and adoption. While some SMEs have begun integrating waste reduction practices and eco-certification schemes, a significant number still prioritize short-term economic gains over long-term environmental responsibility.

In order to understand better the indicators and measure the KPIs, specific questions were developed. The results from the questionnaire are presented below.

SMEs Questionnaire

- **Question1:** Does your business participate in climate change mitigation programs? (e.g., CO2 offsetting, energy-saving systems)?
 - o 82,35% answered that they participated in this kind of action.
- **Question2:** Does your business apply zero-waste practices or reuse surplus food for sustainability purposes?
 - o 70,59% answered that they participated in this kind of action. From this kind of policy, 71,43% of the SMEs stated that they reuse the 20% of those waste.
- **Question3:** Does your business take actions to reduce water consumption? (e.g., low-flow fixtures, irrigation)?
 - o 47,06% answered that they participated in this kind of action. From this kind of policy, 66,66% of the SMEs stated that they have reduced the consumption by 20% at least and 22,22% by 60%.
- **Question4:** Does your business use desalination systems to provide water?
 - o 23,53% answered that they participated in this kind of action. From this kind of policy, 40,00% of the SMEs stated that they have reduced the consumption by 20% at least and 40,00% of SMEs by 60%.
- **Question5:** Has your business adopted energy-saving practices? (e.g., LED lighting)?
 - o 94,12% answered that they participated in this kind of action.
- **Question6:** Does your business engage in biodiversity or landscape conservation actions?
 - o 11,76% answered that they participated in this kind of action.

This indicates that while SMEs show promising progress in energy efficiency—and to a lesser extent waste reduction—there are significant gaps in water management, desalination uptake, and biodiversity actions. Based on the above questions, specific indicators have been identified, which will play a crucial role in measuring and achieving the KPIs.

- Q1: SMEs_Climate
- Q2: SMEs_zero
- Q3: SMEs_water
- Q4: SMEs_desalination
- Q5: SMEs_energy
- Q6: SMEs_biodiversity

Local Community

Locals are both affected by and contributors to environmental change. Their perception of environmental quality, participation in sustainable behaviors, and tolerance to tourism pressures are crucial indicators. Educating and empowering locals to become environmental ambassadors remains a top priority of the GreCO project. According to the questionnaire responses collected from locals' community, several insights emerge regarding their perceptions of the Municipality's environmental actions and sustainability initiatives. The following section present the key findings for each question, highlighting how locals assess municipal efforts across areas such as water management, energy efficiency, biodiversity protection, and climate change mitigation. The results from the questionnaire are presented below.

Local Community Questionnaire

- Question 1: Does the municipality participate in climate change mitigation programs? (e.g., CO₂ offsetting, energy-saving systems)
 - A majority of respondents (67.74%) report that the Municipality participates in climate change mitigation programs, such as CO₂ offsetting or energy-saving initiatives. However, 32.26% state that the Municipality does not engage in such programs.
- Question 2: Does the municipality apply zero-waste practices or reuse surplus food for sustainability purposes?
 - Responses are nearly balanced: 48.28% believe the Municipality applies zero-waste practices or reuses surplus food, while 51.72% state that it does not.
- Question 3: Does the municipality take actions to reduce water consumption? (e.g., low-flow fixtures, irrigation)
 - Responses are evenly split: 50% believe that the Municipality takes actions to reduce water consumption, while the remaining 50% state that no such measures are in place.
- Question 4: Does the municipality use desalination systems to provide water?
 - Only 20% of respondents report that the Municipality uses desalination systems to provide water, while a large majority (80%) state that no such systems are in place.
- Question 5: Has the municipality adopted energy-saving practices? (e.g., LED lighting)
 - An overwhelming majority of respondents (90%) state that the Municipality has adopted energy-saving practices, such as LED lighting. Only 10% believe that no such measures have been implemented.
- Question 6: Does the municipality engage in biodiversity or landscape conservation actions?
 - A majority of respondents (66.67%) believe that the Municipality participates in actions related to biodiversity or landscape preservation. In contrast, 33.33% state that the Municipality does not participate in such actions.

Overall, the descriptive statistics reveal strong recognition of energy efficiency and moderate acknowledgment of climate and biodiversity actions, while perceptions remain divided on zero-waste and water-saving initiatives and clearly negative regarding desalination.

Based on the above questions, specific indicators have been identified, which will play a crucial role in measuring and achieving the KPIs.

- Q1: LOCALS_Climate
- Q2: LOCALS_zero
- Q3: LOCALS_water
- Q4: LOCALS_desalination
- Q5: LOCALS_energy
- Q6: LOCALS_biodiversity

KPIS RELATED TO ENVIRONMENTAL IMPACT

The Environmental Pressure Index (EPI) is a specialized and realistic methodological approach for determining the baseline value of KPI9, within the framework of the GreCO project. The development of the model is based on the guiding principles of the European Tourism Indicator System (ETIS), which proposes monitoring and evaluating the environmental performance of destinations through multidimensional indicators covering waste, water, mobility, and spatial pressure (European Commission, 2016). At the same time, the UNWTO approaches are adopted, according to which environmental pressure in urban tourist destinations stems from a combination of behavioral and structural factors, which vary by stakeholder category.

The EPI is based on four fundamental dimensions of environmental pressure: waste management, water resource pressure, mobility/traffic congestion, and spatial overconcentration of visitors. In this model, these dimensions are weighted differently for each stakeholder group, based on their relative influence on the formation of environmental pressure. This differentiation in weighting reflects the approach taken in the international literature, according to which the impacts of tourism are unevenly distributed among those involved (Nádasi et al., 2024).

To ensure methodological consistency and transparency, KPI9 was operationalized through the systematic conversion of stakeholder responses into measurable environmental pressure indicators. The environmental dimensions included in the Environmental Pressure Index (EPI) were translated into observable variables through the final stakeholder questionnaire, enabling direct measurement of environmental engagement and pressure generation.

Each questionnaire item was associated with a specific environmental dimension according to its conceptual contribution. Climate mitigation initiatives, zero-waste practices, water conservation actions, energy efficiency measures, and biodiversity-related activities were classified as behavioral environmental indicators, representing stakeholder participation in sustainability-oriented actions. These indicators were selected because they capture dimensions where individuals and organizations can directly influence environmental outcomes through decision-making and operational practices.

To enable comparability across stakeholder groups, responses were transformed into standardized pressure values using normalization procedures. Lower levels of participation in environmental actions correspond to higher environmental pressure, whereas greater participation indicates lower environmental pressure generation. Through this mapping process, qualitative survey responses were converted into quantitative indicators capable of supporting KPI monitoring, benchmarking, and longitudinal assessment within the GreCO environmental evaluation framework.

Table 1: Dimensions: WTS, WTR, MOD, and CRD.

Dimension	Description	Examples
Waste Management Pressure (WTS)	Volume of waste generated, recycling behaviour, zero-waste participation	Zero-waste policies, food reuse, recycling
Water Resource Pressure (WTR)	Water consumption intensity, efficiency measures, desalination adoption	Low-flow systems, irrigation, desalination
Mobility and Congestion Pressure (MOD)	Urban congestion, traffic flow, eco-mobility	Car dependence, micro-mobility, visitor flows
Crowding / Visitor Density Pressure (CRD)	Concentration of visitors in space & time	Beach density, cultural hotspots, seasonal peaks

Primary data from the questionnaire used in the GreCO framework was used to compile the behavioral components of the index, which reflects the participation of SMEs and local communities in practices such as water conservation, energy efficiency, zero waste programs, and biodiversity actions. A scoring logic was applied to the value assigned to each behavioral component through the normalization of values. In this way, the averages of the responses were converted into behavioral pressure scores, where low participation in sustainable practices corresponds to higher levels of pressure. The set of variables was mapped to the dimensions of waste, water, and biodiversity, producing a quantified behavioral contribution for each stakeholder group.

Weighting and Construction of the Environmental Pressure Index

The Environmental Pressure Index (EPI) was constructed as a composite indicator designed to estimate the overall environmental pressure generated within the tourism destination. The index integrates multiple environmental dimensions into a single measurable value, allowing for comparison across stakeholder groups and monitoring of environmental performance over time. For the initial implementation of the GreCO framework, equal weighting was applied across the environmental dimensions included in the index calculation. This approach was selected to ensure methodological simplicity, transparency, and comparability during the baseline assessment phase. Equal weighting also minimizes subjective prioritization of dimensions in the absence of empirical evidence supporting differentiated contribution levels. Prior to aggregation, indicator values were normalized into a common measurement scale ranging from 0 to 100. The normalized values were then aggregated through weighted averaging procedures to calculate the final Environmental Pressure Index score for each stakeholder group.

The final index is calculated using a weighted sum of the four dimensions of environmental pressure, according to the formula: $EPI = w_{WST} * WST + w_{WTR} * WTR$, where the sum of the weights is equal to 1.

Table 2: KPI9 – Baseline Environmental Pressure Index (EPI) & Target (-15%).

Stakeholder Group	Baseline (0-100)	Target (15% reduction)
Locals	69	58.65
SMEs	71	60.35

Interpretation of Environmental Pressure Scores

To facilitate interpretation and policy application, Environmental Pressure Index values were classified into environmental pressure categories. These categories support decision-makers in identifying areas requiring intervention and allow monitoring of environmental improvement over time.

Environmental pressure levels are interpreted as follows:

- 0–25: Very Low Environmental Pressure
- 26–50: Low Environmental Pressure
- 51–75: Moderate Environmental Pressure
- 76–100: High Environmental Pressure

Lower values indicate stronger adoption of sustainable practices and reduced environmental burden, whereas higher values indicate greater environmental pressure and increased need for policy intervention. Based on the baseline calculations of KPI9, both stakeholder groups currently fall within the moderate environmental pressure category, with SMEs presenting an estimated baseline value of approximately 61.7 and local communities approximately 68–69. These results suggest that although sustainability actions have already been introduced, additional interventions are necessary to achieve the GreCO target of reducing tourism-related environmental pressure by 15%. The classification system provides a practical interpretation mechanism that enables destination managers to prioritize actions, allocate resources more effectively, and establish measurable environmental performance targets within smart tourism governance processes.

Calculation of classification

The classification of the dichotomous scale (1=No, 2=Yes) is based on the average. Therefore, we will have:

The closer to 2 => the greater the participation => the lower the environmental pressure.

The closer to 1 => the lower the participation => the greater the environmental pressure.

Table 3: SMEs – Environmental Pressure.

Indicator	Mean	Recognition	Environmental Pressure
Climate (Q1)	1.82	Very high	Very low
Zero waste (Q2)	1.82	Very high	Very low
Water reduction (Q3)	1.71	High	Low
Desalination (Q4)	1.53	Medium	Medium
Energy saving (Q5)	1.76	High	Low
Biodiversity (Q6)	1.06	Very high	Very high

Table 4: Locals – Environmental Pressure.

Indicator	Mean	Recognition	Environmental Pressure
Climate (Q1)	1.32	High	Low
Zero waste (Q2)	1.52	Low	Medium
Water reduction (Q3)	1.50	Medium	Medium
Desalination (Q4)	1.80	Low	High
Energy saving (Q5)	1.10	Very High	Very Low
Biodiversity (Q6)	1.33	Very High	Low

Convert Mean to Behavioral Pressure Score

Use of transformation: "Pressure Score"=(Mean-1)×100

Values for each question between 0-100.

Table 5: SMEs – Pressure Score

Indicators	Mean	Pressure Score
Climate	1.82	82
Zero waste	1.82	82
Water	1.71	71
Desalination	1.53	53
Energy	1.76	76
Biodiversity	1.06	6

Average behavioral pressure for SMEs = 61.7

Table 6: Locals – Pressure Score.

Indicators	Mean	Pressure Score
Climate	1.32	32
Zero waste	1.52	52
Water	1.50	50
Desalination	1.80	80
Energy	1.10	10
Biodiversity	1.33	33

Average behavioral pressure for Locals = 42.8

Structural Pressure

- Locals Waste structural = 56.7
- Locals Water structural = 66.7
- SMEs Waste structural = 39
- SMEs Water structural = 46.7

SMEs Final Baseline

- $EPI_{SMEs} = 0.50(WST \text{ behav}) + 0.50(WTR \text{ behav})$
- SMEs baseline ≈ 61.7

Locals Final Baseline

- $EPI_{Locals} = 0.50(WST \text{ behav}) + 0.50(WTR \text{ behav})$
- Locals baseline $\approx 68-69$

DISCUSSION & CONCLUSION

The findings of this study provide empirical support for the use of a multi-dimensional environmental pressure assessment framework as a practical mechanism for measuring environmental sustainability within smart tourism destinations. Through the implementation of the Environmental Pressure Index (EPI) under the GreCO project, the analysis demonstrates that environmental performance cannot be adequately captured through isolated indicators or generalized sustainability narratives but requires an integrated assessment that reflects both behavioral and structural dimensions of environmental pressure.

One of the most important findings concerns the differentiated environmental profiles observed across stakeholder groups. The results indicate that SMEs exhibit relatively strong engagement in climate mitigation initiatives, energy-saving practices, and waste-related actions, while considerably lower performance was recorded in biodiversity protection and more advanced resource-management practices such as desalination. This suggests that environmental actions associated with immediate operational and economic benefits tend to be adopted more rapidly than initiatives requiring long-term investment or broader ecological commitment. Such findings are consistent with sustainability literature indicating that environmental behavior among businesses is often influenced by cost-effectiveness, visibility of outcomes, and regulatory incentives.

Similarly, responses from the local community reveal heterogeneous perceptions regarding municipal environmental action. High recognition of energy efficiency initiatives and moderate confidence in climate and biodiversity policies indicate a generally positive environmental awareness. However, the relatively weaker perception

of progress in water management and zero-waste practices suggests that environmental policies may not yet be sufficiently visible or impactful from the residents' perspective. These findings reinforce the importance of stakeholder inclusion in sustainability governance and support arguments that environmental transitions require both institutional action and community engagement. From the perspective of smart tourism destinations, the findings suggest that environmental intelligence should extend beyond digital technologies and incorporate structured monitoring mechanisms capable of supporting evidence-based governance. The GreCO framework demonstrates how KPIs and environmental indices can serve as governance tools that facilitate continuous assessment, adaptive policy responses, and stakeholder accountability. Although the current implementation relies primarily on questionnaire-based indicators, the planned integration of real-time environmental monitoring systems presents an opportunity to strengthen predictive capacity and reduce dependence on perception-based measurements.

Therefore, this study proposed a Multi-Dimensional Environmental Pressure Assessment Framework to evaluate environmental sustainability in smart tourism destinations within the context of the GreCO Project. By integrating behavioral and structural dimensions of environmental impact, the framework operationalized environmental sustainability through the development of an Environmental Pressure Index (EPI) based on four major dimensions: waste, water, mobility, and crowding.

The findings demonstrate that environmental pressure cannot be understood exclusively through stakeholder perceptions or solely through structural indicators. Instead, sustainable destination management requires a combined perspective that incorporates both individual participation in environmentally responsible practices and broader destination-level environmental conditions. The empirical application revealed measurable differences between stakeholder groups, highlighting varying levels of participation in climate actions, resource conservation, and biodiversity-related practices. The analysis also justified the exclusion of mobility and crowding indicators from questionnaire-based measurement due to their systemic and spatial nature, supporting the methodological robustness of the proposed framework. From a practical perspective, the framework provides destination managers and policymakers with a structured mechanism to establish environmental baselines, monitor sustainability performance, and define measurable reduction targets. Such evidence-based approaches can support more adaptive and data-informed governance in tourism destinations.

Future research should further validate the framework across multiple destination contexts, expand the integration of smart monitoring technologies and real-time environmental data, and refine weighting mechanisms to improve comparability and predictive value across tourism ecosystems.

REFERENCES

- Abdelmalak, F., 2024. Smart tourism destinations: Governance and resilience the use of ICTs in destination governance and its impact on resilience. *Journal of Smart Tourism*, 4(2), pp.35-45.
- Christou, T., García-Rodríguez, A., Heidelk, T., Lazarou, N.J., Monfort, P. and Salotti, S., 2025. Economic growth and environmental objectives: An evaluation based on 2021–2027 cohesion policy regional data. *Journal of Policy Modeling*.
- Eslami, S.; Khalifah, Z.; Mardani, A.; Streimikiene, D.; Han, H. Community attachment, tourism impacts, quality of life and residents' support for sustainable tourism development. *J. Travel Tour. Mark.* 2019, 36, 1061–1079.
- European Commission. (2016). *The European Tourism Indicator System: ETIS Toolkit for Sustainable Destination Management*. Publications Office of the European Union.
- Khan, M.R., Khan, H.U.R., Lim, C.K., Tan, K.L. and Ahmed, M.F., 2021. Sustainable tourism policy, destination management and sustainable tourism development: A moderated-mediation model. *Sustainability*, 13(21), p.12156.
- Krce Miočić, B., Razović, M. and Klarin, T., 2016. Management of sustainable tourism destination through stakeholder cooperation. *Management: journal of contemporary management issues*, 21(2), pp.99-120.
- Mihalič, T. (2000). Environmental management of a tourist destination: A factor of tourism competitiveness. *Tourism management*, 21(1), 65-78.

- Nádasi, L., Kovács, S. and Szöllős-Tóth, A., 2024. The extent of overtourism in some European locations using multi-criteria decision-making methods between 2014 and 2023. *International Journal of Tourism Cities*.
- Pearce, D. G. (2015). Destination management in New Zealand: Structures and functions. *Journal of Destination Marketing & Management*, 4 (1), 1-12.
- Risteskia, M., Kocевskia, J. and Arnaudov, K., 2012. Spatial planning and sustainable tourism as basis for developing competitive tourist destinations. *Procedia-Social and Behavioral Sciences*, 44, pp.375-386.
- Scharlemann JP, Brock RC, Balfour N, Brown C, Burgess ND, Guth MK, Kapos V (2020) Towards understanding interactions between sustainable development goals: the role of environment–human linkages. *Sustain Sci* 15(6):1573–1584
- Shekhar, C., 2024. Sustainable tourism development: Balancing economic growth and environmental conservation. *Available at SSRN 4901174*.
- Vanhove, N. (2011). *The Economics of Tourism destinations*. London and New York: Routledge.

DESIGNING DATA-DRIVEN SMART TOURISM ECOSYSTEMS: A USER-CENTERED REQUIREMENTS, STAKEHOLDER CO-CREATION, AND KPI EVALUATION FRAMEWORK FROM THE GRECO PROJECT

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ABSTRACT

Smart tourism destinations require integrated approaches that combine technological innovation, stakeholder participation, and performance evaluation. This paper presents the methodological framework developed within the GreCO (Green Cultural Oases) project for designing and evaluating a data-driven smart tourism ecosystem. The proposed framework integrates user-centered design, stakeholder co-creation, requirements engineering, and KPI-based performance monitoring. Through interviews, workshops, personas, user journeys, and use-case scenarios, stakeholder needs are systematically translated into system requirements and measurable indicators. The study contributes a replicable approach for developing sustainable, inclusive, and evidence-based tourism solutions that support destination management, visitor experience enhancement, and long-term urban sustainability.

Keywords: Smart Tourism Destinations, user-centered design, stakeholder co-creation, Key Performance Indicators, GreCO project.

INTRODUCTION

The tourism sector is undergoing a profound transformation driven by rapid advances in digital technologies, increasing sustainability concerns, and changing visitor expectations (Srinivasan et al., 2024). Modern destinations are no longer evaluated solely based on their cultural, historical, or natural assets, but also on their ability to provide personalized, seamless, and sustainable experiences through the effective use of digital solutions. As a result, the concept of Smart Tourism Destinations has emerged as a strategic approach that combines information and communication technologies, data analytics, stakeholder collaboration, and sustainable governance to enhance both visitor experiences and destination competitiveness. Despite significant technological progress, many smart tourism initiatives continue to face challenges related to user adoption, stakeholder engagement, and the measurement of their long-term impacts.

A major limitation identified in existing smart tourism research is the fragmented treatment of system design, stakeholder participation, and performance evaluation. While numerous studies focus on technological innovation and platform development, fewer efforts have examined how stakeholder needs can be systematically translated into system requirements and subsequently evaluated through measurable indicators. This gap often results in digital solutions that are technologically advanced but insufficiently aligned with the expectations of tourists, local communities, businesses, and policymakers. Consequently, there is an increasing need for integrated frameworks that combine user-centered design principles, requirements engineering methodologies, and performance monitoring mechanisms within a unified approach.

This paper addresses this challenge by presenting the methodological framework developed within the GreCO (Green Cultural Oases) project, a European initiative aiming to foster sustainable and data-driven urban tourism ecosystems. The project seeks to leverage digital technologies, artificial intelligence, environmental monitoring systems, and participatory governance approaches to create innovative tourism services that support

cultural heritage promotion, environmental awareness, and local economic development. The GreCO platform is designed as an integrated ecosystem that enables personalized visitor experiences while simultaneously providing valuable insights and decision-support tools for local authorities, businesses, and cultural organizations.

The contribution of this study is twofold. From a theoretical perspective, it advances current knowledge on smart tourism development by integrating stakeholder engagement, requirements engineering, and performance evaluation into a coherent methodological framework. From a practical perspective, it provides municipalities, destination management organizations, and technology providers with a replicable approach for designing, implementing, and evaluating smart tourism solutions that are both user-driven and evidence-based. By demonstrating how stakeholder needs, technological capabilities, and measurable outcomes can be systematically aligned (Georgopoulos et al., 2025), the paper contributes to the development of more sustainable, inclusive, and resilient tourism destinations capable of responding to contemporary urban and societal challenges.

STAKEHOLDER-CENTERED REQUIREMENTS ANALYSIS FRAMEWORK

Blank (2020) emphasizes the involvement of stakeholders in the software development process as early as the first phases of the innovation and design stages. It requires several iterative experiments involving end users before any successful commercialization of the product. Blank (2020) also emphasizes the importance of the initial phases in his customer development model, namely determining customers' real problems and needs. The paying customers do not necessarily know what they need or want, but they can offer valuable comments and suggestions for your visualized drafts and prototypes (Dirin & Nieminen, 2014). Those comments and feedback work as guidelines in searching the possibilities for successful product and service innovations. Moreover, usability and user experience considerations are increasingly important in contemporary mobile application developments. This complex and yet important process is accomplished by applying appropriate software development methods such as UCD (User-Center Design) or lean product development. Both of these methods consider users as key stakeholders at the various design and development stages.

The methodology and techniques that will be used for gathering the user requirements in GreCO project will follow the user-centered design principles and tools. User-centered design (UCD) is an approach for designing products, services, and systems that prioritizes the needs, preferences, and experiences of the end-users (Emma, 2004). The primary goal of UCD is to create designs that are intuitive, easy to use, and meet the needs of the user. Based on the UCD method, researchers put the users and their needs at the center. By involving users in the design process, designers can create products and services that meet the users' needs and are more likely to be successful in the marketplace. The UCD process typically involves the following steps:

1. Understand the User: In this stage, designers conduct research to gain an understanding of the users' needs, preferences, and behaviours. This can be done through user interviews, surveys, focus groups, and other research methods.
2. Define the Problem: Based on the user research, designers define the problem they are trying to solve. This includes identifying the user's pain points, needs, and desires.
3. Ideate Solutions: In this stage, designers brainstorm ideas for solutions to the problem.
4. Prototype and Test: Once designers have a range of potential solutions, they create prototypes and test them with users. This allows them to get feedback on the designs and make improvements before finalising the product.
5. Implement: After the testing phase is complete, designers can implement the final design.

The research includes a follow-up survey regarding the participatory mapping results and the activity experience. This will act as a validation step, as it includes various process and outcome criteria to evaluate effectiveness. In theory, a follow-up survey “provides a means to assess consistency with plan assumptions” (Brown & Reed, 2022). In a similar light to the previous survey, the participants will be asked a series of introductory questions. To better assess the opinions of the results, a number of constructs will be devised. The research process involved three key activities: the development of preparatory materials, interviews with key stakeholders, and a stakeholder workshop.

- Developing preparatory materials.
- Interviews.

- Workshop event.

Initial stakeholder meetings are also going to provide fruitful input from community representatives, local authorities, business associations shaping the activity's details based on their visions for the future. This action is going to act as a baseline to check which aspects of the activity needed to be reconsidered in order to effectively engage and display their input.

Use Case Scenario Design

Scenario-based design (SBD) (Carroll, 1997) is a method for envisaging and developing new technology-based systems for work or leisure. It extends previous work in soft systems (Checkland & Scholes, 1999), socio-technical and cooperative design and the application of ethnography to system design. SBD is one of a range of methods adopted as part of User Centred Systems Design and Design Based Research where computer systems developers, topic experts and potential users work together to envision and design future human–technology systems (people interacting with technologies) which are then developed through an iterative cycle of implementation and user testing. SBD starts with the writing of short narrative descriptions of how people might interact with technology in the future. The systems designers in consultation with potential users, normally write each narrative, or scenario. It is told from the perspective of a typical user and describes a series of events that include the social setting, interactions with the technology, resources, constraints and background information. The aim is to produce a compelling and informative short story that illustrates the typical user's goals, activities and context (MacCabe et al., 2012).

The value of a user scenario is that it acts as a bridge between designers and stakeholders in the project, providing an informative 'day in the life' of a typical user of some future technology while indicating to systems developers the social and contextual factors that need to be considered in developing the new technology. The scenario then becomes a 'design object' that can be extended or revised as the technology is developed (MacCabe et al., 2012). It might directly inform specification of the new technology or provide a more general indication of how designers and stakeholders view the impact of new technology on everyday activity.

The GreCO platform is designed to support a diverse range of stakeholders within the Municipality of Elliniko-Argyroupoli area. Each stakeholder has its unique needs, goals, and challenges. From SMEs owners who are striving to improve their visibility and revenue, to tourists seeking authentic cultural experiences, GreCO app and website will offer tailored tools and smart digital services that enable sustainability, connectivity, and economic balance across the region of Elliniko. The use case scenarios that are developed on this project, are going to illustrate how different users interact with the GreCO system. Each scenario reflects a practical, real-world journey, highlighting how the app adapts to the everyday routines and ambitions of its users. Whether the goal is business growth, cultural promotion, environmental monitoring, or personal exploration, GreCO serves as a unifying digital ecosystem that brings value to both local stakeholders and visitors alike. By integrating user-friendly features such as AR-guided cultural tours, live environmental data, performance analytics, and educational content, GreCO not only simplifies operations but also empowers users to contribute to a more inclusive, sustainable, and vibrant local economy.

Persona & Journey Design

The next step was to define the key personas for each pilot case, and to develop the user journeys for each persona. Personas are fictional characters that represent the various user types, needs, and behaviours of a product or service's target audience (LeRouge et al., 2013). They are used to create a deeper understanding of the users' needs, goals, motivations, and pain points. Personas help to humanise the design process, making it easier to empathise with users and to create designs that are more intuitive and user-friendly. The personas in GreCO included information on the user's demographic situation, their goals, frustrations and pain points, the technologies and tools they use, and representative quotes related to their role in GreCO.

For each persona, the main user journey was developed. A user journey is the series of steps that a user takes to achieve a particular goal or complete a task within a product or service. It involves mapping out the user's experience from their initial point of contact with the product or service, through each interaction and touch point, up to the successful completion of their goal. User journeys are important for designing user-centred experiences because they help designers and product teams understand the user's perspective and identify areas for improvement in the design.

By mapping out the user journey, designers can gain insight into how users interact with the product or service, identify opportunities for optimising the user experience, and create designs that are more intuitive, user-friendly, and satisfying.

The user journeys in GreCO monitored the steps and touch points of each persona while performing their tasks. The persona's emotions and context, as well as the related stakeholders were also depicted in the user journeys. This facilitated the identification of the pain points in each journey, and the opportunities for improvement by adopting the GreCO technologies in each case.

Personas were developed as a design process methodology, that is used by designers to understand, focus, and clarify user aims and needs. While some variation in the application and creation of personas exists, some attributes, such as a name, a photo, a set of goals, and "a narrative that covers mental model, environment, skills, frustrations, attitudes, typical tasks, and any other factors that seem critical to understanding the behavior pattern," are consistent across most persona theories (Goodwin, 2009). While some persona experts acknowledge that occasionally it is necessary due to budgetary and time constraints to develop personas based solely on designer anticipations, stakeholder expectations, and subject matter expert opinions, most persona experts recommend doing empirical fieldwork in the form of end-user interviews or observations to create data-driven personas (Goodwin, 2009). Designers then assess the data to identify commonalities and patterns in the data, and develop a single persona with a reasonable name, a realistic photo, a set of goals, and a narrative that accurately presents critical aspects of the persona in a memorable way (Goodwin, 2009).

However, personas are steadily becoming a standard user centered method, and persona method advocates claim that personas have benefits that simple data aggregation does not have. Perhaps the most cited benefit of personas is their ability to facilitate communication (Pruitt & Grudin, 2003). Personas can "help...focus stakeholders on relevant issues", "diffuse conflict or disagreement among team members when discussing possible design solutions", establish "a common language with which to talk about users meaningfully", and are "excellent tools for summarizing...research data because they let stakeholders 'meet' the interviewers by proxy" (Friess, 2012).

The persona could be developed and used as a role-played in order to visualize the needs and goals that users have of the e-service in a specific use context. The persona can moreover be documented and thus be a conceptualized representation of the intended user group. A documented persona is a conceptualization of real users and are often selected to represent a imaginary person. This narrative has three purposes:

- first, to make the persona seem like a real person;
- second, to provide a vivid story concerning the needs of the persona in the context of the product being designed;
- and third, to function as a vehicle to communicate user needs and requests to the developer.

For the persona to become a research device, it needs to be enlisted in and aligned with the purposes of research. How the persona is configured, what decisions are made about the sites, digital objects, activities and connections that make up the persona, depends on the research question and objectives. The research persona can involve research techniques to obtain otherwise unavailable data and insights. In social research, personas can be used to study spaces and processes that would otherwise be difficult to access. Moreover, conceptual work is needed for mapping different problem areas requiring social change, then ideating ways personas could be part of solutions to socio-technical problems (Salminen et al., 2022).

STAKEHOLDER NEEDS AND REQUIREMENTS

User requirements describe how a future product or service is able to help future users to achieve their aims both effectively and efficiently (the definition of usability in ISO 13407: 1999). So, user requirements by definition, include data & information about those particular user needs that are selected and that are satisfied by the future product/service (Shi, 2022). Most of the times, the users are not in position to identify what they need, they cannot manage their needs and expectations, and they are not aware about the technical possibilities or the potential costs of their requests.

According to previous researches, it has been proved that in order to identify the needs of stakeholders and embody them into the formative stage of a project, it is necessary to manage the stakeholders in a way to express their needs, views and expectations in an appropriate forum (Heywood & Smith, 2006). Based on the previous statement, the model “Strategic Need Analysis (SNA)” has been developed to assist tourists, stakeholders and their design teams in determining their strategic needs for a given project (Smith & Love, 2004). The SNA process is simple and based on the engagement of as many important stakeholders as is possible. The group of GreCO project includes:

- SMEs,
- Policymakers,
- Cultural Organisations/NGOs,
- App Users (Inbound tourist – Culture Lover),
- App Users (Inbound tourist – Ancient Culture Lover),
- App Users (Traveller – Food lover),
- App Users (Local/Citizen – Adventure lover - Connection with locals).

The SNA model involves all the significant stakeholders at three levels, which consist of briefings, seminars and workshops.

- Level 1, briefing is conducted in the form of seminars and workshops.
- Level 2, participants will be involved in developing alternative strategies for the achievement of corporate missions,
- Level 3, participants will develop a detailed performance brief for the project implementation.

The outcome of SNA is in developing a comprehensive performance brief to guide project team members to develop the project within adequate parameters (Smith & Love, 2004).

Stakeholder Engagement Techniques

The stakeholder engagement strategy in the GreCO project is grounded in User-Centered Design (UCD) and participatory planning methodologies, ensuring that the technological, social, and cultural components of the GreCO platform are co-created with the very users and stakeholders who will benefit from it (Emma, 2004). The following techniques were applied in order to define, refine, and prioritize user requirements and needs:

Participatory Mapping and Co-Design Workshops

To ensure early and consistent engagement, a series of participatory workshops were conducted with representatives from diverse stakeholder groups (as mentioned in the previous section) (Sauter & Loss, 2021). These sessions were structured using scenario-based design (SBD) and storyboarding exercises, allowing participants to visualize future interactions with the GreCO platform (Carroll, 1997). Participants were encouraged to share their own mobility and cultural experience patterns and to collaboratively identify frictions and opportunities in current tourism services. Their inputs shaped the user journeys, identified key touchpoints, and contributed to the refinement of digital feature proposals.

Semi-Structured Interviews

Key informant interviews were conducted with strategic stakeholders, particularly policymakers, tourism experts, urban mobility planners. These interviews helped uncover complex, often latent requirements related to governance, environmental monitoring, data privacy, and digital transformation (Adeoye-Olatunde & Olenik, 2021). The interviews followed an open-ended format but were guided by thematic categories aligned with GreCO's pillars: sustainability, cultural integration, digital innovation, and citizen empowerment.

Persona Validation and Use Case Walkthroughs

Based on the personas developed in the previous deliverable, this phase conducted validation sessions with real people in order to match the persona profiles. Participants reviewed and validated the personas and their journeys. Iterative refinements were made based on their feedback.

Iterative Feedback Loops and Requirement Prioritization

As all these new inputs were collected by the partners, this deliverable gathered them and developed them into a User Requirement Table. The above process that partners followed ensured a coherent and user-aligned roadmap, where features were validated by different aspects of view.

General Categories of User Requirements

It is truly important to identify firstly the user needs that stakeholders may have, because their needs are considered to be the first and most important data that will be used in order to extract the requirements. The requirements engineering cycle can be seen as the process by which user needs are converted to user requirements. Thus, user needs form the basis for the rest of the product development; they represent problems that hinder users in achieving their goals, or they represent opportunities to improve the likelihood of users' achieving their goals. An important factor affecting user needs is the context of use, which includes users, tasks, equipment, and the physical and social environments in which a product is used (Maguire, 2001).

The user requirements for the GreCO platform are organized into a set of general and diverse categories, each representing a core functional of the system. These categories are the product of an extensive engagement process and reflect the needs of GreCO's diverse stakeholder groups, including tourists, local residents, SMEs, policymakers, and cultural organizations. These general categories are not only thematically structured but also strategically aligned with the GreCO project's objectives. Needs and expectations of different types of customers groups are demonstrably different. The expectations of the stakeholders are shaped not only by their unique experiences of tourism destinations but also by their day-to-day experiences of other services, hotels, museums etc. The user requirements categories that were identified, are:

1. Multilingual login & profile management (Registration, login via multiple channels e.g. email, Google, WeChat, and user preference profiling).
2. Route suggestions & re-routing (Thematic route suggestions based on user profile and interests, with possible re-routing due to environmental data or other criteria).
3. Environmental data & alerts (Live overlays and alerts for pollution/noise thresholds; visualizing environmental impact of user behavior).
4. Chatbot & communication support (Multilingual chatbot to support navigation, service queries, and cultural bridging).
5. Feedback & rewards system (User feedback collection, reward generation, eco-profile display, and gamified incentives).
6. POI discovery & personalization (Browsing and discovering Points of Interest – POIs by category and cultural tags, tailored to user profiles).
7. Stakeholder dashboard & content management (SMEs, NGOs, and cultural entities can register, manage content, view feedback, and offer promotions).
8. Policy dashboard & reporting tools (Municipality access to KPIs, sustainability indicators, engagement metrics, and event uploads).
9. Augmented Reality & cultural layer (AR features linked to POIs for storytelling, gamification, and cultural context tailored to different backgrounds).
10. Transport integration & navigation support (Live public transport data - bus itineraries, route guidance, and carbon savings estimations).

KPI FRAMEWORK DEVELOPMENT

The selection of Key Performance Indicators (KPIs) for the GreCO project follows a structured, multi-layered methodology that ensures alignment with stakeholder expectations, system requirements, and the overarching strategic objectives of the project. As GreCO aims to transform Elliniko–Argyroupoli and the partner transfer cities into sustainable, inclusive, and culturally rich urban tourism destinations, it is essential that its evaluation framework captures the real impact of the implemented solutions.

The first step in KPI development involved reviewing the user needs and requirements identified in previous section, where stakeholder groups articulated their priorities through interviews, participatory mapping, co-design

workshops, and iterative feedback loops. These needs were categorized into thematic domains. From these requirement categories, the project extracted measurable expectations that could be translated into KPIs. By grounding indicators in stakeholder expectations, the KPIs remain user-centered, contextually relevant, and representative of real-world priorities, ensuring that evaluation measures what stakeholders genuinely value. To ensure consistency, comparability, and evaluability, all KPIs were formulated according to the SMART framework—Specific, Measurable, Achievable, Relevant, and Time-bound (E Ishak et al., 2019). This approach was essential for narrowing broad stakeholder requirements into actionable metrics that could support monitoring and decision-making.

- **Specific:** Each KPI clearly links to a particular use case, requirement, or GreCO objective (e.g., “increase cultural site visitation by 25%”).
- **Measurable:** Indicators were defined with quantifiable metrics (e.g., number of app interactions, environmental sensor readings, stakeholder participation counts).
- **Achievable:** Values reflect realistic improvement trajectories based on baseline assessments and technological capabilities of WP7 partners.
- **Relevant:** KPIs directly contribute to GreCO’s intended short- and long-term impacts such as sustainable tourism, enhanced visitor experience, and cultural appreciation.
- **Time-bound:** KPIs include target deadlines aligned with the project timeline, such as mid-term checks and final evaluation milestones.

Applying SMART criteria ensured that KPIs are not aspirational but operational, enabling systematic observation, verification, and adjustment throughout the project’s lifecycle. The mapping of user and system requirements to KPIs followed a structured prioritization logic, where each requirement was assigned a High, Medium, or Low priority based on its relevance to stakeholder needs, its impact on the GreCO platform’s functionality, and its importance for achieving the project’s strategic objectives.

High-priority requirements were directly translated into core KPIs. These KPIs represent essential performance dimensions that must be systematically measured to validate the success of the project. For example, high-priority requirements related to environmental stress mitigation were mapped to KPIs monitoring real-time pollution levels or reductions in congestion, while requirements emphasizing user experience informed KPIs on satisfaction scores, app usability metrics, and cultural route engagement.

Medium-priority requirements were mapped to KPIs that hold supporting or enabling roles within the evaluation architecture. These indicators provide contextual insights or measure intermediate outcomes that influence the core KPIs. While not directly critical to the project’s transformative goals, these KPIs help the consortium understand behavioral patterns, optimize design decisions, and refine the platform’s performance across diverse user groups.

Low-priority requirements, typically associated with non-essential features or future enhancements, were not excluded but instead mapped to monitoring KPIs that allow for long-term observation without imposing strict performance expectations. These KPIs often measure exploratory aspects of user interaction or optional system attributes that may inform scalability or transferability in later project stages. This tiered approach ensures that evaluation efforts remain focused and resource-efficient, while still maintaining a comprehensive view of system performance. It also provides a flexible framework where low-priority indicators may be elevated if project context or stakeholder needs evolve.

Baseline & Evaluation Protocol

The Baseline & Evaluation Protocol establishes the methodological foundation for assessing GreCO’s performance across its use cases and strategic objectives. Building on the KPI framework, this section outlines the baseline values, how data will be collected and validated, and how the consortium will evaluate progress throughout the project lifecycle. The protocol ensures consistency, comparability, and accountability, enabling GreCO to measure not only its outputs but its real-world impact on sustainable tourism, cultural engagement, environmental resilience, and stakeholder participation.

The first step of the evaluation process is the establishment of baseline indicators, which represent the “starting point” against which all future progress will be measured. The evaluation framework follows a continuous monitoring

model, integrating both periodic and event-driven assessments. Periodic evaluations will occur at predefined milestones—such as prototype deployment, pilot operation phases, and full implementation—allowing for longitudinal comparison of KPI performance. Event-driven evaluations will be triggered by key use case activations, system updates, or significant environmental or tourism flow changes. This dual approach ensures that the consortium can detect both gradual improvements and rapid shifts in system performance.

Finally, the evaluation protocol includes mechanisms for adaptive learning, ensuring that KPI interpretation evolves alongside stakeholder needs, system maturity, and real-world tourism dynamics. If baselines or targets require recalibration due to unforeseen circumstances—such as environmental events, policy shifts, or user behavior variations, partners will use iterative feedback loops to update assumptions and measurement approaches. These adaptations will be documented to ensure transparency and replicability. The protocol therefore supports GreCO’s broader aim: not only to measure impact but to create a dynamic, data-driven evaluation culture that strengthens sustainable tourism planning beyond the project’s lifespan.

Establishing initial baseline values is a critical step in the evaluation process, as these baselines serve as the reference point against which all future KPI measurements will be compared. Baselines provide a clear picture of the “pre-GreCO” condition for each indicator, enabling the consortium to quantify progress, identify gaps, and assess the real impact of the implemented interventions. Given that GreCO introduces new digital tools, augmented reality experiences, and data-driven services not previously available in the participating cities, several KPIs will naturally have a zero or undefined baseline prior to deployment. In these cases, the baseline will be established during the pilot testing period, allowing the consortium to observe initial interaction levels and system behaviors before setting meaningful performance targets. This phased approach ensures that baselines remain realistic, context-sensitive, and empirically grounded, forming a robust foundation for evaluating the platform’s evolution throughout the project lifecycle.

Evaluation Methodology

The evaluation timeline for GreCO is designed to follow the phased development and deployment of the platform, ensuring that KPI measurement occurs systematically throughout the project lifecycle. Evaluation activities begin with the establishment of baseline values during the early stages of prototype testing and initial system rollout. These early measurements capture the first indicators of user engagement, environmental data integration, AR interactions, and stakeholder activities, forming a reference point for subsequent comparisons. As the platform matures, additional evaluation milestones are scheduled to coincide with the deployment of core functionalities, pilot testing in Elliniko–Argyroupoli, and later implementation in the transfer partner cities. This phased timeline ensures that KPIs are assessed under real operating conditions and can be compared across different user groups, environmental contexts, and tourism patterns.

The evaluation method integrates continuous monitoring, periodic assessment, and event-driven analysis, providing a comprehensive understanding of GreCO’s performance. Continuous monitoring captures real-time data streams produced by the system—such as environmental thresholds, route selections, chatbot interactions, AR usage, and transport queries—allowing the consortium to observe trends and identify emerging issues as they occur. Periodic assessments are organized at key project milestones, including quarterly internal reviews, the mid-term assessment, and the final evaluation. During these intervals, partners will analyze KPI progress relative to baseline values and targets, assess the effectiveness of interventions, and identify areas requiring refinement. This mixed approach ensures both short-term responsiveness and long-term strategic evaluation. Data collection for the evaluation relies on clearly defined roles across consortium partners, ensuring methodological rigor and reliability.

The evaluation method also incorporates iterative feedback loops, allowing KPI interpretation and measurement processes to evolve as new insights emerge. For example, if early monitoring reveals unexpected user behavior patterns, shifts in environmental conditions, or differing levels of digital readiness across stakeholder groups, the consortium may adjust measurement frequency, refine targets, or introduce complementary indicators. This adaptive evaluation approach ensures that the methodology remains responsive to the dynamic nature of urban tourism, seasonal variations, and technological maturity. All adaptations will be documented to maintain transparency and support knowledge transfer to partner cities.

Ultimately, the evaluation timeline and method ensure that GreCO’s impact is measured in a consistent, evidence-based manner, while remaining flexible enough to reflect real-world complexities. By combining continuous analytics, periodic assessments, and adaptive learning mechanisms, the evaluation framework provides a robust foundation for demonstrating the project’s contributions to sustainable tourism, cultural engagement, environmental protection, and community participation. This systematic approach ensures that KPIs are not merely indicators of performance, but meaningful tools for guiding strategy, improving system design, and reinforcing GreCO’s long-term sustainability vision.

To ensure consistency, clarity, and accountability in the evaluation of GreCO’s Key Performance Indicators, the consortium adopts a unified procedure that defines how KPI data will be collected, validated, monitored, and interpreted throughout the project lifecycle. KPI measurements will follow a structured timeline that includes four principal periods: the baseline period, operational monitoring, quarterly reviews, and major milestone evaluations. The baseline period occurs before or during the pilot deployment and establishes the initial values of all indicators, using historical municipal datasets, stakeholder surveys, prototype analytics, and environmental data. Once the system becomes operational, KPI data will be monitored continuously through the platform’s automated logs and sensor feeds. These continuous observations support early detection of issues and provide a detailed view of system performance in real time. In addition to continuous monitoring, partners will conduct quarterly reviews, during which KPI progress is assessed collectively, data completeness is verified, and any deviations from expected trends are analyzed. The baseline and quarterly review cycles are complemented by two major project-wide assessments: a mid-term evaluation and the final evaluation at the end of the project, both of which synthesize KPI outcomes into broader impact reporting.

To ensure clarity, consistency, and accountability in KPI assessment, GreCO establishes a unified internal procedure governing data collection, measurement periods, quality assurance, and partner collaboration across the consortium.

Table 1: KPI Internal procedure.

Period Type	Frequency	Purpose
Baseline Period	Before or during pilot deployment	Establish initial KPI values using historical datasets, prototype analytics, and stakeholder feedback.
Operational Monitoring	Continuous (automated logs, sensor data, user interactions)	Track system performance in real time for early detection of issues.
Quarterly KPI Review	Every 3 months	Consortium-wide review of KPI progress, data validation, and corrective actions.
Mid-Term Evaluation	Month 21	Validate progress against expected targets, recalibrate baselines if necessary, and update methodology.
Final Evaluation	Months 40–42	Consolidated impact assessment across all KPI categories and partner cities.

All KPI-related data collection follows a standardized internal procedure that requires partners to use consistent extraction methods, validation checks, and documentation practices.

DISCUSSION & CONCLUSION

The findings presented in this study demonstrate the importance of integrating stakeholder engagement, user-centered design methodologies, and KPI-driven evaluation mechanisms into the development of smart tourism ecosystems. The proposed framework, developed within the GreCO project, highlights how participatory approaches can be systematically translated into concrete system requirements and measurable performance indicators. By actively involving tourists, local residents, SMEs, cultural organizations, and policymakers throughout the design process, the framework ensures that the resulting digital ecosystem addresses real user needs while supporting broader sustainability and cultural objectives.

A key contribution of the study is the establishment of a structured connection between stakeholder needs, system functionalities, and performance evaluation. The results indicate that combining requirements engineering techniques with participatory design practices improves the relevance, usability, and acceptance of smart tourism solutions. Furthermore, the KPI framework provides a practical mechanism for monitoring project progress, measuring impacts, and supporting evidence-based decision-making throughout the lifecycle of the platform. The adoption of SMART indicators and continuous evaluation procedures enables project partners to assess outcomes systematically and adapt interventions when necessary.

The research also underscores the importance of interdisciplinary collaboration in smart destination development. Sustainable tourism challenges cannot be addressed solely through technological innovation; they require coordinated efforts among public authorities, local communities, businesses, researchers, and technology providers. The GreCO approach demonstrates how digital technologies, environmental monitoring, cultural heritage promotion, and participatory governance can be combined within a unified ecosystem that creates value for both visitors and local stakeholders.

In conclusion, this study proposes a comprehensive and replicable framework for the design, implementation, and evaluation of smart tourism ecosystems. The framework contributes to both research and practice by offering a structured methodology that aligns stakeholder expectations, system requirements, and performance measurement processes. As cities increasingly seek to balance tourism growth with sustainability and quality of life objectives, the GreCO framework provides valuable guidance for developing adaptive, data-driven, and citizen-centered tourism solutions. Future research should focus on longitudinal assessments of platform impacts and explore how emerging technologies, such as artificial intelligence, digital twins, and predictive analytics, can further enhance sustainable destination management and stakeholder engagement.

REFERENCES

- Adeoye-Olatunde, O. A., & Olenik, N. L. (2021). Research and scholarly methods: Semi-structured interviews. *Journal of the American College of Clinical Pharmacy*, 4(10), 1358-1367.
- Blank, S., 2020. The four steps to the epiphany: successful strategies for products that win. John Wiley & Sons.
- Brown, G., Kyttä, M., & Reed, P. (2022). Using community surveys with participatory mapping to monitor comprehensive plan implementation. *Landscape and Urban Planning*, 218, 104306.
- Carroll, J. M. (1997). Scenario-based design. In *Handbook of human-computer interaction* (pp. 383-406). North-Holland.
- Checkland, P., & Scholes, J. (1999). *Soft systems methodology in action*. John Wiley & Sons
- Dirin, A., & Nieminen, M. (2014). Framework for addressing usability and user experience in m-learning. *J. Comput.*
- E Ishak, Z., Fong, S. L., & Shin, S. C. (2019, October). SMART KPI management system framework. In *2019 IEEE 9th International Conference on System Engineering and Technology (ICSET)* (pp. 172-177). IEEE.
- Emma, L. (2024). User-centered design to enhance accessibility and usability in digital systems
- Friess, E. (2012, May). Personas and decision making in the design process: an ethnographic case study. In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 1209-1218).
- Georgopoulos, N., Katsanakis, I., Kopanaki, E., Varelas, S., Stroumpoulis, A., Anastasopoulos, I., Konstantopoulou, C., Klada, N. and Tsoupros, G., 2025. Bridging Visitors' and Residents' Perspectives in Destination Planning: A Sustainability and Governance Case Study of Piraeus Port. *Tourism and Hospitality*, 6(4), p.196.
- Goodwin, K. *Designing for the digital age: how to create human-centered products and services*. Wiley, Indianapolis, IN, 2009.
- Heywood, C. and Smith, J., 2006. Integrating stakeholders during community FM's early project phases. *Facilities*, 24(7-8), pp.300-313.

- LeRouge, C., Ma, J., Sneha, S. and Tolle, K., 2013. User profiles and personas in the design and development of consumer health technologies. *International journal of medical informatics*, 82(11), pp.e251-e268.
- Maguire, M., 2001. Context of use within usability activities. *International journal of human-computer studies*, 55(4), pp.453-483.
- McCabe, S., Sharples, M., & Foster, C. (2012). Stakeholder engagement in the design of scenarios of technology-enhanced tourism services. *Tourism Management Perspectives*, 4, 36-44.
- Pruitt, J., & Grudin, J. (2003, June). Personas: practice and theory. In *Proceedings of the 2003 conference on Designing for user experiences* (pp. 1-15).
- Salminen, J., Wenyun Guan, K., Jung, S. G., & Jansen, B. (2022, April). Use cases for design personas: A systematic review and new frontiers. In *Proceedings of the 2022 CHI Conference on human factors in computing systems* (pp. 1-21).
- Sauter, A., & Loss, J. (2021). Capacity building in participatory stakeholder groups: results from a German research consortium on active lifestyles. *Health promotion international*, 36(Supplement_2), ii65-ii78.
- Shi, Y., 2022. Definition of customer requirements, function requirements, and product structures based on big data and data mining methods.
- Smith, J. and Love, P.E., 2004. Stakeholder management during project inception: Strategic needs analysis. *Journal of architectural engineering*, 10(1), pp.22-33.
- Srinivasan, S., SHerkar, A., Jayamani, J., Indora, A. and Mukherjee, R., 2024. Tourism innovation and the role of technology in enhancing visitor experiences. *Educational Administration: Theory and Practice*, 30(4), pp.1506-1513.

BUILDING TRUST IN DIGITAL TIMES: A CRM FRAMEWORK TO ENGAGE YOUNG PROFESSIONAL WEALTH ADVISORY CLIENTS

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ABSTRACT

As wealth management undergoes digital transformation, firms struggle to engage young professionals aged 30–45 who exhibit fundamentally different expectations than traditional clients. Drawing on Commitment-Trust Theory and employing thematic analysis of interviews with 40 young professionals in South Africa, this study develops a comprehensive customer relationship management (CRM) framework tailored to this demographic. Eight key themes emerged: evolving value propositions emphasising holistic financial guidance over product sales; trust as the foundational relationship element built through transparency and competence; preference for hybrid digital–human service models that balance efficiency with personalised advice; significant barriers to engagement including fee scepticism and wealth-threshold misconceptions; personalisation as the primary competitive differentiator; financial education as a critical relationship-building tool; specific communication frequency and quality expectations; and referral behaviour driven by demonstrated results. The findings reveal that effective CRM for young professionals requires moving beyond transaction-focused approaches toward relationship-centric strategies that acknowledge digital preferences while maintaining human touchpoints for complex decisions. This research contributes theoretically by extending Commitment-Trust Theory to digitally native wealth-management contexts and practically by providing actionable insights for firms seeking to attract and retain this strategically important demographic segment.

Keywords: Customer Relationship Management, wealth advisory services, young professionals, trust, commitment.

INTRODUCTION

The global wealth-management industry is undergoing a significant transformation driven by technological disruption, changing client demographics, and evolving service expectations (Eckardt & Spies, 2025). Young professionals aged 30–45 – late Millennials and early Generation X – represent a strategically critical demographic, poised to inherit substantial wealth while simultaneously building their own assets during peak earning years. This cohort differs fundamentally from traditional clients. They exhibit greater digital literacy, demand fee transparency, and approach financial advice with informed scepticism shaped by having witnessed multiple financial crises.

Despite the strategic importance of this cohort, existing CRM scholarship in financial services remains insufficient for guiding firm practice in three respects. First, the 30–45 segment has predominantly been treated as undifferentiated within a broader ‘Millennial’ category, obscuring the distinctive relationship expectations and service preferences of affluent young professionals at peak earning and wealth-accumulation stages (EY, 2024). Second, the bulk of empirical work has been conducted in developed-market contexts, leaving emerging-market dynamics – including regulatory transformation, digital financial services adoption, and demographic wealth transitions – comparatively underexamined (Henley & Partners, 2024). Third, while Commitment-Trust Theory (Morgan & Hunt, 1994) remains the dominant theoretical lens for relationship marketing in financial services, its application to digitally native client cohorts has been limited, and the mechanisms through which digital nativity reshapes the trust–commitment pathway are under-theorised. The research problem this study addresses is, therefore, as follows: how can wealth-management firms in an emerging-market context develop CRM strategies that build trust and commitment among young professional clients whose service expectations diverge from those of the cohorts for which existing CRM models were designed?

The study pursues four research objectives: (1) to explore how young professionals conceptualise wealth-adviser value propositions; (2) to understand the factors driving trust and commitment formation; (3) to identify preferred service-delivery models and touchpoints; and (4) to describe effective CRM strategies across the client lifecycle. Grounded in Commitment-Trust Theory (Morgan & Hunt, 1994), the investigation employs a qualitative methodology to uncover the nuanced expectations and relationship dynamics that characterise young professional–wealth adviser interactions.

Theoretically, the study contributes to relationship-marketing scholarship by extending Commitment-Trust Theory to a digitally native, emerging-market context and by identifying generation-specific antecedents of trust, namely digital service integration, fee transparency and the delivery of educational value, that were not foregrounded in the original framework. The study further surfaces age-specific mediators of commitment, including life-stage personalisation and the preference for hybrid digital–human service delivery, that modify the conventional trust–commitment pathway for the 30–45 cohort. In practice, the resulting integrated CRM framework provides actionable, evidence-based guidance for wealth-advisory firms seeking to engage this strategically important segment throughout the client lifecycle.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

The South African Wealth-Management Context

South Africa’s financial services sector ranks among the most sophisticated on the African continent and is overseen by the Financial Sector Conduct Authority (FSCA), which enforces comprehensive market conduct and consumer protection regulations (FSCA, 2024). The country’s wealth landscape is evolving rapidly: Africa’s millionaire population is projected to grow by approximately 65% over the next decade, with South Africa remaining a primary wealth hub on the continent (Henley & Partners, 2024).

However, younger South Africans (aged 18–49) demonstrate significantly lower engagement with financial advisers than older cohorts, preferring online sources and personal networks for financial guidance (EY, 2024). This engagement gap presents both a challenge and an opportunity for wealth-management firms. The average financial-adviser client is reported to be approximately 55 years old (Statista, 2024) – a demographic reality that demands a strategic focus on acquiring younger clients to ensure long-term business sustainability. The South African context thus provides an instructive setting for investigating young-professional engagement strategies in emerging wealth markets.

Customer Relationship Management in Wealth-Advisory Services

CRM in wealth-advisory contexts differs fundamentally from retail-banking CRM owing to the complexity, intimacy and bespoke service requirements of wealth-advisory relationships. Three characteristics distinguish wealth-advisory CRM: a) relationships are prolonged and intense, often spanning decades and involving frequent, intimate financial discussions; b) services are highly customised to individual circumstances rather than standardised products; and c) the advice carries significant consequences, affecting clients’ long-term financial security and life goals (Aung et al., 2024; Coffi & George, 2022).

Wealth-management CRM has evolved through three stages. The transactional stage (2000–2010) focused on contact management and product tracking. The relational stage (2010–2020) emphasised building long-term relationships through enhanced personalisation and holistic advice. The current stage of digital transformation integrates advanced analytics, artificial intelligence, and omnichannel engagement while maintaining human advisory relationships (Liu & Aaker, 2008).

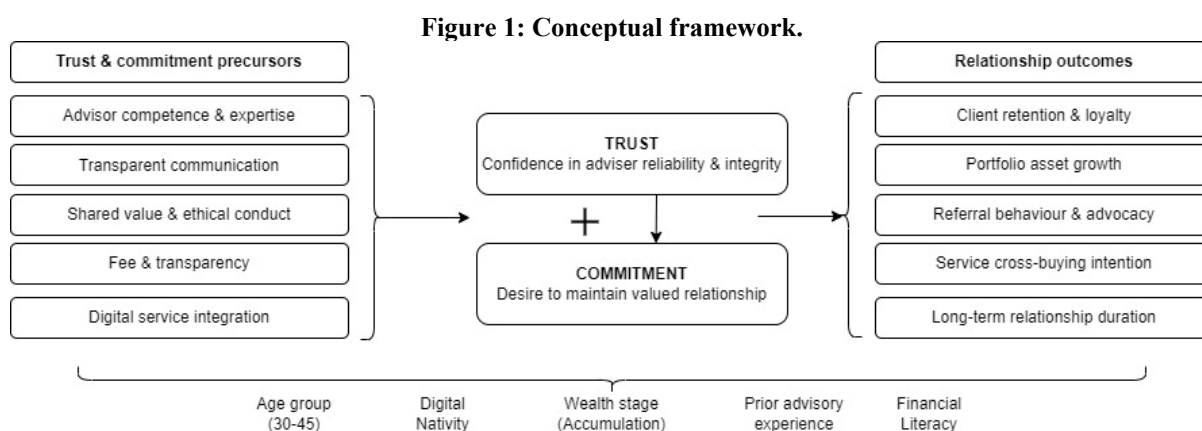
Empirical research identifies critical CRM success factors, including increasing customer lifetime value, reducing churn and enhancing satisfaction through personalised service (Yuliasih et al., 2025). However, a significant gap exists in relationship expectations across generations. Traditional CRM was designed for baby boomers, who preferred in-person meetings and phone communication. Young professionals demand seamless digital experiences, transparent fee structures and on-demand access to information, while still valuing human expertise for complex

decisions. Effective CRM for this demographic must therefore reconcile personalisation with scalability, technological sophistication with the human touch, and efficiency with relationship depth.

The Commitment-Trust Theory of Relationship Marketing

Morgan and Hunt's (1994) Commitment-Trust Theory posits that successful relational exchanges depend on two key mediating variables: commitment and trust. Commitment represents an exchange partner's belief that the relationship is worth maintaining and warrants maximum effort. Trust exists when one party has confidence in the reliability and integrity of the exchange partner. The theory identifies five antecedents: relationship-termination costs, relationship benefits, shared values, communication quality and opportunistic behaviour.

Subsequent research confirms that trust and commitment significantly predict customer loyalty, though their relative importance varies by industry (Palmatier et al., 2006). In financial services, trust assumes particular importance owing to information asymmetry, risk exposure and the intimate nature of financial discussions. The theory's application to wealth-advisory relationships suggests that advisers must systematically build trust through demonstrated competence, ethical behaviour and transparent communication, while fostering commitment through consistent value delivery and a shared long-term financial-planning vision. For young professionals, these trust-building mechanisms may differ from traditional approaches, requiring investigation of generation-specific drivers of trust and commitment in digital wealth-management contexts. Figure 1 depicts the conceptual framework of CRM strategies for young professional wealth-advisory clients, grounded in the study's theoretical foundations.



Source: Author's conceptualisation based on the Commitment-Trust Theory of Relationship Marketing (Morgan & Hunt, 1994).

The framework extends the Commitment-Trust Theory of Relationship Marketing (Morgan & Hunt, 1994) to young professional wealth-advisory contexts, positioning trust and commitment as central mediating variables linking relationship antecedents to loyalty outcomes. The framework acknowledges the distinctive characteristics of digitally native younger clients (aged 30–45) in emerging-market settings characterised by digital financial-services adoption and regulatory transformation.

Young Professionals as a Distinct Wealth-Advisory Segment

Young professionals aged 30–45 represent a demographically and behaviourally distinct segment whose expectations differ fundamentally from those of traditional clients. Cerulli Associates projects that between 2024 and 2045, approximately US\$84 trillion will transfer from baby boomers to younger generations, positioning Millennials and Generation Z as primary beneficiaries (Bank of America, 2024). This cohort comprises two sub-cohorts: a) inheritors prioritising capital preservation, and b) self-made wealth builders exhibiting greater risk tolerance (The Wealth Mosaic, 2024).

Digital nativity shapes service expectations profoundly. Having grown up with internet technology, young professionals expect seamless digital experiences, instant access to information and personalised service delivery.

However, research indicates that they do not desire fully automated advice; instead, they seek hybrid models that combine digital convenience with human expertise for complex decisions (EY, 2024). They value transparency in fee structures, expect educational content that empowers informed decision-making, and prefer advisers who communicate through multiple channels, including email, messaging apps and video calls, as well as traditional meetings.

Scepticism characterises this demographic's approach to financial services. Having witnessed the 2008 financial crisis, the European debt crisis and market volatility during their formative years, they exhibit heightened distrust of financial institutions and commission-based advice models (PwC, 2025). Many hold misconceptions about the wealth thresholds required to engage advisers, believing they lack sufficient assets even when they often meet minimum requirements. Overcoming this scepticism requires demonstrating genuine value, transparent communication about compensation structures, and education about service accessibility.

Life-stage considerations further distinguish this segment. Young professionals navigate complex financial decisions, including purchasing a first home, starting families, managing student debt, building emergency funds, and beginning retirement planning. Unlike older clients focused primarily on wealth preservation and estate planning, the 30–45 cohort requires holistic guidance balancing immediate needs with long-term wealth-accumulation goals. Understanding these generational characteristics, digital preferences, sources of scepticism and life-stage priorities is therefore essential for developing effective CRM strategies.

RESEARCH METHODOLOGY

Research Design

This study employed an interpretivist qualitative research design to explore young professionals' perceptions, experiences and expectations regarding wealth-advisory relationships. A qualitative methodology was deemed appropriate given the exploratory nature of the research and its focus on understanding subjective meanings and relationship dynamics that quantitative approaches would inadequately capture (Creswell & Creswell, 2018).

Data Collection

The study focused on young professionals aged 30–45 in South Africa. The justification for this audience is threefold. First, this cohort sits at the centre of the largest projected intergenerational wealth transfer in modern history, with approximately US\$84 trillion expected to transfer to younger generations between 2024 and 2045 (Bank of America, 2024), positioning them as the strategically most important emerging client segment for wealth-advisory firms. Second, evidence from emerging-market financial-services research indicates that this age band exhibits a pronounced engagement gap with traditional advisory channels (EY, 2024), making them an information-rich case for investigating the antecedents of relationships. Third, the cohort comprises both 'inheritors' and 'self-made wealth builders' (The Wealth Mosaic, 2024) – a heterogeneity particularly well suited to surfacing the trust and commitment dynamics theorised by Morgan and Hunt (1994) under conditions of digital nativity.

Participants were recruited in South Africa through a combination of professional networks (primarily LinkedIn), referrals from professional associations, and snowball sampling. Prior to inclusion, prospective participants completed a brief eligibility screen comprising four questions: (i) confirmation of age within the 30–45 band; (ii) gross annual income at or above the wealth-advisory engagement threshold defined for the study; (iii) South African tax residency; and (iv) willingness to discuss financial decision-making in writing via email. The sample was deliberately balanced across three subgroups – active wealth-advisory clients, former clients, and individuals who had never consulted an adviser – to enable simultaneous exploration of engagement, satisfaction, and barrier mechanisms within a single design.

Data were collected through semi-structured email interviews conducted in English, following a structured interview protocol with up to two follow-up rounds for clarification and to elicit greater depth. Email interviewing was selected to accommodate busy professionals' schedules and to elicit considered, written narratives (Creswell &

Creswell, 2018). Purposive sampling was used to identify information-rich cases meeting the eligibility criteria above, with sampling continuing until thematic saturation was attained.

Ethical clearance was granted by the institutional research ethics committee prior to fieldwork. All participants provided written informed consent, were assured of anonymity and confidentiality, and were informed of their right to withdraw at any stage without consequence. All data were stored on a password-protected institutional drive accessible only to the researcher. The final sample comprised 35 participants. Sample characteristics are presented in Table 1.

Table 1: Sample characteristics.

Characteristic	n	Percentage
Age range		
30–34 years	12	34%
35–39 years	11	31%
40–45 years	12	34%
Current adviser relationship		
Active client	15	43%
Former client	7	20%
Never consulted	13	37%

The interview protocol comprised open-ended questions aligned with the research objectives, exploring perceptions of wealth-adviser roles and value propositions; past experiences with financial advisers; information sources and decision criteria for adviser selection; product and service expectations; communication preferences; trust and relationship-quality evaluations; and suggestions for enhanced service delivery. Questions were designed to elicit detailed narratives rather than brief responses.

Data Analysis

Data were analysed using Braun and Clarke’s (2022) six-phase reflexive thematic analysis: (i) familiarisation through repeated reading of transcripts; (ii) generation of initial codes; (iii) searching for candidate themes; (iv) reviewing themes against the coded extracts and the full dataset; (v) defining and naming the final themes; and (vi) producing the report. Coding proceeded inductively but was theoretically informed by the Commitment-Trust framework, allowing both data-driven and concept-driven codes to surface. A coding log was maintained to document all coding decisions and code-revision rationales, and a reflexive journal was maintained throughout to interrogate the researcher’s assumptions, positionality and interpretive choices.

Trustworthiness was established through four complementary strategies (Lim, 2024; Ahmed, 2024; Kakar et al., 2023). Credibility was supported through prolonged engagement with the dataset, negative-case analysis examining disconfirming evidence, and triangulation across participants’ perspectives. Dependability was supported by transparent documentation of analytical decisions in the coding log and by maintaining a clear audit trail. Confirmability was supported through reflexive examination of the researcher’s assumptions and explicit grounding of interpretations in participants’ words. Transferability was supported through thick, contextual description of participants and setting, enabling readers to assess the applicability of the findings to other contexts.

RESEARCH FINDINGS

Analysis of participant interviews revealed eight interconnected themes characterising young professionals' perspectives on wealth-advisory relationships and preferred CRM approaches. These themes illuminate the complex interplay among digital expectations, trust requirements and relationship dynamics that shape this demographic's engagement with financial advisers.

Evolving Understanding of Adviser Value Proposition

Participants articulated a sophisticated understanding of wealth-adviser value extending beyond product sales to holistic financial guidance. One participant explained: "It's not about picking stocks – I can Google that. I need someone who understands my whole financial picture and helps me make sense of competing priorities." This holistic perspective emphasises strategic planning, behavioural coaching and life-stage guidance over transactional product recommendations. Young professionals seek advisers who function as strategic partners navigating complex decisions, rather than mere product distributors.

Trust as the Foundational Relationship Element

Trust emerged unanimously as the critical prerequisite for wealth-advisory relationships. Participants identified three trust dimensions: competence trust (technical expertise and market knowledge), integrity trust (honest recommendations prioritising client interests) and transparency trust (clear communication about fees, conflicts and limitations). One participant noted: "I need absolute confidence they're putting my interests first, not selling products for commissions." Trust-formation mechanisms included personal referrals, professional credentials, transparent fee structures and demonstrated expertise through educational content. Notably, young professionals actively research advisers online, expecting professional websites, educational resources and positive client testimonials before initial contact.

Digital–Human Hybrid Service Preferences

Contrary to stereotypes about digital natives' preferences for fully automated services, participants overwhelmingly preferred hybrid models that combine digital convenience with human expertise. They value digital tools for routine tasks – portfolio monitoring, document access, quick queries – but insist on human advisers for complex decisions, life transitions and strategic planning. As one participant explained: "I want the app for checking balances and uploading documents, but when I'm deciding about buying a house or changing jobs, I need to talk to a real person who understands my situation." This hybrid preference reflects recognition that, while technology enables efficiency, human judgment remains essential for nuanced financial decisions. Participants expect seamless integration between digital platforms and adviser interactions, not a choice between channels.

Barriers to Adviser Engagement

Non-client participants identified several barriers to engaging with advisers, despite recognising the potential value. The "wealth-threshold misconception" proved prominent – many believed they lacked sufficient assets to afford professional advice, with one stating: "I thought you needed millions to have a financial adviser." Fee scepticism constituted another significant barrier, with concerns about hidden costs and commission-based recommendations undermining trust. Some participants felt intimidated by perceived complexity, fearing judgment about past financial decisions. Time constraints and difficulty finding advisers who understand young professionals' needs further inhibited engagement. These barriers suggest that wealth-management firms must actively address misconceptions by communicating transparently about service accessibility, fee structures and the value proposition for young professionals at different wealth levels.

Personalisation as a Competitive Differentiator

Personalisation emerged as the primary factor distinguishing advisers in participants' perceptions. Young professionals expect advisers to understand their unique circumstances, goals and values, rather than applying generic templates. Meaningful personalisation encompasses understanding career trajectories, family plans, risk tolerance and values-based preferences. One participant emphasised: "Don't give me the same pitch you give everyone. Show me you understand my specific situation and what keeps me up at night." Participants particularly valued advisers who proactively identify relevant opportunities or concerns based on individual circumstances. This expectation of deep personalisation creates both challenges and opportunities for wealth-management firms seeking to balance customisation with operational efficiency.

Financial Education as a Relationship Builder

Financial education emerged as a crucial relationship-building tool and competitive differentiator. Participants valued advisers who educate clients, empowering informed decision-making rather than creating dependency. Educational content – including market insights, planning guides and explanations of complex concepts – demonstrated expertise while building trust. One participant noted: "My adviser sends quarterly market updates that actually help me understand what's happening and why it matters to my portfolio. That builds confidence in their expertise." Young professionals actively seek educational resources when researching advisers, viewing educational content as evidence of genuine expertise and commitment to client empowerment. This educational approach aligns with young professionals' preference for transparent, informed partnerships rather than opaque expert-client hierarchies.

Communication Frequency and Quality Expectations

Participants expressed clear expectations regarding communication frequency, channels and quality. Most desired quarterly formal reviews with additional touchpoints for market volatility or life changes. However, frequency preferences varied by relationship stage and individual needs, emphasising the importance of customisation. Regarding channels, participants expected multi-channel access, including email, phone, video calls and messaging apps, with channel choice determined by query urgency and complexity. Communication quality proved more important than frequency – participants valued proactive, relevant communications over generic updates. As one stated, "Don't just send me what you send everyone. Reach out when something actually affects my situation." Responsiveness to client-initiated communications emerged as critical, with expectations for same-day acknowledgement of urgent matters.

Referral Behaviour and Loyalty Drivers

Satisfied clients demonstrated a strong propensity to refer, but referral behaviour followed specific patterns. Participants referred advisers when demonstrable results, exceptional service or values alignment made them confident recommending the adviser to trusted contacts. One explained: "I only refer my adviser when I'm absolutely confident they'll deliver the same great experience my friends would expect." Loyalty drivers included consistent performance, trust maintenance, proactive communication and evolving service to match changing client needs. However, young professionals exhibited lower switching costs than older clients and were willing to change advisers if service quality declined or better alternatives emerged. This finding underscores the importance of continuous relationship management and value demonstration throughout the client lifecycle.

Cross-Theme Synthesis

The eight themes collectively articulate the architecture of young professional-wealth adviser relationships and provide the empirical foundation for the integrated CRM framework presented in the Discussion section. Table 2 maps each theme to its corresponding research objective and the relevant theoretical construct from the Commitment-Trust framework, thereby moving from descriptive presentation of themes toward theoretical interpretation.

Table 2: Thematic findings mapped to research objectives and Commitment-Trust constructs.

#	Theme	Research objective	Theoretical construct (Commitment-Trust Theory)
1	Evolving understanding of adviser value proposition	RO1	Relationship benefits; redefinition of the exchange value proposition
2	Trust as a foundational relationship element	RO2	Trust — central mediating variable
3	Digital–human hybrid service preferences	RO3	Service-design moderator of the trust–commitment pathway
4	Barriers to adviser engagement	RO1, RO2	Inverse antecedents: perceived opportunistic behaviour and information asymmetry
5	Personalisation as a competitive differentiator	RO4	Relationship benefits and shared values
6	Financial education as a relationship builder	RO2, RO4	Communication quality; shared values
7	Communication frequency and quality expectations	RO3, RO4	Communication quality (key antecedent of trust and commitment)
8	Referral behaviour and loyalty drivers	RO4	Commitment manifested as loyalty outcomes (advocacy, retention)

Themes 2, 5, 6 and 7 (trust, personalisation, financial education and communication quality) operate as antecedents to commitment for this cohort; Theme 3 (digital–human hybrid preference) functions as a service-design moderator of the trust–commitment pathway; Themes 1 and 4 (evolving value proposition and barriers to engagement) clarify the cognitive frame within which the pathway operates; and Theme 8 (referral behaviour and loyalty) captures the observable downstream outcomes of successfully formed trust and commitment. Crucially, the analysis surfaces two age-specific mediators – digital integration preference and educational engagement – that modify the conventional trust–commitment pathway and that constitute a key empirical basis for the theoretical extension developed in the following section.

DISCUSSION

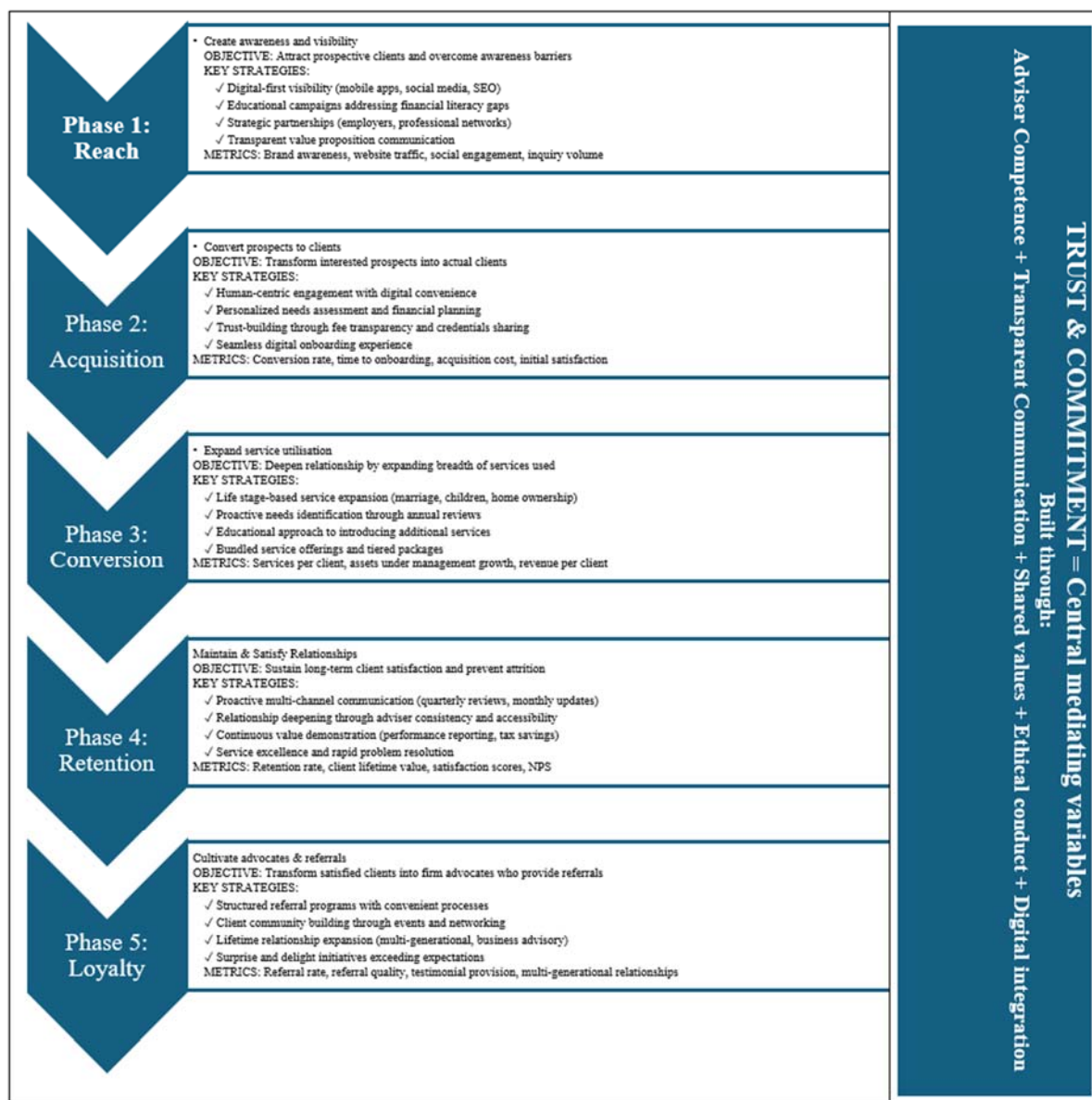
Theoretical Contributions

This research extends Commitment-Trust Theory (Morgan & Hunt, 1994) to digitally native wealth-management contexts in an emerging-market setting, in three specific ways. First, the findings identify a set of generation-specific antecedents of trust that were not foregrounded in the original framework. Whereas Morgan and Hunt emphasised communication quality and shared values as antecedents of trust, the analysis reveals that – for young professionals – transparency in fee structures, demonstrable integration of digital services, and the consistent delivery of educational value serve as critical additional drivers of trust. Second, the findings show that commitment in this cohort is built not only through relationship benefits and termination costs (as theorised in the original framework) but also through life-stage-sensitive personalisation that demonstrates a deep understanding of individual circumstances and goals. Third, the findings establish hybrid digital–human service delivery as a service-design moderator of the trust–commitment pathway: pure digital channels constrain trust formation for high-stakes decisions, while pure human channels are perceived as inefficient for routine interactions. Together, these extensions sharpen the theory’s applicability to digitally native client cohorts.

The study further contributes to the CRM literature by developing an integrated framework tailored to young professional wealth-advisory clients, encompassing five strategic phases: Reach, Acquisition, Conversion, Retention and Loyalty (Figure 2). The framework operates on the premise that trust and commitment (as articulated in the Commitment-Trust Theory) serve as the central mediating variables throughout the client lifecycle. However, the

pathways to building trust and commitment differ markedly for younger clients compared with traditional wealth-management segments, necessitating age-specific strategies at each phase.

Figure 2: An integrated CRM framework for young professional wealth-advisory clients.



Source: Author's conceptualisation.

Each phase incorporates evidence-based strategies derived from the thematic findings. The Reach phase emphasises digital marketing channels, educational content strategies and third-party validation through professional associations and awards. The Acquisition phase focuses on reducing entry barriers through transparent minimum thresholds, complimentary initial consultations and simplified communication of the fee structure. The Conversion phase prioritises a comprehensive needs assessment, the development of personalised recommendations and a clear value proposition that connects advisory services to client goals. The Retention phase emphasises proactive communication, regular portfolio reviews, the integration of digital tools and the delivery of continuous education. The Loyalty phase cultivates referral behaviours through consistent, exceptional service, client appreciation initiatives, and the structured implementation of a referral programme.

Unlike traditional CRM frameworks designed for undifferentiated high-net-worth segments, this integrated model explicitly accounts for the unique characteristics of young professionals, including digital nativity and multi-channel engagement preferences; heightened scepticism toward traditional financial services; demand for transparency in fee structures and value delivery; preference for hybrid digital–human advisory models; life-stage considerations (career establishment, family formation, wealth accumulation); and an educational orientation coupled with a desire for financial-literacy development. This framework addresses a significant gap in the literature by providing specific, actionable guidance for wealth-management CRM tailored to younger demographics in emerging markets and by integrating relationship-marketing theory with contemporary realities of digital engagement.

Finally, the findings challenge assumptions about digital natives’ preferences for fully automated services, revealing a nuanced preference for hybrid models that strategically deploy digital efficiency alongside human expertise. This insight suggests that technology adoption in wealth management should focus on augmenting, rather than replacing, adviser relationships, contrary to some industry predictions of robo-advisory dominance.

Practical Implications

The findings yield several actionable implications for wealth-advisory firms. First, firms must address misconceptions about wealth thresholds by communicating transparently about service accessibility and minimum asset requirements. Marketing strategies should explicitly target young professionals, countering misconceptions that professional advice requires millions in assets. Second, fee transparency emerges as non-negotiable for this demographic. Firms should clearly communicate compensation structures, avoid hidden fees and consider fee-based models that eliminate commission conflicts.

Third, successful engagement requires hybrid service models offering digital convenience without sacrificing human expertise. Firms should invest in user-friendly digital platforms for routine transactions while ensuring that advisers remain available for complex decisions. Fourth, personalisation at scale requires sophisticated CRM systems that enable advisers to track individual clients’ circumstances, goals and preferences while identifying proactive outreach opportunities. Finally, firms should develop educational content marketing strategies that demonstrate expertise while addressing young professionals’ knowledge needs, building trust before formal client relationships begin.

CONCLUSION

The wealth-management industry’s success with the 30–45 cohort will increasingly depend on its ability to build trust and commitment amid digital nativity, fee scepticism and rising service expectations. Drawing on thematic analysis of 40 semi-structured interviews with young professionals in South Africa and grounded in the Commitment-Trust Theory of Relationship Marketing, this study has shown that trust is the foundational element of the young-professional–adviser relationship, that this cohort favours hybrid digital–human service delivery rather than fully automated advice, and that fee transparency, digital integration and educational value act as generation-specific antecedents of trust. The principal theoretical contribution lies in extending the Commitment-Trust framework to digitally native, emerging-market wealth-advisory contexts and in surfacing age-specific antecedents and mediators of trust and commitment. In practice, wealth-advisory firms that seek to win and retain this cohort must move beyond transaction-focused approaches toward relationship-centric CRM strategies that combine digital convenience with human expertise throughout the full client lifecycle.

LIMITATIONS AND FUTURE RESEARCH

This study has several limitations, which in turn suggest a theoretically grounded future research agenda. The South African setting, while informative for emerging wealth markets, may limit generalisability to developed-market contexts with different regulatory regimes and competitive landscapes. The qualitative design, while appropriate for the study’s exploratory aims, limits statistical generalisability. The cross-sectional design captures current perspectives but cannot examine the evolution of trust and commitment over time. Finally, the study foregrounds the client perspective and does not incorporate the adviser’s viewpoint.

These limitations open four theoretically grounded directions for future inquiry. First, future research should quantitatively test the extended Commitment-Trust model proposed here, operationalising the identified age-specific antecedents – digital service integration, fee transparency, and educational value – and estimating their relative effects on trust and commitment within structural equation models. Second, longitudinal designs should examine how the trust–commitment pathway evolves across life stages within the 30–45 cohort, for example, as clients transition from early-career accumulation to family formation and homeownership. Third, cross-cultural replication studies should test the boundary conditions of the Commitment-Trust Theory across emerging- and developed-market settings, allowing systematic assessment of whether the generation-specific antecedents identified here generalise beyond emerging-market contexts. Fourth, dyadic research designs incorporating both the adviser and the client perspective would extend Commitment-Trust scholarship from a client-centric to a relational level of analysis, enabling examination of mutual trust formation and the operational feasibility of the relationship strategies proposed in this study.

REFERENCES

- Ahmed, S. K. (2024). The pillars of trustworthiness in qualitative research. *Journal of Medicine, Surgery, and Public Health*, 2, 100051. <https://doi.org/10.1016/j.glmedi.2024.100051>
- Aung, T. H., Mo, T. R., & Bhaumi, A. (2024). The impact of business intelligence on customer relationship management in the banking sector: A financial analysis. *Advancement in Management and Technology*, 4(04), 1–10. <https://doi.org/10.46977/apjmt.2024.v04i04.001>
- Bank of America. (2024). 2024 Bank of America Private Bank Study of Wealthy Americans. Bank of America Institute and Bank of America Private Bank. Available at: https://ustrustaem.fs.ml.com/content/dam/ust/articles/pdf/2024BoAPB_Study_of_Wealthy_Americans.pdf (Accessed: 29 November 2025).
- Braun, V., & Clarke, V. (2022). Conceptual and design thinking for thematic analysis. *Qualitative Psychology*, 9(1), 3–26. <https://doi.org/10.1037/qup0000196>
- Coffi, J., & George, B. (2022). The fintech revolution and the changing role of financial advisors. *Journal of Applied and Theoretical Social Sciences*, 4(3), 261–274. <https://doi.org/10.37241/jatss.2022.66>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Eckardt, F., & Spies, H. (2025). The detriments of detachment: Consequences for customer–wealth manager relationships. *The Journal of Wealth Management*, 28(1), 75–90. <https://doi.org/10.3905/jwm.2025.1.272>
- EY. (2024). *Global Wealth Research Report 2025*. Available at: https://www.ey.com/en_zs/wealth-management-research (Accessed: 20 November 2025).
- Financial Sector Conduct Authority (FSCA). (2024). *Regulatory framework and consumer-protection overview*. Pretoria: FSCA. Available at: <https://www.fsc.co.za> (Accessed: 2 December 2025).
- Henley & Partners. (2024). *Africa Wealth Report 2024*. Available at: <https://www.henleyglobal.com/publications/africa-wealth-report-2024> (Accessed: 20 November 2025).
- Kakar, Z. U. H., Rasheed, R., Rashid, A., & Akhter, S. (2023). Criteria for assessing and ensuring the trustworthiness in qualitative research. *International Journal of Business Reflections*, 4(2), 150–173. <https://doi.org/10.56249/ijbr.03.01.44>
- Lim, W. M. (2024). What is qualitative research? An overview and guidelines. *Australasian Marketing Journal*, 33(2), 199–229. <https://doi.org/10.1177/14413582241264619>
- Liu, W., & Aaker, J. (2008). The happiness of giving: The time–ask effect. *Journal of Consumer Research*, 35(3), 543–557.

- Morgan, R. M., & Hunt, S. D. (1994). The Commitment-Trust Theory of Relationship Marketing. *Journal of Marketing*, 58(3), 20–38. <https://doi.org/10.1177/002224299405800302>
- Palmatier, R. W., Dant, R. P., Grewal, D., & Evans, K. R. (2006). Factors influencing the effectiveness of relationship marketing: A meta-analysis. *Journal of Marketing*, 70(4), 136–153. <https://doi.org/10.1509/jmkg.70.4.136>
- PwC. (2025). South Africa — Major banks analysis. September 2025. Available at: <https://www.pwc.co.za/en/publications/major-banks-analysis.html> (Accessed: 2 December 2025).
- Statista. (2024). Financial advisory industry in the United States and globally — average client age and demographic statistics. Statista Research Department. Available at: <https://www.statista.com> (Accessed: 2 December 2025).
- The Wealth Mosaic. (2024). Wealth’s next wave: Navigating the millennial mindset in 2024. Maveric Systems Blog, The Wealth Mosaic. Available at: <https://www.thewealthmosaic.com/vendors/maveric-systems/blogs/wealths-next-wave-navigating-the-millennial-mindse/> (Accessed: 29 November 2025).
- Yuliasih, M., Meyla, D. N., Paranita, E. S., Widjaja, Y. G., & Denovis, F. O. (2025). The impact of digitalization on the effectiveness of financial management in the era of Industry 4.0 transformation. *Journal of the American Institute*, 2(1), 23–31. <https://doi.org/10.71364/85r2hz79>

ANALYSIS OF THE MANAGEMENT OF DONATIONS TO SCHOOLS

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ABSTRACT

Most South African public schools cannot survive solely on government funding but need assistance from private donations to carry out their operations. Most donations to schools come from mines, local businesses, and individuals, who trust that their donations are used predominantly for the benefit of the schools and for community development at large. However, schools do not have a donations management tool that ensures accurate recording, proper use, reporting, and disclosure of all donations received. Therefore, the main aim of this study is to develop such a tool. Employing a qualitative research design, data was collected through interviews from six (6) school accounting teachers, located in Gauteng (2), Mpumalanga (2), Limpopo (2) and two (2) government officials, from Limpopo and Mpumalanga respectively. It was established in this study that the Department of Basic Education does not provide schools with a donation management policy that requires the disclosure of these donations and that schools do not have donations management policies. Besides this, it is not clear if donations are completely used for the schools' benefits or not. Therefore, this study will assist the Department of Basic Education and schools in developing and implementing a strict donations management system that will reinforce donors' confidence in the use and application of donations received by schools.

Keywords: school donations management, accountability, corruption, misappropriations.

INTRODUCTION

In addition to government grants, schools receive donations from business communities, parents, and other donors. These donations are imperative but are often reported as insufficient to meet most schools' operational needs. In addition, they are also subjected to misappropriation and poor accounting (Erfiyana, et al., 2025). Some principals refer to them as philanthropic funds, and despite hoping to get more from the donors, they regard the accounting and reporting requirements as time-wasting or unnecessary (Rowe & Di Gregorio 2025). Some secondary schools even employ AI software to manage donations. Nevertheless, challenges such as inadequate teacher training, high AI implementation costs, lack of technological infrastructure, and school data privacy issues have emerged (Akpan & Essien, 2025), leaving schools with no option but to return to traditional ways of managing school donations.

Reports highlight administrative weaknesses, political influences, and other inefficiencies in the schools' management of the donations. Consequently, poor school infrastructure, inadequate teacher development, and poor educational quality, especially in marginalised communities, persist (Gabdo, et al., 2025). Furthermore, the little donations received by schools are often misappropriated by the schools' heads of departments and administrators (Obizue, 2025). Moreover, schools do not have government policies or procedures that guide the use, accounting, and reporting of donations (Umesi, 2025). This misuse of donations robs the learners and teachers of their opportunity for quality education through better infrastructure, quality learning materials, professional development, training opportunities, and other incentives. Adherence to professional ethics, strict compliance to policies, and consistent application of school regulations would make schools realise their goals (Elesia & Jumbo 2025). Finally, also the incompetence of many school principals in dealing with school donations underpins the misappropriations (Garba 2025).

In South Africa, schools in marginalised communities have failed to raise sufficient donations due to the unavailability of the School Governing Bodies (SGBs), their lack of planning and commitment, incompetence, and lack of knowledge, thus, depriving schools of the opportunity to improve the quality of their education and teachers' professional development (Sebidi 2025). However, notwithstanding the importance of school donations management in improving the quality of school education, teacher training opportunities, technological, and infrastructural resources, only few scholars have written about this phenomenon. Below is a table showing scholarly work reviews on donations received by schools.

Table 1: Scholarly Work Review.

No	Author	Research Method			Paradigm				Area			Provincial or National
		QL	QN	MX	P	I	C	P	S	A	INT	
1	Erfiyana, et al., 2025	X				X					X	N/A
2	Rowe & Di Gregorio, 2025	X				X					X	N/A
3	Akpan & Essien, 2025	X				X					X	N/A
4	Gabdo, Magaji & Yakubu, 2025			X	X			X		X		N/A
5	Umesi, 2025		X		X					X		N/A
6	Elesia & Jumbo, 2025)	X				X				X		N/A
7	Garba 2025		X		X					X		N/A
8	Sebidi, 2025	X				X			X			National
9	Muyambi & Ahiako, 2025	X				X			X			National
10	Mopholosi & Chauke, 2025	X				X			X			National
TOTALS		7	2	1	3	7	0	1	3	4	3	

Abbreviations: QL-Qualitative, QN-Quantitative, MX-Mixed, P-Positivism, I-Interpretivism/Constructivism, Critical Theory/Realism, P-Pragmatism, S – South Africa, A – African, INT – International

With reference to the 10 articles outlined in Table 01 above, a number of studies addressed the corrupt activities in schools relating to donations received. Three of these articles (Erfiyana, et al., 2025; Rowe & Di Gregorio, 2025; Akpan & Essien, 2025) are from outside Africa, four (Gabdo, et al., 2025; Umesi, 2025; Elesia & Jumbo, 2025; Garba, 2025) from other African countries focusing on country-specific contexts, and only three (Sebidi, 2025; Muyambi & Ahiako, 2025; Mopholosi & Chauke, 2025) referred to a South African context. However, not all of these three South African articles address the school management donations: Muyambi & Ahiako (2025) concentrate on inequities in the South African education, while Mopholosi & Chauke (2025) look at challenges affecting the quality of education in the Republic. Only Sebidi (2025), along with a few others from outside South Africa, discusses school donations but with a focus on SGBs' collection incompetencies, rather than school donations' management as contemplated in this study. Therefore, it can indeed be suggested that more studies are needed to raise awareness on improvements to schools' donations management, thereby strengthening the internal controls in schools and realising value for money on all school donations received. Moreover, none of the above-listed studies addresses the recording, use, reporting, and disclosure of donations received, and the provision of information to all users on how those donations were used and reported. On the other hand, with regard to the research paradigm choice, the majority of the papers (7) preferred rather interpretivism than a positivist paradigm. Also in this study, interpretivism was preferred as it sought to achieve a deep understanding of the roles of school accounting teachers and the schools' government officials with respect to schools' donations management and the existing policies governing donations. By doing so, this study contributes to the body of knowledge regarding school donation management and tries to encourage scholars to draw their attention to the challenges schools may be experiencing and to assist with more scholarly research. This may help to address an important aspect lowering the quality of education in South Africa and robbing communities'

opportunity to learn – in an environment where companies indeed donate to schools but are prioritising concepts like Corporate Social Responsibilities.

THEORETICAL FOUNDATION

This study is based on the resource allocation theory, according to which an organisation tries to direct restricted resources into their most efficient employment (Bower 2017). Thus, also educational institutions should generate and allocate resources according to their operational needs as well as to the services and products they offer (Hackman 1985). Schools receive donations from various donors for specific operational purposes. For example, when mines donate digital classrooms to schools, it may mainly be either because of their sustainability requirements as a compensation for their impact on the environment and society, or because of the respective schools' proven record of offering subjects that the donating mines value. In return, the schools will allocate these classrooms to their teachers and learners and are expected to produce high school graduates equipped with the knowledge underpinned by the donated resources. This theory is also supported by Ahn et al. (2026), as they also apply it in their study.

METHODOLOGY

Being qualitative, this study is unpinning by the interpretivist paradigm and the resource allocations theory. This chosen paradigm assisted the researcher to dwell deeper into the participants' perceptions and the understanding of the phenomenon under review. Based on a literature review and documentary analysis the gaps in the literature were identified and interview guide questions formulated. Articles reviewed were sourced from Emerald Insight, Science Direct, Taylor & Francis online, Google scholar and other relevant databases. The population for this study comprised all school accounting teachers and provincial government officials responsible for funding schools and monitoring their financial reports in the Mpumalanga, Limpopo and Gauteng Provinces of South Africa. Purposive sampling was applied in arriving at the sampled number of teachers and officials for this study. Participants were selected randomly. Data was collected from schoolteachers who were informed about donations to their respective schools and provincial government officials as displayed in Table 02 hereunder:

Table 2: Participants Interviewed.

CATEGORY	PROVINCE	CODE	ENVISAGED NUMBER	INTERVIEWED NUMBER
TEACHERS	MPUMALANGA	T1&T2	2	2
	LIMPOPO	T3&T4	2	2
	GAUTENG	T5&T6	2	2
OFFICIALS	MPUMALANGA	O1	1	1
	LIMPOPO	O2	1	1
	GAUTENG	3	1	0
TOTAL			9	8

From each of the three provinces, two accounting teachers and one government official were selected. However, it was not possible to secure an appointment with the one government official from Gauteng, so that in total only 8 participants were interviewed face to face by the researchers. The researchers collected the data personally to avoid ethical issues. All participants were required to sign consent forms to confirm that they participated in the interviews voluntarily. After signing, the participants immediately answered the interview questions posted by the researchers.

DATA COLLECTION

The following question, which relates to donations, was asked during the interviews:

“How do the South African government and private donors assist schools with external funding?”

Follow-up questions referred to:

- a. Laws and Policies,
- b. Types of external funding,
- c. Government monitoring of the use of donations,
- d. Assistance, support, or direction from the Department of Basic Education (DBE), and
- e. Disclosure of donations in the annual financial statements of the schools.

FINDINGS

The responses of the participants were almost similar as if they resided in the same area. The following submissions were made during the interviews:

- Donations were only received from SAICA and the mines. No other donor made donations to schools.
- Schools receive donations for digital classrooms from the local mines. These classrooms are donated for the sole use of science learners and no one else.
- Schools also receive donations of laptops from the local mines for schooling purposes.
- The South African Institute of Chartered Accountants (SAICA) provides additional winter and summer accounting classes. It hires and pays the local teachers to assist during these seasons. However, learners must acquire at least 60% to qualify to attend.
- Participants are not aware of any government or school policy that governs the management of donations in schools.
- Participants believe that donations are managed according to the discretion of the schools' principals.
- There is no asset register kept for assets donated to schools.
- Donations received by schools are not required to be reported in the annual financial statement of the schools.
- Participants are not aware of any policy that requires schools to declare the donations received to the DBE.

DISCUSSIONS

Schools receive donations for laptops and digital classrooms from the local mines. These classrooms are donated for the sole use of science learners and no one else.

- The digital classrooms donated by mines may seem discriminatory as the rooms can only be used for science purposes and nothing else. These donations are made to schools in terms of Corporate Social Responsibility (CSR). Obviously, CSR is a priority for the mining industry (Haroon, et al., 2025). However, schools are not required to report these donations in their asset registers or to disclose them in the annual financial statements or DBE. With the high corruption rates reported by scholars in the administration of donated funds, the lack management policies for donated assets instilled by DBE and its district offices is likely to pave the way for the misappropriation of donated assets without any punishment for those involved (Bagherimajd et al. 2025). On the other hand, schools may lose these critical donors if the donors establish that their donations are misappropriated and not benefiting the communities.
- The mines do not have control over the use of the digital classrooms once donated. Schools can still open these rooms for other subjects.
- The objective of the resource allocations theory, i.e. the direction of the restricted resources into the best possible employment as outlined in the theoretical framework section, can never be met if the donated resources are subjected to misappropriation.

The South African Institute of Chartered Accountants (SAICA) provides additional winter and summer accounting classes. It hires and pay the local teachers to assist during these seasons.

- This initiative by SAICA is helpful, but may be helping fewer learners than it could, as the majority of the learners who may profit from this assistance may fall well below the 60% threshold.
- The 60% plus requirement in mathematics mainly, is consistent with the SAICA Thuthuka Development Campus and Bursary Fund university entry requirements. SAICA strictly applies the 60% rule even in preparing learners who still have not yet completed their matric.
- If SAICA can relax the requirements for the Winter and Summer Schools, more accounting learners may benefit from this initiative even if they do not pursue chartered accountancy thereafter.

LIMITATIONS AND IMPACT

This study focused on school accounting teachers employed in public schools only. Private schools' teachers were excluded. Furthermore, participants included only accounting teachers. Other subjects' teachers were excluded. The results of the study are meant to assist policymakers to implement schools' donations management strict policies that may safeguard the donations received by schools and ensure their proper use.

RECOMMENDATIONS

The Department of Basic Education needs to develop a Donations Management Tool (DMT) that may comprise of the following workflow.

- **Donation Acceptance** (Donor donates funds/resources physically or digitally)
- **Verification** (SGB receives and classifies the donation)
- **Resources are allocated to priority areas** (e.g., classrooms, training)
- **Monitoring** (There must be a tool that tracks the usage and outcomes of the donated resources)
- **Reporting** (Reports on the use of the donated resources shared with education stakeholders).

The prescribed DMT may be linked to a specific government policy or legislation in order to make it more effective. Recording of all donations received by schools must be compulsory. In addition, it is suggested that letters of appreciation are suggest to come from DBE as evidence that the schools have declared the donations to DBE and the due diligence to verify the donations was performed by DBE. Assets registers must be maintained. Furthermore, DMT may require that assets and other donations be disclosed separately in the annual financial statements for users' benefits. Any theft of donated assets must be subjected to disciplinary actions and severely dealt with.

CONCLUSION

Donations received by schools are not well taken care of, let alone are reported in the schools' annual financial statements. This lack of controls in the schools' sector subjects' donations leads to theft, corruption, and misappropriations and undermines the CSR initiative. Therefore, DBE needs to act swiftly by strengthening the school donations management to ensure that all resources received and allocated to school activities are used as originally intended without any misappropriation.

LIMITATION AND RECOMMENDATION FOR FUTURE STUDIES

As this study has only a small sample (although the answers were similar among all the participants), and, with respect to the schools, only addressed accounting teachers, it is suggested that further studies may include more teachers and also the school governing bodies to gather their understanding on the schools' management of donations.

REFERENCES

- Ahn, J., Enoch-Stevens, T. & Moreno, B. (2026). *Equity audits and school resource allocation: Applying critical resource theory to increase equal opportunity in schools: by William Owings and Leslie Kaplan*, Routledge, 2025, 198 pages (paperback: ISBN: 9781032797052), edn., Taylor & Francis.
- Bagherimajd, K., Khajedad, K. & Mahmoudi, F. (2025). 'Design of a model to reduce academic corruption in higher education', *International Journal of Ethics Education* 10(1), 21-45.
- Bower, Joseph L. (2017). "Resource Allocation Theory." In *The Palgrave Encyclopedia of Strategic Management*. Continuously updated edition, edited by Mie Augier and David J. Teece. Palgrave Macmillan, 2017. Electronic. (Pre-published, July 2016.)
- Elesia, F.O. & Jumbo, J.K. (2025). 'Professional Ethics In The Funding Of Secondary Education: A Strategy For Effective School Administration In Port Harcourt Metropolis, Rivers State', *Int'l Journal Of Education, Management Sciences And Professional Studies* 1(3), 128-139.
- Erfiyana, E., Arifudin, O. & Kartika, I. (2025). 'Islamic School Financial Management: A Case Study of Islamic Junior High Schools in Rural Areas', *International Journal Of Science Education and Technology Management (IJSETM)* 4(2), 33-43.
- Gabdo, A.L., Magaji, S. & Yakubu, J. (2025). 'Impact of government policies on educational quality in FCT Abuja, Nigeria', *OSR Journal of Humanities and Social Science (IOSR-JHSS)* 30(6), 07-14.
- Garba, I. (2025). 'Strategies for Improving Funds Acquisition and Management in Secondary Schools for Enhancing Teaching and Learning of Agricultural Education in Kano State, Nigeria', *Rima* 4(1).
- Hackman, J.D. (1985). 'Power and centrality in the allocation of resources in colleges and universities', *Administrative science quarterly*, 61-77.
- Haroon, M., Ullah, M., Li, Z., Zhu, S., Wang, J. & Hsueh, C.-P.E. (2025). 'Impact of emerging technologies on corporate social responsibility in mining industry', *Resources Policy* 102, 105454.
- Obizue, M.N., Olowu, S.B. & Ogbonna, H. (2025). 'Corruption in School Administration: Ethical Challenges and Management Implications in Public Education', *Int'l Journal of Humanities, Economic Development and Contemporary Studies* 1(2), 251-265.
- Rowe, E. & Di Gregorio, E. (2025). 'Grant chaser and revenue raiser: Public school principals and the limitations of philanthropic funding'.
- Sebidi, S.D. (2025). 'Fundraising for financial sustainability towards the acquisition of teaching and learning resources in rural public secondary schools, South Africa', *South African Journal of Education* 45(2), 1-9.

UNVEILING THE COMPLEXITIES OF COUNTERFEIT TRADING AND EXPLORING A MULTI-DISCIPLINARY POLICING RESPONSE IN SOUTHERN AFRICA

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ABSTRACT

While counterfeiting destroys legitimate brands and businesses, counterfeiters continue to benefit from a free ride by unduly profiting from the destruction of legitimate businesses and goods they own. The free rider problem indicates a market failure in context. However, research on the counterfeiters' modus operandi is scanty. The counterfeiters' operation is characterised by secrecy, and the goods production and warehouses are hidden. Counterfeiters are not targeted by law enforcement in various jurisdictions, as they operate covertly in various countries. The main objectives of this qualitative study were to explore the complexities of counterfeiting in the Southern African countries. The supply chain channels and peddlers of the trade were unmasked. The law enforcement strategies used by various law enforcement agencies to control the illegal trade from spreading further were detailed. Literature study was conducted on the counterfeiting trade, and also an in-depth interview was conducted with ten South African Police Service's Specialised commercial crime investigators. The information was analysed using the spiral qualitative method. The analysis revealed that counterfeiting is an increasing problem in the global south. Many people continue buying counterfeited goods knowingly and unknowingly. Some countries have no proper strategy to deal with the counterfeiting problem. Law enforcement mechanisms used by various countries struggle to target counterfeiters as the root cause of the menace. The findings suggest that law enforcement targets peddlers other than counterfeiters, causing the problem to continue unabated. Furthermore, counterfeiters should be policed through multi-pronged teams of investigators with complementary skills.

Keywords: counterfeiting, law enforcement strategies, business brand, intellectual property, multi-disciplinary policing response.

INTRODUCTION

Internet usage in the world has spiked to over 67.2%, assisted by uptake in online transactions. (Xu, Wang, Ye & Hu, 2026:1537). Many goods are traded online; however, with the problem of counterfeits, some of the counterfeited products are not easy to identify by their appearance. Counterfeit products can be grouped into non-deceptive counterfeit, whereby consumers are aware that they are buying counterfeit products. This could be that the product is priced low or the original product is scarce in the market, such as sports apparel.

The illicit trade has increased drastically at an alarming pace, posing a multitude of threats not only to brand holders but affects the people's health and the economy. Physical appearance, quality and durability are three product characteristics that are linked to the purchase intention of counterfeit goods. Product appearance features, including logos and trademarks, are one of the main reasons for counterfeiting, mainly in the case of consumable goods as it mimics the original product owned by legitimate brand holders or owners (Raj & Verma, 2026:1-3).

Counterfeit goods infringe the legal rights of legitimate brand holders. Counterfeiting results in many problems, including loss of profits for the brand owners, loss of tax revenue for the governments and a serious risk to the health and safety of consumers because of their inferior quality products. Counterfeiters manifest their trade by either placing inferior products in authentic or reused packaging; duplication, the direct copying of packaging,

products, tampering through interfering with packages or logos and replacing the real product with spiked, pilfered, or stolen goods; and returns and warranty fraud (Dube & Muhindi, 2024:386).

Of note is that counterfeit trade's impact on intellectual property rights leads to a downward spiral of reduced research and development funds allocated for innovation and incentives for product development. Counterfeit goods affect almost every sector, from food, money, fashion, clothes, medicine, drugs, to electronics and luxury brands. Although the phenomenon of counterfeiting has been in existence from medieval times, it has expanded drastically in the modern globalised economy characterised by online shopping, e-commerce, artificial intelligence and machine learning. Counterfeit products range from luxury items and electronics to pharmaceuticals and everyday consumer goods, raising concerns for businesses, governments, and consumers (Singh, Goyal & Thakur, 2025: 12).

The increased consumption and demand for counterfeit products suggest that efforts made by the government and international agencies to curb illicit trade appear to have yielded minimal success. Although developing and poor nations are frequently targeted by counterfeiters on a large scale, the first-world countries are not left unscathed by fakes or substandard goods.

Counterfeiters' effects are felt across diverse sectors, ultimately spiking unemployment as production of genuine goods will be reduced, and some workers will be laid off from their work. Product appearance and perceived brand image significantly influence consumer attitudes and purchase intentions (Raj & Verma, 2026:4-6).

LITERATURE REVIEW

Theoretical Framework

The study was guided by theories such as Rational Choice Theory (RCT), Theory of Planned Behaviour, Value Consciousness and Price Sensitivity, Supply Chain Vulnerability, Social Status and Brand Consciousness, Weak Enforcement and Enforcement Constraints and Economic Factor Theory. The theoretical frameworks were used to analyse and interpret the complexities of counterfeit trading and to explore a multi-disciplinary policing response. RCT offers valuable insights into understanding a wide range of human behaviours, from economic decisions to social interactions

RCT suggests that customers weigh the pros and cons and rationalise and maximise their utility prior to purchasing counterfeit goods. The Theory overlooks the fact that some of the consumers may lack accurate information about the authenticity of goods. Moreover, the counterfeit goods erode revenue streams of brand holders and contribute to low tax collection from businesses.

Theory of Planned Behaviour: The theory explains consumer buying behaviour. It suggests a person's intention to buy fake goods is driven by their attitude towards the behaviour, social pressures and perceived ease of buying the goods. Brand holders can address counterfeits by employing technology to identify counterfeits (Ting, Goh & Isa, 2026).

Value consciousness and price sensitivity: Consumers often purchase counterfeits because they want the brand experience but are unwilling or unable to pay premium prices, making the low cost or fakes a major factor. The price factor can work for a non-deceptive counterfeiter (Cho, Fang & Tayur, 2015).

Supply Chain Vulnerability: Counterfeiters enter the market through three main sources. Local manufacturers, imported items passing through weak border controls, and unauthorised distributors. This includes the diversion of goods that are destined for other jurisdictions. The One Stop Border Post should be prioritised for funding joint training to encourage interagency collaboration to increase prevention and detection of cross-border crimes (Cerrullo & Peter, 2026:183).

Social status and brand consciousness: High-end luxury brands are highly sought after to signify social status and lifestyle. When brands become status symbols rather than just functional products. They become major targets for

counterfeiting, leading to immense brand devaluation. Multilayered defence mechanisms that involve technology and hardware can reduce counterfeit (Choudhury, Costa, Manara & Genovesi, 2025).

Weak enforcement and enforcement constraints: lenient legislation, coupled with overwhelmed law enforcement authorities, created a high-profit, low-risk environment for counterfeits (Bardeker, Chule, Damre & Dhurre, 2024:2242).

Economic Factor (Poverty and unemployment): high rates of unemployment encourage involvement in the illicit economy, which provides a supply base for fake goods.

The above theories are appropriate in the case of counterfeit in Southern Africa. It has been discovered that, owing to the lucrative counterfeit market, criminal networks derive some of the funds from the trade and have the potential to contribute to insecurity in the region. Consumers often balance perceived risk and benefits before making the choice. Although people differ in preference, with cultural preference, there is a need for localised strategies both for the enforcement and marketing of genuine brands to reduce counterfeits. Law enforcement agencies exhibit their efficiency by upholding the rule of law and by conducting policing activities in an organised manner.

Complexities of Counterfeit

Globalisation, development and digital technology have contributed to the spike in illicit trade that is a pervasive challenge (Dube & Muhindi 2024:386). As the global economy becomes increasingly knowledge-based, understanding the symbiotic relationship between counterfeiters and economic security is imperative. Counterfeit consumption is a growing problem with serious economic and social consequences. Counterfeiting activities cause substantial losses to brands. The presence of counterfeits erodes the market share of genuine products. Counterfeits are often of inferior quality compared to genuine products. In poor countries, decreased market shares and diluted purchase motives may discourage brand holders from improving product quality and expanding product offerings, ultimately harming consumer welfare by reducing employment opportunities. The counterfeit trade's impact on intellectual property rights can lead to a downward spiral of reduced innovation incentives, industry competitiveness, and economic prospects.

Counterfeits lead to a mirage of problems for brand holders such as high costs of production, lost sales, product recalls and even legal action. Network transparency, cost of quality and pre-supply evaluation approaches and supplier relationship management are the most effective mitigation strategies to overcome deceptive counterfeit risk in global supply chains (Ghadge, Duck, Er, & Caldwell (2021: 87-92). Effective anti-counterfeiting measures, such as blockchain technology to protect legitimate businesses and consumers (Anivudha, Darshan & Nirmala, 2024:274-276). They contribute to a trust relationship and security in online trading platforms. Orthodox methods that were used to detect counterfeits, such as holograms, barcodes, and manual inspections, fall short due to the sophistication of counterfeiters (Verma, Bilgaiya, Bhatia, Bilgaiya & Rathore, 2025).

Modus Operandi of Counterfeiters

The products are counterfeits mainly because they lack active ingredients, have incorrect dosages or fakes or spurious, or have falsified logos or branding. For instance, a QR code can be duplicated and imported into a fake product. Migration problem has given rise to cross-border issues, and it is a frequent occurrence (Pathak, Gaur, Sankrityayan, Jaideep & Gogtay, 2023:281–290). However, high-quality counterfeits, often called super fakes, have gained popularity. The ability of super fake manufacturers to produce high-quality products has inspired a novel anti-counterfeiting measure and converting counterfeiters to authorised suppliers (Lu, Fang, Gao & Kazaz, 2025: 2910-2913). In the South African context, the manufacturers and suppliers of goods are not operating in South Africa but export goods to local traders. There is a parallel supply chain with genuine goods, and goods are distributed physically or online via e-commerce platforms.

Anti-counterfeiting is a broader strategy that includes authentication to deter counterfeit production, which is primarily based on tangible objects and can be used as an anti-counterfeiting measure and is a physical hardware

tool. They are used to test products for authentication, considering appearance, perceived brand image and product knowledge. Product appearance is a product feature that allows consumers to judge the product based on aesthetic and symbolic motives (Gurvinder, Singh, Goyal & Thakur, 2025:1-4).

Legislative Scheme in Southern Africa

Counterfeiting, among others, spans money, medicines, food, electronics, clothing, with serious effects on economies, public health, and brand damage. In South Africa, counterfeiting is a criminal and civil offence and happens where the packaging of a trademark has been imitated without the authorisation of the actual brand holder. Non-Deceptive counterfeiting involves consumers who are aware that the product is counterfeit but choose to purchase it regardless.

Anti-counterfeiting measures are used to deter, detect and control counterfeiting activities, and different packaging-related approaches include the use of smart covert and overt technology. Although the anti-counterfeiting effort exerted by the legitimate brand holder does not necessarily decrease with the penalty levied by the authority, even though they serve the same purpose. It is still viable to couple law enforcement efforts with anti-counterfeiting strategies by brand holders (Yao, Zhu & Yang, 2025).

Lekanova (2025) argues that counterfeiting leads to increased inflation, social tension, trust deficit in the brand, a decline in stock market activity, and discrediting of government agencies. Improving criminal law and improving forensic technology, tactics, and methods in the field of counterfeiting investigation are the keys to minimising the negative socio-economic phenomena.

In South Africa, the main Anti-counterfeit legislations are counterfeit goods Act 37 of 1997, Trademarks Act 194 of 1993, Tobacco Product Control Act 83 of 1993, Customs and Excise Act 91 of 1964, and Merchandise Goods Act 17 of 1941. The complementary legislation includes the South African Police Service Act 68 of 1995, which empowers law enforcement to prevent, detect and conduct search and seizures. Law enforcement can prevent counterfeit products from being produced and sold to consumers (Yao et al., 2025). The police can even confiscate equipment used in production as a means to halt the illegal act.

METHODOLOGICAL LENS OF THE STUDY

The study adopted a qualitative approach (Yin, 2016:6-8), and a descriptive research design. A research design is the process to collect and analyse data in a manner that aims to be relevant to the research objectives (Dubey & Kothari, 2022). It is a roadmap that directs the research process by mapping out the study's objectives (Abutabenjeh & Jaradat, 2018). The study aligns with the objectives and utilised literature and in-depth interviews to acquire information. An interview schedule was used to guide the interviews and gather information. The proper framing of the interview schedule questions enabled the inclusion of relevant questions aligned with the study's objectives (Leedy & Ormrod, 2019). Interviews were conducted with key informants, who are policing counterfeit in the metropolitan municipalities in South Africa, to wit: Johannesburg Metropolitan (n3), Ethekwini Metropolitan (n2), Cape Town Metropolitan (n2), Mbombela (n1) Mangaung (n1) and Polokwane (n1). To that effect, the study drew on authored literature as an informed assessment of the conducted research to allow for ideas to be processed for use in this study. Peer-reviewed academic journals, books, legislation, international literature and conventions, websites, and national and international non-governmental organisations (NGOs) and non-profit organisations' (NPOs) websites, to determine what authors have written on the topic of the study. The topics are aligned with the research objectives, and the sources are in line. Only relevant sources were selected for the study based on the topics. Literature and interviews were reviewed repeatedly to ensure the accuracy of the data. Moreover, a document review of public records was conducted of existing records.

A formalised data collection involved repeated examination of records to answer the objectives of the study. Descriptive research answers questions related to the who, what, where, when and how about people in this context to provide an accurate description of the problem. The researcher used the qualitative data analysis as outlined by Mezmir (2020:22-24). Data analysis was done using the spiral qualitative method. It was imperative to investigate the

reasons for the problem and come up with suggested solutions for implementation so that the problem can be eradicated.

Data preparation: data was obtained from the literature and was prepared to identify inconsistencies.

Theme identification: The research has identified common and related data that have recurrent themes. Thematic analysis was used – recurring themes and patterns related to Counterfeiting, fakes, law enforcement strategies, business brand, Intellectual property, multi-disciplinary policing response, corruption, bribes, and organised crime were identified, and valuable information on the challenges faced was obtained.

Data preparation: reporting of relevant findings was made.

The study utilised theories to explain the problems associated with the complexities of counterfeit trading and explored a multi-disciplinary policing response in Southern Africa.

FINDINGS AND DISCUSSION

This research confirms the theories discussed by making a significant contribution to both theory and practice on counterfeit in South Africa. The prevalence of counterfeit goods has raised significant concerns worldwide, and the trade is growing as a testament to weak anti-counterfeit efforts. One of the investigators stated that *“counterfeit has grown dramatically as seen by lots of fakes in the streets”*.

A consistent finding is that price advantage, value consciousness, and social influence are the strongest drivers of counterfeit product consumption. Another investigator mentioned that *“many counterfeit dealers sell their products at a lower price to capture the market and make a profit at the expense of legitimate traders”*.

These findings highlighted the intricate chain reaction triggered by counterfeit goods, leading to outcomes such as job displacement, a reduction in overall revenue, and damage to brands in the global south.

The findings underscore the urgent need for interventions to address the environmental challenges associated with counterfeit trade in the region. The study highlights the multifaceted impact of counterfeit goods, emphasising the importance of comprehensive strategies to mitigate these challenges. Strengthening legal frameworks and enforcement mechanisms, fostering international collaboration, and raising consumer awareness are ideal to combat counterfeiting. There is a sufficient regulatory framework; however, weak enforcement. Price reduction in the authentic goods could reduce non-deceptive counterfeiter (Cho, et al. 2015: 273-275).

Study Recommendations

There is no single technique that is sufficient to address the counterfeiting problem. The multi-layered approach that involves technology, hardware and multidisciplinary is preferred. By combining the proposed solutions with complementary measures like supply chain monitoring, a resilient defence can be created.

Brand holders should deploy anti-counterfeiting technologies in combination, such as AI, machine learning and blockchain technology, to differentiate genuine products from replicas. AI and machine learning are used for generating QR codes and Radio frequency identification (RFID) tags, and blockchain technology for supply chain traceability and product authentication.

The recommendations will address the environmental security risks posed by counterfeit goods in South Africa. Governments, on the other hand, must strengthen penalties to curb supply while brand holders manage social campaigns emphasising the economic losses, health risks, and ethical concerns. Immutability ensures that once data is captured, it cannot be altered or deleted, thereby creating a permanent record of product information and transactions.

CONCLUSION

Counterfeit is a growing concern that affects brand holders, people, the environment, well-being, and businesses. The study revealed that counterfeit goods significantly contribute to environmental pollution in Southern Africa. This conclusion highlights the pressing nature of addressing the environmental hazards associated with counterfeit trade to safeguard the ecological integrity of the region. Embedding anti-counterfeit into quality programme can reduce supply-chain management issues. Although no single strategy can be successful in the fight against counterfeiting. The complementarity of technology, hardware and people can reduce crime drastically. Law enforcement should coordinate to control the crime.

REFERENCES

- Anirudha, P., Darshan, V., & Nirmala, H. (2024). Identification of Counterfeit/Fake Products using Blockchain. *International Journal of Advanced Research in Science, Communication and Technology*. <https://doi.org/10.48175/ijarsct-15338>. 274-282.
- Bardekar, V., Chule, B., Damre, G., & Dhurre, D. (2024). Securing supply chains: A blockchain-based approach for authenticity assurance and counterfeit product detection. *International Journal for Research in Applied Science & Engineering Technology*. 12(XI). 2242-2246
- Cerrullo, O.M. & Peter, M. G. (2026). The Roles of OSBP in Enhancing Collaboration Among the Security Agencies to Combat Crime at the Busi Border, Kenya. *International Journal of Advanced Multidisciplinary Research and Studies*. 6(2). 1839-1855. <https://doi.org/10.62225/2583049X.2026.6.2.6179>
- Cho, S., Fang, X., & Tayur, S. (2015). Combating Strategic Counterfeiters in Licit and Illicit Supply Chains. *Manufacturing and Service Operations Management*, 17(3), 273-289. <https://doi.org/10.1287/msom.2015.0524>.
- Choudhury, S., Costa, F., Manara, G., & Genovesi, S. (2025). Combating the Counterfeit: A Review on Hardware-Based Anticounterfeiting Technologies. *Applied Sciences*. <https://doi.org/10.3390/app151810298>.)
- Cohen, L.E. & Felson, M. (1979). Social change and crime rate trends: A routine activity approach. (1979). *American Sociological Review*. Vol. 44: 588-608.
- Constitution of the Republic of South Africa, No. 108 (1996). Government Printer.
- Criminal Procedure Act, No 51 (1977). Government Printer.
- Cybercrimes Act, No. 19 (2020). Government Printer.
- Dube, AA. & Muhindi, S. (2024). Evaluation of the impact of counterfeit goods on economic security in Nairobi, country Kenya. 385-395 *African Journal of Social Issues* 7 (1): 2024 <https://dx.doi.org/10.4314/ajosi.v7i1.18>.
- Ghadge, A., Duck, A., Er, M., & Caldwell, N. (2021). Deceptive counterfeit risk in global supply chains. *Supply Chain Forum: An International Journal*, 22, 87 - 99. <https://doi.org/10.1080/16258312.2021.1908844>.
- Gamchi, N.S., Mohammadi, M, Van Wassenhove, I. & Farahazi, R.Z. (2025). Counterfeiting from an operations and engineering management perspective. *JEEE*, 1-28.
- Gurvinder, Singh, Nitesh, Goyal & Thakur. (2025). Understanding Counterfeiting and its Prevalence: A Comprehensive Review *International Journal for Multidisciplinary Research* 7(5), p. 1-9.
- International Covenant on Economic and Social, and Cultural Rights (1966), signed 1994.

International Covenant on Civil and Political Rights (1966), signed in 1998.

Labour Relations Act (LRA), No 66 (1995). Government Printer.

Lekanova, E. (2025). Counterfeiting: criminal-legal and forensic characteristics. Полицейская и следственная деятельность. <https://doi.org/10.25136/2409-7810.2025.3.75612>.

Lu, L., Fang, X., Gao, S., & Kazaz, B. (2025). Converting Counterfeiters in Emerging Markets to Authorized Suppliers: A New Anti-Counterfeiting Measure. *Production and Operations Management*, 34, 2910 - 2930. <https://doi.org/10.1177/10591478251327759>.

Mezmir, E.A. (2020). Qualitative data analysis: An overview of Data Reduction, Data Display and Interpretation. *Research on Humanities and Social Sciences*. 10(21), 15-27.

Pathak, R., Gaur, V., Sankrityayan & Gogtay, J. (2023). Tackling Counterfeit Drugs: The Challenges and Possibilities. *Pharm Med* 37, 281–290 (2023). <https://doi.org/10.1007/s40290-023-00468-w>

Prevention of Unfair Discrimination Act, No. 4 (2000). Government Printer.

Protection of Constitutional Democracy Against Terrorist and Related Activities (POCDATARA) Act, 33 (2004). Government Printer.

Promotion of Administrative Justice Act, No. 3 (2000).

Promotion of equality and prevention of unfair discrimination Act 4/2000.

Raj, R & Verma, S (2026;). Counterfeit lovers encounter with product and risk determinants: an Indian consumers' perspective.. *Asia-Pacific Journal of Business Administration*. <https://doi.org/10.1108/APJBA-05-2024-0254>. 1-27.

Singh, G, Goyal, N & Thakur, G. (2025). Understanding Counterfeiting and its Prevalence: A Comprehensive Review *International Journal for Multidisciplinary Research* 7(5). 1-9. <https://doi.org/10.36948/ijfmr.2025.v07i05.54933>.

South African Police Service Act, No. 68 (1995). Government Printer.

Verma. K, Bilgaiya, P, Bhatia, R, Bilgaiya, S, & Rathore, S. (2025). AL-powered fake product detection System. *International Journal on Science and Technology*. 16(1). 1-6.

Universal Declaration of Human Rights (UDHR) (1948)

Yao, S., Zhu, K., & Yang, R. (2025). Combating Counterfeit Products: Anti-counterfeiting Technology and Law Enforcement. *Production and Operations Management*, 34(11), 3493-3512. <https://doi.org/10.1177/10591478251335156>.

Yin, R.K. (2016). *Qualitative research from start to finish*. 2nd edition. London: The Guilford Press.
Prevention of Organised Crime Act, No. 121 (1998). Government Printer.

Xu X, Wang Y, Ye R, Hu H (2026), "To do or not? NFT platform's anti-counterfeits strategy". *Industrial Management & Data Systems*, Vol. 126 No. 5 pp. 1537–1554, <https://doi.org/10.1108/IMDS-05-2025-0584>.

Sustainable Development Goals:

No Poverty (SDG 1)

Gender equality (SDG 5)

Decent work and economic growth (SDG 8)

Reduction of Inequalities (SDG 10)

Target 10.7 (Safe migration policies to protect migrants from smuggling and trafficking rings)

Collaboration between government, businesses and other stakeholders for developing and implementing sustainable practices in the perishable goods sector (SDG 17)

Data accessibility statement

The datasets used and/or analysed during the current study are available from the corresponding author on request.

Ethics and consent

Ethical approval through the author's Research Ethics Committee (University of South Africa College of Law Ethical Clearance Review Board) was sought and obtained before beginning this project.

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Competing interests

There are no ethical conflicts or competing interests in completing this research.

SUSTAINABLE MANAGEMENT IN CULTURAL INSTITUTIONS: EVIDENCE FROM ARCHAEOLOGICAL MUSEUMS

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ABSTRACT

The need for a more sustainable environment is becoming increasingly imperative on a global scale and this is reshaping management practices across various sectors, including cultural institutions like archaeological museums. This study investigates the extent to which archaeological museums in Greece adopt sustainable management practices and examines the organizational factors related to the adoption of green policies. The survey was carried out in 81 Museums using a questionnaire. The findings show that environmental awareness and perceived benefits are positively associated with the adoption of green policies, with museums implementing sustainability programs reporting significantly higher levels of adoption.

Keywords: cultural institutions, environmental management, green practices, sustainability.

INTRODUCTION

Sustainability has become one of the most important strategic priorities for governments, organizations and society worldwide transforming the way organizations are expected to operate and create value. This has resulted in sustainable development emerging as an integrated framework that seeks to balance economic growth, environmental protection and social well-being (United Nations, 1987, 2015). The adoption of the 2030 Agenda for Sustainable Development and the seventeen Sustainable Development Goals (SDGs) has further strengthened the international commitment to sustainability. Towards this end, the European Union adopted the European Green Deal with the aim of achieving climate neutrality by 2050 (European Commission, 2019). The above initiatives highlight the fact that sustainability should not be seen only as an environmental issue, but as a framework for overall management (Bansal & Song, 2017; Geissdoerfer et al., 2017).

Consequently, organizations across all sectors are increasingly expected to adopt sustainable practices. Sustainable management requires organizations to integrate sustainability principles throughout their operating framework, including corporate governance, organizational culture, business processes, and performance evaluation (Dzhengiz & Niesten, 2020; Lozano, 2018). Today, several studies have highlighted the fact that organizations that adopt sustainable management practices exhibit improved organizational reputation, enhanced stakeholder trust, greater operational effectiveness, and increased long-term resilience (Eccles et al., 2014; Schaltegger & Burritt, 2018).

In recent years, increased attention in reducing environmental footprint has also been paid not only to organizations that produce goods but also to service organizations, including various cultural organizations such as museums, galleries, and cultural heritage organizations. In this context, museums can play an important role as they receive a significant number of visitors annually and can contribute to promoting environmental awareness and sustainable behavior (McGhie, 2019, 2020). The International Council of Museums (ICOM), recognizing the role of museums towards a sustainable future, recently incorporated sustainability into the official definition of museums (ICOM, 2022; UNESCO, n.d., 2021)

The adoption of sustainability practices in museums includes a wide range of practices such as improving energy efficiency, reducing water consumption, implementing waste management systems, adopting environmentally friendly procurement practices, minimizing greenhouse gas emissions, promoting sustainable exhibitions, integrating

circular economy principles, and encouraging environmentally responsible visitor behavior (Lord, 2024; Merriman, 2023). Also, increasing visitor numbers, expanding tourism activity, aging infrastructure, and limited financial resources often complicate the implementation of environmental management initiatives (ICOM, 2022; Sesana et al., 2021). Consequently, the integration of sustainability principles into the operation of archaeological museums is highlighted as very important. However, empirical evidence on how such practices is specifically adopted in archaeological museums remains limited, especially in the Greek context.

Against this background, the present study seeks to contribute to the growing literature on sustainable cultural management by providing empirical evidence from Greek archaeological museums. In contrast to studies examining just environmental practices alone, the research examines the conditions in organizations which allow the effective implementation of green practices. In particular, the research examines whether environmental awareness, organizational benefits, and implementation barriers affect the adoption of environmental management practices in archaeological museums.

Accordingly, the study addresses the following research questions:

RQ1: To what extent does environmental awareness influence the adoption of green policies in archaeological museums?

RQ2: How do perceived organizational benefits affect the implementation of sustainable management practices?

Additionally, the study exploratorily examines the role of perceived implementation barriers to understand whether they constrain or differentiate the adoption of green policies.

Based on the existing literature, the following hypotheses are proposed:

H1: Environmental awareness is positively associated with the adoption of green policies in archaeological museums.

H2: Perceived benefits of green policies positively influence the adoption of green policies.

H3: Museums offering sustainability-related programs demonstrate higher levels of adoption of green policies.

SUSTAINABILITY MANAGEMENT IN ARCHAEOLOGICAL MUSEUMS

In recent years, sustainability has been increasingly seen not just as a means to compliance with regulation but also as an opportunity to build resilience, innovation, and value for stakeholders. This paradigm shift has changed the management of cultural institutions as well. Museums, galleries, libraries, archives, and heritage institutions are expected not only to conserve and transmit cultural heritage but also to do so responsibly through the incorporation of sustainability into their management processes, operations, and engagement with the public (ICOM, 2022; UNESCO, 2021). Cultural organizations could contribute to sustainable development both by limiting their impact on the environment and educating people on sustainable living (McGhie, 2019).

Sustainable management in the cultural organization context is directly related to the principles of circular economy such as resource efficiency, reduced waste, reuse and recycling of resources and optimization of resource and energy flows (Geissdoerfer et al., 2017; Winans et al., 2017). These principles can be implemented in the museum sphere in sustainable exhibitions, sustainable procurement, energy-efficient building, recycling programs, digitalization and environmentally responsible facilities management (Einarsson & Sorin, 2020).

Research done previously shows that the implementation of sustainability practices will result in significant benefits to the organization. In addition to minimizing the impact on the environment, some of the benefits linked to sustainability practices include reduced costs, increased efficiency, good reputation of the institution, and legitimacy (Eccles et al., 2014; Fouteris et al., 2018; Moriarty, 2022).

Sustainability management has been recognized as an important aspect of cultural management. Cultural organizations can promote environmental sustainability by implementing environmental policies that incorporate the principles of the circular economy. These may include actions such as energy conservation, sustainable resource use, waste prevention, and environmentally conscious organizational management (Einarsson & Sorin, 2020). The redesign of organizational functions with sustainability in mind is thus recognized not only as a matter of

environmental responsibility but also as a strategy to support organizational sustainability (Moriarty & Honnery, 2020).

Furthermore, environmental sustainability can play a positive role in shaping the quality of the visitor experience, as well as the reputation of cultural organizations. Studies conducted in the fields of service management and tourism have shown that environmentally sustainable practices can be used to enhance visitor satisfaction and customer loyalty (Keshavarz & Jamshidi, 2018; Wu et al., 2018). The dimension of sustainability in relation to cultural organizations is of great importance, given the increased environmental awareness of society (McSweeney, 2015).

Today's research highlights the necessity for cultural organizations to engage in environmentally friendly behaviors within the framework of sustainable development strategies. This can also have advantages for the institutions themselves, as cultural marketing is able to combine the promotion of cultural actions with supporting the sustainable development of cultural institutions, while ensuring the continuous renewal of cultural heritage (Chhabra, 2010). Sustainability management in the cultural sector may involve such aspects as implementing circular economy principles, applying energy-saving approaches, practicing sustainable resource management, and being environmentally responsible as regards organizational planning (Winans et al., 2017).

On the other hand, cultural organizations and cultural businesses also cause environmental issues, either directly or indirectly, because of energy usage, infrastructure operations, transportation and digital technologies. Even the use of digital technologies for cultural purposes or offering cultural services on the Internet has caused serious environmental impacts because of the high energy needs of the infrastructure supporting data exchange (Hesmondhalgh, 2019). As a result, the environmental impact of cultural activities has been acknowledged as a crucial element in the context of sustainable cultural management.

Furthermore, adopting sustainable strategies may bring about positive institutional impacts as well. Some earlier studies indicate that environmentally friendly practices may result in cost savings, better organizational efficiency, improved corporate image and stronger stakeholder confidence (Fousteris et al., 2018). Moreover, environmentally friendly behaviors could positively affect the audience's opinion towards the organization and visitor satisfaction due to increasing public environmental awareness (Schaltegger & Burritt, 2018). Taken together, these findings suggest that the perceived benefits associated with green policies represent a further variable that may influence the extent to which such policies are ultimately adopted. In this sense, sustainability is no longer seen only as a necessary element for environmental responsibility, but also as a sustainable organizational strategy that can create institutional advantages and competitive advantages.

Finally, it should be noted that the success of the implementation of the sustainability strategy is significantly influenced by organizational culture, commitment of management, and awareness of the environment. As stated by previous research, sustainable initiatives implementation usually takes place for value-based motives related to the need for environmental accountability and engagement in social issues and not only for financial purposes (Nikolaou et al., 2011).

Over the past decades, museums have changed considerably. Traditionally considered organizations dealing with collecting, protecting, and displaying heritage. In our days modern museums have started to take on the wider range of social, educational, and environmental responsibilities. In accordance with the new definition provided by the International Council of Museums (ICOM, 2022), museums are non-profit institutions that operate ethically and professionally while promoting diversity, accessibility, education, and sustainability. This revised perspective reflects the growing expectation that museums should contribute not only to cultural preservation but also to sustainable development and environmental responsibility.

In light of these developments, sustainability is seen to be an important aspect of museum management. Modern-day museums are being urged to include environmental issues in their planning, management, and activities for engaging visitors. Sustainable museum management can, thus, include a range of programs such as energy saving, water saving, sustainable purchasing, waste minimization, environmentally friendly exhibitions, carbon footprint minimization, and environmental education. (Lord, 2024; UNESCO, 2021).

Amidst various types of museums, archaeological museums create an especially difficult challenge in terms of sustainability. In contrast to most other types of museums, it is necessary for archaeological museums to take care of preserving delicate exhibits in carefully controlled environmental conditions. The regulation of temperature,

humidity, lighting, preservation laboratories, and security consume significant amounts of energy (Sesana et al., 2021). At the same time, increasing visitor numbers, climate-related risks, and financial constraints place additional pressure on museum managers to adopt sustainable practices without compromising conservation standards.

The connection between sustainability and the performance of the museum involves more than just environmental management. Studies indicate that sustainability-focused museums are becoming recognized as being innovative, socially responsible, and reliable institutions. Being environmentally responsible could improve the institution's reputation, increase trust, foster better relations with the community, and improve perceptions of service quality among visitors. (Pop & Borza, 2016). As environmental awareness continues to increase worldwide, visitors increasingly expect museums to demonstrate environmental responsibility alongside their traditional educational and cultural missions.

Although the importance of sustainability as part of the governing process of museums is increasingly being appreciated, its implementation is still not universal. Financial constraints, insufficient infrastructure, lack of environmental knowledge, minimal government intervention, and resistance to change are among the major obstacles that previous research repeatedly highlights for implementing sustainability ((Lord, 2024). Therefore, apart from having access to environmental technology, it is crucial to have organizational commitment, leadership, and engagement as well as organizational readiness to embrace sustainability into its organizational culture.

Regarding archaeological museums, environmental considerations can impact the decision-making process in relation to energy efficient conservation, sustainable purchasing, recycling programs, environmentally friendly exhibitions, and reduction of the environmental impact of museum activities. It can be assumed that managers that view sustainability as part of their organization's mission will exhibit more dedication to environmental initiatives than managers in companies whose second priority is sustainability.

However, despite the increasing emphasis on sustainability, museums often face significant hurdles when it comes to putting concepts into practice. Money-related limitations, lack of financial support from government organizations, lack of technical skills, old-fashioned facilities, bureaucracy, and lack of specialists make it impossible for many cultural organizations to carry out their environmental efforts (Lord, 2024). The situation is especially difficult in archaeological museums because of the high demands for conservation of their collections.

These findings suggest that sustainability in museums depends on the interplay between organizational capacity, institutional context, and managerial choices. Nevertheless, despite the increasing importance of sustainability as a subject of study in museumology, relatively little empirical work has been carried out in terms of which organizational factors contribute the most to the implementation of green strategies in archeological museums. The absence of empirical insights into this problem forms the starting point for exploring the impact of organizational awareness, organizational incentives, and barriers to implementation on sustainable management.

Moreover, despite the strategic importance that sustainability has taken on in cultural management, empirical research in this domain is rare in the case of Greece. Considering the archaeological richness of the country and the strategic importance of museums for cultural tourism and sustainability, empirical analysis is required.

In this study, an effort has been made to fill this gap by exploring how environmental consciousness, organizational benefits, and implementation barriers affect the adoption of green policies in Greek archaeological museums.

METHODOLOGY

The research adopted a quantitative approach and utilized a structured questionnaire for data collection. Likert-type and close-ended questions were used within the questionnaire. The responses to the questionnaire were mostly analyzed by a Likert scale of 5 points. The questionnaire was sent via Google Forms to museums listed in the official platform of the Greek Ministry of Culture. The final sample consisted of 81 museums that participated voluntarily and anonymously. No personal identification data was collected during the research.

The questionnaire items were grouped into the following research dimensions: Environmental Awareness, Adoption of Green Policies, Probability of Adoption, Consumption Restriction, Perceived Benefits of Green Policies, Barriers to the Adoption of Green Policies

An “Overall Probability of Adoption” variable was additionally created by combining the variables “Probability of Adoption” and “Consumption Restriction.” Data collection was conducted electronically through the Google Forms platform between December 2025 and February 2026. The statistical analysis was conducted using IBM SPSS Statistics software.

Before conducting the test of hypotheses, the reliability of measurement scales was determined using the Cronbach's Alpha Coefficient, one of the most widely used measures of reliability in social sciences (Cronbach, 1951). The Cronbach's Alpha Coefficient assesses the extent of internal consistency among items measuring the same construct. According to Nunnally and Bernstein a value of alpha greater than 0.70 represents acceptable reliability while a value greater than 0.80 represents good internal consistency (Nunnally & Bernstein, 1994).

The reliability test proved satisfactory internal consistency of all variables in the questionnaire, which made it a reliable tool for further statistical testing. Pearson correlation tested the relationship between the main variables. One way ANOVA tested the differences in sustainability adoption between those who had sustainability programs and those who did not.

RESULTS

The statistical analysis was carried out with the aim of analyzing the connection between environmental consciousness, organizational support, and sustainable management practices in archeological museums. To be more precise, the goal of the analysis was the evaluation of the formulated research hypotheses (H1, H2, and H3). These hypotheses are related to the value of sustainability practices, climate change consciousness, and organizational/administrative support.

The questionnaire reliability was tested using Cronbach's alpha coefficient. The scales used were characterized by an acceptable degree of consistency, with all Cronbach's alpha values being above the acceptable limit of 0.70 (Nunnally & Bernstein, 1994). This implies that the questions in the questionnaire were consistent in their measurement of the construct.

Table 1: Internal consistency index of the main variables.

<i>Reliability Statistics of the first variable “Environmental Awareness”</i>		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,866	0.866	7
<i>Reliability Statistics of the second variable “Adoption of Green Policies”</i>		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,862	0.864	6
<i>Reliability Statistics of the third variable “Probability of Adoption”</i>		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,878	0.898	10
<i>Reliability Statistics of the fourth variable “Consumption Restriction”</i>		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,876	0.879	10
<i>Reliability Statistics of the fifth variable “Perceived benefits of Green Policies”</i>		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,849	0.853	7
<i>Reliability Statistics of the sixth variable “Barriers to Adoption Green Policies”</i>		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,735	0.724	5

From the reliability analysis conducted to examine the internal consistency of the variables, the first five variables demonstrated high to very high reliability ($\alpha > 0.84$), while the sixth variable showed acceptable internal consistency ($\alpha = 0.735$), remaining above the minimum acceptable threshold of 0.70 (Taber, 2018). The findings indicate that the measurement scales were sufficiently reliable for the subsequent statistical analyses.

Regarding sustainability-related programs and environmental-awareness initiatives, only a minority of institutions reported that such programs are already implemented.

Table 2: Existence of programs related to sustainability and environmental awareness.

<i>Does your institution offer programs or activities related to sustainability and environmental awareness?</i>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	24	29.6	29.6	29.6
	No	45	55.6	55.6	85.2
	Coming soon	12	14.8	14.8	100.0
	Total	81	100.0	100.0	

The participants' responses showed that only 29.6% of museums already offer programs or activities related to sustainability and environmental awareness. In addition, 55.6% reported that such programs are not currently being implemented, while 14.8% reported that sustainability initiatives are in the development phase. These findings suggest that sustainability has not yet been systematically integrated into the operational orientation of the majority of museums.

To test hypotheses H1 and H2, a Pearson correlation analysis was conducted between the main variables related to sustainability. The results revealed several statistically significant positive relationships between environmental awareness, institutional sustainability initiatives, and the adoption of green policies.

Table 3: Pearson correlations between the main research variables.

<i>Correlations</i>								
		Environmental Awareness	Adoption of Green Policies	Probability of Adoption	Consumption Restriction	Perceived Benefits of Green Policies	Barriers to Adoption of Green Policies	Overall Probability of Adoption
Environmental Awareness	P. Correlation	1	0.312**	0.358**	0.277*	0.641**	0.328**	0.339**
	Sig. (2-tailed)		0.005	0.001	0.012	0.000	0.003	0.002
	N	81	81	81	81	81	81	81
Adoption of Green Policies	P. Correlation	0.312**	1	0.745**	0.650**	0.411**	-0.170	0.737**
	Sig. (2-tailed)	0.005		0.000	0.000	0.000	0.130	0.000
	N	81	81	81	81	81	81	81
Probability of Adoption	P. Correlation	0.358**	0.745**	1	0.831**	0.348**	-0.088	0.971**
	Sig. (2-tailed)	0.001	0.000		0.000	0.001	0.436	0.000
	N	81	81	81	81	81	81	81
Consumption Restriction	P. Correlation	0.277*	0.650**	0.831**	1	0.234*	-0.092	0.940**
	Sig. (2-tailed)	0.012	0.000	0.000		0.036	0.414	0.000
	N	81	81	81	81	81	81	81
Perceived Benefits of Green Policies	P. Correlation	0.641**	0.411**	0.348**	0.234*	1	0.142	0.314**
	Sig. (2-tailed)	0.000	0.000	0.001	0.036		0.206	0.004
	N	81	81	81	81	81	81	81
Barriers to Adoption of G. P.	P. Correlation	0.328**	-0.170	-0.088	-0.092	0.142	1	-0.093
	Sig. (2-tailed)	0.003	0.130	0.436	0.414	0.206		0.407
	N	81	81	81	81	81	81	81

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

The findings revealed statistically significant positive correlations between “Environmental Awareness” and “Adoption of Green Policies” ($r = 0.312$, $p = 0.005$), as well as between “Environmental Awareness” and “Perceived Benefits of Green Policies” ($r = 0.641$, $p < 0.001$). These findings indicate that museums with higher levels of environmental awareness are more likely to support and adopt practices aimed at sustainability.

Furthermore, “Perceived Benefits of Green Policies” was positively associated with “Adoption of Green Policies” ($r = 0.411$, $p < 0.001$), suggesting that more positive perceptions regarding the benefits of green policies are linked to higher levels of green-policy implementation. Therefore, hypotheses H1 and H2 are supported.

In contrast, the variable “Barriers to Adoption of Green Policies” did not demonstrate statistically significant correlations with the principal adoption variables.

To investigate Hypothesis H3, a one-way analysis of variance (ANOVA) was conducted to examine whether museums that implement sustainability programs demonstrate higher levels of adoption of sustainability practices.

Table 4: Variance analysis of the overall probability of adoption by existence of sustainability programs.

ANOVA					
Overall Probability of Adoption					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.318	2	3.659	9.028	0.000
Within Groups	31.615	78	0.405		
Total	38.934	80			

Results from the ANOVA test showed that there were statistically significant differences in “Overall Probability of Adoption” based on whether there were any sustainability programs, $F(2,78) = 9.028$, $p < 0.001$. Specifically, those museums with sustainability programs scored higher sustainability adoption compared to museums that did not have sustainability programs. Hypothesis H3 is therefore supported.

To further examine the relationship between current sustainability implementation and future adoption intentions, descriptive statistics and paired samples t-tests were conducted.

Table 5: Descriptive statistics of paired variables.

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Adoption of Green Policies	2.064	81	0.591	0.066
	Probability of Adoption	2.140	81	0.857	0.095

The mean value of “Adoption of Green Policies” was 2.064, while the mean value of “Probability of Adoption” was slightly higher ($M = 2.140$). This finding suggests that museums report a marginally stronger future orientation toward sustainability adoption compared to their current implementation level.

Table 6: Paired sample testing between existing and potential adoption of green policies.

Paired Samples Test (‘Adoption of Green Policies’ and ‘Probability of Adoption’)							
Paired Differences					t	df	Sig. (2-tailed)
Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
			Lower	Upper			
-0.076	0.574	0.064	-0.203	0.051	-1.188	80	0.238

The paired samples t-test indicated that the difference between current adoption levels and future adoption intentions was not statistically significant, $t(80) = -1.188$, $p = 0.238$. Consequently, although museums appear to

express a slightly stronger intention toward future sustainability adoption, the difference does not constitute a statistically significant divergence between current practices and future orientation.

DISCUSSION

The study was concerned with investigating the extent to which the idea of sustainability has been incorporated into the functioning of the archaeological museums in Greece, especially with regard to the green policies adopted by the museums. As indicated by the findings of the study, sustainability is becoming a strategic element in museums, but the adoption of this strategy is still not common in most museums. (Pop & Borza, 2016).

It is evident from the results of the reliability analysis that the scales used in the study were highly reliable and valid. It needs to be emphasized that the scales dealing with sustainability and consumption were characterized by a very high level of reliability.

Regarding the existing integration of the concept of sustainability, only fewer than one third of the museums have incorporated sustainability and environmental awareness activities. Such findings suggest that environmental sustainability has not yet been incorporated into the culture and functioning of archaeological museums (Haghi & Zabihi, 2012). The above-mentioned outcomes correlate with other studies conducted before, since the integration of sustainability has been considered challenging for institutions because of their organizational structure (Ghosh & Ravichandran, 2021; Nikolaou et al., 2011).

Positive correlations between the variable “Environmental Awareness” and the two variables “Adoption of Green Policies” and “Perceived Benefits of Green Policies” were found in the correlation analysis. Thus, the organizations that exhibit more concern with respect to climate change issues are more inclined to introduce green policies and improve them. Also, it should be noted that the introduction of sustainability not only implies awareness of the issue but also organizational and institutional support in order to adapt and develop an environmentally friendly strategy, which is in agreement with existing literature (Moriarty & Honnery, 2020), and further supported by the one-way ANOVA results.

Interestingly, the exploratory data analysis concerning the issues that could be barriers to implementing greener measures (such as financial restrictions or old facilities) does not show any statistical significance concerning the use of greener policies. The surprising result indicates that if the environmental awareness is high in the administration of a museum, then there will be little hindrance from operational issues when it comes to implementing sustainable measures.

All in all, the outcomes may be summarized in the following way: the existing approach to sustainability management in Greece’s archaeological museums is still at its transitional stage. While environmental awareness serves as an essential facilitating factor on one side, on the other side the benefits of the green policies, together with organizational support, have a positive effect on green policies’ implementation. Nevertheless, the medium adoption rate implies that the sustainability implementation process is still underdeveloped.

CONCLUSIONS

This study examined the implementation of sustainable management in Greek archaeological museums, focusing on the variables of environmental awareness, sustainability initiatives, and green policies. It appears that sustainability is evolving into a critical organizational dimension for cultural institutions, although the current level of its implementation is rather modest and shows significant differences among the various museums.

More specifically, this study identified the existence of sustainability programs and environmental awareness activities in some, but not many, Greek museums. However, the majority of these cultural institutions are characterized by the absence of sustainable practices in their operations. On the other hand, it was found that the level of environmental awareness has a positive effect on the implementation of green policies. Furthermore, it has been demonstrated that sustainability initiatives promote the adoption of green policies. Finally, it was found that museums with sustainability-related programs adopted significantly more sustainable management practices compared to organizations without such programs.

On the other hand, museums showed a slightly positive attitude toward adopting sustainability practices in the future; however, the gap between current activities and future plans was not statistically significant. This suggests that the process of adopting sustainability in cultural management is progressing slowly, with no statistically significant difference between museums' current practices and their future intentions.

In conclusion, this study contributes to highlighting issues related to sustainability management in cultural organizations through the application of an empirical case study concerning archaeological museums in Greece. Thus, the findings of this study underscore the importance of environmental awareness and the implementation of appropriate initiatives within an organization as key factors contributing to the adoption of sustainability.

However, an analysis of other cultural institutions may provide a more comprehensive picture of the issue. On a more practical level, the findings may suggest that stronger institutional support, as well as sustainability strategies within organizations, could prove useful in promoting environmental responsibility in archaeological museums. Thus, sustainability management could become one of the key strategic areas for the further development of cultural institutions.

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REFERENCES

- Bansal, P., & Song, H.-C. (2017). Similar But Not the Same: Differentiating Corporate Sustainability from Corporate Responsibility. *Academy of Management Annals*, 11(1), 105–149. <https://doi.org/10.5465/annals.2015.0095>
- Chhabra, D. (2010). *Sustainable Marketing of Cultural and Heritage Tourism*. <https://www.routledge.com/Sustainable-Marketing-of-Cultural-and-Heritage-Tourism/Chhabra/p/book/9781138880733>
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297–334. <https://doi.org/10.1007/BF02310555>
- Dzhengiz, T., & Niesten, E. (2020). Competences for Environmental Sustainability: A Systematic Review on the Impact of Absorptive Capacity and Capabilities. *Journal of Business Ethics*, 162(4), 881–906. <https://doi.org/10.1007/s10551-019-04360-z>
- Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The Impact of Corporate Sustainability on Organizational Processes and Performance. *Management Science*, 60(11), 2835–2857.
- Einarsson, S., & Sorin, F. (2020). *Circular Economy in Travel and Tourism*.
- European Commission. (2019). *COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS The European Green Deal*. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52019DC0640>
- Fousteris, A. E., Didaskalou, E. A., Tsogas, M.-M. H., & Georgakellos, D. A. (2018). The Environmental Strategy of Businesses as an Option under Recession in Greece. *Sustainability*, 10(12), 4399. <https://doi.org/10.3390/su10124399>
- Geissdoerfer, M., Savaget, P., Bocken, N. M. P., & Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm? *Journal of Cleaner Production*, 143, 757–768. <https://doi.org/10.1016/j.jclepro.2016.12.048>

- Ghosh, A., & Ravichandran, S. (2021). Understanding Hospitality Employers' Perceptions of Preemployment Testing in Determining Successful Hires. *International Journal of Hospitality & Tourism Administration*, 22(2), 111–141. <https://doi.org/10.1080/15256480.2018.1547241>
- Haghi, H., & Zabihi, H. (2012). Social and Cultural Sustainability. *International Journal of Architecture and Urban Development*, 5(4), 31.
- Hesmondhalgh, D. (2019). *The Cultural Industries* (Fourth Edition, Vol. 1–0). SAGE Publications, Ltd. <https://doi.org/10.4135/9781036234232>
- ICOM. (2022). Museum Definition. *International Council of Museums*. <https://icom.museum/en/resources/standards-guidelines/museum-definition/>
- Keshavarz, Y., & Jamshidi, D. (2018). Service quality evaluation and the mediating role of perceived value and customer satisfaction in customer loyalty. *International Journal of Tourism Cities*, 4(2), 220–244. <https://doi.org/10.1108/IJTC-09-2017-0044>
- Lord, G. D. (Ed.). (2024). *Manual of Museum Management, Third Edition*. <https://www.lord.ca/resources/books/manual-of-museum-management>
- Lozano, R. (2018). Sustainable business models: Providing a more holistic perspective. *Business Strategy and the Environment*, 27(8), 1159–1166. <https://doi.org/10.1002/bse.2059>
- McGhie, H. (2019). *Museums and the Sustainable Development Goals – Curating Tomorrow*. <https://curatingtomorrow.co.uk/museums-and-the-sustainable-development-goals/>
- McGhie, H. (2020). Evolving climate change policy and museums. *Museum Management and Curatorship*, 35(6), 653–662. <https://doi.org/10.1080/09647775.2020.1844589>
- McSweeney, R. (2015, July 27). Global survey: Where in the world is most and least aware of climate change? *Carbon Brief*. <https://www.carbonbrief.org/global-survey-where-in-the-world-is-most-and-least-aware-of-climate-change>
- Merriman, N. (2023). The role of museums and galleries in addressing the climate and ecological crisis. In *Museums and the Climate Crisis*. Routledge.
- Moriarty, P. (2022). Making urban travel sustainable: Travel reductions are needed. *Cleaner Production Letters*, 3, 100010. <https://doi.org/10.1016/j.clpl.2022.100010>
- Moriarty, P., & Honnery, D. (2020). New Approaches for Ecological and Social Sustainability in a Post-Pandemic World. *World*, 1(3), 191–204. <https://doi.org/10.3390/world1030014>
- Nikolaou, E. I., Ierapetritis, D., & Tsarakakis, K. P. (2011). An evaluation of the prospects of green entrepreneurship development using a SWOT analysis. *International Journal of Sustainable Development & World Ecology*, 18(1), 1–16. <https://doi.org/10.1080/13504509.2011.543565>
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd edn). McGraw-Hill. <https://www.scirp.org/reference/ReferencesPapers?ReferenceID=1017362>
- Pop, I. L., & Borza, A. (2016, September 16). *Quality in museums as a way to increase sustainability*. 5, 217–228. <https://mpa.ub.uni-muenchen.de/76898/>
- Schaltegger, S., & Burritt, R. (2018). Business Cases and Corporate Engagement with Sustainability: Differentiating Ethical Motivations. *Journal of Business Ethics*, 147(2), 241–259. <https://doi.org/10.1007/s10551-015-2938-0>

- Sesana, E., Gagnon, A. S., Ciantelli, C., Cassar, J., & Hughes, J. J. (2021). Climate change impacts on cultural heritage: A literature review. *WIREs Climate Change*, 12(4), e710. <https://doi.org/10.1002/wcc.710>
- Taber, K.S. (2018). The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. *Research in Science Education*, 1293. <https://doi.org/10.1007/s11165-016-9602-2>
- UNESCO. (n.d.). *Museums*. Retrieved 22 July 2026, from <https://www.unesco.org/en/museums>
- UNESCO. (2021). *UNESCO report: Museums around the world in the face of COVID-19*. https://unesdoc.unesco.org/ark:/48223/pf0000376729_eng
- United Nations (Ed.). (1987). *Report of the World Commission on Environment and Development: Note*. UN. <https://digitallibrary.un.org/record/139811>
- United Nations (Ed.). (2015). *Transforming our world: The 2030 Agenda for Sustainable Development: resolution*. UN. <https://digitallibrary.un.org/record/3923923>
- Winans, K., Kendall, A., & Deng, H. (2017). The history and current applications of the circular economy concept. *Renewable and Sustainable Energy Reviews*, 68, 825–833. <https://doi.org/10.1016/j.rser.2016.09.123>
- Wu, J. (Snow), Law, R., & Liu, J. (2018). Co-creating value with customers: A study of mobile hotel bookings in China. *International Journal of Contemporary Hospitality Management*, 30(4), 2056–2074. <https://doi.org/10.1108/IJCHM-08-2016-0476>

CYBER-SOCIAL INTELLIGENCE AS AN EMERGING COMPETENCY WITHIN ENTREPRENEURSHIP EDUCATION

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ABSTRACT

Since 2022, generative AI has rapidly reshaped education and professional practice, enabling advanced analytical and generative capabilities. However, uncritical reliance on AI risks undermining autonomy and judgment—core principles of entrepreneurship education. In response, this paper argues for the need to articulate new competencies that enable meaningful human–AI engagement. This paper proposes Cyber-Social Intelligence as an emerging competency in entrepreneurship education within sustained human–AI interaction. Drawing on cases documenting AI initiatives across South African higher education institutions, the paper develops a conceptual framework that illustrates how meaningful human–AI engagement unfolds. Entrepreneurship education is presented as a particularly illuminating site for examining Cyber-Social Intelligence, given its emphasis on uncertainty, decision-making, and accountable action. The paper contributes a human-centred conceptual framework aligned with global business and technology scholarship and offers implications for pedagogy in Entrepreneurship Education as well as policy makers.

Keywords: Artificial Intelligence, entrepreneurship education, Cyber-Social Intelligence, teaching and learning.

INTRODUCTION

Generative artificial intelligence (AI) is rapidly reshaping educational and professional practice, which includes how knowledge is produced, interpreted, and acted upon (Nikolopoulou, 2024; Kalaitzidis, 2025). A growing body of work now emphasises that the central question on how human judgment, responsibility, and agency are reconfigured when students work alongside algorithmic systems (Chen, 2021; Stepanović, 2024).

Within Entrepreneurship Education (EE) in particular, pedagogy has traditionally been framed around learning *about*, *for*, or *through* entrepreneurship (Rodrigues, 2023). Over the past decade, research has increasingly argued that at the tertiary level, learning *for* and *through* the entrepreneurial process of entrepreneuring to develop student competence beyond propositional knowledge *about* entrepreneurship (Tselepis, et al., 2021). While generative AI systems can augment entrepreneurial opportunity recognition, analysis, and execution, they may also obscure ownership of decisions, dilute reflective judgment, and shift responsibility away from students. Generative AI could therefore be applied to the entrepreneurial process because it is a powerful analytical tool for pre-empting risks-taking, interpreting opportunities, and creating business and marketing plans (Tselepis, 2025). One may argue that human autonomy and judgement are becoming more relevant in entrepreneurship and this requires Cyber-Social intelligence.

In Entrepreneurship Education (EE), where uncertainty, autonomy, and judgment are central (Hedeboe Frederiksen, 2025), the rapid production of generative AI raises fundamental questions about entrepreneurial competence rather than tool adoption. This paper argues that the challenge is not whether AI is used, but how human capability is developed in sustained relation with non-human intelligence. The research question of this paper: What does Cyber-Social Intelligence entail in Higher Education in the Entrepreneurship Education context? Two research objectives were therefore set: 1) Exploring Cyber-Social Intelligence in Teaching and Learning in HE initiatives. 2) Interpreting/Contextualising what Cyber-Social Intelligence would entail for EE.

LITERATURE REVIEW

This literature review discusses entrepreneurial competencies and then conceptualises Cyber-Social Intelligence as an additional competence to promote learning with AI.

The Competencies Developed within Entrepreneurship Education

The primary objective of EE has long been framed as the development of individuals who are able to recognise and judge opportunities, mobilise resources, and take action under conditions of uncertainty (Haneberg, Aaboen & Middleton, 2022). Contemporary EE emphasises the formation of entrepreneurial ways of thinking and acting that enable learners to navigate complexity, ambiguity, and change (Rodrigues, 2023). A critical question is how generative AI may change these autonomous or judgment-based competencies relevant to entrepreneurship?

A common theoretical framework for entrepreneurial competency is proposed by the The Organisation for Economic Co-operation and Development (OECD). According to the OECD (2018), the entrepreneurship competence (EntreComp) framework defines entrepreneurship as the capacity to act on opportunities and ideas to create value for others. Organised across the dimensions of ideas and opportunities, resources, and into action, the framework foregrounds judgment, ethical reasoning, coping with uncertainty, and learning through experience as central to entrepreneurial competence. While the EntreComp (2018) framework provides a solid foundation for entrepreneurship education at the tertiary level (Banha, et al., 2025), it assumes human agency as the locus of responsibility and decision-making. An argument can be made that the emergence of generative AI may influence this assumption by introducing non-human analytical agents into entrepreneurial processes. Entrepreneurial processes that develop competencies are commonly understood and summarised in Table 1.

Table 1: Entrepreneurial processes that develop competencies.

OECD (2018) competence domain	Entrepreneurial process	Authors to support this
Ideas & Opportunities	Opportunity recognition, evaluation, and exploitation	Shane & Venkataraman (2000) Shane (2003)
	Judgment and decision-making under uncertainty	Frank Knight (1921) Foss & Klein (2012)
	Sense-making and interpretation	Weick (1995) Gartner (1988) Sarasvathy (2001)
Resources	Risk engagement (distinct from calculable risk management)	Miller (1983) Lumpkin & Dess (1996)
	Resource mobilisation and bricolage	Baker & Nelson (2005) Penrose (1959)
	Experimentation and iterative action	Sarasvathy (2001; 2008) Ries (2011) McKelvie et al. (2020)
Into action	Venture creation and organising	Gartner (1985) Aldrich & Martinez (2001) Shepherd et al. (2019)
	Reflection, learning, and adaptation	Kolb (1984) Rae (2006) Pittaway & Cope (2007) Cope (2011)
	Value creation	Stevenson & Jarillo (1990) Zahra et al. (2009) OECD (2018)

Source: Self compiled from various sources, as well as using Copilot.

The entrepreneurial processes illustrated in Table 1 are typically encouraged in Higher Education to enhance students' entrepreneurial competencies; however, the roles of humans and AI remain implicit. In a study by Tselepis (2025) relating to EE and the human edge in an AI age, the author highlighted the entrepreneurship competencies that AI could master and argues that while analytical tools such as AI may support elements of opportunity analysis, planning, and resource evaluation, the entrepreneurial processes aligned with OECD competencies remain fundamentally human-centred. The question that arises, then, is how AI can be used and what role it can play in EE. Entrepreneurial processes with AI imply that **Cyber-Social Intelligence** is a competency that needs consideration.

Conceptualising Cyber-Social Intelligence

The rapid integration of artificial intelligence (AI) into educational and professional contexts has generated extensive scholarship on digital literacy, AI literacy, and data literacy (Long & Magerko, 2020). While related to existing digital and AI literacy frameworks, Cyber-Social Intelligence moves beyond knowledge of system functionality or ethical guidelines. Cyber-Social Intelligence foregrounds the human capacity to exercise judgment, regulate trust, and retain responsibility for decisions in AI-mediated practice (Chen, 2021; Okamura & Yamada, 2020). Cyber-Social Intelligence is therefore proposed to address this educational gap by focusing on human development.

Cyber-Social Intelligence, in this paper, builds on social and emotional intelligence traditions, extending them to interactions with non-human cognitive agents. Cyber-Social Intelligence goes beyond literacy frameworks by foregrounding how humans regulate trust, reliance, and interpretive authority in sustained human–AI interaction (Chen, 2021). Cyber-Social Intelligence is therefore best understood as a meta-competency that governs how AI-related knowledge is enacted in complex decision contexts rather than as a discrete technical skill.

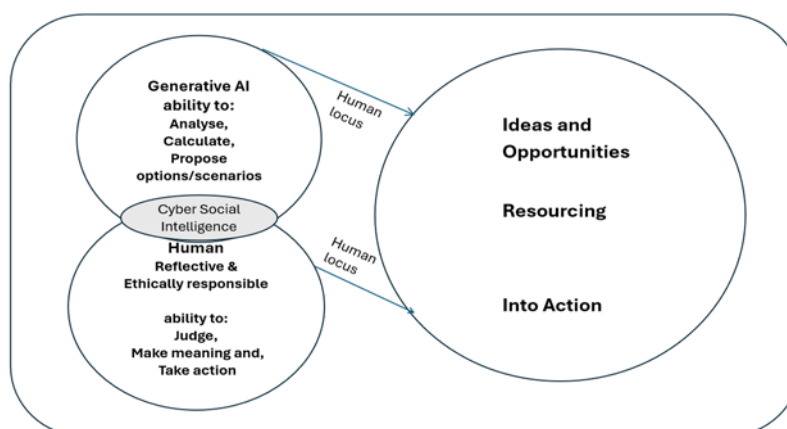
Research on human-centred AI consistently argues that AI should augment rather than replace human cognition, positioning technology as decision support rather than decision authority (Shneiderman, 2020). Similarly, the concept of augmented intelligence highlights collaboration between human judgment and machine analytics (Raisch & Krakowski, 2021). Cyber-Social Intelligence shifts attention to the human competency required to engage AI appropriately, including regulating trust in algorithmic outputs and avoiding automation bias (Okamura & Yamada, 2020). Sociomaterial and posthuman perspectives challenge the assumption that cognition resides solely within the individual, proposing instead that thinking emerges through groupings of humans, technologies, practices, and contexts (Fenwick & Edwards, 2013). Cyber-Social Intelligence adopts this insight by recognising that cognition is increasingly distributed across human and artificial systems (Hayles, 2017). Crucially, however, this recognition of distributed cognition resists the diffusion of responsibility, maintaining that ethical accountability and decision ownership remain human. This paper, therefore, also maintains that in EE, judgment, responsibility and ethical accountability in technologically facilitated environments remain human competencies.

The core dimensions of Cyber-Social Intelligence for EE, therefore, include analytical discernment, judgment under uncertainty, autonomy preservation, ethical responsibility, and dialogic engagement with AI. This positioning aligns with emerging work on non-delegable human responsibility in AI-mediated decision-making (Floridi & Cowls, 2019).

Preliminary Conceptual Framework (from literature)

Drawing on the preceding literature, Cyber-Social Intelligence in this paper is defined as the human competency to engage with artificial intelligence systems as cognitive and analytical partners while retaining responsibility for judgment, meaning-making, ideation, and action.

Figure 1: Illustrates the construct/concept Cyber-Social Intelligence as an additional competence.



Source: Self-compiled.

RESEARCH METHODOLOGY

An interpretivist approach was adopted to enable context-sensitive interpretation of AI practices. In this study, the researcher 1) explored how various AI initiatives in Higher Education in SA were used for cyber social intelligence and 2) interpreted/contextualised what that could mean for a specific context, such as EE.

This study adopted a case study research design to explore the construct of Cyber-Social Intelligence for HE teaching and learning. According to Yazan (2015), case studies are suitable for interpretive paradigms that require exploration and then interpretation for a particular context. The cases were identified from an online Community of Practice (CoP) for AI in Teaching and Learning focused on Higher Education. The CoP was launched in March 2025, and public universities and private Higher Education organisations were invited to participate in a range of sessions. The sessions were specifically designed to share thoughts and practices in teaching and learning. At the time of data analysis, five public South African Universities had presented and published their initiatives on the online platform. The cases made up from those who have published and shared their teaching and Learning initiatives could be analysed as a starting point for a larger study. The researcher could draw on shared practices to interpret those applicable to EE in particular from the website, but also from the details presented in the CoP sessions.

A number of South African institutions shared teaching and learning initiatives, and, due to the qualitative nature of this study, all were considered suitable for exploring Cyber-Social Intelligence. Initiatives were also presented in some of the online CoP sessions. The researcher could therefore attend the presentations on initiatives and make field notes that further enhanced understanding. South African institutions willing to share in the public domain were included in the sample. The selected initiatives were available on a centralised website, with the aim of making this information publicly available. In this regard, no formal ethical clearance was obtained.

The shared initiatives of five SA public institutions were analysed in accordance with the preliminary conceptual framework developed from the literature review (Figure 1). The first part of the content analysis was therefore directed. According to Kisbiswa (2019), directed content analysis requires a coding agenda; in this study, it was the preliminary conceptual framework on Cyber-Social Intelligence (developed from literature). The findings from the analysis were then compared to literature pertinent to EE to calibrate relevance and contextualise the data. This process is referred to as a literature check (Senanayake & Nawaratne, 2025), to enhance the trustworthiness of the study.

In the spirit of Cyber-Social Intelligence, the researcher also used CoPilot as a peer reviewer for the categories proposed in accordance with the preliminary conceptual framework of this study. The researcher compared the AI tool's analysis with the human analysis on categories. The categories were therefore logically deduced first to answer objective 1 and interpreted against relevant, recent EE literature to answer objective 2.

The methodology does have limitations. The study draws on publicly shared initiatives and researcher field notes, which may reflect institutional narratives that emphasise success rather than challenges. This can potentially obscure failed or contested practices. The researcher is the central instrument of analysis. While this enables deep contextual interpretation, it also introduces subjectivity, particularly in the categorisation of Cyber-Social Intelligence dimensions. There was also a limit in the depth of engagement with participants and constrained opportunities for triangulation through interviews or direct validation of interpretations. These limitations suggest that the findings should be interpreted as exploratory and a conceptual starting point only.

The evidence drawn from the AI initiatives documented within a South African community of practice focused on ethical AI integration in HE is presented in the next section.

FINDINGS ON AI INITIATIVES IN SA CASES

The decentralised initiatives revealed meaningful human–AI engagement in HE. Initiatives included local experimentation, ethical framing, and boundary-setting within institutions. These initiatives were also deemed appropriate to deduce entrepreneurial sense-making under conditions of uncertainty.

In the initiatives, the wider context was first interpreted in terms of AI use in HE to answer objective 1. The findings are presented in Table 2

Objective 1: Exploring what Cyber-Social Intelligence in Teaching and Learning in HE Entails.

Table 2: AI use in HE from the CoP.

Institution / Initiative	How AI Is Used in HE	Category Ascribed	Rationale for Category Attribution
UCT	Institutional AI in Education Framework guiding ethical AI use in teaching and assessment	Judgment under uncertainty	Human actors explicitly retain decision authority, using AI to inform rather than determine action. This reflects entrepreneurial judgment where decisions must be made without delegating responsibility.
UFH	AI explored in relation to curriculum decolonisation and research practices	Contextualisation (sense-making)	AI outputs are interpreted through historical, cultural, and curricular contexts, indicating that meaning is constructed by humans rather than assumed from AI-generated insights.
NWU	AI@NWU platform coordinating teaching, learning, and research initiatives	Autonomy preservation	Governance structures act as boundaries that prevent over-reliance on AI, ensuring that human independence and ownership of decisions remain central.
UKZN	Guidelines for generative AI use in academic work	Responsibility and accountability	Clear integrity norms reinforce that accountability for meaning, authorship, and assessment outcomes cannot be delegated to AI systems.
UJ	Localised experimentation with AI tools across disciplines and contexts	Experimentation	Variation across contexts indicates exploratory action, iterative learning, and situated judgment rather than standardised adoption

Source: Self-compiled and applying Copilot to observed human AI-practice.

Table 2 illustrates that the categories in this study's conceptual framework are relevant across the wider HE context. The notions of: 1) Judgment under uncertainty, 2) experimentation, 3) contextualisation (sense-making), 3) preserving autonomy, as well as 4) responsibility and accountability are evident.

Objective 2: Interpreting what Cyber-Social Intelligence Would Entail for EE

Table 3 illustrates the implications of Cyber-Social Intelligence on each initiative in the five cases.

Table 3: Implications of Cyber-Social Intelligence linked to EE.

Institution / Initiative	Observed Human–AI Practice (from Table 1)	Category Ascribed	Implications for EE
UCT	AI supports analysis and design while pedagogical decisions remain human-led	Judgment under uncertainty	Entrepreneurial judgment is needed where decisions must be made without delegating responsibility.
UFH	AI engaged critically as an object of inquiry and analytical support, particularly in relation to decolonization	Contextualisation (sense-making)	Meaning is constructed by humans rather than assumed from AI-generated insights. Entrepreneurial thinkers are able to contextualise all knowledge to enhance opportunity
NWU	AI augments analytical capacity within defined human governance structures	Autonomy preservation	Governance structures act as boundaries of systems that entrepreneurial thinkers have to own up to
UKZN	AI framed as supportive within academic integrity guidelines	Responsibility and accountability	Clear integrity norms reinforce that accountability for meaning, authorship, and assessment outcomes cannot be delegated to AI systems.
UJ	Localised experimentation with AI tools across diverse contexts and disciplines	Experimentation	Variation across contexts indicates exploratory action, iterative learning, and situated judgment rather than standardised adoption (key characteristics of entrepreneurial practice).

Source: Self-compiled.

Table 3 illustrates that the AI initiatives in the five cases had implications for EE. The role of the human was evident and enhanced the researcher's understanding of Cyber-Social Intelligence. Details of some observations that emerged and that informed the researcher's interpretation of the data are presented in the discussions that follow.

DISCUSSION

The discussion flows from the findings and from the interpretation of observations on the initiatives in the AI Teaching and Learning CoP.

Observations

Observation 1: Judgment Under Uncertainty: Across initiatives, AI is consistently positioned as a supportive analytical. All the cases emphasise that final judgments remain human-led, particularly in teaching, assessment, and curriculum design. This approach is relevant to entrepreneurial decision-making, which requires action under uncertainty (Csonka-Peeren & Cozzarin, 2021). Therefore, decision-making cannot be reduced to algorithmic optimisation. The initiatives suggest that meaningful engagement with AI requires students to develop the competence to interpret, question, and selectively apply AI-generated insights. Cyber-Social Intelligence, therefore, emerges as the capacity to exercise judgment while engaging AI as a cognitive partner.

Observation 2: Contextual Sense-Making Rather Than Optimisation; The diversity of initiatives reflects an emphasis on contextual interpretation rather than technological optimisation. The value of contextualization as a skill pertaining to Cyber-Social Intelligence is noteworthy. In EE, sense-making is a foundational capability (Soelberg, et al., 2024). Entrepreneurs are required to interpret ambiguous signals, construct meaning, and act in the face of uncertainty (Mensah, et al., 2021). Cyber-Social Intelligence supports this mode of engagement by enabling students

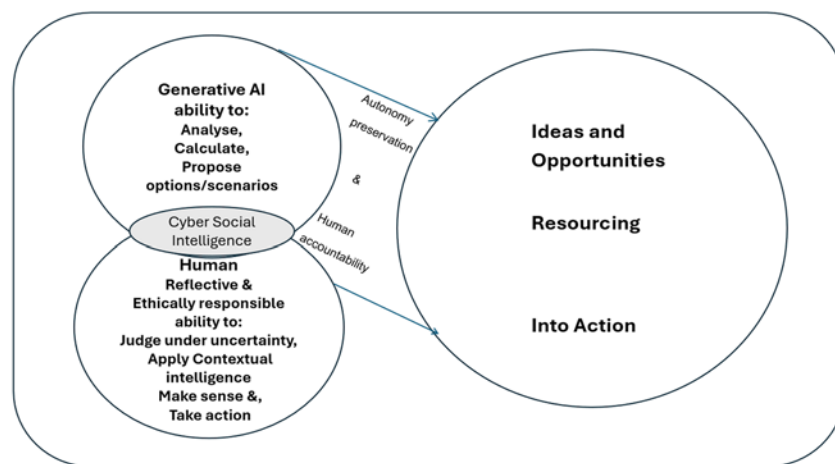
to translate AI outputs into contextually relevant insights (Hulus, 2026). This implies that recognising that AI lacks situated understanding of local, cultural, and ethical contexts is important and may also influence how competence for EE is developed.

Observation 3: Autonomy Preservation and Independence of Thought: A recurring feature of initiatives is the explicit articulation of boundaries governing AI use, particularly regarding academic integrity, authorship, and responsible engagement. These boundary-setting practices relating to academic integrity resist uncritical automation and protect human autonomy (Guadu, et al., 2026). EE similarly prioritises independence of thought and ownership of decision-making (Mei, et al., 2020). Therefore, Cyber-Social Intelligence functions as a developmental competency that enables students to use AI without cultivating cognitive dependence.

Observation 4: Responsibility and Non-Delegable Accountability: Ethical considerations and human accountability are foregrounded across the initiatives in the data set, reflecting a shared understanding that responsibility for decisions cannot be delegated to AI systems. This notion of non-delegable accountability aligns closely with entrepreneurship education, where individuals are accountable for the social, economic, and ethical consequences of their actions (Deilami, 2025). Cyber-Social Intelligence in EE, therefore, includes recognising the persuasive power of AI outputs while maintaining human responsibility for interpretation, judgment, and action. Taken together, these observations demonstrate that decentralised AI initiatives in HE already reflect entrepreneurial modes of thinking and acting. They reveal that meaningful human–AI engagement is not intuitive and cannot be assumed to develop automatically through exposure to technology. Instead, they point to the necessity of intentionally cultivating Cyber-Social Intelligence as a core competency within EE. EE should therefore develop and integrate competencies in judging under uncertainty, contextual sense-making, autonomy preservation, and human accountability.

Bearing in mind the findings and interpretations, the conceptual framework for Cyber-Social Intelligence in EE is refined as follows.

Figure 2: Conceptualising Cyber-Social Intelligence for EE.



In Figure 2, the Human reflective and ethical responsibility is deepened, with the human locus revolving around autonomy and preservation, as well as human accountability in particular.

IMPLICATIONS FOR TEACHING AND LEADERSHIP

Developing Cyber-Social Intelligence requires shifts in curriculum design, academic development, and institutional leadership. Educators must be supported to engage AI critically while retaining responsibility for judgment.

Over the past decade, however, scholarship increasingly argues that at the tertiary level, learning *for* and *through* the entrepreneurial process of entrepreneuring enhances students' competencies beyond knowledge *about* entrepreneurship (Rodrigues, 2023). However, these pedagogies were relevant before the age of free access to

generative AI; therefore, the fourth pedagogy may need to consider AI applications. Considerations on AI relevant to HE therefore, include:

- Embracing a pedagogy that includes learning about, through and for entrepreneurship *with* AI
- Investing in educator training that equips lecturers to facilitate critical engagement with AI, rather than merely adopting technological tools.
- Encouraging alternative assessment approaches (e.g., reflective decision logs, process-based evaluation) that make human reasoning visible alongside AI use.

The emergence of Cyber-Social Intelligence also has direct implications for higher education policymakers, particularly in systems undergoing rapid digital transformation. Policymakers should consider:

- Embed Cyber-Social Intelligence explicitly within national qualification frameworks for entrepreneurship education, ensuring that learning outcomes include judgment under uncertainty, ethical AI use, and autonomy preservation.
- Developing institutional policies that clearly define the non-delegable nature of human accountability, particularly in assessment, authorship, and decision-making contexts.
- Ensure that AI policies account for resource disparities, preventing unequal access from deepening educational inequalities.

CONCLUSION

As AI becomes a persistent cognitive presence, cultivating Cyber-Social Intelligence is essential. Cyber-Social Intelligence offers a human-centred framework for engaging AI meaningfully, ensuring that technological advancement enhances rather than diminishes entrepreneurial capability.

EE must prioritise competencies that preserve human autonomy and accountability. For policymakers, the key insight is that AI integration is not solely a technological issue but a human capability challenge, requiring systemic alignment between policy, pedagogy, and institutional practice.

REFERENCES

- Banha, F., Graça, A. R., Góis, B., & Banha, F. M. (2025). A critical analysis of the Portuguese framework for entrepreneurship education considering the EntreComp competence framework. *Entrepreneurship Education*, 8(1), 1–28.
- Chen, N.S. (2021). Human-centered artificial intelligence in education: Seeing the invisible through the visible. *Computers & Education: Artificial Intelligence*, 2, Article 100008.
- Csonka Peeren, J. & Cozzarin, B.P. (2021). A conceptual model of ambiguity attitudes for entrepreneurship experiments. *Journal of Behavioral and Applied Management*, 21(2), 62–80.
- Deilami, A. (2025). Entrepreneurial education and entrepreneurial success: The mediating role of learner autonomy and the moderating influence of digital literacy. *International Journal of Learning, Teaching and Educational Research*, 24(7), 212–234.
- European Commission. (2018). EntreComp: The entrepreneurship competence framework. Publications Office of the European Union.
- Fenwick, T. & Edwards, R. (2013). Performative ontologies: Sociomaterial approaches to researching adult education and lifelong learning. *European Journal for Research on the Education and Learning of Adults*, 4(1), 49–63.
- Floridi, L., & Cowls, J. (2019). A unified framework of five principles for AI in society. *Harvard Data Science Review*, 1(1).

- Guadu, A., Dibekulu, D. & Menberu, A.W. (2026). Academic integrity in the age of AI: Challenges and strategies for African higher education. *Discover Education*, 5, Article 21.
- Haneberg, D.H., Aaboen, L. & Middleton, K.W. (2022). Teaching and facilitating action-based entrepreneurship education: Addressing challenges towards a research agenda. *The International Journal of Management Education*, 20(3), Article 100711.
- Hayles, N.K. (2017). *Unthought: The power of the cognitive nonconscious*. University of Chicago.
- Hedeboe Frederiksen, S. (2025). Entrepreneurship education as a liminal experience: Balancing uncertainty and safety in a student team. *International Journal of Entrepreneurial Behavior & Research*, 31(10), 2548–2565.
- Hulus, A. (2026). A systematic response to ethical blind spots in AI education: Cross-cultural insights and the role of digital literacy. *Smart Learning Environments*, 13, Article 11.
- Kalaitzidis, T. (2026). How generative AI fixes what higher education broke: Reframing the colonization of knowing and learning. *AI & Society*, 41, 895–913.
- Mei, H., Lee, C.H. & Xiang, Y. (2020). Entrepreneurship education and students' entrepreneurial intention in higher education. *Education Sciences*, 10(9), Article 251.
- Mensah, E.K., Asamoah, L.A. & Jafari Sadeghi, V. (2021). Entrepreneurial opportunity decisions under uncertainty: Recognizing the complementing role of personality traits and cognitive skills. *Journal of Entrepreneurship, Management & Innovation*, 17(1), 25–55.
- Nikolopoulou, K. (2024). Generative artificial intelligence in higher education: Exploring ways of harnessing pedagogical practices with the assistance of ChatGPT. *International Journal of Changes in Education*, 1(2), 103–111.
- Okamura, K. & Yamada, S. (2020). Adaptive trust calibration for human–AI collaboration. *PLOS ONE*, 15(2), e0229132.
- Raisch, S. & Krakowski, S. (2021). Artificial intelligence and management: The automation–augmentation paradox. *Academy of Management Review*, 46(1), 192–210.
- Rodrigues, A.L. (2023). Entrepreneurship education pedagogical approaches in higher education. *Education Sciences*, 13(9), Article 940.
- Senanayake, S.P.S. & Nawaratne, N.N.J. (2025). Factors influencing trustworthiness of qualitative research: A systematic literature review. *International Journal of Research and Scientific Innovation*, 12(12), 297–319.
- Shneiderman, B. (2020). Human-centered artificial intelligence: Reliable, safe & trustworthy. *arXiv*.
- Soelberg, F., Botha, M., Moos, M.N. & Stokvik, H. (2024). Creating value through entrepreneurial learning and education. *Southern African Journal of Entrepreneurship and Small Business Management*, 16(1).
- Stepanović, I. (2024). Towards a human-centered education in the age of algorithmic governance. *Prospects*, 54, 459–466.
- Tselepis, T. (2025). The human edge in the AI age: Irreplaceable skills in entrepreneurship education. In *Proceedings of the International Business Conference (IBC) 2025*.
- Tselepis, T.J., Nieuwenhuizen, C. & Schachtebeck, C. (2021). To live and to learn: Practice-led learning through entrepreneurship education. *Teaching Innovations*, 34(2), 12–26.
- Yazan, B. (2015). Three approaches to case study methods in education: Yin, Merriam, and Stake. *The Qualitative Report*, 20(2), 134–152.

SUSTAINABLE RESOURCE UTILIZATION AND FOOD SECURITY IN DEVELOPING ECONOMIES: A CASE STUDY OF ONDO STATE, NIGERIA

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ABSTRACT

Nigeria possesses a rich mineral and food resource base. Ondo State is known for its abundant cassava. The production of this resource has, to a large extent, contributed to the indigenous economies of the host communities. The ethanol production activities of Wewood Limited, a Chinese company in the Odigbo Local Government Area of Ondo State, require cassava supplies, sourced from farmers in the host communities among other sources. This has primarily affected the availability of cassava for the production of staple food by residents of the host communities. This paper assesses how bio-ethanol production by the Chinese company has influenced food availability in the host communities. Qualitative method and In-depth interviews were conducted among twenty-five (25) residents of Odigbo, LGA, Ondo State, Nigeria. Purposive sampling was used with an unstructured questionnaire. All ethical conditions and face to face method were employed. The content analysis method was adopted. The study finds that farmers divert cassava supplies to Wewood Limited in exchange for lump-sum payments, thereby limiting the availability of cassava for food production in the communities at large. The study recommends that the government should encourage the use of bio-waste in ethanol production to avoid food scarcity among residents of the host communities.

Keywords: resource production, food security, bio-ethanol, bio-waste, cassava.

INTRODUCTION

The need for clean energy has made governments of nations to adopt the use of renewable energy which necessitates the production of bioethanol. It becomes important to get the suitable raw materials required for conversion into bioethanol. In order to meet the high demand for ethanol in Nigeria, the government imports 350million liters of ethanol yearly from Brazil, India, USA, Canada, South Africa (Oyegoke et al., 2022) which are made from maize which approximately cost \$160million. The concern about the number of foreign reserves that goes to the importation of bioethanol has necessitated increase in the production of bioethanol in Nigeria (Matemilola et al., 2019), this step is identified to help reduce the fund spent on bioethanol importation (Iye and Bilsborrow, 2012).

As a result, the Nigerian Biofuel policy was implemented in 2015 which led to the setting up of about twenty new bioethanol projects in different parts of the country (Ohimain, 2015). Additionally, cassava has been identified to be the root source of the feedstock that can be used in the production of bioethanol which give much yield compared

to maize, palm wine among other resources required for bioethanol production. At the same time, it is used in the production of food such as fufu, pupuru, ilafun, garri which are all sources of food for human. It has been argued that the use of feedstocks in production of biofuel could result to food fuel competition. That is substituting food for biofuel production (Balogun and Salami, 2016). It is further argued that the production of biofuel using cassava as the raw material could result to increase in food prices which necessitate the implementation of a viable policy (Oyegoke et al., 2022; Agba et al., 2010).

However, ensuring that the people are food secured and energy secured are important, which could be identified as an indicator of sustainable development, as both are connected to SDG 2 and SDG 7 which are zero hunger and affordable and clean energy. It is against this backdrop that the study examines the effect of bioethanol production on food availability in Odigbo Local Government Area of Ondo State, Nigeria.

METHODOLOGY

The study adopts qualitative research methods and exploratory research design. The location of the study is the Odigbo local government area of Ondo State, Nigeria. For the purpose of the study, 10 (cassava farmers) participants were interviewed using unstructured questionnaires to collect data through in-depth interviews. 8 local producers of cassava-based foods and 7 local consumers of cassava producer) were interviewed on the effect of cassava diversion to ethanol production on food availability in the commodity. The non-probability (snowballing & purposive) sampling techniques were adopted for the purpose of this study. To identify the participants to be interviewed in the selected study locations the snowballing method was adopted, using the face-to-face method of interview. The content method of data analysis was employed for the interpretation of the verbal data collected from various selected participants in the field in the study. All ethical conditions have been considered for the purpose of the study.

DISCUSSION OF FINDINGS

This study examines the effect that bioethanol production using the cassava produce has on the availability of food in Odigbo Local government area of Ondo state, Nigeria. The findings reveal that the establishment of Wewood Limited in the area has to a large extent altered the value chain of cassava among the members of the surrounding communities. When the company first began its operations, farmers were attracted to cassava farming due to the higher prices offered for the supply of cassava. This resulted in the farmers' prioritization for sales to the bio-ethanol producing company, instead of selling to the local food processors. Consequentially, there was a reduction in the availability of cassava for the production of staple foods such as; pupuru and garri, resulting in the shortage of food and increase in its prices within the host communities.

The findings support food and fuel argument which was advanced by Subramaniam, Masron, and Azman (2019), Babakhani et al. (2023), and Matemilola et al. (2019), who opine that the utilization of food crops as feedstock for the production of biofuel may affect food security negatively. This happens when food availability is reduced and there is an increase in the prices of food. The experiences that the respondents have shared also show that the use of cassava for industrial bioethanol production in the first instance compromised the access to affordable food among the members of the host communities.

Furthermore, the study finds that the once attractive market that was created by the industrial production of ethanol had encouraged farmers to engage in the cultivation of cassava. The production of cassava therefore expanded at a very considerable measure within the area of study. The finding is in alignment with Koizumi's (2015) aversion that the production of biofuel can increase the development of agricultural practices, thereby creating new market opportunities and allowing for an increase in crop production. The expansion of cassava farming beams a light on the potential of bioenergy investments to encourage rural economic activities and the increase in the participation of farmers in commercial agricultural activities.

The study on the other hand beams light on an unexpected shift in the dynamics of the market. As the rate of the production of cassava increased, its supply exceeds its demand from the bioethanol company. As a result, cassava farmers began to experience a reduction in profit and an accumulation of post-harvest losses; securing buyers for their produce became a challenge. The finding shows that smallholder farmers are largely vulnerable to the fluctuations in

market particularly when the decisions of production are solely driven by an industrial buyer. Hence, power imbalance as highlighted in the Complex Interdependence theory is reflected; the local cassava farmers are economically dependent on the decisions of the multinational corporation.

In furtherance, the study finds out that although the community experienced food scarcity at the early stages of the bioethanol production in Odigbo Local Government Area of Ondo state, subsequently, the increased cultivation of cassava produce improved the availability of food and allowed for the reduction in the prices of cassava-based foods. This is in support of the submission of Dick (2014) and Ogundari et al. (2012), who aver that the production of biofuel and food security may co-exist, when the output of agriculture increases enough to meet the demands of the household and industry.

In sum, the study shows that the production of bioethanol has influences food security both negatively and positively. As it creates job opportunities, encourages agricultural production and improves the development of renewable energy, it may lead to momentary food shortages and market instability if not checked. In order to achieve a balance between energy security and food security, it is important to ensure that coordinated policies are established; such that promote sustainable production of cassava, market diversification, and alternative feedstocks such as waste from agricultural produce are used for the production of ethanol.

CONCLUSION AND POLICY RECOMMENDATIONS

This study investigated the implications of cassava-based bioethanol production on food availability in Odigbo Local Government Area of Ondo State, Nigeria. The findings show that establishment of Wewood Limited at the initial stage led to increase in employment opportunities and rise in demand for cassava, thereby increasing incomes of farmers. However, this diversion of large amount cassava to bioethanol production reduces the quantity of cassava available for food production and at the same time increases the staple foods such as garri and pupuru. The results further show that increase in farmers' incomes led to increase in cassava supplied to the ethanol industry as more farmers cultivate cassava, which consequently led to excess in cassava supplied and eventually improved food supply and reduces food prices within the communities. In spite of improvement in food availability for consumers, most farmers started experiencing a decline in their profits as a result of market saturation and the limited purchasing capacity from the ethanol industry. The study therefore concludes that as production of bioethanol contributes to energy security and rural economic development, lack of adequate coordination industrial demand and food demand could generate a short-term food insecurity and long-term market instability for farmers. To ensure a sustainable resource utilization, there is need to adopt a balance approach that concurrently support production of renewable energy, food security and secure agricultural livelihoods. The study recommends the establishment of collaboration among the government agencies, the MNC and the local farmers in order to promote trade relationships and the importation of the produce within and without Ondo state, as well as beyond the borders of the country. It further recommends that the government should encourage the use of bio-waste in ethanol production to avoid food scarcity among residents of the host communities.

REFERENCES

- Abemi, A., Oyegoke, T., Dabai, F. N., & Jibril, B. Y. (2018). Technical and economic feasibility of transforming molasses into bioethanol in Nigeria. In *Faculty of Engineering National Engineering Conference* (p. 145).
- Abu, G. (2016). Analysis of factors affecting food security in rural and urban farming households of Benue State, Nigeria. pp.6-8).
- Babakhani, E., Rostamian, R., & Goudarzi, M. (2023). The Effects of Biofuels on Food Security in Selected Countries. *AGRIS on-line Papers in Economics and Informatics*, 15(4), 3-18.
- Boly, M., & Sanou, A. (2022). Biofuels and food security: evidence from Indonesia and Mexico. *Energy Policy*, 163, 112834.
- Chakravorty, U., Hubert, M. H., Moreaux, M., & Nøstbakken, L. (2017). Long-run impact of biofuels on food prices. *The Scandinavian Journal of Economics*, 119(3), 733-767.

Dick, N. A. (2014). *Analysis of biofuel potential in Nigeria* (Doctoral dissertation, Newcastle University).

Genest, Marc A. (1996). *Conflict and Cooperation: Evolving Theories of International Relations* Belmont, CA: Thomson & Wadsworth.

Iye, E., & Bilsborrow, P. (2013). Cellulosic ethanol production from agricultural residues in Nigeria. *Energy Policy*, 63, 207-214.

Keohane, R.O. & Nye, J.S. (1977). *Power and Interdependence: World Politics in Transition*. Boston: Little, Brown & Co.

Kiggundu, N., Arhin, S. G., Banadda, N., & Kabenge, I. (2017). Impacts of biofuel policies on welfare and food security: Assessing the socioeconomic and environmental trade-offs in sub-Saharan Africa. *International Journal of Renewable Energy Research*, 7(4), 2162-2171.

Koizumi, T. (2015). Biofuels and food security. *Renewable and Sustainable Energy Reviews*, 52, 829-841.

Matemilola, S., Elegbede, I. O., Kies, F., Yusuf, G. A., Yangni, G. N., & Garba, I. (2019). An analysis of the impacts of bioenergy development on food security in Nigeria: Challenges and Prospects. *Environmental and Climate Technologies*, 23(1), 64-83.

Ogundari, I., Famurewa, A., Olaopa, R. I., Akarakiri, J., & Siyanbola, W. (2012). Cassava Bio-Ethanol Development in Nigeria and Its Food Security Considerations.

Oshewolo, S. (2012). Designed to fail? Nigeria's quest for biofuel. *Afro Asian J. Soc. Sci*, 3(3.3).

Osseweijer, P., Watson, H. K., Johnson, F. X., Batistella, M., Cortez, L., Lynd, L., ... & Nassari, A. (2015). Bioenergy and food security. *Bioenergy & Sustainability: Bridging the Gaps* (eds Souza GM, Victoria R, Joly C, Verdade L)(Chapter 4), 72, 779.

Oyegoke, T., Obadijah, E., Adah, F., Oguche, J. E., Timothy, G. T., Mantu, I. A., & Ado, A. D. (2022). Trends of progress in setting up biorefineries in developing countries: A review of bioethanol exploration in Nigeria. *Journal of Renewable Energy and Environment*, 9(1), 37-52.

Oyenike, A. O., RASHEED, O. K., Abiodun, O., & Toyese, O. (2020). TECHNO-ECONOMIC Assessment of Transforming Sorghum Bagasse into Bioethanol fuel in Nigeria: 1-Process Modelling, simulation, and cost Estimation. *Journal of Engineering Studies and Research*, 26(3), 154-164.

Pachapur, P. K., Pachapur, V. L., Brar, S. K., Galvez, R., Le Bihan, Y., & Surampalli, R. Y. (2020). Food security and sustainability. *Sustainability: Fundamentals and Applications*, 357-374.

Pettersson, K., & Grahn, M. (2012). *How much can biofuels reduce greenhouse gas emissions?* In B. Sandén & K. Pettersson (Eds.), *Systems perspectives on biorefineries 2012* (pp. 72–79). Chalmers University of Technology.

Rana, W. (2015). Theory of Complex Interdependence: a comparative analysis of Realist and Neoliberalist thoughts. *International Journal of Business and Social Science*, 6(2).

Subramaniam, Y., Masron, T. A., & Azman, N. H. N. (2019). The impact of biofuels on food security. *International Economics*, 160, 72-83.

Yatsenko, V. (2017). Improving Food and Energy Security of Ukraine—Reproductive Sources of Energy. *Bulletin of the Cherkasy Bohdan Khmelnytsky National University. Economic Sciences*, 2(4).

THE MUNICIPAL RESPONSES TO SUSTAINABLE TOURISM POLICY GAPS IN GREECE

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ABSTRACT

Greece is among Europe's most tourism-dependent economies yet lacks a national framework for sustainable tourism. Objectives are set nationally; implementation falls to municipalities acting with limited guidance, fragmented support, and five-year electoral cycles. From a phenomenological study of 12 municipal leaders across 9 of 13 regions, interviewed after the 2023 elections (Tsolis, 2024), this case examines how competing conceptions of the mayoral role shape partnership formation. It documents seven partnership layers and six systemic barriers and extends the triple-helix theory by identifying asymmetric configurations in which resource-constrained municipalities substitute one strand for another. Decision points and a teaching note support classroom use.

Keywords: sustainable tourism, municipal leadership, public–private partnerships, Greece, triple helix.

INTRODUCTION

In February 2024, a deputy mayor of tourism in a major Greek city faced significant operational challenges. The municipal office lacked an approved budget, and the legal entities inherited from the previous administration had been dissolved. Staff morale was low. Six weeks into the new term, the deputy mayor attempted to attend an international tourism fair to promote the region, but was unable to authorize the expenditure due to a lack of funds. With four months remaining until summer, local hoteliers were already requesting the municipality's promotional plan for the year.

On a small Ionian island, a mayor encountered a different challenge. The objectives included extending the tourism season year-round, promoting sustainability, and collaborating with the local university. The regional government, previously responsible for tourism outreach, had not produced a strategy during the last term; as the mayor put it, "results were not as expected," so he bypassed the regional authorities and approached the university rector directly.

On an Aegean island, another mayor addressed coordination challenges by establishing a direct partnership with the United Nations World Tourism Organization (UNWTO), successfully persuading four national ministries to amend legislation and thereby enabling municipal-level partnerships.

These scenarios are drawn from interviews with 12 municipal leaders from 9 of Greece's 13 regions, conducted in winter 2023–2024 following the October 2023 municipal elections (Tsolis, 2024). Each leader confronted the same central challenge: advancing sustainable tourism without a national framework, amid fragmented support, and with partnerships built from the ground up.

BACKGROUND: TOURISM AND GOVERNANCE IN GREECE

The Tourism Economy

Greece is one of the world's leading tourist destinations, known for its "sun–sea–antiquities" brand (Kouri, 2012). Tourism contributes roughly 18% of GDP and supports nearly 900,000 jobs (Hellenic Ministry of Foreign Affairs, n.d.). The country has 13,676 km of coastline, the most in the Mediterranean, 27 protected national areas, 227 inhabited

islands, and a deep archaeological and cultural heritage, drawing visitors from Europe, the Middle East, and, increasingly, Asia and the Americas.

Now hope to diversify beyond summer beaches and extend the season into the shoulder and off months (Carbonaro, 2022). Tourism destinations are complex systems spanning hospitality, food, transport, education, and support services (da Fontoura Costa & Baggio, 2009), and score high on tourist infrastructure but low on sustainable development relative to other EU members (Kiselakova et al., 2020; Stec & Grzebyk, 2022). Uncontrolled growth has already strained island destinations, underscoring the urgency of credible sustainability frameworks (Tsilimigkas et al., 2022).

The Three-Tier Governance Structure

Greece is a unitary parliamentary republic. Tourism falls primarily under the Ministry of Tourism in Athens and is supported by the Greek National Tourism Organization (EOT). The country's 13 regions manage regional development, and within those regions, 332 municipalities handle local planning, infrastructure, and community development. Municipal leaders are elected every five years, most recently in October 2023.

In principle, this three-tier system should produce a coordinated tourism policy. In practice, coordination is uneven. Scholars document weak local and regional structures (Karampela et al., 2016), poor codification of tourism legislation (Mylonopoulos et al., 2011), and a persistent gap between national rhetoric and municipal reality. Greece still lacks a unified national framework for sustainable tourism; existing instruments are fragmented across regions, coastal or forested areas, or specific typologies such as agritourism (Mylonopoulos et al., 2017; Pridham, 1999). Within this context, municipal leaders are held responsible for local sustainable-tourism outcomes yet often lack dedicated frameworks, specialized staff, and the resources to develop independent strategies.

LITERATURE REVIEW

Given Greece's economic dependence on tourism, the scholarship is strikingly uneven in who is expected to manage sustainability on the ground. Research has thoroughly documented the country's reliance on a sun–sea–antiquities product (Kouri, 2012) and the sector's exposure to seasonal and climatic pressure, yet it has been slower to interrogate the municipal actor on whom implementation depends. This review argues that the existing body of work, although rich in frameworks, remains predominantly descriptive at the national and regional scales and largely silent on municipal agency under constraint.

The sustainable tourism literature has matured from a narrow focus on economic and environmental management toward a more critical stance that foregrounds power, inequality, and ideology (Boluk et al., 2019; Laitamaki et al., 2016). Central to this turn is an unresolved tension: growth and sustainability are routinely invoked together, yet in practice they are often contradictory (Bianchi & de Man, 2021). The United Nations Sustainable Development Goals (SDGs) have become the default vocabulary for reconciling them, and scholars argue that tourism policy should be anchored in widely accepted sustainability concepts rather than bespoke local definitions (Niavis et al., 2022). However, the SDGs are a normative aspiration rather than an operational framework. The proliferation of sustainable-tourism frameworks across global, national, and regional scales (Draper et al., 2011; Ferrer-Roca et al., 2022; Stoddard et al., 2012) has, paradoxically, compounded the difficulty: an abundance of models has not produced a usable playbook for the official closest to the destination.

Nowhere is this gap sharper than in Greece. The literature consistently characterizes Greek tourism governance as fragmented and weakly codified (Mylonopoulos et al., 2011; Pridham, 1999), with sustainability instruments scattered across regions, coastal and forested zones, and discrete typologies such as agritourism rather than consolidated into a national framework (Mylonopoulos et al., 2017). Karampela et al. (2016) and Iliopoulou-Georgoudaki et al. (2016) document weak local and regional structures, while Niavis et al. (2022) show that careful policy prioritization struggles to contend with regional heterogeneity. Underlying these findings is a structural fact that the descriptive literature tends to report but rarely theorizes: Greece is a centralized state that affords local government limited fiscal and administrative autonomy (Psycharis et al., 2015). The result is a governance paradox—municipalities are accountable for local sustainable tourism outcomes yet are denied the authority, staffing, and resources to deliver them. Complexity-oriented scholarship offers a partial explanation, arguing that centralized

policymakers consistently underestimate the unpredictability of the systems they try to steer (Cairney, 2012), but the literature stops short of examining how municipal leaders behave inside this constraint.

Partnership theory offers the most promising lens for that examination, though it too requires adaptation. The triple-helix model of university–industry–government relations (Etzkowitz & Leydesdorff, 2000) and its quadruple-helix extension incorporating civil society (Carayannis & Campbell, 2009) were built to explain innovation systems, not tourism governance, and they presume relatively symmetrical, institutionalized relations among the strands. Public–private partnership research in tourism likewise emphasizes formal alliances grounded in shared interest and trust (Milne & Ateljevic, 2001; Stoddard et al., 2012), and complexity perspectives recast these relationships as evolving networks of interdependent actors (Mason, 2008; Onyx, 2022). What this literature underweights is asymmetry—the possibility that a municipality, lacking institutional pathways, substitutes one helix strand for another: leaning on a university as compensatory infrastructure where state or EU channels are absent, or bypassing a non-performing region altogether. The present case treats that asymmetry as its central empirical phenomenon rather than as an anomaly.

Finally, because individuals, rather than institutions, drive partnership formation in this setting, leadership theory is indispensable for interpreting it. Situational leadership holds that a leader's approach is contingent on the maturity and capability of followers (Cote, 2017; Gates et al., 1976; Hersey & Blanchard, 1982; Jackson & Naziri, 2020); complexity leadership theory reframes leadership as the navigation of interdependent interactions within adaptive systems rather than linear command (Jensen, 2021; Marion & Uhl-Bien, 2002; Uhl-Bien et al., 2007); and contingency models tie effectiveness to the specific demands of the situation (Boehe, 2016). Followership theory adds a corrective often missing from municipal analysis: mayors are themselves followers within a larger hierarchy, answerable to an electorate and subordinate to national ministries (Burns, 1978; Hollander, 1992; Riggio, 2020). Read together, these theories predict that no single leadership model should dominate, precisely the pattern this case documents.

In sum, the literature supplies abundant frameworks but little account of municipal agency under constraint. It describes the absence of a national framework without explaining how leaders act in that absence, and it imports partnership models that presume an institutional symmetry that Greek municipalities lack. This case addresses that gap by examining, through the lived experience of 12 municipal leaders, how differing conceptions of the mayoral role shape the architecture of partnerships required for sustainable tourism development.

CONSTRUCTS AND OPERATIONAL DEFINITIONS

To support the interpretation of the findings, the constructs used in this case are defined below before they appear in the analysis.

- *Sustainable tourism development*: The management of tourism so that economic, social, cultural, and environmental value can be sustained for present and future generations; here it is operationalized against the United Nations' SDGs as the reference standard (Bianchi & de Man, 2021; Niavis et al., 2022).
- *Municipal leadership*: The unit of analysis, the elected mayor or deputy mayor holding the tourism portfolio, together with the conception of the role each articulates. Leadership is treated not as a fixed trait but as a situated practice shaped by followers' capabilities, situational demands, and systemic complexity (Boehe, 2016; Hersey & Blanchard, 1982; Uhl-Bien et al., 2007).
- *Partnership layer*: A distinct category of counterpart with which a municipality forms a cooperative relationship (municipality-to-municipality, municipality-to-region, municipality-to-ministry or national body, municipality-to-higher-education, municipality-to-private-sector, municipality-to-international-organization, and municipality-to-EU-program). Layers are defined by counterpart type, not by the formality or depth of any single relationship.
- *Helix configuration*: Drawing on triple- and quadruple-helix theory (Carayannis & Campbell, 2009; Etzkowitz & Leydesdorff, 2000), the mix and relative weight of university, industry, government, and civil-society strands a municipality draws upon. An asymmetric helix is one in which a municipality substitutes or overweights one strand to compensate for the weakness or absence of another.
- *Tourism policy*: Initiatives designed specifically to govern and develop tourism, set largely at the national level but implemented locally.

RESEARCH DESIGN AND METHODOLOGY

The case is drawn from a qualitative phenomenological study (Tsolis, 2024) designed to surface the lived experience of municipal leaders responsible for sustainable tourism. Phenomenology was chosen because the research question concerns how leaders perceive and enact their roles rather than measuring a predefined variable; the tradition seeks the common meaning of shared experiences (Creswell & Poth, 2018; Moustakas, 1994; van Manen, 2014).

Participants were identified through purposeful sampling supplemented by convenience sampling (Richards & Morse, 2013). Eligibility required holding municipal office after the October 2023 elections, a municipal population above 8,000, and demonstrable tourism potential through coastal, mountain, agritourism, or cultural-heritage assets. To broaden representation beyond the author's network, more than 175 municipalities were contacted directly; this cold outreach produced only two participants, a result discussed under lessons learned. The final sample comprised 12 leaders across 9 of Greece's 13 regions, with 2 leaders in some regions to offset non-responding regions. The autonomous monastic community of Mount Athos was excluded for its distinct religious and legal status.

Interviews were semi-structured and conducted via Zoom, with two also held in person, and were recorded with informed consent following Pepperdine University Institutional Review Board approval. Eleven interviews were conducted in Greek, and one in English; consent materials and interview questions were provided in Greek to maximize participant comfort and comprehension. Because cross-language research carries documented validity risks, translation followed Abfalter et al.'s (2021) seven-question framework (why, when, what, who, how, where, and by what means). Interviews were coded in the original Greek to preserve nuance, and a hermeneutic, contextualized rather than word-for-word approach was used, with the bilingual author reconciling machine-assisted drafts. Transcripts were analyzed in NVivo using both a priori codes derived from the interview protocol and emergent codes, with a certified NVivo specialist consulted to iteratively verify the coding. Validity rested on triangulation against the literature, deliberate suspension of researcher bias, and a documented positionality statement reflecting the author's Greek American background and hospitality experience (Creswell & Poth, 2018; van Manen, 2014).

Limitations and Lessons Learned

Several limitations bound the findings. The sample was skewed toward males, limiting insight into female municipal leadership. As the research instrument, the interviewer's presence and dual cultural identity may have shaped responses despite bias-suspension efforts. Self-selection and non-response, both pronounced among re-instated post-election administrations, mean that the participating municipalities may be those most disposed to engage with tourism. The single-country focus and the small, non-probability sample preclude statistical generalization; the findings are analytically transferable rather than statistically representative. Finally, the anonymity guaranteed to public officials limits the amount of identifying contextual detail the case can include.

Three methodological lessons emerged that bear on future research in centralized governance settings. First, access was overwhelmingly relationship-dependent: personal and professional introductions secured nearly all interviews, whereas institutional cold contact rarely succeeded—an empirical echo of the "management through personal acquaintance" documented by the study itself. Second, verbal agreement proved an unreliable proxy for participation; several leaders deferred repeatedly, suggesting that future designs should build in scheduling redundancy and over-recruit by region. Third, coding in the source language before translating quotations protected meaning that an English-first workflow would likely have eroded.

FINDINGS: CONCEPTIONS OF THE MAYORAL ROLE

The twelve leaders reflect the diversity of Greece's geography and tourism markets; all assumed office following the October 2023 elections. No single leadership model emerged. Instead, each leader held distinct conceptions of the municipal tourism leadership role. Anonymity is preserved, and municipalities are described by type. The leaders' partnership engagement is summarized in Exhibit 1.

Leader A governs a Greek island whose economy is based primarily on tourism. His municipality was one of the first in Greece to have partnered directly with the UNWTO, after personally lobbying four national ministries

to change the law enabling municipal-level UNWTO partnerships. The municipality also aligned its operational plan with all 17 SDGs and completed a Voluntary Local Review. Nevertheless, when asked about his leadership approach, he pushed back against the concept itself:

[I do not believe much in this model, the leadership model... You want teamwork, to find people with the same vision, who believe the same things, who are honest... You always need someone to give the inspiration.]

When pressed, Leader A explained that the role is not to command but to unite stakeholders, such as airlines, the UNWTO, the national tourism organization, and hoteliers, around a shared vision for the destination. "However much a leader wants, nothing moves unless everyone works together," he said. His tenure produced notable outcomes: amended national legislation, an unprecedented international partnership, and an SDG review few national governments have completed. Despite these results, he declined the label of leader.

Leader B governs a mid-sized municipality in northern Greece with a port, a university, and significant archaeological assets. His conception of leadership was anchored in the proximity principle: the municipality is the level of government closest to the citizen, and that proximity creates both authority and responsibility.

[The municipality is the state authority closest to the citizen... You are the mayor, and you go out into the street and speak directly, without intermediaries, face to face with your constituents.]

Leader B described the practical implications of this proximity: the municipality coordinates with utility companies, the regional government, and national ministries, yet remains accountable when, for example, a newly paved road is excavated by a utility company. He formalized a memorandum of cooperation with the local university and hired six specialized scientific consultants, the maximum allowed by law, to strengthen staff capacity.

Leader C governs a mainland municipality in western Greece with coastal and agricultural assets, including a protected oak forest with ecotourism potential. He described the mayor's role as fundamentally connective:

[The mayor's role is pivotal because he is the person who will bring the vision into contact with the research... and with the private sector, which is important because it actually invests.]

Leader C signed memoranda of cooperation with three universities. He also noted that results were not yet tangible and acknowledged the absence of a strategic cooperation framework among neighboring municipalities: "We have a relationship of solidarity, but a strategic framework has not been developed."

Leader D governs a small municipality on a major Ionian island that had been a pioneer in sustainability, recycling, and year-round tourism promotion. Leader D described a leadership approach centered on strategic design and partner identification:

[My role is to chart the first steps... and to find the right partner, whether that will be the university... or an external collaborator who knows and covers a specific knowledge domain.]

Leader D initiated direct contact with the rector of the island's university, which had recently established a tourism department. This approach intentionally bypassed the regional government. The resulting five-year plan involved cooperation among the university, municipalities, and the region, but was initiated at the municipal level.

Leader E governs a coastal municipality in Southern Greece with 36 villages and historical sites spanning antiquity to the modern era. Leader E, A veteran of municipal politics, held the most pragmatic and bounded view of the role:

[The institutional role of a municipality is to define the framework... The players are not just the municipality, they are the professionals, they are even the residents.]

Leader E engaged academic consultants for specific projects and was organizing a tourism conference featuring academic presenters. Even so, he emphasized, "Academics do not do these things. The local communities themselves must deliver these things." He also offered a vivid description of partnership formation in Greece: "Greek management runs through personal acquaintances... The Greek will call a friend."

BUILDING PARTNERSHIPS WITHOUT A PLAYBOOK

The leadership approaches above shaped how each municipality-built partnership. Across the twelve interviews, seven distinct partnership layers emerged (see Exhibit 1).

Municipality-to-Municipality. Nearly every leader described cooperation with neighboring municipalities as the most natural partnership, though formal strategic frameworks among them were rare. As one put it, "There are six other municipalities we must cooperate with... Synergy is key."

Municipality-to-Region and Municipality-to-Ministry. Views of the region diverged sharply: Leader D found it had produced no strategy and bypassed it, while a deputy mayor in northern Greece called it essential—"a complete package that requires partnerships" spanning the Region, the EOT, and EU programs. The most striking ministry partnership was Leader A's: told in 2020 that the UNWTO "only works with countries, not municipalities," he changed national law to enable it, working through the Ministries of Finance, Tourism, Foreign Affairs, and Development.

Municipality-to-Higher Education. Five of twelve leaders described substantive university partnerships, each formalized by a memorandum of cooperation and favoring nearby, thematically relevant institutions over flagship universities—"The universities are in your area; they have a local image."

Municipality-to-Private Sector. Mentioned in every interview, this was the only layer with universal engagement. One island leader worked with a private marketing firm that vetted the cost-benefit of each promotional action before funds were committed, and Leader B called private cooperation "a matter of philosophy": "I could choose not to, but we do, and that is why we achieve what we achieve."

Municipality-to-International Organizations and EU Programs. Leader A's UNWTO partnership was the most prominent example, and a large-island leader cited a longstanding Blue Flag program across 13 beaches. EU-funded programs—Interreg, LEADER, the climate-neutral cities mission, and Cohesion Funds—resourced many partnerships; where that infrastructure was absent, leaders improvised.

THE BARRIERS

Across all twelve interviews, six systemic barriers to partnership formation and execution recurred (see Exhibit 2).

Bureaucracy and licensing. A leader in Northern Greece named licensing and bureaucracy as the single biggest obstacle: "Step by step, the state is entering into this logic so that there can be partnerships... but these bureaucratic problems are being overcome only gradually." A leader in Southern Greece said flatly, "The main problem is the public sector... very time-consuming processes that do not always address real needs."

Funding and resources. A deputy mayor described the constraint in operational terms: the municipality took office without a budget and was unable to participate in tourism fairs. An island leader identified resource acquisition as the primary limitation: "Once you want to engage in partnerships, no other restrictions exist. However, resources must be secured."

Personal-network dependency. Leader E illustrated this clearly: "Greek management runs through personal acquaintances... the Greek will call a friend." Leaders with academic or professional contacts could leverage them for partnerships, while those without such networks lacked an equivalent institutional pathway.

Implementation gap. Leader C signed three university MoUs but acknowledged a lack of tangible results, and several leaders described their efforts as still in "preliminary steps." Formal agreements did not automatically translate into operational outcomes.

Inter-level coordination failures. Leader B described a typical failure: a municipality paves a road, only for utility companies to excavate it a month later. Leader D noted that regional outreach often lacked a coherent strategy.

Political-cycle disruption. A newly elected deputy mayor, six weeks into office, faced no budget, dissolved legal entities, and unsettled staff. Partnership efforts often stall at the start of each new term.

DISCUSSION: THEORETICAL CONTRIBUTION

This case makes three contributions. First, it extends triple- and quadruple-helix theory (Carayannis & Campbell, 2009; Etzkowitz & Leydesdorff, 2000), developed to explain innovation systems, into the under-examined domain of municipal tourism governance, and in doing so identifies asymmetric helix configurations as a recurring pattern: resource-constrained municipalities lean on universities as compensatory infrastructure, while those with direct EU or UN access rely on them less. Second, it specifies a mechanism linking leadership and partnership architecture, showing how a leader's decisions shape the number, depth, and level of partnerships pursued, an interpretive bridge between leadership theory (Boehe, 2016; Hersey & Blanchard, 1982; Uhl-Bien et al., 2007) and partnership theory that neither literature has fully drawn. Third, it documents the bottom-up construction of a framework, most strikingly in a municipality that secured changes to national legislation to enable a UNWTO partnership, raising the question of whether policy influence in centralized states can travel upward and thereby reframing the missing national playbook as a site of municipal agency.

IMPLICATIONS FOR PRACTICE AND POLICY

The findings translate into several actionable measures for ministries, regional authorities, and municipal leaders. These recommendations are distinct from the decision points that follow, which remain open teaching prompts rather than prescriptions.

1. A national coordination platform. A clearinghouse, convened by the Ministry of Tourism or the Central Union of Municipalities, could codify and disseminate best practices so that each incoming administration does not have to start from scratch, directly addressing the lack of a shared playbook (Pridham, 1999; Psycharis et al., 2015).
2. Standardized municipal–university MoU templates. Model agreements with built-in performance measures and sunset clauses would help close the implementation gap between signing a memorandum and producing outcomes, a gap several leaders acknowledged.
3. An expert-matching or secondment program. Because partnership access currently depends on personal networks, an EU-funded mechanism that pairs municipalities with academic and technical experts would replace a personal pathway with an institutional one, a targeted remedy for the network-equity problem (Garcia & Cater, 2022; Svoronou & Holden, 2005).
4. Regional best-practice repositories and benchmarking. Curated, comparable examples would enable municipalities to learn from peers facing similar constraints (Saarinen & Lenao, 2014).
5. Capacity-building outreach to "non-tourism" municipalities. Several leaders declined to participate because their municipalities were not tourism destinations, despite having coastlines, vineyards, or event infrastructure; informing rather than pressuring these municipalities could broaden the base of sustainable development and tourism growth in Greece, independent of seasonality.
6. Calibrated decentralization. Shifting selected authority and fiscal latitude to the municipal level, with the central government in a supporting role, would align responsibility with capacity (Cairney, 2012; Psycharis et al., 2015).

CONCLUSION

None of the leaders interviewed regarded the current system as optimal; all expressed a desire for greater structure, best practices, and institutional support. Nevertheless, each pursued partnership-building with the resources at their disposal in a way that mirrored how they understood the role. Leader A, who led by inspiration rather than command, influenced national legislation; Leader B, anchored in the municipality's proximity to the citizen, hired six consultants and formalized a university partnership; Leader C, who saw the role as connecting vision, research, and investment, signed three university memoranda; Leader D, who framed it as strategic design and partner-finding, engaged a university rector directly; and Leader E, who held that the municipality's task is to set the framework, relied on personal networks. Whether the solution involves a national coordination platform, standardized MoU templates, EU-funded secondment programs, or another approach remains undetermined. The data make clear that Greek municipal leaders are not waiting for external direction. They are leading without a playbook and, in doing so, may be laying the foundation for one.

EXHIBITS

Exhibit 1: Partnership Engagement Matrix.

Leader	M2M	M2R	M2N	M2HE	M2P	M2I	M2EU
A			✓		✓	✓	
B		✓		✓	✓		✓
C	✓			✓	✓		✓
D		✓		✓	✓		
E				✓	✓		
F	✓		✓		✓	✓	
G			✓		✓	✓	✓
H	✓			✓	✓		
I		✓	✓		✓		✓
J		✓	✓		✓		
K					✓		
L					✓		

Note. M2M = municipality-to-municipality; M2R = municipality-to-region; M2N = municipality-to-ministry/national body (including EOT); M2HE = municipality-to-higher-education; M2P = municipality-to-private-sector; M2I = municipality-to-international-organization (e.g., UNWTO, UNESCO, Blue Flag); M2EU = municipality-to-EU-program (e.g., Interreg, LEADER, Mission). A check mark indicates documented engagement.

Exhibit 2: Barriers to Partnership Formation and Execution.

Barrier	Description	Leaders
Bureaucracy & licensing	Time-consuming public-sector processes, unclear legal requirements, and multi-layered permitting that delay or block partnership execution.	B, E, H, I, J, L
Funding & resources	Insufficient municipal budgets for tourism promotion, inability to spend at the start of a new term, and dependence on external funding.	D, G, I, K
Personal-network dependency	Partnerships form through personal acquaintances rather than institutional pathways; leaders without the right contacts lack access.	C, E, G
Implementation gap	MoUs and formal agreements are signed but produce no tangible outcomes; leaders describe being in "preliminary steps."	B, C, D
Inter-level coordination failure	Weak coordination across municipal, regional, and national levels; duplicated effort; utility companies undoing municipal work.	B, D, I, J
Political-cycle disruption	New administrations take office without approved budgets, with dissolved legal entities and unsettled staff, stalling ongoing partnerships.	D, I

REFERENCES

- Abfalter, D., Mueller-Seeger, J., & Raich, M. (2021). Translation decisions in qualitative research: A systematic framework. *International Journal of Social Research Methodology*, 24(4), 469–486. <https://doi.org/10.1080/13645579.2020.1805549>
- Bianchi, R. V., & de Man, F. (2021). Tourism, inclusive growth and decent work: A political economy critique. *Journal of Sustainable Tourism*, 29(2–3), 353–371. <https://doi.org/10.1080/09669582.2020.1730862>
- Boehe, D. M. (2016). Supervisory styles: A contingency framework. *Studies in Higher Education*, 41(3), 399–414. <https://doi.org/10.1080/03075079.2014.927853>
- Boluk, K. A., Cavaliere, C. T., & Duffy, L. N. (2019). A pedagogical framework for the development of the critical tourism citizen. *Journal of Sustainable Tourism*, 27(7), 865–881. <https://doi.org/10.1080/09669582.2019.1615928>
- Burns, J. M. (1978). *Leadership*. Harper & Row.
- Cairney, P. (2012). Complexity theory in political science and public policy. *Political Studies Review*, 10(3), 346–358. <https://doi.org/10.1111/j.1478-9302.2012.00270.x>
- Carayannis, E. G., & Campbell, D. F. J. (2009). 'Mode 3' and 'Quadruple Helix': Toward a 21st-century fractal innovation ecosystem. *International Journal of Technology Management*, 46(3–4), 201–234. <https://doi.org/10.1504/IJTM.2009.023374>
- Carbonaro, G. (2022, November 24). 'Not only islands': How Greece is reinventing its tourism. Euronews.
- Cote, R. (2017). Vision of effective leadership. *Journal of Leadership, Accountability & Ethics*, 14(4), 52–63. <https://doi.org/10.33423/jlae.v14i4.1486>
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). SAGE.
- da Fontoura Costa, L., & Baggio, R. (2009). The web of connections between tourism companies: Structure and dynamics. *Physica A*, 388(19), 4286–4296. <https://doi.org/10.1016/j.physa.2009.06.034>
- Draper, J., Woosnam, K. M., & Norman, W. C. (2011). Tourism use history: Exploring a new framework for understanding residents' attitudes toward tourism. *Journal of Travel Research*, 50(1), 64–77. <https://doi.org/10.1177/0047287509355322>
- Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: From national systems and 'Mode 2' to a triple helix of University–industry–government relations. *Research Policy*, 29(2), 109–123. [https://doi.org/10.1016/S0048-7333\(99\)00055-4](https://doi.org/10.1016/S0048-7333(99)00055-4)
- Ferrer-Roca, N., Guia, J., & Blasco, D. (2022). Partnerships and the SDGs in a cross-border destination: The case of the Cerdanya Valley. *Journal of Sustainable Tourism*, 30(10), 2410–2427. <https://doi.org/10.1080/09669582.2020.1847126>
- Garcia, O., & Cater, C. (2022). Life below water: Challenges for tourism partnerships in achieving ocean literacy. *Journal of Sustainable Tourism*, 30(10), 2428–2447. <https://doi.org/10.1080/09669582.2020.1850747>
- Gates, P. E., Blanchard, K. H., & Hersey, P. (1976). Diagnosing educational leadership problems: A situational approach. *Educational Leadership*, 33(5), 348–354.
- Hellenic Ministry of Foreign Affairs. (n.d.). Tourism in Greece. <https://www.mfa.gr>

- Hersey, P., & Blanchard, K. H. (1982). Leadership style: Attitudes and behaviors. *Training & Development Journal*, 36(5), 50–52.
- Hollander, E. P. (1992). The essential interdependence of leadership and followership. *Current Directions in Psychological Science*, 1(2), 71–75. <https://doi.org/10.1111/1467-8721.ep11509752>
- Iliopoulou-Georgoudaki, J., Kalogeras, A., Konstantinopoulos, P., & Theodoropoulos, C. (2016). Sustainable tourism management and development of a Greek coastal municipality. *International Journal of Sustainable Development & World Ecology*, 23(2), 143–153. <https://doi.org/10.1080/13504509.2015.1102780>
- Jackson, D. A., & Naziri, R. S. (2020). Connecting situational leadership to emotional intelligence. *Journal of Behavioral & Social Sciences*, 7(4), 283–290.
- Jensen, R. (2021). Complexity leadership theory: A conceptual model for Christian higher education. *Journal of Leadership, Accountability & Ethics*, 18(1), 76–88. <https://doi.org/10.33423/jlae.v18i1.4005>
- Jurdana, D. S. (2018). Strategic planning of tourism development—Towards sustainability. *Horizons Series A*, 23, 239–248. <https://doi.org/10.20544/HORIZONS.A.23.2.18.P17>
- Karampela, S., Kizos, T., & Spilanis, I. (2016). Evaluating the impact of agritourism on local development in small islands. *Island Studies Journal*, 11(1), 161–176. <https://doi.org/10.24043/isj.341>
- Kiselakova, D., Stec, M., Grzebyk, M., & Sofrankova, B. (2020). A multidimensional evaluation of the sustainable development of European Union countries: An empirical study. *Journal of Competitiveness*, 12(4), 56–73. <https://doi.org/10.7441/joc.2020.04.04>
- Kouri, M. (2012). Merging culture and tourism in Greece: An unholy alliance or an opportunity to update the country's cultural policy? *The Journal of Arts Management, Law, and Society*, 42(2), 63–78. <https://doi.org/10.1080/10632921.2012.685688>
- Laitamaki, J., Tada, M., Liu, S., Setyady, N., Vatcharasoonporn, N., Zheng, F., & Hechavarria, L. T. (2016). Sustainable tourism development frameworks and best practices: Implications for the Cuban tourism industry. *Managing Global Transitions*, 14(1), 7–29.
- Marion, R., & Uhl-Bien, M. (2002, October). Complexity v. transformation: The new leadership revisited [Conference session]. *Conference on Complex Systems and the Management of Organizations*, Fort Myers, FL, United States.
- Mason, M. (2008). Complexity theory and the philosophy of education. *Educational Philosophy & Theory*, 40(1), 4–18. <https://doi.org/10.1111/j.1469-5812.2007.00412.x>
- Milne, S., & Ateljevic, I. (2001). Tourism, economic development and the global–local nexus: Theory embracing complexity. *Tourism Geographies*, 3(4), 369–393. <https://doi.org/10.1080/146166800110070478>
- Moustakas, C. (1994). *Phenomenological research methods*. SAGE.
- Mylonopoulos, D., Moira, P., & Papagrigoriou, D. A. (2017). The institutional framework of the development of agritourism in Greece. *Journal of Tourism and Leisure Studies*, 2(1), 1–15. <https://doi.org/10.18848/2470-9336/cgp/v02i01/1-15>
- Mylonopoulos, D., Moira, P., & Parthenis, S. (2011). The legislative framework of the management of the protected areas in Greece: The case of the National Marine Park of Zakynthos. *Journal of Coastal Research*, SI(61), 173–182. <https://doi.org/10.2112/SI61-001.12>
- Niavis, S., Papatheochari, T., Koutsopoulou, T., Coccossis, H., & Psycharis, Y. (2022). Considering regional challenges when prioritizing tourism policy interventions: Evidence from a Mediterranean community of projects. *Journal of Sustainable Tourism*, 30(4), 663–684. <https://doi.org/10.1080/09669582.2021.1876074>

- Onyx, J. (2022). Methods in the third sector: Collective memory-work in a complexity framework. *Voluntas*, 33(6), 1132–1139. <https://doi.org/10.1007/s11266-021-00405-y>
- Pridham, G. (1999). Towards sustainable tourism in the Mediterranean? Policy and practice in Italy, Spain and Greece. *Environmental Politics*, 8(2), 97–116. <https://doi.org/10.1080/09644019908414463>
- Psycharis, Y., Zoi, M., & Iliopoulou, S. (2015). Decentralization and local government fiscal autonomy: Evidence from the Greek municipalities. *Environment and Planning C: Government and Policy*, 34(2), 262–280. <https://doi.org/10.1177/0263774x15614153>
- Richards, L., & Morse, J. M. (2013). *README first for a user's guide to qualitative methods* (3rd ed.). SAGE.
- Riggio, R. E. (2020). Why followership? *New Directions for Student Leadership*, 2020(167), 15–22. <https://doi.org/10.1002/yd.20395>
- Saarinén, J., & Lenao, M. (2014). Integrating tourism to rural development and planning in the developing world. *Development Southern Africa*, 31(3), 363–372. <https://doi.org/10.1080/0376835X.2014.888334>
- Stec, M., & Grzebyk, M. (2022). Sustainable development in the EU member states. *Technological and Economic Development of Economy*, 28(4), 1088–1113.
- Stoddard, J. E., Pollard, C. E., & Evans, M. R. (2012). The triple bottom line: A framework for sustainable tourism development. *International Journal of Hospitality & Tourism Administration*, 13(3), 233–258. <https://doi.org/10.1080/15256480.2012.698173>
- Svoronou, E., & Holden, A. (2005). Ecotourism as a tool for nature conservation: The role of WWF Greece in the Dadia–Lefkimi–Soufli Forest Reserve in Greece. *Journal of Sustainable Tourism*, 13(5), 456–467. <https://doi.org/10.1080/09669580508668573>
- Tsilimigkas, G., Pafi, M., & Rempis, N. (2022). Urban sprawl on Greek islands. *International Journal of Sustainable Development & World Ecology*, 29(4), 330–342.
- Tsolis, P. G. (2024). Sustainable tourism development in Greece: A phenomenological study of municipal leaders [Doctoral dissertation, Pepperdine University]. Pepperdine Digital Commons.
- Tzifakis, N., Petropoulos, S., & Huliaras, A. (2017). The impact of economic crises on NGOs: The case of Greece. *Voluntas*, 28(5), 2176–2199.
- Uhl-Bien, M., Marion, R., & McKelvey, B. (2007). Complexity leadership theory: Shifting leadership from the industrial age to the knowledge era. *The Leadership Quarterly*, 18(4), 298–318. <https://doi.org/10.1016/j.leaqua.2007.04.002>
- van Manen, M. (2014). *Phenomenology of practice*. Routledge.

RETHINKING THE ROLE OF ENVIRONMENTAL LAWS IN ADAPTING TO CLIMATE CHANGE IN SOUTH AFRICA IN THE PURSUIT OF SUSTAINABLE DEVELOPMENT

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ABSTRACT

The article evaluates the role of environmental laws in climate change adaptation in South Africa over the past 27 years (since the promulgation of the National Environmental Management Act 107 of 1998). The author will track the emergence of international adaptation Conventions and Treaties within the climate and non-climate regimes, alongside an increasingly dire need for adaptation to extreme events and a strident consensus in South Africa. The author will examine the growth in national and local laws for adaptation and reflect on the role and framework of legislation, sectoral laws, policies, and mechanisms in South Africa. In evaluating progress over the past 27 years, the author will outline how the role of environmental laws can be enhanced and accelerated in the future, based on the principles of sustainability as outlined in the Brundtland Report (1987). The author will identify significant trends to adopt legislation and the consideration of the potential for these promulgations to drive the future adaptation in climate change: the sheer growth in the priority and volume of environmental laws such as the Climate Change Act 22 of 2024 which are directed towards adaptation; the intersection of adaptation within other policy domains (for example the Income Tax Act 58 of 1962), with the consideration of disaster risk reduction within the scope of the Disaster Management Act 57 of 2002 as amended; and the critical role of different strategic litigation and case laws. Due to the slow progress in implementing transformational adaptation law reform, the author identifies the following principles for adaptation in environmental laws. The laws must be responsive to change, address the equity dimensions of climate change as well as the Constitution of the Republic of South Africa, 108 of 1996, the implementation of innovative and quick solutions, the maximisation of co-benefits for the three government spheres, and the establishment of different processes for the effective management of trade-offs.

Keywords: adaptation, climate change, international regulation, mitigation, sustainable development.

INTRODUCTION

The South African environmental law has evolved since the inclusion of the constitutional environmental clause contained in section 24 of the *Constitution of the Republic of South Africa*, 108 of 1996 (hereinafter referred to as the Constitution of 1996) (Kotze, 2003, p. 81). In interpreting Section 24(a) of the 1996 Constitution, it is stipulated that everyone has an environmental right, which entails that the environment should not harm a person's health or well-being (section 24(a) of the Constitution). Subsection 24(b) further entails that the environment must be protected for present and future generations. This will be achieved through reasonable legislation and other measures such as policies, directives, and case laws. This subsection stipulates that the reasonable measure must prevent environmental pollution and ecological degradation, promote environmental conservation, and ensure that the environment is ecologically sustainable when persons use natural resources. In the use of natural resources, a person must promote justifiable economic and social development (section 24(b) of the Constitution). Section 24(b) thereby places a direct duty on the South African state to promote environmental sustainability. Kotze argues that there is a conflict in interpreting the wording of section 24 of the Constitution of 1996, which requires both environmental conservation and sustainable development (Kotze, 2003, p. 81).

South Africa has, in relation to reasonable legislative measures, developed the National Environmental Management Act 107 of 1998 (hereinafter referred to as NEMA), which is the framework Act that gives effect to the constitutional right. Section 2 of NEMA outlines a number of sustainable development principles that place a directive on all organs of state (Lemine, 2021, p. 162). With this background, this paper, through doctrinal research, aims to determine whether legislation, policies, and actions related to climate change regulation and management are coordinated and effectively address climate change mitigation and its environmental impacts. By focusing on section 24 of the Constitution of 1996, other domestic legislation, relevant case law, and international law, the paper aims to identify the issues of sustainable development in ensuring the adaptation to climate change. The recommendation aims to influence law reform that enhances mitigation and adaptation to climate change, as well as the management, conservation, and protection of these issues, while promoting the objectives outlined in section 24 of the 1996 Constitution.

BACKGROUND OF THE ENVIRONMENTAL CLAUSE

Before the promulgation of the Constitution of 1996, South Africa was governed by the *Constitution of the Republic of South Africa*, 200 of 1993, also known as the Interim Constitution. In terms of the Interim Constitution, section 29 dealt with the environmental clause, stipulating as follows: "Every person shall have the right to an environment which is not detrimental to his or her health or well-being." (section 29 of the *Constitution of the Republic of South Africa*, 200 of 1993). With reference to this clause, the drafters drew examples from other countries, including India, Ireland, Spain, Peru, Ethiopia, and Namibia (Glazewski, 1994, p. 22). Glazewski (1994, p. 23) further states that section 29 of the Interim Constitution is negatively phrased, meaning it affirms the right to an environment that is not detrimental to health and well-being. It should instead have been phrased that everyone has a right. Glazewski believes that this means the environmental right in the Interim Constitution implies a minimum standard of environmental quality rather than an unlimited quantity (Glazewski, 1994, p. 23).

After the interim Constitution, the final Constitution was promulgated and gave effect to the environmental right in section 24. The final *Constitution of the Republic of South Africa*, 108 of 1996, in section 24, deals with environmental protection and sustainable development, which underpin the governance required to protect the environment. Section 24 states that:

"Everyone has the right

- a. to an environment that is not harmful to their health or well-being; and
 - b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that
 - i. prevent pollution and ecological degradation;
 - ii. promote conservation; and
 - iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development"
- (section 24 of the Constitution).

The fundamental individual human right is set out in paragraph a, whereas, under paragraph b, a positive duty is placed on the state to provide measures to achieve the human right. The state uses a comprehensive environmental framework of statutes and policies, such as NEMA, to meet its positive obligation (Theil, 2019, p.108). Du Plessis (2018, p.193) states that when interpreting section 24(a) of the Constitution, the link between human health and well-being is that the aforementioned are influenced by environmental conditions, with both positive and negative effects on the economic and social consequences.

With the new constitutional dispensation in South Africa, an extraordinary legal framework for environmental rights and climate change has been created. Not only in South Africa but also internationally, to address environmental issues and climate change. However, it became clear that South Africa still has to take certain measures to address climate change. After a discussion of sustainable development in the international context, the national sustainable development legislation has been consulted to develop a management tool to promote sustainable development and the environmental rights contained in the Constitution. A conclusion was drawn regarding the interpretation of different case laws and the idea of achieving a sustainable environment.

SUSTAINABLE DEVELOPMENT IN INTERNATIONAL AND NATIONAL LAW

To understand what is meant by the term ‘sustainable development’, an analysis of the distinction between the terms sustainable and development will be made. Sustainability, or being sustainable, means the ability to maintain a desired condition over time. This further entails that the natural stance will not be eroded or negatively impact social or financial resources. Therefore, the drive for sustainability will be the ultimate aim, which can be achieved through development. Development is therefore the process of achieving the objective set through sustainability; however, development can’t be sustainable in itself (Kotze, 2003, p. 81).

Sustainable development was first defined in the 1987 *Brundtland Report*, ‘*Our Common Future*’, by the *World Commission on Environment and Development*, as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (*World Commission on Environment and Development*, 1987). This marked the watershed change in how individuals think about the environment, development, and governance. However, there are still fundamental contradictions between the environmental, social, and financial pillars, as indicated by the term sustainable development (Sneddon, Howarth, and Norgaard 2005, p. 254).

To achieve the robust principles and goals set by the World Commission on Environment and Development in the Brundtland Report, Agenda 21, an action plan, was developed in 1992 to promote sustainable development. During the Earth Summit held in Rio, Brazil, the Rio Declaration was developed to change how humankind thinks globally and acts locally in pursuit of sustainable development. This Agenda 21 action plan was overseen by the United Nations Commission for Sustainable Development, established in 1993 (Chiang, Ma, Wen, Lin, 2024, p. 11).

Sustainable development was further developed in the 2000s when 189 countries in a joint effort issued the eight Millennium Development Goals at the United Nations Sustainable Development Summit, which was followed by the World Summit on Sustainable Development (WSSD) in 2002 to promote sustainable development (Chiang, Ma, Wen, Lin, 2024, p. 11). The eight Millennium Development Goals aimed to eradicate extreme poverty and hunger, achieve universal primary education, promote gender equality and empower women, reduce child mortality, improve maternal health, and combat HIV/AIDS. Malaria and other diseases, ensuring environmental sustainability, and developing a global partnership for development (United Nations, 2015).

In 2012, the United Nations Conference on Sustainable Development was held, with the vision of “The Future We Want,” aiming to promote sustainability and alleviate poverty (Chiang, Ma, Wen, Lin, 2024, p. 12). The United Nations Conference on Sustainable Development, also known as Rio+20, focused on the gaps in the agreements made at the 1992 conference (see above) (United Nations Women, 2012). This vision was promoted by the green economy to achieve sustainable development and influence decision-making; however, it is not compulsory and is not seen as a rule. The green economy, in essence, aims to eradicate poverty, promote economic growth, enhance social inclusion, improve human well-being, and create employment and high-quality job opportunities for all, while maintaining a sustainable ecosystem (Chiang, Ma, Wen, Lin, 2024, p. 12). At the United Nations Conference on Sustainable Development, policies on the green economy were adopted, which instituted intergovernmental processes under the General Assembly to prepare a strategy for sustainable financing, which in essence will strengthen the United Nations Environment Programme (UNEP) but also open the doors for a high-level political forum for sustainable development (International Institute for Sustainable Development, 2012). Not only was Rio+20 adopted to address the political outcomes, but it also marked the launch of a process to develop the Sustainable Development Goals (SDGs), which were built upon the Millennium Development Goals as a post-2015 development agenda (International Institute for Sustainable Development, 2012).

Sustainable Development Goals (SDGs), also known as the Agenda 30, were designed in 2015 by the United Nations Assembly, which includes 17 goals and 169 targets, succeeded the Millennium Development Goals after realising that the Agenda 21 aim was too optimistic, and developed the SDGs to be achieved in 2030 (Chiang, Ma, Wen, Lin, 2024, p. 12). The SDGs shape the future development framework, aiming to create a society free of poverty, hunger, and human suffering. Children receive a high-quality education, and gender equality is achieved in society. People fulfil their basic needs for clean water and sanitation while having access to affordable, clean energy. People have decent work and achieve economic growth, with a sustainable developing industry, innovation and infrastructure, which reduces inequality among and between different groups, which builds sustainable cities and communities, while

achieving responsible consumption and production patterns, to implement climate actions, to protect life below water and life on land, to achieve peace, justice and strong institutions and to form different partnership for achieving the SDGs (Chiang, Ma, Wen, Lin, 2024, p. 12).

What does this mean for climate change on an international level? When pursuing sustainable development, it may reduce vulnerability to climate change, as vulnerability factors closely depend on development, access to economic, ecological, social, and human resources, and inadequate institutions, governance, and infrastructure (Chiang, Ma, Wen, Lin, 2024, p. 12). It is further stated that sustainable development and climate change are mutually reinforcing. This means that the impact that climate change has on the environment may hinder development and threaten the effectiveness and sustainability of development investments (Chiang, Ma, Wen, Lin, 2024, p. 12). On the positive side, promoting sustainable development increases adaptive capacity for climate resilience, which, in turn, contributes to climate change adaptation (Chiang, Ma, Wen, Lin, 2024, p. 12).

The United Nations Framework Convention on Climate Change (UNFCCC), which entered into force on 21 March 1994 and became a binding international treaty for United Nations member countries, is designed to negotiate emission-reduction responsibilities among all countries. The UNFCCC further stipulated that the Conference of the Parties be held annually, during which the setting of the target amount, the scheduling for controlling greenhouse gas emissions, and the declaration of greenhouse gas emission information by Member States would be addressed (Chiang, Ma, Wen, Lin, 2024, p. 12). South Africa ratified the UNFCCC in August 1997. At the 21st Conference of the Parties to the UNFCCC, held in Paris in 2015, the Paris Agreement on climate change was adopted, and South Africa signed it. The Paris Agreement is a universal milestone in the development of the international climate change regime, established under the UNFCCC. The Paris Agreement serves as the framework that guides international efforts to limit greenhouse gas emissions and address the challenges posed by climate change. The Paris Agreement marks a shift to low-carbon development from 2020 onward, as countries commit to their national plans, also known as Nationally Determined Contributions (NDCs). The Paris Agreement aims to limit global temperature increase to below 2 degrees Celsius, while also seeking to limit it to 1.5 degrees Celsius. This is particularly important, as the effects of climate change will have a drastic impact on South Africa, a vulnerable developing country. The Paris Agreement requires countries to incorporate it into their own legal systems through ratification, acceptance, approval, or accession, and to take action on climate change (Molewa, 2016).

Countries also pledged to the net-zero emission targets. If countries adhere to the pledge, the Paris Agreement temperature goal is within reach. This further means that the projected average global temperature increase is limited to 2.0-2.4 degrees Celsius by 2100 (Chiang, Ma, Wen, Lin, 2024, p. 14). How does South Africa evaluate in terms of the net-zero target? The overall rating for South Africa is considered insufficient. South Africa has announced its intention to achieve net-zero carbon emissions by 2050. The Presidential Climate Commission released the Just Transition Framework in 2022 as part of its commitment to achieving net-zero greenhouse gas emissions (Climate Action Tracker, 2025). At COP 26, South Africa, France, Germany, the United Kingdom, the United States of America, and the European Union declared their intention to establish long-term partnerships to achieve low-emissions, climate-resilient development through the Just Energy Transition Partnership (JETP). This means that grants, concessional loans, guarantees, private investments, and technical support have been provided for the period 2023-2027 to accelerate the decarbonization of South African electricity systems and achieve the NDC targets (Climate Action Tracker, 2025). The implementation of the Just Energy Transition Partnership projects commenced with the publication of an implementation plan in 2023 and 2024, marking the first active year of implementation. The implementation plan comprises six portfolios being funded, namely electricity, Mpumalanga Just Transition, Municipalities, new energy vehicles, green hydrogen, and skills, with a priority on electricity, new energy vehicles, and green hydrogen (Climate Action Tracker, 2025).

One of the biggest challenges faced by the power sector is categorised as an undersupply of generation, an ageing coal fleet, underinvestment in grid infrastructure, and corruption. South Africa's public utility for energy provision has resorted to power cuts to avoid damage to the grid and has even declared a national state of disaster in 2023 as load-shedding intensified, resulting in increased power outages (Climate Action Tracker, 2025). In the regulation of disasters in South Africa, the *Disaster Management Act 57 of 2002* were promulgated. Disaster management aims to reduce or mitigate potential losses from hazards and to ensure that appropriate assistance is provided to victims. While the Disaster Management Cycle (DMC) is considered an ongoing process for governments, businesses, and civil society, it also involves corrective measures to recover from disasters. Developmental consideration is a major contribution to all aspects of the DMC. Therefore, the DMC strives to promote sustainable

livelihoods, protect and recover during disasters, and implement emergency preparedness. Developmental considerations are represented in the mitigation and preparedness phase of the DMC (Warfield, 2023). Ngcamu (2023) states that government agencies failed to apply the DMC to mitigate disasters and the aftermaths of climate change. Ngcamu (2023) is further of the opinion that when interpreting the *Disaster Management Act 57 of 2002* as amended, the following definition of climate change in terms of the *Disaster Management Act 57 of 2002* can be amended to read as follows ‘... a change in the state of the climate that can be identified by changes in the variability of its properties and that persists for an extended period, typically decades or longer...’. Therefore, to encourage mitigation of climate change and the promotion of sustainable development, government officials in all three spheres of government (national, provincial and local), as well as businesses and civil society, should be capacitated on the effective application of DMC and all government spheres should include climate change and its variations in their plans and planning (Ngcamu, 2023).

Deduced from the above, the South African power sector faces numerous challenges. In 2024, the South African government further passed the *Electricity Regulation Amendment Act 38 of 2024* (ERAA), which came into force on January 1, 2025. The aim of the ERAA is to facilitate and accelerate the investment, policy development, and skills required to modernise the grid for a low-carbon future and energy security (Energy Council of South Africa, 2023).

When considering cross-sectoral policies addressing climate change and sustainability, South Africa has made progress in tackling this phenomenon. The *Climate Change Act 22 of 2024* represent a significant step forward in the governance of climate change mitigation. The intention of the *Climate Change Act* is to facilitate the development of an effective climate change response and a just transition to a low-carbon and climate-resilient economy and society, within the context of sustainable development (Department of Forestry, Fisheries and the Environment, 2025). The *Climate Change Act* is also seen as the foundation for a green economy, which represents inclusivity, resilience, and a focus on the future. In order to achieve the framework for climate action in South Africa, innovation, sustainable industries, and support for job creation in renewable energy, sustainable agriculture and eco-tourism will be promoted, and in essence, this will also lead to the achievement of environmental sustainability (Department of Forestry, Fisheries and the Environment, 2025).

The role players in the *Climate Change Act* are the Minister of Forestry, Fisheries and the Environment and other members of the Cabinet, to impose restrictions or obligations on different persons, such as carbon budgets, but not specifically on the private sector (Colegrave, 2024).

“[R]esponding to climate change raises unique challenges to effective governance as its impact transcends and challenges traditionally sectoral governance approaches, which require a nationally driven, coordinated and cooperative legal and administrative response” (Preamble of the *Climate Change Act 22 of 2024*).

The voluntary carbon market existed in South Africa in recent years, however with the implementation of the *Climate Change Act* which provides for carbon budgets, it is anticipated that there will be a growth in the voluntary carbon market due to the activities which emit or the potential greenhouse gas emissions to seek more offset on their emissions in order to reach the assigned carbon budgets as set by the *Climate Change Act* (Colegrave, 2024). A criticism against the *Climate Change Act* is that it does not make any provision as a legal basis or mechanism for dealing with loss and damage that are brought about by natural disasters that are linked to climate change. The *Climate Change Act* has already been enacted and must be amended through the official process to address loss and damage from natural disasters. Another problem identified is that the *Climate Change Act* does not address penalties for exceeding the carbon budget or failing to implement the greenhouse gas emission mitigation plan. Instead, it is noted that the *Carbon Tax Act 15 of 2019* will be amended to provide for an additional tax payable at prescribed rates when emissions exceed the carbon budget (Colegrave, 2024).

Another initiative, as a strict policy and legislation to reduce greenhouse gas emissions that contribute to climate change, is the *Carbon Tax Act 15 of 2019*. The *Carbon Tax Act* imposes taxes on the carbon dioxide equivalent of greenhouse gas emissions. The *Carbon Tax Act* is another piece of legislation that represents South Africa’s commitment to mitigating greenhouse gas emissions, as outlined in the National Development Plan for 2030. Under the *Carbon Tax Act*, South Africa has set domestic targets outlined in its Nationally Determined Contributions, established when South Africa ratified the Paris Agreement under the United Nations Framework Convention on Climate Change. The aim of the *Carbon Tax Act* is to divert taxpayer funds to more renewable projects, thereby

encouraging businesses to transition to renewable energy. This shift to utilising sustainable energy sources will enhance South Africa's renewable energy industry and, in the long term, promote sustainability by mitigating climate change (Matarirano & Calitz, 2019). Section 15 of the *Carbon Tax Act* (15 of 2019) states that the Commissioner of the South African Revenue Service regulates the carbon tax, which falls within the ambit of the collectable environmental levy as defined by the *Customs and Excise Act* 91 of 1964. Every entity is responsible for paying a carbon tax when its activities result in greenhouse gas emissions exceeding the thresholds. These thresholds are determined by the *National Greenhouse Gas Emission Reporting Regulations* of 2017, promulgated under the *National Environmental Management: Air Quality Act* 39 of 2004.

The collection of levies under environmental legislation gives rise to the 'polluter pays principle', as set out in the *National Environmental Management Act* 107 of 1998 (NEMA). According to the principle outlined in Section 28 of the *National Environmental Management Act* 107 of 1998, the person or entity responsible for polluting the environment should bear the costs associated with the mitigation and remediation effects resulting from the pollution (Section 28 of the *National Environmental Management Act* 107 of 1998). This principle and NEMA are components of the principle of sustainable development, where a person who causes significant environmental degradation may be required to remedy the damage or, alternatively, face criminal sanctions and civil claims. The liability under section 28 of NEMA is strict, in that a person may, in certain instances, be liable to remedy a situation where the pollution or degradation is not the main cause of the degradation. This liability also applies retrospectively, whereas the *National Environmental Management Act* holds a person or company liable for pollution or degradation that occurred before the Act's commencement, stipulating that even pollution or environmental degradation caused decades ago may be remedied (Norton Rose Fulbright, 2017).

NEMA not only addresses environmental degradation but also significantly supports sustainable development. NEMA in section 1 defines sustainable development as 'the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.' (section 1 of NEMA). A number of principles in NEMA have been established in section 2(1)(4)(a) that authorities must consider during the initiation and implementation of developments. It is important to note that all the principles listed in NEMA are rooted in the concept of sustainable development and that it promotes the environmental rights contained in section 24 of the Constitution (Kotze, 2003: p88).

The *Income Tax Act* 58 of 1962, although seen as the primary legislation governing the taxation of income and donations for individuals, companies, and trusts (preamble of the *Income Tax Act* 58 of 1962), also addresses the environment. Section 37(C) of the *Income Tax Act* 58 of 1962 provides a tax incentive that encourages taxpayers to use current conservation methods and maintenance expenditure to preserve nature and the environment for the public good. In terms of section 37(C)(1), deductions of conservation and maintenance expenditures are allowed against a taxable income that was earned on land, which includes land in the proximity of the land that is subject to a biodiversity management agreement (Thiart and Du Plessis, 2025: p68)

It is clear from the discussion of international and national measures that it is seen as a management tool that also provides guidelines for future development and control measures. The more legislation is tested in courts, the more detailed management approaches and practices may be developed and refined.

PRECEDENTS SET BY CASE LAW

Section 24 of the Constitution and sustainable development have been developed through legislation and case law. In *Maccsand (Pty) Ltd v City of Cape Town and Others* [2012] ZACC 7, the Constitutional Court had to interpret a permit issued by the competent Minister under the *Mineral and Petroleum Resources Development Act* 28 of 2002 (as amended) as sufficient to overcome a rezoning decision that was issued under provincial legislation. The Constitutional Court decided that both provincial and national legislation applied jointly and that the mining operations in the area were illegal (Theil, 2019, p.110).

In *Hichange Investment (Pty) Ltd v Cape Produce CO (Pty) Ltd t/a Pelts Products and Others* [2004] 2 SA 393 (E), the court heard the case in which the applicants complained of noxious gases and odours originating from the neighbouring property, where chemical waste from a tanning business was generated. The applicants stated that these gases and odours threaten their health and well-being as an environmental right from section 24(a) of the Constitution.

The High Court noted that the definition of health and well-being in the Constitution set a low threshold; the court was not convinced that the pollution arising from noxious gases and odours reached a sufficient level of severity to constitute a violation (Theil, 2019, p. 110).

The case of Fuel Retailers Association of South Africa (Pty) Ltd v Director General, Environmental Management Mpumalanga and others [2007] ZACC 13, which dealt with sustainability under section 24(b) of the Constitution. In this case, the Constitutional Court had to deal with an application for the construction of a filling station, which was granted by the local municipalities. This application was opposed because of environmental concerns. The Constitutional Court interpreted environmental protection and the relationship with socio-economic development and sustainable development. The Constitutional Court held that:

“Economic and social development is essential to the well-being of human beings [...] But development cannot subsist upon a deteriorating environmental base. Unlimited development is detrimental to the environment and the destruction of the environment is detrimental to development. Promotion of development requires the protection of the environment” (Fuel Retailers Association of South Africa (Pty) Ltd v Director General, Environmental Management Mpumalanga and others [2007] ZACC 13 para 44).

The Constitutional Court reprimanded the local environmental department for failing to consider the environmental impact of the filling station (Theil, 2019, p. 112). Although these court cases and decisions provide a framework for interpreting section 24 of the Constitution and sustainable development in addressing environmental rights and mitigating climate change, they still need to be tested and refined as new legislation and policies are promulgated.

CONCLUSION

The interim Constitution was indeed the threshold for creating a new era, not only for the South African people but also for addressing the environmental and ecological degradation and challenges caused by anthropocentric conditions. However, it is recommended that South Africa must develop and consistently adhere to international standards, such as those for addressing climate change and promoting sustainable development. With this in mind, South Africa has developed in a sustainable and justifiable way.

The courts have not yet had the opportunity to fully discuss the scope and implications of section 24 of the Constitution; however, the courts have established principles in order to reach the constitutional mandate in terms of environmental right and sustainability. The arguments and judgments in the cases were developed to assist the public in combating environmental harm or degradation that is often invisible but affects a person’s environmental rights. This environmental degradation and environmental harm not only affect humans and the environment but also the progress that South Africa has made toward sustainability and a sustainable environment.

South Africa should be commended for its legislation and policies, which effectively promote climate change management, adaptation, and mitigation, and for their alignment with international law and sustainability principles. However, since the *Climate Change Act 22 of 2024* was only promulgated in July 2024, and some sections were enacted in March 2025, and other sections are awaiting proclamation, the results appear to be uncertain, and therefore, the proper management, adaptation, and mitigation of climate change have yet to be tested. In some of the cases highlighted above, there were concerns that the legislation and policies were only passed to raise revenue for the state. It should be noted that legislation is promulgated as a regulatory tool to change public behaviour and mindset, and not as a generator of income in the first instance.

In the face of legislation and policies to facilitate sustainable development while adhering to the environmental right contained in section 24 of the Constitution, the State further established legislation that predominantly addresses environmental factors and climate change. Clearly, the *Electricity Regulation Amendment Act 38 of 2024* (ERAA), *Customs and Excise Act 91 of 1964*, *Disaster Management Act 57 of 2002*, and *Income Tax Act 58 of 1962* are examples of this, playing a profound role in environmental management and in establishing sustainable development.

REFERENCES

Carbon Tax Act 15 of 2019.

Chiang, PC., Ma, Hw., Wen, L., Lin, Ch. (2024). “Sustainable Development. In: Introduction to Green Science and Technology for Green Economy”. Springer, Singapore. https://doi.org/10.1007/978-981-99-9676-6_2.

Climate Action Tracker. (2025). “South Africa” available at: <https://climateactiontracker.org/countries/south-africa/policies-action/>.

Climate Change Act 22 of 2024.

Colegrave, A. (2024). “Unpacking the South African Climate Change Act” available at: <https://www.whitecase.com/insight-alert/unpacking-the-south-african-climate-change-act>.

Constitution of the Republic of South Africa, 108 of 1996.

Constitution of the Republic of South Africa, 200 of 1993.

Customs and Excise Act 91 of 1964.

Du Plessis, A. (2018). “The promise of ‘well-being’ in Section 24 of the Constitution of South Africa” *South African Journal on Human Rights* 34(2): 191-208. <https://doi.org/10.1080/02587203.2018.1475116>.

Department of Forestry, Fisheries and the Environment. (2025). “Minister George announces proclamation and implementation of the Climate Change Act, 2024 (Act no. 22 of 2024)” available at: https://www.dffe.gov.za/mediarelease/george_climatechangeact.

Disaster Management Act 57 of 2002.

Energy Council of South Africa. (2023). “Electricity Regulation Amendment Bill Essential to Resolve Energy Crisis, Keep Transition on Track” available at: <https://energycouncil.org.za/news/electricity-regulation-amendment-bill-essential-to-resolve-energy-crisis-keep-transition-on-track/>.

Electricity Regulation Amendment Act 38 of 2024.

Fuel Retailers Association of South Africa (Pty) Ltd v Director General, Environmental Management Mpumalanga and others [2007] ZACC 13.

Glazewski, J. (1994). “The Environment and the Interim Constitution”. *SA Bar Journal* 7(1): 22-27.

Hichange Investment (Pty) Ltd v Cape Produce CO (Pty) Ltd t/a Pelts Products and Others [2004] 2 SA 393 (E)

Income Tax Act 58 of 1962.

International Institute for Sustainable Development. (2012). “UN Conference on Sustainable Development – UNCSD” available at: <https://enb.iisd.org/negotiations/un-conference-sustainable-development-uncsd>.

Kotze, LJ. (2003). “The Constitutional Court’s Contribution to Sustainable Development in South Africa”. *Potchefstroom Electronic Law Journal (PELJ)* 6(2): 81- 95.

Lemine, BJ. (2021). “The Efficacy of Section 2(4)(l) of the National Environmental Management Act in the Context of Cooperative Environmental Governance”. *Obiter* 42(1): 162-174.

Maccsand (Pty) Ltd v City of Cape Town and Others [2012] ZACC 7.

Matarirano, G and Calitz, T. (2019). “A step towards a sustainable future – introducing the Carbon Tax Act” available at: <https://www.derebus.org.za/a-step-towards-a-sustainable-future-introducing-the-carbon-tax-act/>.

Molewa, E. (2016). “Minister Edna Molewa signs Paris Agreement on climate change”. Available at: <https://www.gov.za/speeches/south-africa-signs-paris-agreement-climate-change-new-york-22-apr-2016-0000>.

National Environmental Management Act 107 of 1998.

National Environmental Management: Air Quality Act 39 of 2004.

National Greenhouse Gas Emission Reporting Regulations of 2017.

Ngcamu, B.S. (2023). “Application of the disaster management cycle and climate change: Studying flood disasters in South Africa” *Social Sciences and Humanities Open* 8(1). <https://doi.org/10.1016/j.ssaho.2023.100657>.

Norton Rose Fulbright. (2017). “Navigating the maze of environmental liabilities” available at: <https://www.nortonrosefulbright.com/en-za/knowledge/publications/b0c7428d/navigating-the-maze-of-environmental-liabilities>.

Sneddon, C., Howarth, R.B., and Norgaard, R.B. (2006). “Sustainable development in a post-Brundtland world”. *Ecological Economics* 57(2): 253-268.

Theil, S. (2019). “The problem with the Normative Content of Section 24 of the Constitution of South Africa” *Nordic Journal of Human Rights* 37(2). <https://doi.org/10.1080/18918131.2019.1643669>.

Thiart, C., and Du Plessis E. (2025). “A Critical Analysis of the Application of Section 37C(1) of the Income Tax Act” *Obiter* 46(1). <https://doi.org/10.17159/zvd30693>.

United Nations. (2025). “Millennium Development Goals” available at: <https://www.un.org/millenniumgoals/>.

United Nations Women. (2012). “The United Nations Conference on Sustainable Development: Rio+20” available at: <https://www.unwomen.org/en/news/in-focus/the-united-nations-conference-on-sustainable-development-rio-20>.

Warfield, C. (2023). “The disaster management cycle” available at: https://www.gdrc.org/uem/disasters/1-dm_cycle.html.

World Commission on Environment and Development. (1987).

THE LEGAL INTERACTION OF ROAD ACCIDENTS USING COIDA OR THE RAF BILL AS A COMPENSATION MEASURE

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ABSTRACT

This paper examines the accident insurance system, specifically the Road Accident Fund (RAF) in South Africa, which is funded through various sources, including the Fuel Levy income and Government grants paid by the National Treasury. However, the paper examines the common cost phenomenon and the impact that the Road Accident Fund Amendment Bill, 2023, will have on South Africans, particularly in light of the Occupational Health and Safety Act 85 of 1993 and the Compensation for Occupational Injuries and Diseases Act 130 of 1993, as amended. The Road Accident Fund Amendment Bill, 2023, denies the common law claim obtained by the innocent injured party against the balance of his/her loss against the guilty party. The injuries received by the innocent injured party must be due to the negligence of the driver or owner of the vehicle. The paper examines discrimination against working-class individuals who use public transportation to commute to work or are transported in vehicles as part of their employment. Another effect of the Road Accident Fund Amendment Bill, 2023, will be an increase in medical aid premiums, as they will no longer be able to reimburse accident-related medical expenses. The proposed centralised system will remove the right of drivers, passengers, and pedestrians to claim compensation for injuries during accidents, and the payment of funding will be significantly reduced for claimants. The study suggests that the Road Accident Fund Amendment Bill, 2023, conflicts with the primary objective of the Road Accident Fund Act 56 of 1996 and the social security provisions outlined in the Constitution of the Republic of South Africa, 1996.

Keywords: common law claim, discrimination, road accident fund, social security.

INTRODUCTION

A democratic South Africa has come a long way in a short space of time, but one should not forget about the years of oppression. Although progress has been made, South Africa has been shaped by an unequal society. To address this unequal society, South Africa has worked systematically since 1994 to overcome its past and implement social assistance programs to transform the lives of communities and alleviate poverty, thereby restoring dignity to South Africans (Price, 2024). Social grants are the most significant component of South Africa's social protection system, providing financial security and improving the standards of living for its citizens. The South African government is guided by the *Constitution of the Republic of South Africa*, 108 of 1996 (henceforth referred to as the Constitution), and the government, through the Department of Social Development, implements policies and guidelines that support vulnerable communities, protect dignity, and promote equality. The social assistance programme in South Africa includes pensions, disability payments, child support grants, as well as household grants, which are seen as a safety net for South Africans and a key component in the fight against poverty (Price, 2024). Not only does the South African government have an obligation to promote and secure social security, but it also faces significant challenges, including poverty, inequality, and unemployment (Tshoose, 2023, p. 164). South Africa has an extensive social assistance programme; however, it is an inadequate measure to address the poverty alleviation problem in South Africa (Goldblatt, 2014, p. 23). South Africa has high levels of income and wealth inequality, with a population exceeding 63 million (Stats SA, 2024), resulting in unemployment at 31.9%, which ultimately affects people on various levels (Stats SA, 2025).

In understanding the difference between social security and social insurance, it is important to note that the *White Paper for Social Welfare*, 1997 defines social security as security measures that consist of a variety of public

and private measures that provide benefits in either cash or kind or both when an individual's earning power is either permanently lost, never developed or never exercised when unacceptable social cost is generated or the person is unable to avoid poverty and lastly to maintain children (*White Paper for Social Welfare, 1997*). Therefore, the primary aim of social security is to alleviate and prevent poverty, provide social compensation, and ensure equitable income distribution (Klopper, 2024). It should be noted that social security and social protection are not considered to have the same objective; rather, social protection is the general system of basic social support that provides support to individuals who are no longer linked to an employment relationship (Klopper, 2024). The International Labour Organisation (ILO) defines social protection as:

‘the set of public measures that a society provides for its members to protect them against economic and social distress, caused by the reduction of income from work as a result of various contingencies (such as, sickness, maternity, employment injury, unemployment, invalidity, old age, death of the breadwinner, the provision of healthcare, and the provision of benefits for families with children).’ (International Labour Organisation 2025)

Social insurance, on the other hand, is linked to employment and earnings, ensuring continued income if an individual becomes unemployed or is disabled. These benefits are then calculated at a minimum and maximum level, regardless of the level of continuation and individual risk. An example of social insurance is workers' compensation, as outlined in the *Compensation for Occupational Injuries and Diseases Act 130 of 1993 (COIDA)* (Klopper, 2024). It is important to note that social insurance is linked to contributions made by individuals, employers, and the government, and is financed by these contributions (Klopper, 2024).

The article sets out the history and nature of the social security system in South Africa, followed by a legislative perspective. The article examines social assistance payments in relation to the COIDA and Road Accident Fund (RAF), arguing that the Road Accident Fund Amendment Bill, 2023, conflicts with the Road Accident Fund Act 56 of 1996 (RAF Act) and the social security provisions outlined in the Constitution of the Republic of South Africa, 1996.

INSURANCE AND EMPLOYMENT INJURIES AND DISEASES: SOCIAL SECURITY

With the dawn of the new constitutional dispensation in 1994 and the introduction of the Bill of Rights, which contains social and economic rights that guarantee everyone the right to have access to social security, including the provision that if a person is unable to support themselves or their dependants, social assistance will be provided (section 27(1)(b) of the Constitution). This right to social security further enshrines it as a human right (Tshoose, 2023, p.164). To achieve this right, the state must, within its available resources, progressively realise the social assistance right (section 27(1)(b) of the Constitution). The state and non-state actors have a further obligation to respect, promote, protect, and fulfil the human rights as contained in the Constitution (section 7).

The United Nations (UN) and the International Labour Organisation (ILO) unequivocally recognise social security as a fundamental human right, essential for the well-being and dignity of every individual. This concept is enshrined in Article 22 of the Universal Declaration of Human Rights (UDHR), which asserts that “everyone, as a member of society, has the right to social security,” and in Article 9 of the International Covenant on Economic, Social, and Cultural Rights, which emphasises the right of everyone to social security, including social insurance. This recognition signifies that all individuals, regardless of circumstances, are entitled to some form of social security coverage, underscoring the critical need for a universal social security system that reaches every member of society (Nhede & Marumahoko, 2022, p. 110). The implications of this right create a compelling and urgent obligation for both society at large and individual governments to implement and uphold comprehensive social security programs. Such programs are vital for protecting individuals from the myriad adverse effects of social risks, which can encompass unemployment, illness, disability, old age, and other unexpected life events. By establishing effective social security mechanisms, governments can not only alleviate poverty and inequality but also foster economic stability and social cohesion (Istomina & Ivanchina, 2022).

South Africa is aware of social security issues on the global stage and is a signatory to multiple international treaties. The International Covenant on Economic, Social and Cultural Rights (ICESCR) was ratified by South Africa on January 12, 2025, following its 1994 signing. The ICESCR requires a State Party to progressively realise the rights

to education, housing, and health care within the ambit of social security rights (Goldblatt, 2014, p. 26). South Africa further realises regional treaties such as the African Charter on Human and Peoples' Rights, acceded to on the 9th of July 1996, the African Charter on the Rights and Welfare of the Child, ratified on the 7th of January 2000, and the African Charter on Human and Peoples' Rights on the Rights of Women in Africa, which South Africa ratified on the 17th of December 2004.

It is important to recognise that the political, economic, social, and cultural contexts differ significantly across countries. Economic conditions can vary widely; countries could be experiencing high levels of development and industrialisation or grappling with poverty and underdevelopment. Social dynamics, including class structures and ethnic diversity, also play a crucial role in shaping societal interactions and expectations. Culturally, traditions and social norms influence how obligations are perceived and fulfilled within communities. Therefore, it is essential to tailor these obligations to the specific local context, taking into account these diverse factors (Nhede & Marumahoko, 2022, p. 106). Understanding these variations ensures that policies and initiatives are not only relevant but also effective and respectful of local customs and values.

An essential starting point is that the Constitution states that the Bill of Rights applies not only to the legislature, executive, judiciary, and all bodies of government, but also to individuals and legal entities, provided that a right is relevant, considering the essence of the right and any responsibilities that arise from it (Van Niekerk et al, 2023). Therefore, when developing social security legislation in South Africa, it is crucial to ensure that the laws are not only written with clarity but also implemented in strict alignment with the country's constitutional obligations and international human rights standards. Regular assessments and adjustments may also be necessary to effectively address evolving social and economic conditions.

SOUTH AFRICAN PERSPECTIVE

General

Social and economic rights litigation in South Africa has brought to the forefront the complex challenges associated with the realisation of social rights, particularly highlighting systemic inequalities and the barriers faced by marginalised communities. This dynamic has provided an important opportunity to critically reflect on the steps needed to enhance the effectiveness of these rights and ensure broader, more equitable access for all citizens. As noted by Goldblatt (2014, p. 27), addressing these challenges is essential for fostering a more inclusive society. The debate surrounding socioeconomic rights was a significant aspect of the drafting process of the South African Constitution, where discussions centred on balancing individual rights with the demands for social justice, equity, and the fundamental right to a dignified life for every member of society.

The *Ex parte Chairperson of the Constitutional Assembly in Re Certification* addressed the question of whether courts should have the authority to enforce rights to access to housing, healthcare, food, water, and social security. Critics feared that recognising these rights could blur the separation of powers, potentially granting courts overly broad authority traditionally reserved to the legislature or the executive. However, the court held that socio-economic rights are justiciable, meaning they can be enforced by the judiciary, though with limitations. The court emphasised that these rights are protected from excessive interference, thereby ensuring that individuals can access vital services and protect their socio-economic rights. This careful approach enables courts to intervene when necessary to prevent unjust or arbitrary government actions, such as unlawful evictions or refusals of essential services.

In *Glenister v President of the Republic of South Africa* (CCT 48/10) [2011] ZACC 6, it was held that it is not essential to specify the exact measures the state must implement to fulfil its obligations. However, the actions taken must be reasonable and effective, reflecting what a sensible decision-maker would consider appropriate in the given circumstances. This implies that any measures aimed at realising the right to social security should be conducted in a way that respects, protects, promotes, and fulfils that right, ensuring their reasonableness (Basson, 2020, p. 865).

Section 27(2) of the Constitution states that reasonable legislative and other measures must be taken, within the state's available resources, to progressively realise each of these rights. The case of *Government of the Republic of South Africa v Grootboom* is pivotal to these issues. In *Grootboom*, the court focused on the language used regarding sections 26 and 27 of the Constitution, specifically the phrase 'the right to access to' rather than simply 'the right to'. The Court determined that 'the right to access' can have a broader interpretation than just the 'right to.' The Court

emphasised the interconnections among fundamental rights and the importance of access to essential services and resources. Consequently, the state is required to guarantee social security protection by empowering the legislature and taking other necessary measures to ensure that individuals are included in the necessary provisions (Olivier, Smith & Kalula, 2003).

The Constitutional Court further stated that when assessing the steps the government has taken to provide social security, the focus isn't on the existence of 'better' alternatives but on whether the actions taken are 'reasonable'. The court acknowledges that various measures can be deemed reasonable depending on the situation, and as long as the chosen measures meet the standard of reasonableness for that context, they fulfil the requirement (Basson, 2020, p.858). The Constitutional Court, in *Grootboom*, further states that the purpose of the Constitution is to ensure that the basic needs of everyone in our society are effectively met. The principle of progressive realisation requires the state to take necessary steps to achieve this objective. This means that accessibility should be improved gradually. Legal, administrative, operational, and financial obstacles must therefore be reviewed and, where feasible, reduced over time.

One particularly important component of the value-based framework embraced, especially by the Constitutional Court, is the court's clear acknowledgement that the overarching purpose and foundation of social rights is to safeguard an individual's right to human dignity. This is particularly evident in the court's equality jurisprudence, where the infringement of a person's dignity has been elevated to a threshold of critical importance in cases where the unfairness of discrimination must be demonstrated (Olivier, Smith & Kalula, 2003).

The social rights and obligations imposed on the state have been tested in constitutional litigation primarily through the lens of the relationship between the right to social security and the right to equality. In the landmark case of *Khosa v Minister of Social Development* 2004 (6) BCLR 569 (CC), (Khosa-case), the court ruled that when interpreting the term 'everyone', a permanent resident could not be excluded. In this case, the applicants are destitute Mozambican citizens with permanent resident status in South Africa who fled due to civil war. The applicants challenged the constitutionality of Section 3(c) of the Social Assistance Act 59 of 1992, which excluded them from social assistance benefits in South Africa, specifically the Old Age Grant paid to South African citizens. This exclusion was based on the requirement of citizenship, as applied to Khosa (*Khosa v Minister of Social Development* 2004 (6) BCLR 569 (CC)). The focus transitioned from evaluating the reasonableness of measures for progressive realisation to scrutinising the reasonableness of exclusion. Consequently, in Khosa, the court granted a specific group of individuals (permanent residents) a legally enforceable right. The denial of social assistance was accompanied by unfair discrimination, prompting the Court to recognise a socioeconomic right for a group of individuals who had previously been excluded. Therefore, what distinguished this case from other cases previously examined by this Court is that, in addition to the rights to life and dignity, the state's social-security scheme, established to fulfil its duties under section 27 of the Constitution, raises the issue of the prohibition of unfair discrimination (Khosa at para 44).

Section 9 of the Constitution, known as the equality clause, prohibits unfair discrimination based on specific personal attributes that could impair a person's dignity. It not only bans such discrimination but also promotes equality for individuals previously disadvantaged by allowing measures to advance their interests. In essence, Section 9 supports both substantive and formal equality. This section ensures that social security policies and procedures are free of direct and indirect unfair discrimination. Additionally, we must examine how a Court assesses whether a breach of the equality clause has occurred. To grasp the equality clause, it is beneficial to distinguish the investigation of potential violations of section 9(1) from the examination of unfair discrimination outlined in section 9(3) of the Constitution.

The Constitutional Court, in *Harksen v Lane NO & Others* (CCT9/97) [1997] ZACC 12, established a two-step analysis to assess whether a breach of the equality clause has occurred, specifically unfair discrimination. Each of these steps represents a distinct inquiry and should therefore be kept separate. The first step focuses on determining if the differentiation constitutes 'discrimination,' while the second step assesses whether this 'discrimination' is regarded as 'unfair discrimination.' In the first inquiry, it must be assessed whether a legislative provision or executive action that distinguishes between individuals or groups of individuals has a 'rational link to a legitimate government objective'. If such a rational link is absent, it would mean that section 9(1) of the Constitution has been breached. However, even if a rational relationship is established, the differentiation might still be deemed 'unfair discrimination' according to section 9(3) of the Equality Clause. The second inquiry examines whether a differentiation constitutes unfair discrimination as defined in section 9(3) of the Constitution. This test concerns an act of parliament which, by definition, must apply in a diversity of circumstances where the relevant distinctions may or may not be justified in

specific cases. In effect, the presumption places the onus on the state, if challenged, to justify a statutory distinction drawn on listed or specified grounds (Du Toit *et al*, 2023). In this context, social security legislation designed to apply across diverse social and economic circumstances must be justified by the state when it differentiates between beneficiaries. This framework ensures that social security laws are applied equally and that any exclusions or distinctions are constitutionally defensible and not unfairly discriminatory.

A principle that emerges from the jurisprudence is that the more vulnerable a group is, the more likely discrimination is to be unfair. In subsequent rulings, the Court has adopted an intersectional approach to analyse the impact of discrimination on complainants. In *Sithole and Another v Sithole and Another* [2021] ZACC 7, this principle is illustrated. The Court examined how discrimination deepens the challenges faced by Black women. The case questioned the constitutionality of s 21(2)(a) of the Matrimonial Property Act 88 of 1984, which automatically displaced Black couples from community property within two years of a 1988 amendment. This provision was argued to unfairly discriminate against Black women based on race and gender. Judge Tshiqi stressed the broader implications of such discrimination on women's rights to dignity, healthcare, and social security, pointing out the impact of societal factors like patriarchy and cultural practices on Black women's economic status. Intersectionality can therefore permeate the entire analysis of unfair discrimination. It unveils forms of disadvantage that would otherwise go unseen, grounding the recognition of whether differentiation constitutes unfair discrimination in an analysis of the complex ways in which patterns of disadvantage emerge and intersect. In assessing the unfairness of discrimination, intersectionality tips the balance in favour of preserving measures that seek to redress intersectional disadvantage and against eliminating those that cause or entrench disadvantage (Madonsela, 2025). The intersectional perspective offers a crucial framework for analysing social security laws and policies. It requires that differences in social security legislation, including eligibility requirements and exclusions, be evaluated not only for formal equality but also for their real effects on groups experiencing overlapping disadvantages.

COIDA

COIDA was introduced to follow the common law or statutory remedies when an individual sustained injury/illness or death during the course of employment, whether there is fault or no fault involved with the individual. In contrast, it is regulated by statutory compensation from a fund, absolving the employer of liability, while recognising the employee's common law rights (Klopper, 2024). The purpose of COIDA is broadly stated: where a work-related injury affects the employee's ability to earn and provide for their dependents, thereby creating socio-economic problems, the burden falls on the employee to bear the financial implications of such an injury.

Scope and Application of COIDA

Before the interpretation of COIDA can be considered, it is important to note that, as per COIDA, the definition of the term 'accident' is that, before any compensation is payable, the term 'accident' should be adhered to. COIDA defines 'accident' as 'an accident arising out of or in the course of an employee's employment and resulting in a personal injury, illness, or the death of the employee' (section 1 of COIDA).

It is important to note that section 35(1) of COIDA stipulate that:

'No action shall lie by an employee or any dependant of an employee for the recovery of damages in respect of any occupational injury or disease resulting in the disablement or death of such employee against such employee's employer, and no liability for compensation on the part of such employer shall arise save under the provisions of this Act in respect of such disablement or death.'

Section 35(1) was tested in the case of *Churchill v Premier, Mpumalanga* (889/2019) [2021] ZASCA 16 (4 March 2021), where the plaintiff, Ms Catherine Churchill, was assaulted by protestors during a protest at her place of employment. The plaintiff alleged that she had developed permanent acute post-traumatic stress disorder, which resulted from the direct consequence of the incident, and sued the Premier and Director General of Mpumalanga for her medical expenses, the loss of income, and general damages. The motivation behind this is that the plaintiff averred that her employer did nothing to safeguard employees during the protest, despite having a legal duty under Section 8 of the *Occupational Health and Safety Act 85 of 1993* (hence the OHSA). In interpreting section 8 of the OHSA, a direct obligation is placed on the employer to provide and maintain a workplace that is safe and without risk to the health and safety of their employees (section 8(1) of the *Occupational Health and Safety Act 85 of 1993*). The legal question before the court was whether the plaintiff's inquiry could be considered an injury that arose out of her

employment. In the Supreme Court of Appeal judgment, it was stated that the accident indeed arose out of her employment as well as in the course of the plaintiff's employment. The defendants are therefore liable to compensate the plaintiff for damages as proven, as well as the quantum of damages to which she is entitled, as determined by the High Court (*Churchill v Premier, Mpumalanga* (889/2019) [2021] ZASCA 16 (4 March 2021)).

Therefore, when assessing a claim under COIDA, the statutory requirement must always be present: that the accident arose out of or in the course of the employee's employment. There is also an ancillary purpose when determining the effect that COIDA has. This was seen in the *Mankayi v AngloGold Ashanti Ltd* 2011 (3) SA 237 (CC). In terms of the case, the plaintiff, Mr Mankayi, suffered a lung disease that he contracted as a result of working in the mine. In this case, the argument was based on the fact that the employer negligently exposed the plaintiff to harmful levels of dust and gases during the course of his employment, rendering him unfit to work underground. Additionally, based on the fact that the employer is responsible, as per Section 8 of the OHSA, to provide a safe and healthy working environment. The Constitutional Court in 2011 ruled that mineworkers who suffered a compensable occupational lung disease are entitled to claim from former employers in terms of COIDA (*Mankayi v AngloGold Ashanti Ltd* 2011 (3) SA 237 (CC)).

ROAD ACCIDENT FUND ACT

The *Road Accident Fund Act* 56 of 1996 was introduced to create a statutory fund that is financed from fuel levies, as determined by the Act, to be used for payment of claims where an individual sustained bodily injury or in cases of patrimonial loss that are determined by the Act (Klopper (2), 2020). In terms of the objective of the Act, a victim applies for payments of compensation to the RAF where an individual sustained loss or damage that was wrongfully caused by the driving of a vehicle by another person (section 3 of the *Road Accident Fund Act* 56 of 1996).

Scope and Application of RAF

With reference to the *Road Accident Fund Amendment Bill*, 2023, which was published as a draft in 2023 by the Department of Transport to ensure the RAF is a social benefits model rather than one of compensation. A scenario where the right of a driver, passenger, or pedestrian to claim compensation for injuries sustained in a vehicle collision will be prejudiced. Some of the restrictions include that, where a loss of earnings is paid out in a lump sum, which is capped and subject to inflation, it will, under the Bill, be paid annually, equating to the original lump sum. There will be no cessation of the individual's death benefits before the full amount is paid, and they are also subject to periodic review in terms of RAF liabilities. This will create uncertainty for the claimant regarding whether the future benefit will be paid and will halt the claimant's rehabilitation (Narayanasami, 2023).

Under the original Act, claimants receive compensation, commonly referred to as general damages. This compensation is awarded to the claimant for the pain and suffering they sustained during the vehicle accident. Under the Bill, compensation for general damages is completely abolished, and in some cases, individuals who have sustained serious injuries may receive no benefits (Narayanasami, 2023).

In terms of medical expenses incurred, the Bill stipulates that medical aids will not be able to be reimbursed for accident-related medical expenses that they paid out to their members. This will, in effect, increase medical aid premiums for members, as the medical aid industry is compelled to mitigate the risks associated with members not being covered under the Fund (Narayanasami, 2023).

The Bill will bring numerous exclusions. For example, the location where the accident happened is currently covered under the Act. With the Bill, the accident must occur on a public road. Hit-and-run accidents are not eligible for compensation claims where the vehicle is unidentified. Where a driver, pedestrian, or cyclist is over the legal prescribed alcohol limit, irrespective of who caused the accident, they are excluded from claiming compensation, which also excludes a dependent from claiming loss of support if the individual passes away. The Bill is also not applicable to a vehicle accident involving a claimant who is not a South African citizen or a direct permanent resident (Narayanasami, 2023).

As seen above, the Bill has different consequences if it is signed into effect. However, in addressing the shortcomings of the Bill, the South African Government is focusing on a rejected Road Accident Benefit Scheme

(RABS) Bill, 2017. The RABS is a proposed bill intended to replace the RAF and create a no-fault system to compensate victims of road accidents, where negligence need not be proven (Association for the Protection of Road Accident Victims, 2025). The RABS, which were revived in 2025, aim to

“provide for a social security scheme for the victims of road accidents; to establish the Road Accident Benefit Scheme Administrator to administer and implement the scheme; to provide a set of defined benefits on a no-fault basis to persons for bodily injury or death caused by or arising from road accidents; to exclude liability of certain persons otherwise liable for damages in terms of the common law; and to provide for matters connected therewith.”

When interpreting the RABS, the idea is to streamline claims and remove the requirement for proof of fault. However, considering the removal of fault means that claimants will no longer be able to sue a negligent driver – the right has been taken away. This further means that the negligent driver will have the same benefit as the innocent victim. At the same time, it removes the right from the claimant to claim for pain, suffering, and disfigurement as the RABS abolishes non-economic damages. The RABS introduces capped benefits and denies benefits to a victim under 18 or over 60 years, as well as to non-South African citizens or those without permanent residency. Not only does the RABS raise questions about discrimination, but it would also be a costly financial affair. The RABS, with its funding scheme, is likely to require an increase in the fuel levy as the projection is that it will be a costly affair of R21.6 billion (Viljoen, 2025).

It is important to note that although the *Road Accident Fund Amendment Bill, 2023* was withdrawn in March 2025 by the Deputy Minister of Transport and that it does not adhere to the RAF 2020-2025 Strategic Plan (Association for the Protection of Road Accident Victims (1), 2025), the Department of Transport moved to revive the RABS in July 2025 after the dissolution of the Road Accident Fund Board due to governance and operational failures (Nkonki, 2025).

IS THE ROAD ACCIDENT FUND (RAF) WITHIN THE AMBIT OF SOCIAL BENEFITS

To consider whether the Road Accident Fund (RAF) is considered within the ambit of social benefits was tested in the *Road Accident Fund v Auditor-General of SA and Others* [2024] 3 All SA 914 (GP) when a dispute existed between the RAF and the Auditor General, and the adoption of an accounting standard known as the IPSAS 42. In accordance with IPSAS 42, the treatment of payables and liabilities in its financial statements is revised. Before 2024, the RAF had utilised the IFRS 4 accounting standard for insurance contracts. This effect resulted in the RAF liabilities plunging from R327 billion, as reflected in the 2019/2020 financial year, to R34 billion in the 2020/2021 financial year (*Road Accident Fund v Auditor-General of SA and Others* [2024] 3 All SA 914 (GP)). This assertion from 2020 suggested that the RAF was not dispensing insurance-related compensation but rather serving as a social benefit entity. In its judgment, Neukircher J remarked that ‘The RAF, for what appears to be unsound reasons, in our view, suddenly did not consider itself an entity engaged in insurance-like activities anymore.’ Klopper (2024) believes that it is legally incorrect to consider the RAF to be providing social benefits.

Where an individual was in a road accident and sustained injury or loss that arose from the negligent driving of motor vehicles, the compensation system is implied, indicating that it is socio-economic and therefore falls within the ambit of ‘social security’ (para 50 *Law Society of South Africa and Others v Minister for Transport and Another* 2011 (2) BCLR 150 (CC)). An insurance contract did not create this entitlement by the accident victim but rather their common law delictual right to compensation. This is where the *Road Accident Fund Act 56 of 1996* (RAF Act) regulates the access of social security systems to employ fuel levy funding. Section 5 of the RAF Act stipulates that the levy is paid into the National Revenue Fund and is dedicated to supporting victims of road traffic collisions (Klopper, 2024). The characteristics of the system include:

- The system originated and is based on private insurance. The aim is to compensate a victim for loss or damage who suffered loss or damage from the negligent driving of a vehicle or an unlawful act.
- The right to compensation is not a statutory right but rather a common law delictual claim for injury or death that resulted or arose from the negligent driving of a vehicle or an unlawful act.
- The funding is not from the government's income fund or tax-generated, but rather derived from a levy on fuel by participants.

- The common law principles determine the individual claimant's loss or damage, and not by minimum or maximum levels. The compensation must still be proven by the claimant at his/her own cost and risk (Klopper, 2024).

COIDA AND THE RAF ACT

The question remains whether an employee involved in a car accident while travelling to and from work will be covered within the ambit of COIDA. In order to answer this question, the term 'accident' is important to look at. This is difficult to prove; however, the accident should have occurred while the employee was on duty and performing their duties within the scope of their employment. The consideration is therefore that the employee was at work in the performance of his/her duties, and the employment caused the accident or exposed the employee to the risk of the accident (Boshoff, date unknown).

Section 22(5) of the COIDA addresses the situation where an employee is the driver of a vehicle while on duty and is transported as part of their duties. This subsection states that where an employee is transported free of charge from his/her place of employment as part of his/her employment by and vehicle that is driven either by the employer or employee for his/her employment, shall be deemed to be taken part in the course of the employee's employment (section 22(5) of the COIDA). Where the following criteria have been met, the employee would be seen as if the accident arose in the course and scope of the employee's employment, namely:

- Did the employer provide the vehicle?
- Where the vehicle is provided free of charge?
- Was the vehicle provided for the employee's employment? And
- Was the vehicle driven by the employer/themselves or by one of the employees of the employer? (Boshoff, date unknown).

If the criteria above are met, the employee may be eligible to claim compensation under COIDA. It should, however, be noted that COIDA still works on the provision that there is a discretion of the Compensation Commissioner when considering the claim for compensation in terms of COIDA (Boshoff, date unknown). The RAF will cover, for example, an accident that occurs during free transport, provided by a contractor on behalf of the employer. In cases where employees, like an artisan, perform standby duties, it should be seen as in the course and scope of the duty and be deemed to be an injury on duty. When the standby employee uses private transport, the employer is expected to prove that they took the most economical route to work (Boshoff, date unknown).

CONCLUSION

The above discussion highlights the challenges involved in legislation and case law regarding social assistance and social insurance, as well as who is entitled to receive such compensation. The aims of social security were highlighted, and the South African Government's sought to address the concerns of claimants with compensation claims, thereby improving the social welfare of citizens. South Africa's social security system requires new and creative thinking in implementing compensation for occupational injuries and diseases, as well as for road accidents. As discussed above, it should be noted that the RAF can be classified as social insurance, as it is not linked to employment, and contributions are made via a fuel levy.

A recommendation is made that the South African government set different goals for the social security system across all three spheres of government, with a particular focus on the national level. This should be done within the ambit of the Constitution, and to ensure that South Africa addresses the progressive realisation of social security. It is essential to note that road users have a responsibility to ensure their own safety, as well as that of others using the road. The same is true for employees in the workplace, who must ensure their own safety and that of their colleagues. It is believed that when road users and employees adhere to the rules of the road and the workplace, it will result in meaningful reductions in accidents.

REFERENCES

- Association for the Protection of Road Accident Victims. (2025). “RABS Summary” available at: <https://www.aprav.co.za/archives/rabs-summary/>.
- Association for the Protection of Road Accident Victims. (2025). “The Road Accident Fund (RAF) in Shambles” available at: <https://www.gertnelineattorneys.co.za/wp-content/uploads/2025/03/24Mar2025-APRAV-v2.pdf>.
- Basson, Yvette. (2020). The compliance of the South African social security system with the International Covenant on Economic, Social, and Cultural Rights. *Obiter*, 41(4), 850-870. Retrieved January 19, 2026, from http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S1682-58532020000400009&lng=en&tlng=en.
- Boshoff, T. (date unknown). “Travelling to and from work – covered by Workmen’s Compensation or not?” available at: <https://labourguide.co.za/coid/travelling-to-and-from-work-covered-by-workmens-compensation-or-not#:~:text=covered%20by%20COIDA%3F-,death%20of%20the%20employee>".
- Certification of the Constitution of the Republic of South Africa, 1996 (CCT 23/96) [1996] ZACC 26*
- Churchill v Premier, Mpumalanga (889/2019) [2021] ZASCA 16 (4 March 2021).*
- Compensation for Occupational Injuries and Diseases Act 130 of 1993.*
- Constitution of the Republic of South Africa 108 of 1996.*
- Du Toit, D., Conradie, B., Cohen, T., Cooper, C., Fergus, E., Gaibie, S., Giles, G., & Godfrey, S. (2023). *Labour relations law: A comprehensive guide* (7th ed.). LexisNexis South Africa.
- Glenister v President of the Republic of South Africa and Others (CCT 48/10) [2011] ZACC 6*
- Goldblatt, B. (2014). Social Security in South Africa – a Gender and Human Rights Analysis. *Verfassung Und Recht in Übersee / Law and Politics in Africa, Asia and Latin America*, 47(1), 22–42. <http://www.jstor.org/stable/43239720>.
- Harksen v Lane NO and Others (CCT9/97) [1997] ZACC 12*
- International Labour Organization. (2025). “Social protection”. Available at: <http://ilo.org/topics-and-sectors/social-protection#:~:text=Social%20protection%2C%20or%20social%20security,particular%20in%20lower-income%20countries>.
- Istomina, Y. A., & Ivanchina, J. V. (2022). Labour law and social security law: Social value in the modern world. *SHS Web of Conferences*, 134, Article 00045. <https://doi.org/10.1051/shsconf/202213400045>
- Khosa v Minister of Social Development 2004 (6) BCLR 569 (CC).*
- Klopper, H. (2024). “Is the Road Accident Fund a social benefit or a public insurance scheme?” available at: <https://www.derebus.org.za/is-the-road-accident-fund-a-social-benefit-or-a-public-insurance-scheme/>.
- Klopper, H. (2024). “Navigating road crash victim compensation: Are medical aid payments deductible?” available at: <https://www.pmincsa.co.za/podbielski-attorneys-interesting-articles-case-law/navigating-road-crash-victim-compensation/>.
- Klopper, H. (2020). The Law of Third-Party Compensation. *LexisNexis*
- Law Society of South Africa and Others v Minister for Transport and Another 2011 (2) BCLR 150 (CC)*
- Madonsela, T. N. (2025). Mainstreaming social justice in fiscal policy design: A socio-legal case for an income support grant. *Modern Economy*, 16(4), 681–703. <https://doi.org/10.4236/me.2025.164032>
- Mankayi v AngloGold Ashanti Ltd 2011 (3) SA 237 (CC).*

Narayanasami, R. (2023). “What Are the Consequences of the New Road Accident Fund Amendment Bill 2023.” Available at: https://go.gale.com/ps/i.do?p=ITOF&u=usa_itw&id=GALE%7CA766918767&v=2.1&it=r&sid=summon&aty=shibboleth.

Nkonki, A. (2025). “Fierce backlash against proposed Road Accident Benefit Scheme Bill following RAF board dissolution” available at: https://www.gertnelineattorneys.co.za/blog/rabs/fierce-backlash-against-proposed-road-accident-benefit-scheme-bill-following-raf-board-dissolution/?fbclid=IwY2xjawO5BCBleHRuA2FlbQIxMABicmlkETFTWHo5UDRONWRWQjFVcmJYc3J0YwZhcHBfaWQMjIyMDM5MTc4ODIwMDg5MgABHvaBD2TG3mGjhOzNwgZZtXB589-WwBFoWAu_0t0m43AaAx70gzgsodZVGdTf_aem__upM3ie-mzPXE_hcddWJPg.

Nhede, N. T., & Marumahoko, S. (2022). *Reflecting on the past, present, and future of social security systems in Africa with specific reference to selected countries. Strategic Review for Southern Africa*, 43(2), 103–124. <https://doi.org/10.35293/srsa.v43i2.372>

Occupational Health and Safety Act 85 of 1993.

Price, G. (2024). “Social Security” available at: <https://www.gov.za/blog/social-security>.

Ramalekana, N., & Mokgoroane, L. (2024). Intersectionality in the South African Constitution’s Equality Clause. *South African Journal on Human Rights*, 40(3–4), 199–225. <https://doi.org/10.1080/02587203.2024.2440439>

Road Accident Fund Amendment Bill, 2023.

Road Accident Fund v Auditor-General of SA and Others [2024] 3 All SA 914 (GP).

Road Accident Fund Act 56 of 1996.

Sithole and Another v Sithole and Another [2021] ZACC 7

Stats SA. (2024). “South Africa’s population surpasses the 63 million mark” available at: <https://www.statssa.gov.za/?p=17430>.

Stats SA. (2025). “Beyond the Unemployment Rate: A Broader Look at Labour Underutilisation” available at: <https://www.statssa.gov.za/?p=19007>.

Tshoose, C.I. (2023). The role and impact of constitutional values of ubuntu, equality, and human dignity in the interpretation and protection of the right to have access to social security in South Africa. *Tydskrif vir Regswetenskap*, 48(2), 163-194. <https://doi.org/10.38140/jjs.v48i2.7916>.

Van Niekerk, A., Smit, N., Van Eck, B. P. S., Botha, M. M., Fourie, E., Maloka, T., Newaj, K., Prinsloo, C., & Van Staden, M. (2023). *Law@work* (6th ed.). LexisNexis South Africa.

Viljoen, N. (2025). “Government revives rejected Bill to fix Road Accident Fund.” Available at: <https://www.moonstone.co.za/government-revives-rejected-bill-to-fix-road-accident-fund/>.

White Paper for Social Welfare. (1997).

SURVIVAL AND GROWTH: FEMALE ACADEMICS' WORK REALITIES IN SOUTH AFRICA

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ABSTRACT

Female employee studies remain valuable because they help close the theory-practice gap, providing organisations with the understanding to attract, retain, and promote talented women to lead the organisation towards bigger social goals, including gender equality and sustainable development. Research has shown that an employee who is a good fit in their organisation is more likely to experience increased job satisfaction, improved performance, and job wellness, and to have lower turnover, compared to an employee who does not exhibit organisational fit. Person-organisation fit (P-O fit) may be described as individuals' perceptions of congruence with organisations, which mediate attitudes, well-being, and behaviour. The academic-university congruence enhances the alignment of the key strategic objectives, which form a platform of value congruence and psychological ownership to promote effective structures and procedures in academic institutions.

Through an interpretative phenomenological method, the study offers a distinctive perspective on the experiences of organisational fit among South African female academics in higher education. The study population comprised female academic employees aged 30-59 years at a university of technology in Gauteng, South Africa. Non-probability snowball sampling was employed in this study. In-depth, semi-structured interviews were conducted with 12 female academics, allowing for a detailed exploration of their subjective experiences and perspectives. Data was analysed using MAXQDA software, utilising a thematic analysis strategy, to identify patterns and emergent themes. The main themes relate to the individual's overall organisational fit, organisational vision, mission, and value alignment, as well as organisational changes and support initiatives.

Findings reveal that person-organisation fit is not a one-dimensional, static concept but a dynamic, multi-layered phenomenon comprising departmental context, leadership endurance, and daily support. More detailed findings revealed that overall fit was widely experienced through positive relationships at departmental levels, whereby participants anchored themselves in supportive micro-communities. The individuals also remained committed despite recognised incongruence with the organisational vision, mission, and values. Organisational change demonstrates how fluctuating leadership, shifting role expectations and uneven policy enactment disrupted fit for female academics. Organisational support was found to be relationally rich, but structurally thin. Together, these findings illuminate how female academics locate a sense of belonging, endure strain, and cultivate flourishing in their work environment. This suggests that management in higher education would benefit from recognising that person-organisation fit is not solely an individual responsibility, but also an institutional endeavour that should inform the design of future support systems.

Keywords: flourishing, Person-Organisational fit (P-O fit), female academics, South Africa.

INTRODUCTION

Studies of working women have grown in value over the past few years, with organisations and policymakers acknowledging the need to understand what gives women an advantage or a disadvantage in the workplace. Part of the reason this research was conducted is existing gender disparities, which indicate significant differences in career advancement, pay, and leadership positions (Taouk et al., 2025). More female workers also testify that they have been sexually harassed and subjected to gender-based violence in their workplace (Holmes et al., 2025). Awareness of such challenges helps organisations improve employee productivity. Moreover, having men and women in the workplace enhances corporate governance, fosters innovative ideas, and improves decision-making (Branca et al., 2025).

The South African higher education system presents challenges for female academics, who face increasing demands in teaching, research, and administration (Dlamini & Dlamini, 2024). Gender bias is evident in studies (Ejike et al., 2025; Khalid et al., 2025; Khan et al., 2024). Research mainly highlights barriers like unequal workloads, lack of mentorship, and limited access to funds, but often overlooks the crucial alignment between personal identities and institutional values (P-O fit).

P-O fit refers to the alignment between an individual's values, beliefs, and work style and the organisation's values, beliefs, and work style (Fatmasaria et al., 2024). There have been ever-increasing empirical studies showing that consistency between personal values, work preferences, and organisational culture greatly influences individuals' flourishing. Flourishing is a complex state of optimal psychological functioning that encompasses aspects such as involvement, positive affect, connectedness, accomplishment, and overall well-being.

GOAL OF THE STUDY

This study aims to explore the lived experiences encountered by female South African academics at a university of technology in Gauteng. Our research question was: What are the lived-work realities of female academics' experiences of P-O fit and flourishing in their work environments?

LITERATURE REVIEW

Conceptualising P-O Fit in the Workplace

P-O fit has emerged as a critical construct in understanding employee well-being and workplace outcomes. The concept of person-organisation fit encompasses several aspects, including personality match, alignment between employee requirements and organisational resources, and vague congruence (Meng and Valenciae, 2024). Personality match, also referred to as supplementary fit, is the congruence between personal and organisational features. The fit between employee needs and organisational capabilities is considered a complementary fit, encompassing both demand-supply and demand-ability congruence (Meng & Valenciae, 2024). Value congruence refers to how well an organisation lives up to its stated values in daily practice. Research indicates that employees view their workplace more positively when they see the organisation's values as genuine (Pamphile & Ruttan, 2017). This aspect is crucial for how employees feel about their connection to the organisation. When the values of employees align with those of the organisation, it creates stronger bonds and boosts intrinsic motivation (Faisal, 2022). Similarly, employees have higher organisational commitment when they perceive a real value congruence with their organisation's principles (Mostafa, Yunis & Au, 2025).

Workplace Flourishing

Flourishing at work is a multidimensional construct that implies not merely the absence of illness but also positive functioning and fulfilment (Verma et al., 2024). The notion has attracted considerable interest in organisational psychology because scholars have realised that people's flourishing underpins sustainable workplace performance and job satisfaction. Compared to traditional methods, which view employees as an economic resource, modern, flourishing models highlight the significance of the psychological, social, and emotional aspects of workplace health (Elliason, 2025).

One of the most commonly discussed theories of flourishing is the PERMA model, developed by Dr. Martin Seligman, which has five pillars, namely Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment (Butler & Kern, 2016). This conceptualisation acknowledges that flourishing involves emotional health (positive emotions), psychological health (engagement and meaning), and social health (positive relations and accomplishment) (Hall et al., 2024).

Key determinants of workplace flourishing include perceived organisational support, psychological capital, and leadership behaviours. Harunavamwe and Ward (2022) found that perceived organisational support serves as the strongest direct influence on workplace flourishing, while psychological capital fosters employee flourishing by

enhancing optimism, resilience, and self-efficacy (Peethambaran & Naim, 2024). A study by Kleynhans et al. (2022) found that transformational leadership, characterised by authenticity and fostering of trust among followers, contributes significantly to employee flourishing. Moreover, Mukhopadhyay and Hanath (2025) revealed that leadership which takes into account the psychological, emotional, and professional needs of employees is necessary to create inclusive and flourishing workplaces (Mukhopadhyay & Hasnath, 2025).

The consequences of workplace flourishing extend beyond individual well-being to organisational effectiveness. Personnel experiencing higher levels of holistic well-being demonstrate better task performance and operational effectiveness (Bosomtwe & Nubuor, 2025). However, workplace flourishing is not always easy to achieve, as factors such as technostress, work-family conflict, workplace ostracism, and toxic environments continue to undermine it (Harunavamwe & Ward, 2022).

P-O Fit and Employee Flourishing

Research shows that P-O fit is an important predictor of employee flourishing outcomes. A future-oriented investigation on four hundred working individuals discovered that P-O fit can serve as a stepping stone from perceived organisational support to employee flourishing by enhancing psychological capital (Ho & Chan, 2022). The paper addressed both Diener's composite model (Diener, 1984) and Seligman's PERMA model of flourishing (Seligman, 2011) by indicating that, if organisations create conditions for a strong P-O fit, employees can build the psychological resources needed for sustainable well-being. Another study involving 2 321 researchers across ten nations examined how P-O fit influences work performance during challenging periods (Xiao & Xie, 2023). The findings reveal differential patterns. In developing countries, organisational resources assume greater importance relative to P-O fit, whereas managers in developed economies require higher P-O fit to perform effectively. These differences indicate that the effect of P-O fit on flourishing may be contingent upon broader economic and social context.

Leadership styles research identified specific pathways through which P-O fit shapes flourishing. Findings by Farmanesh et al. (2021), who studied spiritual leadership, revealed that P-O fit is an essential psychological link that connects good leadership practices to positive employee outcomes such as flourishing.

Guo et al. (2025) found that workplace psychological safety moderates the relationship between P-O fit and thriving at work. Job autonomy also moderates employee exposure to the damaging effects of workplace stressors when P-O fit is stronger. This moderating role suggests that organisational design aspects can strengthen or weaken the effects of P-O fit on flourishing.

Digital transformation and artificial intelligence are also changing organisational practices and fit considerations (Murire, 2024). As organisations adopt new technologies, it is crucial to focus on digital literacy and involve employees in designing tools or programmes. This helps ensure they can adapt without feeling alienated or overwhelmed by technology (Babashahi et al., 2024), which ultimately affects their flourishing.

From the above literature, it is evident that P-O fit functions as an enabler of employee flourishing.

RESEARCH METHODOLOGY

Research Design

The research used an interpretive phenomenological methodology to gain profound insight into the lived experiences of female academics in the professional setting (Creswell & Poth, 2018; Gaudet & Robert, 2018). Interpretive phenomenology is a qualitative research approach in which the meaning of individuals' lived experiences is studied through small, purposeful samples and in-depth analysis. Instead of concentrating on the generalisability, it is interested in personal meaning-making and the interpretation of experience in context (Van der Walt & Bosch, 2025).

Snowball sampling was used to recruit twelve female academics at a university of technology in Gauteng, South Africa. Participants were female academics from diverse cultural backgrounds, aged 30-59, each with at least

eight years of academic experience. Data was collected through online semi-structured interviews, in which participants reflected on work experiences they perceived as related to P-O fit elements.

Data Analysis

After collecting, organising, and storing the data, the analysis followed, during which its meaning and significance was established. The data was thematically analysed through the MAXQDA programme (2023). Topics were reviewed, focusing on the most essential points that each participant mentioned during each interview (Alase, 2017). Literature control helped to further develop the themes and sub-themes by comparing them to other findings in the literature that were similar or different from the current findings (Paudel, 2025).

FINDINGS AND DISCUSSION

P-O Fit in the Lived Work Realities of Female Academics

The lived reality of female academics is represented in this findings section based on the general theme of P-O fit, which describes how individual fit and misfit between employees and the organisation led to survival, development, and flourishing in the workplace. The descriptions of the participants indicate that the concept of fit does not remain constant; it is perceived as a continuous negotiation across organisational levels, leadership situations, and daily support systems. The narrative that follows traces this ebb and flow by moving through four interrelated categories: overall fit within the organisation, its vision, mission and values, organisational change, and organisational support (see Figure 1). Together, these categories illuminate how female academics locate a sense of belonging, endure strain, and cultivate flourishing.

Figure 1: Organisational fit research themes.



Category 1: Overall Fit of the Person in the Organisation

Female academics' experiences of P-O fit demonstrated a disjointed and inconsistent organisational environment. However, alignment was often experienced at the departmental level. Participants stated that fit was not a constant

condition but rather contingent on leadership, support, communication, and resource availability, which influenced their capacity to flourish or merely survive.

A number of individuals felt like they did not fit in with the organisation, particularly following leadership changes. One participant articulated a significant sense of misalignment during a transitional phase, emphasising a “*disconnect from leadership*” with the introduction of a new role-player in the department amidst considerable change: “*they themselves did not know what to do with me*” (Participant 2). This uncertainty caused the same participant to experience reflexivity: “*a very interesting place that I am still trying to figure out personally*” (Participant 2). In this context, P-O fit was seen as unresolved and emotionally taxing rather than validating.

Several participants indicated that the presence or absence of organisational support structures directly shaped their sense of fit. It was mentioned how designing workspaces, using assistive technology, and tools to control sensory inputs could be helpful, even though they are not common. This means that fit was often worked out on a case-by-case basis rather than being embedded institutionally (Participant 2). Others pointed out that not sharing information and insufficient resources were systemic problems that undermined both agency and belonging: “*If you don’t fight for it, you don’t get anything*” (Participant 3). These kinds of experiences reveal a misalignment between organisational systems and employees’ needs, which limits flourishing.

On the other hand, departmental micro contexts became important places where they felt they fit in. Participants frequently distinguished between the organisation and their immediate work environment. One academic revealed that although she perceived a lack of integration within the organisation, she owned “*my people... my support structure*” within her department (Participant 2). Similarly, others stated that they felt more motivated and like they belonged following supportive leadership changes: “*I felt like maybe starting to belong somewhere*” (Participant 4). These responses indicate that localised relational support can make up for a larger organisational mismatch.

Strong relationships between co-workers and supportive heads of departments were linked to motivation, identity affirmation, and behaviour that was focused on growth. Participants mentioned they were surrounded by “*achievers*” who inspired them to work harder and do their best (Participant 4). They also signalled that they had leaders who were accessible, listened to their concerns, and made the workplace feel safe (Participant 4). In these cases, fit was not only cognitive but effective, which reinforced motivation and effort.

Several participants linked supportive departmental cultures to academic flourishing, including the decision to pursue doctoral studies. Participant 5 described how encouragement from her co-workers made her want to “*get back into the research side of things*” and sign up for a PhD. Others said that feeling valued required respectful communication, shared decision-making, and trust. For instance, “*when you are called to engage... then you feel that you are important in the department*” (Participant 5). This type of relational fit fostered mutual support, collaboration, and intrinsic motivation, enabling individuals to flourish despite organisational challenges.

However, there was still a big mismatch at the organisational level, especially in how senior management operates. Participants were disillusioned with what they saw as selfish decision-making and contractual insecurity, linked to mental health concerns. One participant described the governance of the organisation in extreme terms: “*I feel like we’re dealing with mafias, not employers who want to see us excel*” (Participant 4). These stories demonstrate that personal values and work practices are quite different, which makes it hard for people to flourish.

Despite this, some academics still felt they belonged, usually because of their institutional identity, values, or the physical environment. A participant amplified a strong emotional connection to the university’s mission and tranquil setting. She called it “*peaceful*” and explained that it fit in with her preference for calm spaces (Participant 3). Some participants conceded that there are gaps between what they experienced and what they believed. However, they still felt that they belonged to the institution: “*It’s perfect on paper... I still fit into the university*” (Participant 7). This reflects a form of adaptive fit, in which individuals sustain their commitment despite being aware of ongoing challenges.

Overall, the P-O fit was seen as layered and changing. The strongest fit was at the departmental and relational levels, and the weakest at organisational and governance levels. Female academics managed stress by drawing on small groups for support whilst simultaneously questioning their long-term role within the institution.

These findings are consistent with research by Thomson et al. (2025), which highlights the importance of community building and demonstrates how small group interactions can foster support for women in academia. Another study by Goto et al. (2024) observes that women employees have a better fit at the departmental level than at an organisational level.

Category 2: Organisational Vision, Mission, and Values

Participants' engagement with the organisation's vision, mission and values underscored a persistent disjuncture between formal institutional rhetoric and lived practice. Several participants expressed alignment with the stated values, but this agreement was often undermined because of differences in culture and implementation.

Several participants discussed organisational cultures that contrasted with values such as respect, collegiality, and academic freedom. Participant 1 referred to the way students acted when they didn't follow academic protocol: "*a culture of the university*". She indicated that she was confused and uncomfortable with norms that did not align with traditional academic values. Such situations contributed to uncertainty about the consistent application of institutional values.

Recognition and validation emerged as essential means through which vision and values come to life and are enacted. One participant said that winning a teaching and learning award made her feel good about herself. She shared that it was like "*closing the circle*" in terms of P-O fit, especially when "*motivation and validation... are left hanging*" (Participant 2). This shows that symbolic recognition can momentarily bridge the gap between an institution's values and an individual's experience.

Others were more realistic about their alignment. They revealed no objection to the mission itself, but they did question the execution thereof: "*The only problem is the ability to implement those*" (Participant 4). Participants also noted that values like integrity and collaboration were mostly "*on paper*" (Participant 7), as different divisions of the university accepted them to varying degrees. This selective enactment weakened the sense of unity and the potential of values to foster flourishing.

Notably, some participants based their sense of fit more on relationships between people at diverse levels in the organisation than on formal structures. Participant 6 described her connection through everyday relationships, especially with overlooked staff members, stating: "*those are the people that are closer to my heart*". Within this context, she felt she belonged despite the shortcomings in infrastructure and management.

Some participants were sceptical about organisational rebranding and value articulation. They were unsure whether the new values matched the organisation's actual practices (Participant 8). On the other hand, others expressed their confidence in the university's fundamental mandate to facilitate teaching, research, and community projects (Participant 11).

Collectively, these accounts demonstrate that the organisation's vision, mission, and values function as a symbolic anchor rather than a consistently lived reality. This affects the P-O fit in ways that are sometimes inconsistent and fragile. Other studies also attest to an existing gap between stated organisational purpose (symbolic anchoring) and actual practice (lived reality) in the work environment (Ala-Heikkil et al., 2023; George et al., 2021).

Category 3: Organisational Change

The category of organisational change emerged as a significant fault line in the P-O fit experiences of female academics, influencing whether their work environments were perceived as conducive to flourishing or requiring survival-oriented coping strategies. Participants' narratives revealed that change was not intrinsically resisted; rather, it was more about ambiguity, uncertainty, and uneven execution of organisational change.

A prominent subtheme highlighted the need for dependable, trustworthy leadership to facilitate change. Participants were not pointing to a lack of leadership itself, but rather to a lack of permeability and coherence within the leadership structure. This instability made a participant feel uncertain and emotionally drained. She explained that it was frustrating to have leadership changes all the time and contributed to a sense of organisational fragility: "Now

we will be having a VC. Now maybe two years, three years down the line, the VC has resigned, and we have another one – that’s frustrating” (Participant 1). This experience was summarised by the same participant into the core-effective state of organisational change: “*Uncertainty - instability*” (Participant 1). This instability made it difficult for female academics to plan for their future, feel secure in their jobs, and believe that the university was moving in the right direction.

There is a perception that leadership quality was not evenly distributed across departments, thereby making P-O fit more challenging. Although some staff were considered helpful and smart, others seemed to complicate things. As one participant reflected: “*I’m comfortable with someone like the ED: HR. She’s extremely competent in what she is doing. But... others, I’m not quite sure whether they know exactly what they’re doing*” (Participant 1). This inconsistency made employees feel like the organisational change was not strategically managed.

Changes in the organisation also meant more responsibilities and changing academic expectations, which complicated job fit. Participants revealed that the academic role was gradually but significantly expanding, with new duties being added without consultation or accommodation. One participant demonstrated how this change made job fit ever more ambiguous: “*There is now becoming an extension into a lot more... expectations on academia that weren’t there before... and that’s where the job fit gets to be a bit more niggly*” (Participant 2). The participant indicated that moments of alignment were primarily found through meaningful teaching experiences. However, these were regarded as situational, dependent on fluctuating institutional conditions rather than stable organisational support (Participant 2).

Despite these difficulties, organisational change was not uniformly perceived as negative. Some respondents noted that small shifts in development, particularly related to research and well-being projects, were indicators of organisational potential. For instance, “*the research job... has been changing gradually to the better*” (Participant 3), while another participant noted emerging institutional investment in employee wellbeing: “*They’ve newly hired a company that helps with Health and Wellness... the possibilities are there*” (Participant 2). These accounts suggest that where change was perceived as intentional and supportive, it contributed positively to P-O fit.

Weak policy implementation and communication breakdowns often overshadow positive developments. Nearly all participants expressed their dissatisfaction with the fact that policies and values were treated symbolically, not having clear practical interpretation and enforcement: “*Yes, policies are there, but there’s no interpretation... no one enforcing or engraving the values*” (Participant 5). This mismatch between formal structures and actual reality left academics even more disconnected, especially when calendar modifications, altered assessment processes, and uncommunicated system changes disrupted academic planning. Participant 9 vividly described how these kinds of disruptions compromise teaching and emotional well-being.

A common theme in all the accounts was that departments function like islands of stability in a sea of chaos in the organisation. Many participants expressed a strong sense of belonging and flourishing at the departmental level, but not at the institutional level. One participant explained: “*I wish I could take my department out of the university... we have established some form of rapport... but the organisation itself does not encourage such*” (Participant 5). This fragmentation of fit forced female academics to find their sense of belonging locally, while emotionally distancing themselves from the larger institution.

Lastly, organisational changes have led academics to worry about job security and future stability, especially for early- and mid-career academics. Observing colleagues leave the institution after they have completed their PhDs made Participant 9 ponder about long-term alignment: “*I’m going to finish my PhD next year... I don’t know whether I’m going to stay or going to leave*”.

Alongside these doubts, there were still elements of hope. Some participants held an optimistic view of the organisation’s potential, emphasising the resilience of academic staff, despite leadership turbulence: “*I believe in the university... there’s a lot of sound academics... this institution can be a very, very strong university again*” (Participant 12).

The “organisational change” category shows how fluctuating leadership, changing role expectations, and uneven policy implementation disrupt P-O fit among female academics. While change occasionally leads to growth

and development, its unpredictability more often demands resilience and the ability to adapt to survive, thereby constraining sustained workplace flourishing.

Findings from other studies support these observations. Gayathri and Lavanya (2025) noted that changes in the organisational environment are disruptive, which require employees to show flexibility and resilience. Halat et al. (2023) found that the changes in organisational structure and role expectations of higher education had a significant impact on staff members' well-being. Moreover, Huang et al. (2020) revealed that certain institutional policies and practices lead to prolonged misfit for female academics.

Category 4: Organisational Support Within the Overarching Theme of P-O Fit

The organisational support category revealed that female academics were left to negotiate a complex and frequently fractured system, in which they could find pockets of helpful support alongside institutional gaps that made it hard for them to thrive. Through the stories provided by participants, it was evident that organisational support was not consistently offered institution-wide but was inconsistent, context-dependent, and, in many cases, dependent on closeness to departments, individuals, or informal networks.

At the institutional level, several participants noted issues with resource allocation and administrative support. The lack of sufficient support felt more like a baseline constraint than an exception. Participant 1 found that these support problems were not just a logistical inconvenience; they required employees to work harder and take on more responsibilities. Participant 12 articulated that escalating administrative demands were *“taking too much time... taking away time from... teaching and research”*, making it harder for individuals to perform well and flourish.

A key subtheme that ran throughout was the misalignment between support roles and the blurred boundaries between academic and support services. Participants described being compelled to take on tasks traditionally allocated to the examination, human resources (HR), and student support services departments. One participant questioned the expectation for lecturers to *“do the work of examination... HR...”* (Participant 9). Another linked these ambiguities to relational strain, noting that: *“functions have not been clearly defined... [creating] a little bit of animosity”* (Participant 8). Such experiences suggested a lack of P-O fit as the institutional systems in place failed to support academics in fulfilling their core scholarly roles.

Despite these constraints, participants emphasised localised and relational instances of organisational support that, to some extent, mitigated institutional deficiencies. Departments, colleagues, and direct line managers proved to be key buffers. Participant 5 described having *“enough support from the coworkers, enough support from the HOD, enough support from the department itself”*, while also noting a realisation that for her to flourish required a reorientation away from top management and turning towards other available support structures: *“focus on what makes you the person that you are, which is a department, your coworkers”*. This strategic narrowing of focus reveals a survival adaptation to work within a misaligned organisational context.

The availability of opportunities for professional development and growth is depicted as another point of variation in organisational support. On the one hand, participants reported the existence of affirming and growth-enabling institutional mechanisms, including teaching and learning awards, research support units, the Centre for Academic Development programmes, and fee reductions. Participant 2 described the teaching and learning award as *“nice validation... closing the circle”* in relation to P-O fit, while other participants highlighted staff discounts and funding support as enablers (Participants 10 and 11). On the other hand, the uneven availability and accessibility of these services constrained their effects. One academic noted that newer staff members were *“not always fully aware of all the different support services offered by the institution”* (Participant 12) and suggested that support was available but not always effectively embedded or communicated.

Interestingly, some participants reported self-funding and self-accommodating as compensatory strategies in response to organisational shortfalls. For example, Participant 2's story of buying her own noticeboard to reduce cognitive load demonstrated that organisational support was occasionally internalised as an individual rather than an institutional responsibility. Over time, this may cause doubt over organisational loyalty, and lead participants to ask themselves: *“where the breakdown in organisation fit was”* (Participant 2).

Lastly, feelings of acknowledgement and recognition influenced organisational support. Participants expressed not feeling valued by senior management, as Participant 10 asked: “*Do they know that we exist?*”, and Participant 6 stated that lecturers were “*not recognised... [despite being] the ones... the institution is here because of us*”. Minimal recognition, particularly in contrast to the demands placed on academics, weakened the correlation between individual investment and institutional return.

In totality, the findings show that organisational support was rich in relationships with structurally thin characteristics. As a department, colleagues and units of the institution enabled expansion, development, and confirmatory experiences. However, underlying administrative inefficiency, role confusion, and the perceived aloofness of managers were barriers to the blossoming of the entire workplace. In this respect, P-O fit among female academics became maintained not by organisational coherence but by adaptive strategies, relational anchoring, and selective participation in a supportive organisational micro-environment.

These results are congruent with numerous other studies. As Insan et al. (2025) suggest, relational trust is compromised by organisational change, including instability driven by inappropriate values and priorities, resulting in scholars failing to find a sense of consistency between their professional identity and the organisational course. Akbar (2024) found that employees with strong P-O fit exhibit higher adaptability and engagement during times of organisational change; however, this protective effect is undermined when leadership changes create uncertainty about organisational values. Cullen-Smith et al. (2025) pointed out that when formal organisational systems fail to provide adequate support, individuals rely on informal networks, and peer-to-peer relationships emerge as essential coping mechanisms. Faba-an et al. (2025) revealed that uneven policy implementation leads to “disparities in departments” where employees face fundamentally different experiences of the same organisational policy based solely on which department they work in. Additionally, Shinde (2025) stated that when organisational shifts occur without clear communication or rationale, employees experience role ambiguity, which affects their well-being.

In conclusion, all the above thematic findings reveal P-O fit as a negotiated, dynamic process influenced by values in practice, leadership stability, organisational change, and the day-to-day supportive context. Female academics navigated misalignment through relational resilience, utilising departments, and colleagues as localised communities of belonging and support in the face of implementing survival strategies within organisational structures. Flourishing did not occur by accident but grew in pockets of alignment amid institutional turbulence.

MANAGERIAL IMPLICATIONS

The study aims to provide research input on the phenomenon and to offer recommendations to higher education management regarding the P-O fit of female academics. These findings indicate that P-O fit is not only a recurring phenomenon but also a continuous, multi-layered process that is affected by departmental contexts, leadership stability, and support structures. Top management must understand that organisational misalignment can limit prosperity, even as some isolated departments and effective practices are observed. The discrepancy between stated organisational values and actual realities continues to erode trust and engagement. Management needs to appreciate that instability in leadership and an increase in role without consultation may result in uncertainty and emotional exhaustion, directly undermining commitment and flourishing in the workplace. Moreover, recognition and validation emerge as important processes for closing the theory-practice gap in institutional values. Organisations must move beyond symbolic gestures to ensure that policies are interpreted, enforced, and culturally embedded. Most importantly, strengthening support at the departmental level while addressing systematic inefficiencies at the institutional level offers a pragmatic pathway to enhanced flourishing and retention.

RECOMMENDATIONS

The following are suggested recommendations:

- Place systems in place to enhance continuity and strategic coherence in the leadership arrangements, including succession models that help minimise the length of time in vacancy.
- Audits to assess the congruence between espoused and enacted values, operationalising organisational values through explicit interpretation, enforcement, and cultural embedding.

- Address administrative support and resource allocation shortcomings that disrupt academic prosperity. The reinforcement of support at the system level should involve investing in sufficient administrative personnel, simplifying examination and human resources processes, and establishing clear boundaries so that academics are not formally charged with administrative duties outside their job descriptions.
- Although the departments might offer localised services, institutions might pay more attention to ensuring that professional development services are equally apparent and available to all academics, thus facilitating overall academic involvement.
- Firmly recognise departments as the key areas of belonging and capitalise on their strengths to reinforce institutional connections, cultures, and structure.

FUTURE RESEARCH

A longitudinal investigation of P-O fit trajectories is recommended for future research, including whether female academics who experience misfit remain in academia or leave. Research is also essential to investigate trends and determine whether the layered fit experiences we have described are unique to this organisation or systematic across higher education. Furthermore, comparative research involving male academics would facilitate an analysis of whether fit clashes are gender-specific or organisation-specific. Qualitative research exploring the mechanisms through which departmental support compensates for organisational fit misalignment would deepen understanding of adaptive resilience. Lastly, intervention studies on the recommended structural changes (specifically, leadership stabilisation, policy enforcement, and administrative support enhancement) would offer evidence-based guidance for organisational change and improvement.

CONCLUSION

This study shows that the P-O fit of female academics is a complex and dynamic phenomenon influenced by values-in-practice, stable leadership and organisational support systems. Although female academics demonstrate commendable resilience in anchoring themselves within micro communities within departments, institutional maladaptation (lack of stability in leadership, disjuncture between espoused and enacted values, and deficiencies in administrative structure) hinders their flourishing in the workplace. To respond to this, there needs to be a basic shift of institutional priorities. Institutions need to move beyond symbolic gestures of values. Instead, they must address structural issues, ensure consistent leadership, and provide support systems that help achieve academic excellence. A promising approach is to give departments more autonomy while maintaining unity across the institution. However, its success requires sustained commitment, as leadership turnover, communication breakdowns, and resource limitations have led to fundamental organisational brittleness. In conclusion, the current investigation urges institutions to acknowledge that P-O fit is not an individual's responsibility but an institutional initiative. Female academics have proven their commitment; institutions should follow by providing supportive systems, aligning with organisational values, and ensuring stability in leadership. In doing so, institutions render P-O fit not as a tenuous experience dependent on local conditions, but as a sustainable foundation for academic flourishing and institutional excellence.

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REFERENCES

Akbar, R. (2024). Comparison and evaluation of how employees with strong versus weak person-organization fit respond to transformational changes in organizational structure or culture. *Social Science Review Archives*, 2(2), 1609-1614. <https://doi.org/10.70670/sra.v2i2.216>

- Ala-Heikkilä, V., & Järvenpää, M. (2023). Management accountants' image, role, and identity: Employer branding and identity conflict. *Qualitative Research in Accounting & Management*, 20(3), 337-371. <https://doi.org/10.1108/QRAM-04-2021-0064>
- Alase, A. (2017). The interpretive phenomenological analysis (IPA): A guide to a good qualitative research approach. *International Journal of Education and Literacy Studies*, 5(2), 9-19. <https://doi.org/10.7575/aiac.ijels.v.5n.2p.9>
- Babashahi, L., Barbosa, C. E., Lima, Y., Lyra, A., Salazar, H., Argôlo, M., Almeida, M. A. D., & Souza, J. M. D. (2024). AI in the workplace: A systematic review of skill transformation in industry. *Administrative Sciences*, 14(6), 127. <https://doi.org/10.3390/admsci14060127>
- Bosomtwe, T. E., & Nubuor, S. A. (2025). Cultivating victory: Workplace flourishing as a predictor of task performance in the Ghana Armed Forces. *Frontiers in Psychology*, 16, 1691941. <https://doi.org/10.3389/fpsyg.2025.1691941>
- Branca, E., Intenza, M., Doni, F., & Martini, S. B. (2025). Women in the top management team: Bridging the gender divide in advanced technologies. *Employee Relations*, 47(9), 234-256. <https://doi.org/10.1108/ER-01-2025-0017>
- Butler, J. C., & Kern, M. L. (2016). The PERMA-Profiler: A brief multidimensional measure of flourishing. *International Journal of Wellbeing*, 6(3), 1-48. <https://doi.org/10.5502/ijw.v6i3.526>
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches*. (4th ed.). Sage.
- Cullen-Smith, S., McKeown, A., McKenna, K., & Giggins, O. M. (2025). Coping together: A qualitative study exploring the work of home health care assistants in Ireland. *Geriatrics*, 10(5), 128. <https://doi.org/10.3390/geriatrics10050128>
- Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, 95 (3), 542-575.
- Dlamini, N. G., & Dlamini, N. D. (2024). Understanding the well-being challenges confronting academic staff in South African universities: A narrative review. *Discover Education*, 3, 9. <https://doi.org/10.1007/s44217-024-00089-8>
- Ejike, I. J., Igwe, A. A., & Ukpere, W. I. (2025). Determinants of gender inequality in research productivity and career advancement of women academics in Nigerian universities. *Journal of Ecohumanism*, 4(2), 2676-2691. <https://doi.org/10.62754/joe.v4i2.6708>
- Elliason, E. K. (2025). Towards a new paradigm of motivation: The development of Theory Alpha in organisational psychology. *International Journal of Advanced Academic Research in Arts and Humanities*, 1(3). <https://doi.org/10.64261/ijaarai.v1n3.008>
- Faba-an, R. S., Valdez, P., Rosario, M. G., Siki, J., & Joven, M. (2025). Understanding policy implementation and organizational behavior for an administrative framework: A literature review. *Advanced International Journal for Research*, 6(6), 1-12. <https://doi.org/10.63363/aijfr.2025.v06i06.2206>
- Faisal, S. (2022). Job embeddedness and its connection with person-organization fit among Saudi Arabian employees. *Problems and Perspectives in Management*, 20(2), 348-360. [https://doi.org/10.21511/ppm.20\(2\).2022.29](https://doi.org/10.21511/ppm.20(2).2022.29)
- Farmanesh, P., Zargar, P., Esenyel, V., & Vehbi, A. (2021). Linking spiritual leadership and boundary-spanning behavior: The bright side of workplace spirituality and self-esteem. *Sage Open*, 11(3). <https://doi.org/10.1177/21582440211040775>
- Fatmasaria, F., Sundjoto, S., & Rahayu, S. (2024). The influence of person-organization fit, psychological climate, and work stress on employee performance. *Gema Wiralodra*, 15(1), 615-626. <https://doi.org/10.31943/gw.v15i1.665>

- Gaudet, S., & Robert, D. (2018). *A journey through qualitative research: From design to reporting*. Sage. <https://doi.org/10.4135/9781529716733>
- Gayathri, P. L., & Lavanya, B. (2025). The impact of workplace disruptions on employee resilience: The mediating role of self-efficacy. *International Research Journal on Advanced Engineering and Management*, 3(5), 1844-1854. <https://doi.org/10.47392/irjaem.2025.0290>
- George, G., Haas, M. R., McGahan, A. M., Schillebeeckx, S. J. D., & Tracey, P. (2021). Purpose in the for-profit firm: A review and framework for management research. *Academy of Management Review*, 49(96) 1841-1869. <https://doi.org/10.1177/01492063211006450>
- Goto, R., Moriya, J., Yanagimoto, S., Tomizawa, Y., & Otani, T. (2024). “He said, ‘Why don’t you make me tea in the morning?’”: A qualitative study of career-building inhibitors and promoters for Japanese female physicians promoted to chief professors in medical schools. *SN Social Sciences*, 2, 221. <https://doi.org/10.1007/s43545-024-01023-3>
- Guo, S., Wu, J., & Wan, P. (2025). Linking social-related enterprise social media usage and thriving at work: The role of job autonomy and psychological detachment. *Kybernetes*. <https://doi.org/10.1108/K-10-2024-2825>
- Halat, D. H., Soltani, A., Dalli, R., Alsarraj, L., & Malki, A. (2023). Understanding and fostering mental health and well-being among university faculty: A narrative review. *Journal of Clinical Medicine*, 12(13), 4425. <https://doi.org/10.3390/jcm12134425>
- Hall, S. S., Riga, E., Sprange, K., Hagan, P., Carr, L., Taylor, J., Thomson, L., & Mitchell, E. (2024). Flourishing and job satisfaction in employees working in UK clinical trial units. *BMC Health Services Research*. 24, 1522 <https://doi.org/10.1186/s12913-024-11986-x>
- Harunavamwe, M., & Ward, C. E. (2022). The influence of technostress, work–family conflict, and perceived organisational support on workplace flourishing amidst COVID-19. *Frontiers in Psychology*, 13, 921211. <https://doi.org/10.3389/fpsyg.2022.921211>
- Ho, H. C. Y., & Chan, Y. C. (2022). Flourishing in the workplace: A one-year prospective study on the effects of perceived organizational support and psychological capital. *International Journal of Environmental Research and Public Health*, 19(2), 922. <https://doi.org/10.3390/ijerph19020922>
- Holmes, M. R., Murray, W. C., Elliot, S., Lutes, B., & McAdams, B. (2025). The influence of workplace inequities through the employment lifecycle on commitment and turnover in the hospitality industry. *Journal of Human Resources in Hospitality & Tourism*, 24(4) 617-646. <https://doi.org/10.1080/15332845.2025.2530284>
- Huang, J., Gates, A. J., Sinatra, R., & Barabási, A. L. (2020). Historical comparison of gender inequality in scientific careers across countries and disciplines. *Proceedings of the National Academy of Sciences*, 117(9), 4609-4616. <https://doi.org/10.1073/pnas.1914221117>
- Insan, M. Y., Batubara, S. S., Munisa, M., & Putri, N. T. (2025). Individual readiness for change: The impact of person–organization fit and psychological ownership in organizational contexts. *International Review of Management and Marketing*, 15(93), 53-63. <https://doi.org/10.32479/irmm.18028>
- Khalid, S., Jiang, D., Huang, X., Gao, C., & Tadesse, E. (2025). From leaking pipe to leadership: Career pathways of women academics in Pakistani higher education. *Educational Management Administration & Leadership*, 28(5), 799-826. <https://doi.org/10.1177/17411432251358145>
- Khan, M., Sulaiman, R., Nazir, O., Khan, S., & Awan, S. (2024). The unseen in the glass ceilings: Examining women’s career advancement in higher education institutions. *Human Resource Development International*, 28(5), 799-826. <https://doi.org/10.1080/13678868.2024.2342762>

- Kleynhans, D. J., Heyns, M., Stander, M. W., & De Beer, L. T. (2022). Authentic leadership, trust in the leader, and flourishing: Does precariousness matter? *Frontiers in Psychology*, 13, 798759. <https://doi.org/10.3389/fpsyg.2022.798759>
- Meng, Y., & Valenciae, M. G. (2024). The effect of person-organization fit on turnover intentions of employees in steel companies. *Journal of Management and Business Studies*, 8(1), 83-87. <https://doi.org/10.54097/0e51v466>
- Mostafa, A., Yunus, S., & Au, W. C. (2025). Customer incivility, person–organization fit and psychological well-being in healthcare: Does ethical leadership matter? *International Journal of Workplace Health Management*, 18(5) 473-491. <https://doi.org/10.1108/IJWHM-11-2024-0221>
- Mukhopadhyay, S., & Hasnath, S. A. (2025). Leaders as well-wishers: Fostering a culture of flourishing through well-being leadership. *EPRA International Journal of Environmental Economics, Commerce and Educational Management*, 12(8), 136-140. <https://doi.org/10.36713/epra23758>
- Murire, O. T. (2024). Artificial intelligence and its role in shaping organizational work practices and culture. *Administrative Sciences*, 14(12), 316. <https://doi.org/10.3390/admsci14120316>
- Pamphile, V. D., & Ruttan, R. L. (2017). Stated-lived value congruence and expressive authenticity. *Academy of Management Proceedings*, 1. <https://doi.org/10.5465/AMBPP.2017.44>
- Paudel, K. (2025). From theory to practice: Understanding literature reviews in qualitative research. *Far Western Review*, 3(1), 133-145. <https://doi.org/10.3126/fwr.v3i1.84660>
- Peethambaran, M., & Naim, M. F. (2024). The workplace crescendo: Unveiling the positive dynamics of high-performance work systems, flourishing at work, and psychological capital. *Industrial and Commercial Training*, 56 (4) 377-389. <https://doi.org/10.1108/ICT-01-2024-0008>
- Seligman, M. E. P. (2011). *Flourishing: A visionary new understanding of happiness and well-being*. London, United Kingdom: Nicolas Brealey.
- Shinde, D. S. (2025). Role ambiguity and employee well-being: The critical need for clear job descriptions. *Kaav International Journal of Arts, Humanities & Social Science*, 12(2), 6-13. <https://doi.org/10.52458/23484349.2025.v12.iss2.kp.a2>
- Taouk, Y., King, T. L., Leineweber, C., Churchill, B., Ruppanner, L., & Hanson, L. M. (2025). Gender differences in work–family conflict and mental health of Swedish workers by childcare responsibilities: Findings from the SLOSH cohort study. *Scandinavian Journal of Work, Environment & Health*, 51(5), 413-422. <https://doi.org/10.5271/sjweh.4231>
- Thomson, A., Belloso, M. L., Warat, M., & Damala, A. (2025). Towards gender equality in research and academia: Conceptualising and practising inclusive mentorship through community building, co-creation, and art-based methods. *Equality, Diversity and Inclusion: An International Journal*. <https://doi.org/10.1108/EDI-12-2024-0619>
- Van der Walt, L., & Bosch, C. (2025). Co-creating OERs in computer science education to foster intrinsic motivation. *Education Sciences*, 15(7), 785. <https://doi.org/10.3390/educsci15070785>
- Verma, R., Sekar, S., & Mukhopadhyay, S. (2024). Unlocking flourishing at work: An integrative review and framework. *Applied Psychology*, 74, e12591, 1-39. <https://doi.org/10.1111/apps.12591>
- Xiao, L., & Xie, C. P. (2023). How person-organization fit impacts work performance: Evidence from researchers in ten countries during COVID-19. *Sustainability*, 15(13), 9866. <https://doi.org/10.3390/su15139866>

GENERATION Z'S AUGMENTED REALITY EXPECTATIONS: IMPACT ON SATISFACTION AND SUBSEQUENT BEHAVIOUR

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ABSTRACT

This research applies expectation confirmation theory to examine Generation Z's (Gen Z's) experiences with augmented reality shopping, addressing a critical gap in understanding how this generation forms and evaluates meaning from AR encounters. Despite AR's rapid growth, research overlooks Gen Z's unique technological socialisation and expectation-performance dynamics, particularly in African markets where the phenomenon remains unexplored. Through interpretive phenomenological analysis of 16 online interviews with South African Gen Z consumers, the study employed iterative interpretation to identify core patterns and synthesise a comprehensive narrative. Findings reveal that satisfaction emerges not from high performance alone, but from positive disconfirmation, when realistic execution exceeds socially shaped expectations. This triggers permanent standard elevation, transforming AR from a delightful feature into a baseline requirement. The research indicates that a positive AR experience can permanently elevate Gen Z's expectations, while poor execution can lead to irreversible rejection. Thus, marketers must prioritise flawless technical execution and seamless purchase integration over aggressive promotion. This study addresses the underrepresentation of African markets in AR shopping literature, which predominantly focuses on Western developed markets or Chinese contexts, despite Africa's rapid mobile penetration.

Keywords: Expectation Confirmation Theory (ECT), Augmented Reality (AR) shopping, Generation Z as consumers, Interpretive Phenomenological Analysis (IPA), interpretive narrative.

INTRODUCTION

Once Generation Z (Gen Z) consumers experience augmented reality (AR) shopping, they cannot “unsee” its possibilities, turning what was once a delightful feature into a non-negotiable expectation – paradoxically, most powerfully among those with the lowest initial expectations. Most AR shopping research employs technology adoption models (TAM, UTAUT) that focus on initial adoption intentions, but these models inadequately explain post-adoption satisfaction and continued usage, which are critical for understanding whether AR becomes habitual or remains novelty-driven (Saprikis et al., 2021). Expectation confirmation theory (ECT) (Oliver, 1980) is a foundational marketing framework explaining how satisfaction, loyalty, and repurchase intentions are shaped by the interplay between pre-purchase expectations and post-purchase experience. While ECT is often applied quantitatively, qualitative approaches provide rich, contextual insight into the mechanisms of expectation confirmation in complex or evolving user experiences (D'Ambra et al., 2020), and context-specific insights into Gen Z's AR expectations are needed, since most studies centre on education, with limited research on other domains such as retail (Kuleto et al., 2021).

Through interpretative phenomenological analysis (IPA), this study explores Gen Z's lived experiences as they form, evaluate, and make meaning from their AR encounters, examining:

- Gen Z's pre-usage expectations of product/service performance and perceived usefulness;
- How Gen Z consumers evaluate product/service performance against their initial expectations, examining confirmation when expectations are met or exceeded and disconfirmation when performance falls short; and
- How satisfaction or dissatisfaction with product/service performance influences Gen Z consumers' intentions to continue or discontinue usage.

This study's contribution is multi-levelled. First, it applies ECT to AR shopping across the complete journey from expectation formation through to confirmation/disconfirmation, satisfaction, and continuance intention, rather than a single adoption construct such as TAM (Riar et al., 2023). Second, existing AR shopping literature predominantly employs quantitative surveys that capture breadth but sacrifice the lived meanings shaping AR adoption; this study instead employs IPA to access those lived experiences directly. Third, AR shopping research has focused overwhelmingly on Western or Chinese markets, leaving African markets underrepresented despite rapid mobile penetration (Riar et al., 2023); this study examines South African Gen Z's AR shopping experiences to reveal context-specific factors that may differ from developed markets.

LITERATURE REVIEW

AR combines real-world environments with computer-generated content displayed in real time, superimposed onto users' view of the physical world through devices like smartphones (Mendoza-Ramírez et al., 2023) – for instance, the Adidas mobile app's AR capability, used in this study, lets users virtually try on shoes before purchasing. Three dimensions inform this review: AR's impact on consumer behaviour, Gen Z's AR expectations, and expectation confirmation theory (ECT), the guiding framework.

Augmented Reality's Impact on Consumer Behaviour

AR transforms consumer behaviour by merging digital content with physical environments, operating primarily through psychological mechanisms – immersion, flow, enjoyment, and perceived usefulness – that enhance cognitive and affective responses and drive higher purchase intentions and brand engagement (Jayawardena et al., 2023). Key technological features (interactivity, vividness, novelty, spatial presence) reduce cognitive dissonance and facilitate more confident purchase decisions by making product information more tangible and personalised (Pandey & Pandey, 2025), enhancing both utilitarian and hedonic value and stimulating impulse buying through instant gratification (Oyman et al., 2022; Hsu et al., 2024). Beyond immediate transactions, AR experiences generate sustained brand benefits – improved attitudes, awareness, and loyalty through memorable interactions – and drive positive word of mouth and repeat usage (Chen & Lin, 2022). However, AR's effectiveness is moderated by individual and contextual factors, including novelty-seeking tendencies, technology familiarity, and cultural context (Hilal, 2023), making the expectations of specific generational cohorts – particularly Gen Z, whose technological socialisation positions them as pivotal AR adopters – especially important to understand in emerging market contexts such as this study's South African setting.

Generation Z's Expectation of Augmented Reality

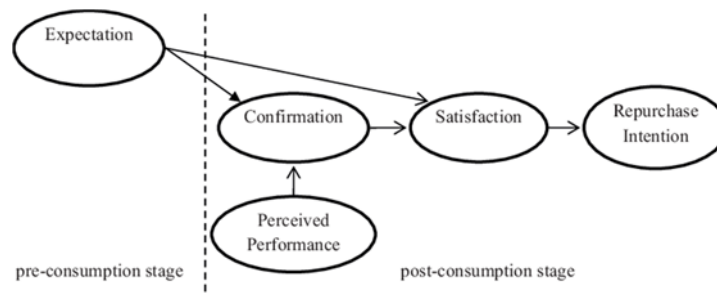
Born between the mid-1990s and early 2010s, Gen Z represents the primary cohort driving AR adoption, with their expectations shaped as digital natives by a demand for seamless, interactive, personalised experiences across shopping, education, and social contexts (Lai et al., 2025). Enjoyment and escapism are critical drivers of their intention to use and revisit AR applications; the technology must provide novelty and excitement, transforming digital interaction into a memorable experience. Personalisation is a non-negotiable expectation, manifesting through virtual try-ons and accurate product visualisation, while convenience – ease of use, mobile accessibility, and integration into fast-paced, mobile-centric lifestyles – is equally important (Kovács & Keresztes, 2024). Social connectivity further enhances AR's appeal: applications enabling experience-sharing, peer interaction, and engagement with influencer content are highly valued, reflecting Gen Z's expectation that technology facilitates individual expression and social participation (Sinha & Srivastava, 2025). Understanding these expectations alone is insufficient, however; it is equally crucial to examine how Gen Z evaluates whether AR experiences meet, exceed, or fall short of them, and how such evaluations shape satisfaction and continued engagement.

Expectation Confirmation Theory

ECT is a foundational framework for understanding how expectations and experiences shape satisfaction across consumer behaviour, technology adoption, and service evaluation. Originally proposed by Oliver (1980), ECT explains how consumers form satisfaction judgements by comparing initial expectations against actual product or service performance, delineating expectation formation, perceived performance evaluation, confirmation /

disconfirmation assessment, and resulting satisfaction (Brown et al., 2008). Positive disconfirmation – where performance exceeds expectations – increases satisfaction, while negative disconfirmation reduces it, with disconfirmation operating as the primary mediator linking expectations and performance to satisfaction (Ramasamy et al., 2024). Research shows predictive expectations (what consumers realistically anticipate) exert stronger positive influence on satisfaction than normative expectations (what consumers believe should occur) (Schiebler et al., 2025). In business applications, ECT guides customer retention and product enhancement strategies, since satisfied customers show higher propensities for repurchase and positive recommendation (Ramasamy et al., 2024).

Figure 1: Expectation confirmation theory.



Source: Oliver (1980).

Current AR research demonstrates limited theoretical diversity, predominantly employing technology adoption models while neglecting frameworks addressing affective, cognitive, and social processes, and remains methodologically dominated by quantitative surveys with minimal qualitative inquiry (Du et al., 2022). This study addresses this deficit by applying ECT qualitatively. Existing scholarship also treats Gen Z as a monolithic cohort, overlooking how cultural background and value orientations shape AR expectations (Kovács & Keresztes, 2024); this study addresses both gaps by applying ECT qualitatively among African Gen Z consumers, illuminating theoretical mechanisms and contextual variation underexplored in AR consumer behaviour literature.

RESEARCH METHODOLOGY

Design and Approach

This study’s exploratory aim best suited a phenomenological research design, focusing on understanding how individuals experience and construct meaning from specific phenomena (Oluka, 2025). Grounded in interpretivism, this paradigm prioritises exploring meaning-making within social, cultural, and historical contexts (Aguzzoli et al., 2024), together forming interpretive phenomenological analysis (IPA). IPA is phenomenological in exploring participants’ subjective worlds through its “double hermeneutic”, recognising that both participant and researcher actively construct understanding (Abdellatif & Haynes, 2025). Qualitative methodology suits this exploration by addressing why and how phenomena occur, rather than just what or when (Bhangu et al., 2023). IPA methodology was adapted from the framework of Abdellatif and Haynes (2025), outlined in Table 1.

Table 1: IPA framework for this study.

Step	Description
1	Purposive sampling
2	Data collection
3	Familiarisation and immersion in the data
4	Initial coding of statements and formulating meaning units
5	Development of themes (not just topics, but meaning-laden statements)
6	Integration and interpretation within the hermeneutic/phenomenological framework

Source: Abdellatif and Haynes (2025).

Step 1: Purposive sampling

IPA employs purposive sampling to recruit small, homogenous samples (3–15 participants) with experiences relevant to the research question; small samples preserve the analytic richness of individual accounts, which larger samples risk diluting (Farrington et al., 2020; Terry & Spendlove, 2025). Sixteen South African Gen Z participants were recruited, with eligibility requiring experiential engagement with AR technologies in retail environments (including virtual try-on features) within the six months prior to participation.

Step 2: Data collection

Semi-structured interviews enabled participants to narrate their experiences in their own words. One-on-one telephonic sessions typically lasted 60–90 minutes and were audio-recorded for transcription and analysis (Alase, 2017). Structured interview frameworks guide researchers in aligning questions with research objectives and enhancing reliability and credibility (Parker et al., 2023); this study’s interview protocol drew its content validity from ECT.

Steps 3, 4, and 5: Data analysis

Familiarisation and immersion in the data are foundational IPA processes, ensuring analysis remains grounded in a nuanced understanding of participants’ lived experiences (Ai, 2024). In vivo coding was chosen as the initial coding approach to honour participants’ voices (Saldáña, 2021), with meaning units – text segments encapsulating singular ideas or experiences – grouped into coherent thematic groupings. Themes in IPA are crafted to answer experiential research questions, focusing on subjective meaning and sense-making (Nigbur & Chatfield, 2025). Table 2 illustrates this process.

Table 2: Data reduction process.

Area of exploration (AoE)	In vivo codes	Meaning unit	Key theme
AoE1: Expectations	233	16	• Social media normalisation • Convenience expectations • Mixed expectations
AoE2: Perceived performance	178	18	• Exceptional realism • Effortless usability
AoE3: Confirmation/Disconfirmation	101	16	Widespread positive disconfirmation
AoE3: Satisfaction/Dissatisfaction	121	14	Confidence boost
AoE3: Continuance intention	154	15	AR as a new standard
Total	787	79	Eight themes

Step 6: Integration and interpretation

Step 6, integration and interpretation, constitutes IPA’s central methodological framework, blending phenomenological focus on lived experience with rigorous hermeneutic interpretation (Abdellatif & Haynes, 2025). This study employed an interpretive narrative presentation format – a reporting methodology that distinguishes participants’ perspectives from researchers’ analytical explanations while maintaining an integrated, cohesive account (Younas et al., 2023, p. 9), transforming fragmented data into coherent analytical constructs that honour phenomenological authenticity and hermeneutic depth. This study employed the rigour framework of Oluka (2025) to ensure credible, trustworthy findings: the philosophical foundations are outlined in the Design and approach section; each research stage is documented in the Purposive sampling, Data collection, and Data analysis sections; and the researcher maintained a reflective journal to recognise and manage assumptions and bias, bracketing preconceptions throughout. Interviews were transcribed verbatim, coded line by line, and analysed iteratively through the hermeneutic circle, with audit trails, peer debriefing, and member checking enhancing credibility. The study’s ethical clearance (certificate number 2025SCiiS023) was obtained via the university’s committees and policies.

FINDINGS AND DISCUSSION

Area of Exploration 1: Expectation Formation

Gen Z holds low to moderate pre-usage expectations regarding product performance and perceived usefulness. Before encountering AR in shopping contexts, participants approached the technology with expectations shaped by social media immersion, prior e-commerce frustrations, and technological familiarity – revealing a generation excited by innovation, yet cautious about genuine utility.

Social Media Normalisation

For most participants, AR awareness emerged organically through TikTok and Instagram. Participant 2 captured this realisation: “I remember seeing someone trying on shoes with AR and I was like, ‘Wait, that’s a thing now?’”, adding that AR seemed “so normal ... everyone was using AR.” Social media exposure alone proved insufficient, however; trust emerged when peers explicitly endorsed AR’s value: “I used to think it was just a gimmick, but hearing people I trust talk about it made me give it a proper try” (Participant 3). Even self-proclaimed sceptics conceded to peer influence: “Even though I like to think I’m not easily influenced, I am. If someone I know has a good experience, I get curious” (Participant 5). Literature agrees: social media platforms have widely adopted AR filters and interactive content that have become central to user engagement and awareness, increasing curiosity and willingness to share AR experiences and further amplifying its reach (Javornik et al., 2022).

Convenience Expectations

Beneath technological excitement lay pragmatic expectations rooted in past shopping disappointments. Participants hoped AR would eliminate the friction of online purchasing, particularly sizing anxiety and returns: “I hate returning stuff, so AR saved that hassle” (Participant 1); Participant 11 recalled buying “a shoe online and it didn’t fit”, making AR’s pre-visualisation promise compelling. Convenience expectations also centred on time and effort: Participant 8 hoped for “no need to go to the shop, no standing in queues”, while Participant 11 wanted “an easier option because I could just click an app and do the whole ‘fitting’ process at home.” These expectations revealed Gen Z’s desire for efficiency without sacrificing purchase confidence – a tension AR promised to resolve. Research confirms that time-saving and effort reduction are core AR benefits in retail, helping consumers make faster, more confident choices and reducing cognitive dissonance when many similar options are available (Alessa et al., 2023).

Mixed Expectations

Not all expectations were optimistic. Participant 10 revealed community-level scepticism: “In my community, it’s seen as unnecessary or even untrustworthy ... we saw it as a tool of deception,” adding a feeling that AR was “for people who know what they’re doing. I didn’t see it as something for me.” Similarly, Participant 9’s negative experience with makeup AR – “I wasn’t convinced, especially as a dark-skinned woman; it didn’t match well” – showed how prior exclusionary technological failures shaped cautious expectations. This community-level scepticism is a novel finding; literature otherwise suggests mixed AR expectations stem mainly from technical limitations such as poor tracking, increased mental workload, and visual confusion (Gottsacker et al., 2024; Jeffri & Rambli, 2021; Duan et al., 2022) – a finding of particular significance within the under-researched African market context.

Area of Exploration 2: Perceived Performance

Gen Z achieved high performance results when comparing AR’s actual performance to their initial expectations. AR’s actual visual fidelity, ease of use, and practical utility would validate or undermine the expectations explored previously; most participants experienced performance that not only met, but frequently exceeded, their anticipatory benchmarks.

Exceptional Realism

The most immediate impact came from AR’s visual realism. Participant 1’s spontaneous exclamation, “Woah, this is actually working,” captured the shock of expectation becoming reality; the lighting adaptation particularly impressed users: “The lighting adjusted to my room. It felt like they were really on my feet” (Participant 1). Participant 3 noted the AR shoes “even had shadows and reflections. It didn’t feel fake or blocky; it felt placed”, while Participant 8 described a sense of embodiment: “It actually felt like I was wearing it.” The 360-degree viewing capability amplified

this effect, with Participant 2 describing spinning a foot around to see the sneaker “from all angles” as feeling “like the future.” Literature concurs: participants frequently report genuine surprise and heightened engagement when AR seamlessly integrates virtual objects with physical surroundings, especially when leveraging real-time environmental cues such as lighting and material texture to enhance authenticity (Aitamurto et al., 2020).

Effortless Usability

If realism captured attention, usability secured engagement. The phrase “just point” recurred across narratives: “Super easy. Just picked the shoe, pointed my camera, done” (Participant 1). This effortlessness proved democratising: Participant 11 found the app “very user-friendly ... so much so that anybody can use the app”, while Participant 14 emphasised intergenerational accessibility – “even my mom would be able to use the app.” The absence of friction between intention and execution meant AR felt natural, rather than technological. Literature confirms that AR applications are widely perceived as easy to learn and use, with young and old alike able to navigate AR interfaces with minimal instruction (Yusof et al., 2024).

Area of Exploration 3: Confirmation/Disconfirmation

The convergence of expectation and experience creates a critical evaluative moment where users judge whether technology delivers on its implicit promises, setting the stage for satisfaction or disappointment. For most participants, AR performance exceeded baseline expectations, creating positive disconfirmation that would cascade into loyalty and advocacy.

Widespread Positive Disconfirmation

The dominant narrative across participants was one of positive surprise: “It went beyond. I thought it’d be glitchy, but it was proper immersive” (Participant 1); “Honestly, better than expected ... it was smooth” (Participant 4), who added that AR “actually matched my outfit way better than I imagined.” The compound surprise of technical smoothness and practical utility amplified the effect: “I wasn’t expecting AR to feel that smooth or polished, especially on a mobile app. But it actually worked” (Participant 3). Visual realism particularly exceeded expectations, with Participant 2 finding “nothing really fell short,” and Participant 16 admitting, “I expected something clunky, but the AR was smooth and surprisingly realistic.” Literature shows that when users experience both technical smoothness and practical utility together, the resulting “compound surprise” produces a powerful positive disconfirmation effect – expectations are not just met but exceeded, heightening satisfaction, engagement, and intention to reuse or recommend (Barhorst et al., 2021).

Area of Exploration 3: Satisfaction

When expectations are exceeded, satisfaction follows; when they are disappointed, dissatisfaction arises. For most participants, the positive disconfirmation described above translated directly into high satisfaction, manifesting as increased confidence, brand trust, and genuine delight in the shopping experience.

Confidence Boost

The primary source of satisfaction was the confidence AR instilled in purchase decisions. Participants described a shift from uncertainty to assurance: “I didn’t feel like I was guessing any more. It was almost like trying them on in store” (Participant 2). Participant 3 articulated this comprehensively: “Before AR, I’d screenshot shoes and try to imagine how they’d look on me. But now I can just see them there, full scale, with shadows and everything ... It makes me more sure about clicking that buy button.” Participant 4 explained why visual certainty created satisfaction: “It gave me a visual I could trust ... that confidence made the whole experience better,” while Participant 16 noted the app made them “feel more in control of the purchase” without relying on product photos alone. This confidence arises because AR allows users to virtually experience products in their real environment, reducing uncertainty and perceived risk and increasing comfort and clarity in their choices (Barta et al., 2023).

Area of Exploration 3: Continuance Intention

Satisfaction's test lies in whether users continue engaging with technology after initial trial. For most participants, AR satisfaction created not just willingness to reuse, but active expectation that all future shopping should include AR capabilities, elevating their standards and permanently altering their retail preferences.

Augmented Reality as a New Standard

The most striking behavioural shift was AR's transformation from novel feature to necessary expectation. Participant 1 asserted: "I check if there's an AR try-on now before buying shoes. AR became a new standard ... It's part of how I shop now. Not just a one-off." Participant 2 agreed: "I look for AR options now ... If an app doesn't have it, I might just skip it." The ultimate indicator of continuance – active rejection of non-AR alternatives – revealed how quickly satisfaction could ossify into expectation. Participant 3 articulated the irreversibility: "I now expect to test stuff digitally before I buy ... The app kind of ruined regular product pages for me." Participant 4 described this raised threshold: "Now I actually check if a sneaker app has AR before I bother looking too far ... This AR set a new standard for me." The language of standards and baselines recurred across narratives, suggesting AR had successfully repositioned from enhancement to expectation. Recent research confirms this shift: immersive technologies like AR have evolved from experimental features to ubiquitous, expected utilities across retail and hospitality, driven by AR's ability to enhance decision-making and deliver utilitarian and hedonic value (Ambika et al., 2023).

LIMITATIONS AND FUTURE STUDIES

This study's findings, while offering rich insight into Gen Z's AR shopping experiences, carry several limitations. The sample of 16 participants, though appropriate for IPA, limits generalisability beyond South African Gen Z consumers; future research should examine cross-cultural variation between emerging and developed markets. The study also focused on a single footwear app, potentially missing category-specific nuances – future studies should investigate AR performance across product types (clothing, furniture, cosmetics) and compare multiple platforms to determine whether identified ECT patterns hold universally.

This research also captured experiences at a single temporal moment; longitudinal studies tracking AR usage over time would reveal whether initial satisfaction sustains or novelty effects diminish continuance intentions. Nor does this study examine physiological or neurological responses – future research using eye-tracking or biometric measures could uncover unconscious cognitive processes underlying satisfaction. Finally, this research centres on consumer perspectives without examining retailer implementation strategies; future studies should investigate optimal AR design features and business model implications for practitioners.

MANAGERIAL IMPLICATIONS

Managers seeking to implement AR shopping must prioritise several critical success factors. First, visual quality is non-negotiable: subpar rendering damages brand credibility more than AR's absence, so brands should delay launches until achieving photorealistic rendering with dynamic lighting adaptation. Second, seamless purchase integration is essential; the gap between virtual try-on and checkout is a critical failure point, so AR experiences must connect directly to localised purchasing options with accurate inventory and delivery information. Third, leverage social proof strategically: since Gen Z form AR expectations mainly through peer demonstrations on TikTok and Instagram rather than corporate advertising, brands should prioritise user-generated content, influencer partnerships, and shareable AR experiences over traditional marketing.

Fourth, maintain effortless usability: AR's simplicity drove satisfaction throughout, so complex calibration or multi-step processes will trigger abandonment – AR must feel like a natural extension of browsing, not a separate technical task. Fifth, recognise that AR permanently raises customer expectations: once consumers experience AR shopping, they reject static product images as inadequate, and brands failing to adopt risk being perceived as technologically backwards. Finally, plan for category expansion and AI enhancement, since satisfied AR users quickly demand broader application across product categories and intelligent features such as style recommendations; early adopters should map these enhancements to maintain competitive positioning as expectations escalate.

CONCLUSION

This study illuminates how Gen Z navigates AR shopping through an ECT lens, revealing a largely positive journey from anticipation to advocacy. Sixteen participants' lived experiences demonstrate that when AR delivers exceptional visual realism, effortless usability, and genuine decision support, it exceeds modest expectations and generates transformative satisfaction. Social media platforms shape initial expectations through peer normalisation, while actual performance – particularly the “wow” moments of realistic rendering – creates positive disconfirmation that cascades into high satisfaction and strong continuance intentions. Successful AR experiences permanently elevate participants' shopping standards, transforming AR from an optional enhancement into an essential expectation whose absence now triggers brand rejection. However, execution failures around visual quality, sizing accuracy, and purchase integration create dissatisfaction, revealing that AR's promise depends entirely on flawless implementation. The question is no longer whether to adopt AR, but how quickly brands can meet the standards this digitally native generation considers baseline.

REFERENCES

- Abdellatif, A., & Haynes, K. (2025). Be-ing seen: Towards a feminist interpretative phenomenological analysis to researching the marginalised. *Culture and Organization*, 31(1), 64–85. <https://doi.org/10.1080/14759551.2024.2378789>
- Aguzzoli, R., Lengler, J., Miller, S. R., & Chidlow, A. (2024). Paradigms in qualitative IB research: Trends, analysis and recommendations. *Management International Review*, 64, 165–198. <https://doi.org/10.1007/s11575-024-00529-5>
- Ai, D. (2024). Using IPA to explore multilingual lived experience and identity: A reflection on methodological issues. *International Journal of Qualitative Methods*, 23. <https://doi.org/10.1177/16094069241297722>
- Aitamurto, T., Aymerich-Franch, L., Saldivar, J., Kircos, C., Sadeghi, Y., & Sakshuwong, S. (2020). Examining augmented reality in journalism: Presence, knowledge gain, and perceived visual authenticity. *New Media & Society*, 24(6), 1281–1302. <https://doi.org/10.1177/1461444820951925>
- Alase, A. (2017). The interpretative phenomenological analysis (IPA): A guide to a good qualitative research approach. *International Journal of Education and Literacy Studies*, 5(2), 9–19. <https://doi.org/10.7575/AIAC.IJELS.V.5N.2P.9>
- Alessa, F. M., Alhaag, M. H., Al-Harkan, I. M., Ramadan, M. Z., & Alqahtani, F. M. (2023). A neurophysiological evaluation of cognitive load during augmented reality interactions in various industrial maintenance and assembly tasks. *Sensors*, 23(18), Article 7698. <https://doi.org/10.3390/s23187698>
- Ambika, A., Shin, H., & Jain, V. (2023). Immersive technologies and consumer behavior: A systematic review of two decades of research. *Australian Journal of Management*, 50(1), 55–79. <https://doi.org/10.1177/03128962231181429>
- Ampadu, S., Jiang, Y., Gyamfi, S. A., Debrah, E., & Amankwa, E. (2023). Perceived value of recommended product and consumer e-loyalty: An expectation confirmation perspective. *Young Consumers: Insight and Ideas for Responsible Marketers*, 24(6), 742–766. <https://doi.org/10.1108/yc-08-2022-1597>
- Barhorst, J. B., McLean, G., Shah, E., & Mack, R. (2021). Blending the real world and the virtual world: Exploring the role of flow in augmented reality experiences. *Journal of Business Research*, 122, 423–436. <https://doi.org/10.1016/j.jbusres.2020.08.041>
- Barta, S., Gurrea, R., & Flavián, C. (2023). How augmented reality increases engagement through its impact on risk and the decision process. *Cyberpsychology, Behavior, and Social Networking*, 26(3), 177–187. <https://doi.org/10.1089/cyber.2022.0087>
- Bhangu, S., Provost, F., & Caduff, C. (2023). Introduction to qualitative research methods – part I. *Perspectives in Clinical Research*, 14(1), 39–42. https://doi.org/10.4103/picr.picr_253_22

- Brown, S. A., Venkatesh, V., Kuruzovich, J., & Massey, A. P. (2008). Expectation confirmation: An examination of three competing models. *Organizational Behavior and Human Decision Processes*, 105(1), 52–66. <https://doi.org/10.1016/j.obhdp.2006.09.008>
- Chen, Y., & Lin, C. A. (2022). Consumer behavior in an augmented reality environment: Exploring the effects of flow via augmented realism and technology fluidity. *Telematics and Informatics*, 71, Article 101833. <https://doi.org/10.1016/j.tele.2022.101833>
- Crawford, R. (2019). Using interpretative phenomenological analysis in music education research: An authentic analysis system for investigating authentic learning and teaching practice. *International Journal of Music Education*, 37(3), 454–475. <https://doi.org/10.1177/0255761419830151>
- D'Ambra, J., Wilson, C., & Akter, S. (2020). Continuance of e-textbook use by tertiary students: A qualitative approach. *Journal of Computer Information Systems*, 60(3), 223–232. <https://doi.org/10.1080/08874417.2018.1456987>
- Du, Z., Liu, J., & Wang, T. (2022). Augmented reality marketing: A systematic literature review and an agenda for future inquiry. *Frontiers in Psychology*, 13, Article 925963. <https://doi.org/10.3389/fpsyg.2022.925963>
- Duan, H., Min, X., Zhu, Y., Zhai, G., Yang, X., & Le Callet, P. (2022). Confusing image quality assessment: Toward better augmented reality experience. *IEEE Transactions on Image Processing*, 31, 7206–7221. <https://doi.org/10.1109/tip.2022.3220404>
- Faria-Schützer, D. B. d., Surita, F. G., Alves, V. L. P., Bastos, R. A., Campos, C. J. G., & Turato, E. R. (2021). Seven steps for qualitative treatment in health research: The clinical-qualitative content analysis. *Ciência & Saúde Coletiva*, 26(1), 265–274. <https://doi.org/10.1590/1413-81232020261.07622019>
- Farrington, A. P., Wilson, G., Limbrick, H., & Swainston, K. (2020). The lived experience of adjustment to prostate cancer. *Psychology of Men & Masculinities*, 21(3), 369–379. <https://doi.org/10.1037/MEN0000237>
- Gottsacker, M., Furuya, H., Choudhary, Z. D., Erickson, A., Schubert, R., Bruder, G., Browne, M.P., & Welch, G. F. (2024). Investigating the relationships between user behaviors and tracking factors on task performance and trust in augmented reality. *Computers & Graphics*, 123, Article 104035. <https://doi.org/10.1016/j.cag.2024.104035>
- Hilal, N. S. H. A. (2023). The impact of the use of augmented reality on online purchasing behavior sustainability: The Saudi consumer as a model. *Sustainability*, 15(6), Article 5448. <https://doi.org/10.3390/su15065448>
- Hossain, M. A., & Quaddus, M. (2012). Expectation-confirmation theory in information system research: A review and analysis. In Y. Dwivedi, M. Wade, & S. Schneberger (Eds.), *Information Systems Theory* (pp. 441–469). Springer. https://doi.org/10.1007/978-1-4419-6108-2_21
- Hsu, W.-C., Lee, M.-H., & Zheng, K.-W. (2024). From virtual to reality: The power of augmented reality in triggering impulsive purchases. *Journal of Retailing and Consumer Services*, 76, Article 103604. <https://doi.org/10.1016/j.jretconser.2023.103604>
- Javornik, A., Marder, B., Barhorst, J. B., McLean, G., Rogers, Y., Marshall, P., & Warlop, L. (2022). “What lies behind the filter?” Uncovering the motivations for using augmented reality (AR) face filters on social media and their effect on well-being. *Computers in Human Behavior*, 128, Article 107126. <https://doi.org/10.1016/j.chb.2021.107126>
- Jayawardena, N. S., Thaichon, P., Quach, S., Razzaq, A., & Behl, A. (2023). The persuasion effects of virtual reality (VR) and augmented reality (AR) video advertisements: A conceptual review. *Journal of Business Research*, 160, Article 113739. <https://doi.org/10.1016/j.jbusres.2023.113739>
- Jeffri, N. F. S., & Rambli, D. R. A. (2021). A review of augmented reality systems and their effects on mental workload and task performance. *Heliyon*, 7(3), Article e06277. <https://doi.org/10.1016/j.heliyon.2021.e06277>
- Kovács, I., & Keresztes, É. R. (2024). Digital innovations in e-commerce: Augmented reality applications in online fashion retail—a qualitative study among Gen Z consumers. *Informatics*, 11(3), Article 56. <https://doi.org/10.3390/informatics11030056>

- Kuleto, V., P., M. I., Stanescu, M., Ranković, M., Šević, N. P., Păun, D., & Teodorescu, S. (2021). Extended reality in higher education, a responsible innovation approach for Generation Y and Generation Z. *Sustainability*, 13(21), Article 11814.
- Lai, Z., Leong, M., Khoo, K., & Sidhu, S. (2025). Integrating technology acceptance model and value-based adoption model to determine consumers' perception of value and intention to adopt AR in online shopping. *Asia Pacific Journal of Marketing and Logistics*, 37(1), 1–19. <https://doi.org/10.1108/apjml-03-2024-0386>
- Mendoza-Ramírez, C. E., Tudón-Martínez, J. C., Félix-Herrán, L. C., Lozoya-Santos, J. d. J., & Vargas-Martínez, A. (2023). Augmented reality: Survey. *Applied Sciences*, 13(18), Article 10491. <https://doi.org/10.3390/app131810491>
- Mishra, S., Mishra, A., Dubey, A., & Dwivedi, Y. K. (2024). Virtual reality in retailing: A meta-analysis to determine the purchase and non-purchase behavioural intention of consumers. *Industrial Management & Data Systems*, 124(1), 212–252. <https://doi.org/10.1108/imds-05-2023-0336>
- Naeem, M., Ozuem, W., Howell, K., & Ranfagni, S. (2023). A step-by-step process of thematic analysis to develop a conceptual model in qualitative research. *International Journal of Qualitative Methods*, 22. <https://doi.org/10.1177/16094069231205789>
- Nigbur, D., & Chatfield, S. L. (2025). Naming themes in interpretative phenomenological analysis (IPA): Recommendations and examples. *International Journal of Qualitative Methods*, 24. <https://doi.org/10.1177/16094069241312792>
- Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing*, 17(4), 460–469. <https://doi.org/10.2307/3150499>
- Oluka, A. (2025). Phenomenological research strategy: Descriptive and interpretive approaches. *F1000Research*, 14, Article 725. <https://doi.org/10.12688/f1000research.166273.1>
- Oyman, M., Bal, D., & Ozer, S. (2022). Extending the technology acceptance model to explain how perceived augmented reality affects consumers' perceptions. *Computers in Human Behavior*, 128, Article 107127. <https://doi.org/10.1016/j.chb.2021.107127>
- Pandey, P. K., & Pandey, P. K. (2025). Unveiling the transformative power of augmented reality in retail: A systematic literature analysis. *Journal of Strategy and Management*. <https://doi.org/10.1108/jsma-05-2023-0101>
- Parker, J. L., Richard, V. M., & Becker, K. (2023). Guidelines for the integration of large language models in developing and refining interview protocols. *The Qualitative Report*, 28(12), 3460–3474. <https://doi.org/10.46743/2160-3715/2023.6801>
- Ramasamy, G., Ramasamy, G. D., & Ramasamy, P. (2024). Conceptual review of consumer satisfaction theories with expectation-confirmation and disconfirmation paradigm for business sustainable growth and decision making. *F1000Research*, 13, Article 1399. <https://doi.org/10.12688/f1000research.158612.1>
- Riar, M., Xi, N., Korbel, J. J., Zarnekow, R., & Hamari, J. (2023). Using augmented reality for shopping: A framework for AR induced consumer behavior, literature review and future agenda. *Internet Research*, 33(1), 242–279. <https://doi.org/10.1108/intr-08-2021-0611>
- Saldaña, J. (2021). *The coding manual for qualitative researchers*. Sage.
- Saprikis, V., Avlogiaris, G., & Katarachia, A. (2021). Determinants of the intention to adopt mobile augmented reality apps in shopping malls among university students. *Journal of Theoretical and Applied Electronic Commerce Research*, 16(3), 491–512. <https://doi.org/10.3390/jtaer16030030>
- Schiebler, T., Lee, N., & Brodbeck, F. C. (2025). Expectancy-disconfirmation and consumer satisfaction: A meta-analysis. *Journal of the Academy of Marketing Science*. <https://doi.org/10.1007/s11747-024-01078-x>
- Shaheen, R., & Ghasemi, M. (2025). Make it real with Gen Z! The impact AR reality congruence on brand information sharing: Exploring a sequential mediation mechanism. *International Journal of Data and Network Science*, 9, 227–242.

- Sinha, M., & Srivastava, M. (2025). Driving customer brand engagement through augmented reality-induced influencer content among Gen Z: The moderating role of credibility. *Journal of Global Fashion Marketing*, 16(3), 386–403.
- Terry, R., & Spendlove, Z. (2025). Early career midwives' experiences of development opportunities and their relation to retention and job satisfaction: An interpretative phenomenological analysis study. *BMC Pregnancy and Childbirth*, 25, Article 156. <https://doi.org/10.1186/s12884-025-07227-6>
- Yaakop, N., Koh, D., & Yasin, R. M. (2023). A content validation of focus group discussions based on need analysis in a physical education training module for primary school teachers. *Retos*, 50, 1115–1122. <https://doi.org/10.47197/retos.v50.100191>
- Younas, A., Fàbregues, S., Durante, A., Escalante, E. L., Inayat, S., & Ali, P. (2023). Proposing the “MIRACLE” narrative framework for providing thick description in qualitative research. *International Journal of Qualitative Methods*, 22.
- Yusof, N., Matzin, A., Hashim, N. L., & Matraf, M. S. B. (2024). User experience of augmented reality applications for future studies: A thematic review. *Journal of Advanced Research in Applied Sciences and Engineering Technology*, 59(3), 117–128. <https://doi.org/10.37934/araset.60.2.91102>
- Zhuoyo, H., Amirul, S., & Feng, O. (2025). Examining the impact of after-hours work connectivity on job satisfaction in universities: An expectation confirmation theory perspective. *International Journal of Advanced and Applied Sciences*, 12(4), 24–33. <https://doi.org/10.21833/ijaas.2025.04.004>

PREFERENCE DETECTION USING MACHINE LEARNING AND MULTILAYER COMBINATORIAL FUSION

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ABSTRACT

Understanding how visual attention influences human preference formation is a fundamental problem in consumer behavior and cognitive science. In this work, we investigate how eye movement patterns can be used to predict preference decisions when subjects compare two alternatives. To address this problem, we analyze an eye-tracking dataset, where subjects view pairs of face images and their gaze behavior is recorded throughout the decision process. We model this problem using multiple machine learning classifiers and apply the Multi-layer Combinatorial Fusion (MCF) framework to iteratively combine diverse models. The MCF framework expands models to a large pool of model fusions and then reduces them based on cognitive diversity, repeating this process across layers until diversity diminishes. Experimental results show that MCF significantly improves performance over individual models. The best single model achieves a Pre@k of 0.90, which is improved to 0.9143 after the first layer of MCF, and further increased to 0.9286 in the second layer. This progression demonstrates that the second layer not only surpasses the performance of the first layer but also outperforms the best individual model, highlighting the effectiveness of leveraging diversity through multi-layer fusion.

Keywords: cognitive diversity, combinatorial fusion, consumer behavior, gaze cascade effect, preference detection.

INTRODUCTION

In everyday consumer environments such as supermarkets, retail stores, and online shopping platforms, individuals are constantly exposed to multiple competing products and must make rapid preference decisions. When browsing items on shelves or screens, consumers visually compare alternatives before selecting one to purchase. These decisions are often formed within seconds and are influenced by both conscious evaluation and unconscious cognitive processes (Milosavljevic et al., 2011; Martin & Morich, 2011). Understanding how consumers visually interact with products and how these interactions translate into preferences is a fundamental problem in consumer behavior research (Pieters & Warlop, 1999; Orquin & Loose, 2013).

Traditional approaches to studying consumer preferences often rely on stated preference data collected through surveys, ratings, intentions, satisfaction measures, and conjoint or choice-based tasks, as well as revealed behavioral data such as purchase histories, transaction records (Rossi et al., 1996; Oard & Kim, 1998; Wedel & Kannan, 2016; Ben-Akiva, 2019; Krivulin & Gladkikh, 2022). While useful, these methods have limited access to the real-time cognitive processes that occur during decision making (Glaholt & Reingold, 2011; Zuschke, 2020; Wedel et al., 2023). In contrast, eye movement analysis provides a direct and continuous measure of visual attention, offering insights into how preferences evolve over time. By analyzing gaze patterns, such as fixation duration, gaze frequency, and transitions between items, we can better understand how consumers evaluate alternatives and form choices.

The importance of modeling consumer preference extends across multiple domains, including marketing, product placement, user interface design, and recommendation systems (Schafer et al., 2001; Dew et al., 2024). For example, understanding which visual features attract attention can help optimize product positioning on store shelves

or digital interfaces (Chandon et al., 2009; Bialkova et al., 2020). Moreover, identifying the relationship between attention and preference can improve predictive models of consumer choice, enabling more personalized and effective decision support systems (Imai et al., 2019). Despite its importance, accurately capturing and modeling preference formation remains challenging due to its dynamic and context-dependent nature (Bettman et al., 1998; Otto et al., 2022).

A substantial body of research in psychology, marketing, and neuroscience has investigated how preferences are formed and how visual attention contributes to decision making. Early studies have shown that factors such as familiarity, novelty, and contextual presentation can significantly influence consumer choices (Zajonc, 1968; Berlyne, 1970; Tversky & Simonson, 1993). More recent work has focused on the role of attention in guiding decisions, suggesting that what individuals look at, and for how long, can both reflect and shape their preferences (Shimojo et al., 2003; Orquin & Loose, 2013). These findings motivate the use of behavioral signals, such as eye movements, as a proxy for underlying cognitive processes.

In the field of eye movement research, the relationship between gaze behavior and preference formation has been extensively studied. In particular, the pioneering work by Shimojo et al. (2003) introduced the gaze cascade effect, demonstrating that when subjects are presented with two alternatives, their gaze gradually shifts toward the option they eventually choose. This phenomenon indicates that visual attention is not merely passive observation but plays an active role in shaping decisions. Subsequent studies have shown that features such as fixation duration, gaze count, and temporal viewing patterns are useful predictors of preference outcomes (Glaholt, et al., 2009; Atalay et al., 2012; Gere et al., 2021).

Multi-layer combinatorial fusion (MCF), proposed by Hurley et al. (2020), is a fusion framework designed to operate across multiple layers. It extends the single-layer framework of combinatorial fusion analysis (CFA), introduced by Hsu et al. (2006, 2024), which provides systematic methods for combining multiple scoring systems. CFA has been applied in a wide range of domains, including virtual screening and drug discovery (Jiang et al., 2023), text classification (Xu et al., 2025), cybersecurity DoS detection (Alfatemi et al., 2025), and Bitcoin price prediction (Wu et al., 2025), value alignment of LLMs (Wu et al., 2026). MCF is an emerging technique that iteratively performs expansion and reduction through model combination, allowing it to explore additional performance gains beyond those achievable by single-layer CFA. This paper is one of the first applications of MCF to preference detection. In this study, we utilize the eye movement dataset developed by Shimojo et al. (2011) to study preference detection through the MCF framework. Several prior studies have explored this dataset (Schweikert et al., 2016; Schweikert et al., 2018; Schweikert et al., 2021; Schweikert et al., 2022; Zhang et al., 2023). For example, Schweikert et al. (2016, 2021) applied the CFA framework to combine multiple features and demonstrated that CFA-based combinations can outperform the best individual feature. In subsequent work, Schweikert et al. (2022) further analyzed the diversity among the 12 subjects by constructing a prototypical subject and measuring differences using cognitive diversity. Building on these studies, we train five diverse machine learning models on the dataset and apply MCF to iteratively combine them across multiple layers. The fusion process continues until the diversity among the models becomes negligible. Experimental results show that MCF progresses through two layers and terminates at the third layer. The best performance achieved at the second layer surpasses both the first-layer results and the performance of the best original model. These findings demonstrate that MCF is an effective fusion framework for leveraging model diversity to improve predictive performance.

METHODOLOGY

This section introduces the combinatorial fusion method used to analyze the eye movement data, including combinatorial fusion analysis (CFA) and multi-layer combinatorial fusion (MCF). CFA combines models within a single layer, while MCF extends this approach by iteratively integrating combinations across multiple layers.

Combinatorial Fusion Analysis

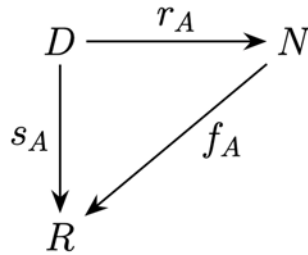
Rank-score function: CFA operates on scoring systems. A scoring system is a broad concept and appears widely in everyday life. Any system that assigns numerical values to observations can be considered as a scoring system. For example, a thermometer assigns a temperature value at each point in time, and a blood pressure monitor produces measurements for each patient, etc.

A scoring system in CFA consists of three components: a score function, a rank function and a rank-score function. The score function represents the original numerical values assigned by the system. The rank function is obtained by ordering these scores in descending order and assigning ranks accordingly. The rank-score function combines both the score and rank information. Specifically, let $D = \{d_1, d_2, \dots, d_n\}$ denotes a set of data items, where each d_i is an observation, and let A be a scoring system defined on D . The score function of A , denoted by s_A , maps each data item to a real value, i.e., $s_A: D \rightarrow R$. By sorting these scores in descending order, we obtain rank function $r_A: D \rightarrow N$, where rank 1 corresponds to the highest score and rank n to the lowest. Then rank-score function f_A is defined by combining s_A and r_A for each data item, as follows (Hsu et al. 2006; Hsu et al. 2010):

$$f_A = s_A(r_A^{-1}(i)) = (s_A \circ r_A^{-1})(i), \quad i \in D.$$

The relationships among score function, rank function, and rank-score function is depicted in Figure 1. We note that these three functions are interconnected. Given any two of them, the third can be derived.

Figure 1: Relationship among score function s_A , rank function r_A and rank-score function f_A (Hsu et al., 2010).



Cognitive diversity and diversity strength: Cognitive diversity, introduced in (Hsu et al., 2010; Hsu et al., 2019), measures the dissimilarity between two scoring systems. Unlike conventional statistical correlation measures such as Pearson’s correlation, Spearman’s correlation, and Kendall’s tau correlation, as well as computation diversity measures like entropy and KW variance (Hurley et al., 2021), cognitive diversity is designed to capture the differences in the rank-score behavior of scoring systems. Let A and B be two scoring systems with rank-score functions f_A and f_B defined on data items D . The cognitive diversity between A and B is defined as (Jiang et al., 2023):

$$CD(A, B) = \sqrt{\frac{1}{n} \sum_{i=1}^n (f_A(d_i) - f_B(d_i))^2} \quad i \in D.$$

Cognitive diversity is a pairwise diversity measure. In order to use it as a fusion weight, we need to extend it to a system-level diversity measure, which leads to a notion of diversity strength. It quantifies the global diversity of a given system relative to all other systems in a system set. Specifically, for a set of t scoring systems, the diversity strength of system A_i is computed by averaging its cognitive diversity with respect to all other systems in the set. The formula of the diversity strength of system A_i is given as follows (Jiang et al., 2023):

$$DS(A_i) = \frac{1}{t-1} \sum_{\substack{j=1, \\ j \neq i}}^t CD(A_i, A_j), \quad i, j \in D.$$

Four combination strategies: CFA generates a large number of model combinations through four combination strategies. Because each scoring system includes both a score function and a rank function, models can be combined using their scores or ranks. For combination weights, we consider two approaches: equal weighting and weighting by diversity strength. By combining these two dimensions: combination method and combination weight, we obtain four types of model combinations. Table 1 summarizes these four combination types.

Table 1: Summary of four combination strategies in CFA, where ASC and ARC represent average score and rank combination, while WSCDS and WRCDS are weighted score and rank combination by diversity strength.

Combination weight	Combination method	
	score	rank
equal weight	ASC	ARC
diversity strength	WSCDS	WRCDS

The corresponding formulas for these four types of combinations are given below (Jiang et al., 2023):

$$\begin{aligned}
 s_{ASC}(d_i) &= \frac{1}{t} \sum_{j=1}^t s_{A_i}(d_i), & s_{ARC}(d_i) &= \frac{1}{t} \sum_{j=1}^t r_{A_i}(d_i), \\
 s_{WSCDS}(d_i) &= \sum_{j=1}^t \frac{DS(A_j)}{\sum_{k=1}^t DS(A_j)} s_{A_i}(d_i), & s_{WRCDS}(d_i) &= \sum_{j=1}^t \frac{1/DS(A_j)}{\sum_{k=1}^t 1/DS(A_j)} r_{A_i}(d_i).
 \end{aligned}$$

In CFA, for each combination strategies, the combination size can vary from 2 to t , which results in $\binom{t}{2} + \binom{t}{3} + \dots + \binom{t}{t} = 2^t - 1 - t$ combined models. Therefore, across all four combination strategies, the full CFA framework can generate in total $4 \times (2^t - 1 - t)$ model combinations.

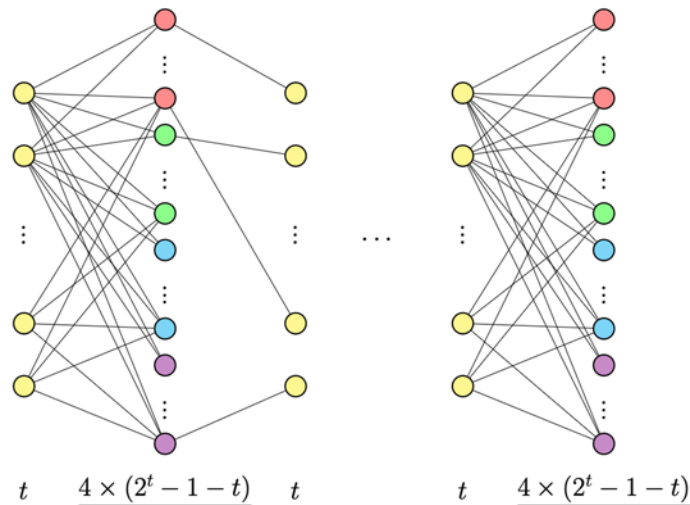
Multi-Layer Combinatorial Fusion

EAR algorithm: The MCF framework performs iterative model fusion through an Expansion-and-Reduction (EAR) algorithm (Hurley et al., 2021). It begins with a set of t diverse scoring systems. The framework first expands them to $4 \times (2^t - 1 - t)$ combinations by applying the six fusion strategies in CFA. Then this large pool of combined models is reduced back to t models using a reduction method. In this study, a diversity-based reduction method is used. Specifically, cognitive diversity is calculated for each pair of combined models. Then, diversity strength is derived for each individual model to reflect its overall distinctiveness within the set. These diversity strengths are then sorted in descending order. And then the top t models with the highest diversity strength are selected as the base models for the next layer of the MCF framework.

MCF proceeds by repeatedly applying expansion and reduction steps as it moves to deeper layers. At each layer, we visualize the base models using the rank-score function graph and assess their diversity. When the graph indicates that the models exhibit little to no diversity, the process terminates. In this study, when the maximum diversity strength among the base models falls below 0.05, we stop the MCF iteration. This is because MCF is diversity-driven framework. When diversity is negligible, fusions barely help.

MCF framework: The diagram of the MCF framework with t initial base models is shown in Figure 2. In each layer, the t models are expanded to $4 \times (2^t - 1 - t)$ combined models (4 node colors represent 4 types of combinations; each color has $2^t - 1 - t$ nodes), after which the top t most diverse models based on diversity strength are selected to serve as the input for the next layer, where the expansion and reduction is repeated. This process continues until there is almost no diversity among the base models. Finally, the $4 \times (2^t - 1 - t)$ models on the last layer are evaluated with the target variable.

Figure 2: The MCF framework with t initial base models. The red, green, blue, and purple nodes in the expansion step correspond to the four types of combinations.

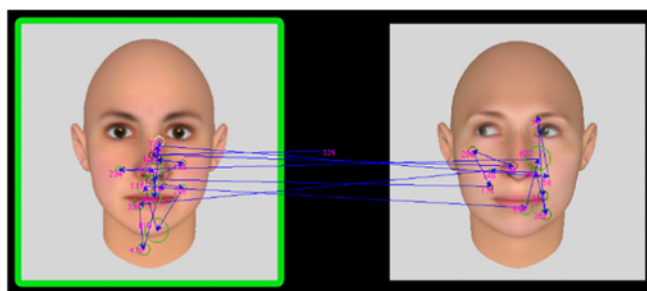


EXPERIMENTS

Dataset Description

The eye movement dataset used in this study comes from the preference decision-making experiment conducted by Shimojo et al (2011). Their experiment was designed to investigate how gaze behavior is related to preference information. In each trial, a subject was shown two computer-generated face images, one on the left and one on the right. And they were asked to choose the face they considered more attractive. During this process, the subject's eye movements were recorded, including x, y coordinates of gaze points and the fixation duration at each point. Each subject completed 60 trials, and the final preference decision for each trial was also stored. Figure 3 shows an example trial plot with the subject's gaze points. The selected face image is highlighted in green.

Figure 3: A sample trial plot with the subject's gaze points (Shimojo et al., 2011).



Based on these recorded gaze sequences, five features are constructed to characterize visual attention and decision behavior. These features include the time spent on each face in the last 200ms of a trial, the total time spent on each face throughout the trail, the number of gaze fixation points on each face, the sustainability of visual interest over time, and the frequency of gaze transitions among facial regions such as the eyes, nose, and mouth. These features allow us to analyze how attention is distributed between two face images and how gaze patterns affect the final preference choice. Each feature is defined as the difference between its value for the left face and the corresponding

value for the right face. For each subject, the feature values across all trials are then normalized to the range [0, 1] using min-max normalization.

Base Models and Training Procedure

In this study, machine learning models are used to construct scoring systems. Based on combinatorial fusion theory and prior empirical practice, combining a small set of models that are diverse and accurate can improve upon the best single model. In practice, CFA usually fuses a limited number of models, such as four, five or six, rather than a large number of models. Although adding more models may further improve performance, the marginal gain often diminishes as the ensemble size increases, while the computational cost continues to grow. Therefore, model selection involves a trade-off between potential performance gain and computational complexity.

In this paper, we use five machine learning models: Gaussian Naïve Bayes (A), Decision Tree (B), Random Forest (C), Gradient Boosting (D), and Multilayer Perceptron (E). These models are selected because they represent distinct learning principles and model architectures, which can lead to diverse scoring behaviors. Gaussian Naïve Bayes is probabilistic Bayesian classifier that estimates class posterior probabilities under a conditional independence assumption among features. This makes it fundamentally different from discriminative models, as it models the probability structure of the data rather than directly learning decision boundaries. Decision Tree is a rule-based model that recursively partitions the feature space using hierarchical decision rules. Random Forest builds a parallel ensemble of decision trees which randomly selects features and samples. Gradient Boosting is also tree-based, but it builds trees sequentially, with each new tree focusing on correcting the errors made by previous trees. In contrast, Multilayer Perceptron is a neural network model that learns nonlinear feature representations through multiple layers of weighted transformations and activation functions. This architectural and algorithmic diversity across models provides the basis for combinatorial fusion to exploit complementary information.

The eye movement dataset contains no missing values, and all features are within the same range [0, 1]. Therefore, no additional preprocessing is required before model training. The data are partitioned into training and test sets with a ratio of 80:20. On the training set, 3-fold stratified cross-validation is employed for each model to ensure robust performance estimation while preserving class distribution. The test set is held out for the final evaluation. After training, each model generates probabilistic predictions on the test set, which are scoring systems. Following prior studies on the eye movement dataset (Schweikert et al., 2022; Zhang et al., 2023), we evaluate model performance using precision at k ($\text{Pre}@k$). $\text{Pre}@k$ is a rank-based evaluation metric that measures the proportion of truly positive instances among the top k ranked items. This metric is widely used in information retrieval, recommender systems, and other rank-based decision tasks (Manning 2008; Cremonesi et al. 2010). In our test set, there are 144 data items, including 71 positive instances. Therefore, we set $k = 70$, which approximately matches the number of positive samples in the test set. An ideal model would rank all positive instances before any negative instances, thereby achieving a high $\text{Pre}@k$ score. $\text{Pre}@k$ is computed as the number of true positive instances among the top 70 data items divided by 70.

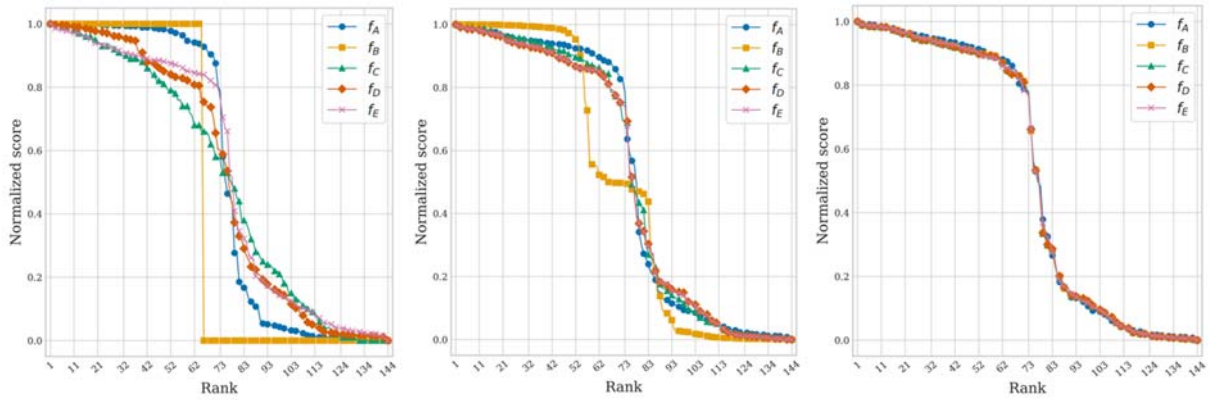
Fusion of Scoring Systems

The scoring systems are integrated using combinatorial fusion, which consists of CFA and MCF. CFA serves as the foundation of MCF. In this study, five base models were used; therefore, ($t=5$) in Figure 2. CFA combines these five models using four types of fusion strategies, defined by two input forms: score and rank, and two weighting schemes: simple averaging and diversity-strength-based weighting. For score-based fusion, the original predictive probabilities are directly used. For rank-based fusion, the predictive probabilities are first sorted in descending order and converted into ranks. Through CFA expansion, the five original models are expanded into $4 \times (2^5 - 1 - 5) = 104$ fused models. A reduction step is then applied to prune these 104 models back to five models based on diversity strength. Together, the CFA-based expansion and diversity-strength-based reduction constitute one iteration of the MCF framework. This process can be repeated until the diversity strength falls below the predefined threshold of 0.05.

RESULTS

In this section, we present results of the MCF framework on the eye movement dataset. The MCF framework proceeds iteratively over three layers. Figure 4 illustrates the evolution of rank-score function graphs throughout this process. In the first layer, the five models are relatively well separated, indicating a moderate level of diversity among their scoring behaviors. As the framework advances to the second layer, all models, except model B, become closely aligned, suggesting a big reduction in diversity, while model B exhibits distinct behavior compared to other four models. In the third layer, the five models nearly overlap, which shows that the diversity among models has reduced to almost zero. At this point, further fusion is unlikely to yield meaningful improvement. The MCF process stops at the third layer. Overall, these observations demonstrate that model diversity decreases gradually across layers. The MCF leverages this diversity in each layer to achieve performance gains.

Figure 4: Rank-score function graphs for layer 1 (left), layer 2 (middle) and layer 3 (right).

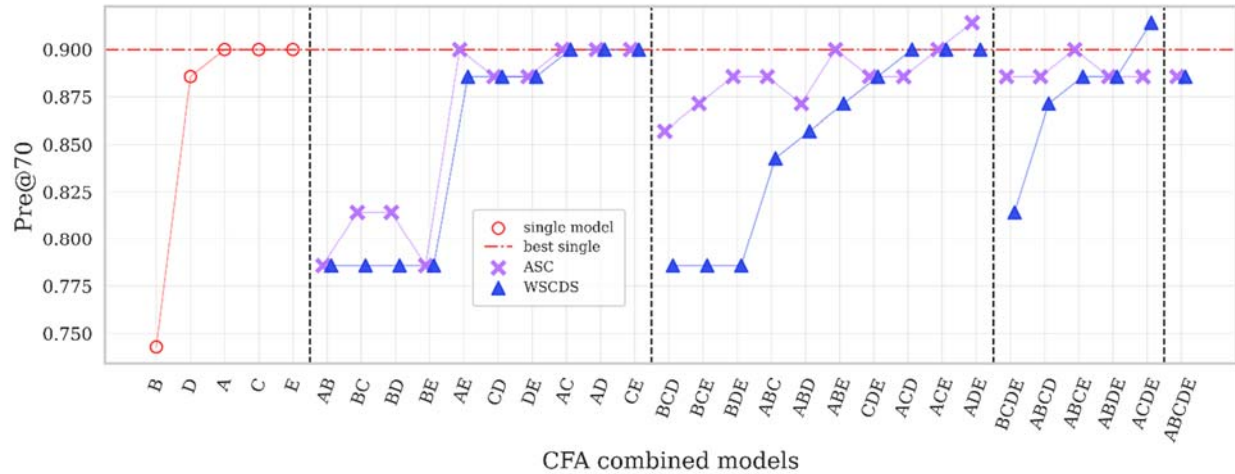


As shown in the rank-score function graph of the first layer in Figure 4, model B exhibits a large number of ties. The presence of ties introduces ambiguity in rank combinations, since multiple data items are assigned the same rank, which reduces the resolution of the ranking and obscures fine-grained distinctions between data items. When this ambiguity is propagated into rank-based fusion, it can degrade the quality of rank combination and introduce instability. Moreover, in the iterative MCF framework, these inaccuracies may accumulate across layers, further diminishing the effectiveness of subsequent combinations. Therefore, we restrict the first layer to score-based fusion only. We consider two types of score combination in the first layer: average score combination (ASC) and weighted score combination by diversity strength (WSCDS).

After evaluating all combined models, the performance results are displayed in Figure 5. The models in x axis are organized into five distinct blocks based on combination size (ranging from single base models to 5-model combinations). The y axis represents the performance metric $\text{Pre}@k$, and the horizontal red dashed line indicates the best performance achieved by any individual model, which is 0.9. In the figure, purple crosses correspond to ASC models, while blue triangles represent WSCDS models.

From the figure, it's evident that combinations from ASC generally achieve performance than those from WSCDS in the first layer. Furthermore, two combined models outperform the best individual model: the ADE combination under ASC and the ACDE combination under WSCDS. Both achieve a $\text{Pre}@k$ of 0.9143, corresponding to 1.43% improvement over the strongest single model. This result shows the effectiveness of MCF at the first layer.

Figure 5: Performance plot for score combination (ASC, WSCDS) in the first layer.



In the first layer, the initial 5 models are expanded into 52 combined models through score combination, which are then pruned back to 5 models by selecting those with the highest diversity strength. These refined models are the base models for the second layer. Since the rank-score function graph in the second layer shows no ties, we apply both score combination and rank combination. As a result, the second layer produces 104 combined models, consisting of 52 models from score combination and 52 models from rank combination. The performance results are presented in two separate plots: one for average combinations (ASC and ARC) and the other for weighted combinations (WSCDS and WRCDS), which provides clearer comparison between score-based and rank-based fusion strategies.

Figure 6 illustrates the performance of average combinations within the second layer. The top-performing individual models achieve a $\text{Pre}@k$ of 0.9. When combining two models, two rank-based combinations reach a performance of 0.9143, showing an improvement over the best base model. As the number of combined models increases, we observe further gains. In particular, the combinations ABD, ABE, and ABCDE under average score combination, as well as BCDE and ABCDE under average rank combination, achieve a $\text{Pre}@k$ of 0.9286. This corresponds to a 2.86% improvement over the best single model at this layer. These results demonstrate that both score-based and rank-based average combinations are very effective, leading to consistent performance gains.

Figure 6: Performance plot for average combination (ASC, ARC) in the second layer.

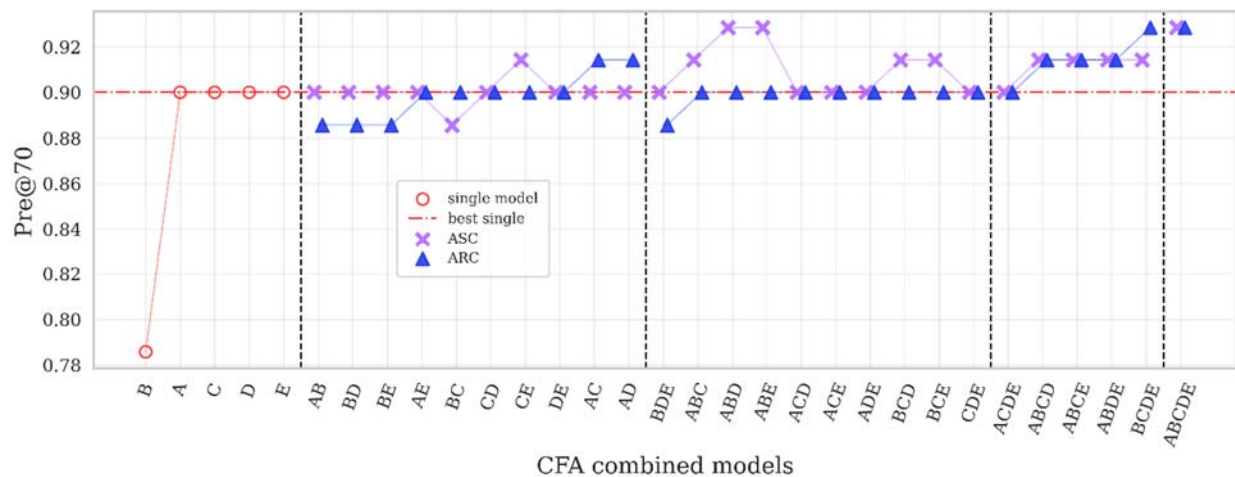


Figure 7: Performance plot for weighed combination (WSCDS, WRCDS) in the second layer.

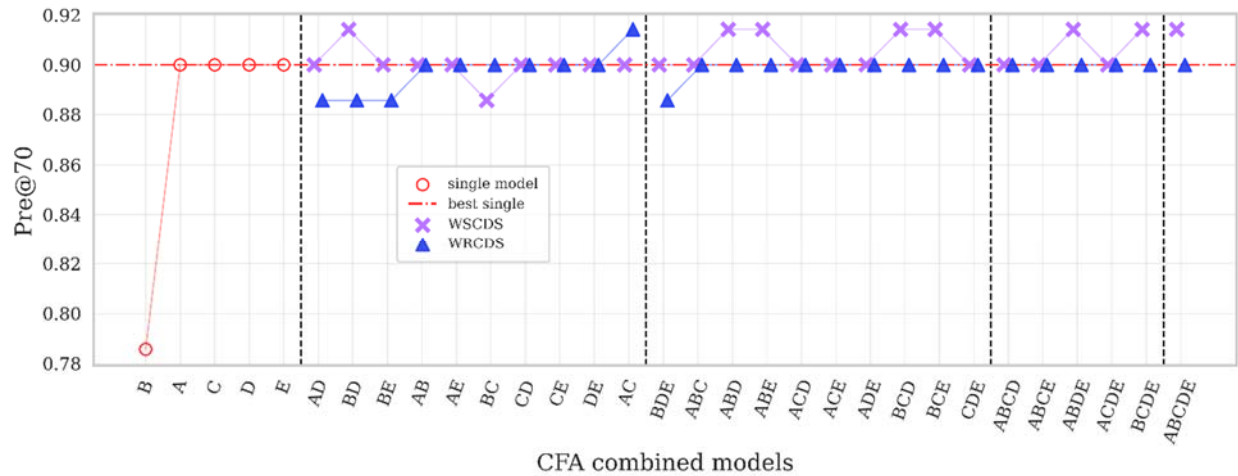


Table 2: Performance comparison of base models and best models from multi-layer combinatorial fusion (MCF) across two layers.

	Model	Combination Type	Pre@70
Base model	A	-	0.9000
	B	-	0.7429
	C	-	0.9000
	D	-	0.8857
	E	-	0.9000
First layer MCF	ADE	ASC	0.9143
	ACDE	WSCDS	
Second layer MCF	ABD	ASC	0.9286
	ABE		
	ABCDE		
	BCDE	ARC	
	ABCDE		

Figure 7 presents the performance for weighed combination in the second layer, where many combined models exceed the best base performance of 0.9. Especially, nine models from the WSCDS approach and two models from the WRCDS approach achieve a performance of 0.9143. These results validate the benefit of using diversity strength as a fusion weight. Figure 7 also suggests that score-based weighted fusion is more effective than its rank-based counterpart in this layer. Finally, because the rank-score function graph for the third layer in Figure 4 reveals nearly no diversity, further combinations are not implemented, as they are almost impossible to yield gains.

A summary of base models and the best combined models across 2 layers is in Table 2. The best initial single model achieves a performance of 0.9. After applying MCF in the first layer, the best performance increases to 0.9143. And the second layer further improves this performance to 0.9286. These findings highlight the MCF framework can improve CFA results by stacking multiple fusion layers, effectively exploiting diversity among models to achieve better performance.

CONCLUSION

Identifying consumer preference is critical in marketing because it helps explain why people choose one product over another. Instead of examining preference through traditional methods such as surveys, ratings, or purchase records, this paper investigates preference detection through eye movement behavior. We use five diverse machine learning models to analyze gaze-based features extracted from an eye-tracking preference dataset. These models are then combined iteratively using the Multi-layer Combinatorial Fusion framework, which refines the model set layer by layer by expanding model combinations and selecting diverse models for the next layer. The results show that MCF proceeds to the second layer and achieves a best Pre@70 of 0.9286, which is higher than both the best first-layer performance and the best original base-model performance. This demonstrates that MCF is an effective framework for improving preference detection and may help predict consumer preference more accurately in marketing applications. In future work, we plan to apply this approach to more realistic consumer-choice settings, such as product images or online shopping interfaces, to further evaluate its practical value.

REFERENCES

- Alfatemi, A., Rahouti, M., Hsu, D. F., Schweikert, C., Ghani, N., Solyman, A., & Assaqty, M. I. S. (2025). Identifying distributed denial of service attacks through multi-model deep learning fusion and combinatorial analysis. *Journal of Network and Systems Management*, 33(1), 8.
- Atalay, A. S., Bodur, H. O., & Rasolofoarison, D. (2012). Shining in the center: Central gaze cascade effect on product choice. *Journal of consumer research*, 39(4), 848-866.
- Ben-Akiva, M., McFadden, D., & Train, K. (2019). Foundations of stated preference elicitation: Consumer behavior and choice-based conjoint analysis. *Foundations and Trends in Econometrics*, 10(1-2), 1-144.
- Berlyne, D. E. (1970). Novelty, complexity, and hedonic value. *Perception & psychophysics*, 8(5), 279-286.
- Bettman, J. R., Luce, M. F., & Payne, J. W. (1998). Constructive consumer choice processes. *Journal of consumer research*, 25(3), 187-217.
- Bialkova, S., Grunert, K. G., & van Trijp, H. (2020). From desktop to supermarket shelf: Eye-tracking exploration on consumer attention and choice. *Food Quality and Preference*, 81, 103839.
- Chandon, P., Hutchinson, J. W., Bradlow, E. T., & Young, S. H. (2009). Does in-store marketing work? Effects of the number and position of shelf facings on brand attention and evaluation at the point of purchase. *Journal of marketing*, 73(6), 1-17.
- Cremonesi, P., Koren, Y., & Turrin, R. (2010). Performance of recommender algorithms on top-n recommendation tasks. In *Proceedings of the fourth ACM conference on Recommender systems* (pp. 39-46).
- Dew, R., Padilla, N., Luo, L. E., Oblander, S., Ansari, A., Boughanmi, K., et al. (2024). Probabilistic machine learning: New frontiers for modeling consumers and their choices. *International Journal of Research in Marketing*.
- Gere, A., Héberger, K., & Kovács, S. (2021). How to predict choice using eye-movements data? *Food Research International*, 143, 110309.
- Glaholt, M. G., & Reingold, E. M. (2011). Eye movement monitoring as a process tracing methodology in decision making research. *Journal of neuroscience, psychology, and economics*, 4(2), 125.
- Glaholt, M. G., Wu, M. C., & Reingold, E. M. (2009). Predicting preference from fixations. *PsychNology J.*, 7(2), 141-158.

- Hsu, D. F., Chung, Y. S., & Kristal, B. S. (2006). Combinatorial fusion analysis: methods and practices of combining multiple scoring systems. In *Advanced data mining technologies in bioinformatics* (pp. 32-62). IGI Global Scientific Publishing.
- Hsu, D. F., Kristal, B. S., & Schweikert, C. (2024). Combinatorial fusion analysis. *Computer*, 57(09), 96-100.
- Hsu, D. F., Kristal, B. S., & Schweikert, C. (2010, August). Rank-score characteristics (RSC) function and cognitive diversity. In *International Conference on Brain Informatics* (pp. 42-54). Berlin, Heidelberg: Springer Berlin Heidelberg.
- Hsu, D. F., Kristal, B. S., Hao, Y., & Schweikert, C. (2019). Cognitive diversity: A measurement of dissimilarity between multiple scoring systems. *Journal of Interconnection Networks*, 19(01), 1940001.
- Hurley, L., Kristal, B. S., Sirimulla, S., Schweikert, C., & Hsu, D. F. (2020). Multi-layer combinatorial fusion using cognitive diversity. *IEEE Access*, 9, 3919-3935.
- Imai, T., Kang, M. J., & Camerer, C. F. (2019). When the eyes say buy: visual fixations during hypothetical consumer choice improve prediction of actual purchases. *Journal of the Economic Science Association*, 5(1), 112-122.
- Jiang, N., Quazi, M., Schweikert, C., Hsu, D. F., Oprea, T., & Sirimulla, S. (2023). Enhancing ADMET property models performance through combinatorial fusion analysis. *ChemRxiv*. <https://doi.org/10.26434/chemrxiv-2023-dh70x>.
- Krivulin, N., Prinkov, A., & Gladkikh, I. (2022). Using pairwise comparisons to determine consumer preferences in hotel selection. *Mathematics*, 10(5), 730.
- Manning, C. D. (2008). *Introduction to information retrieval*. Syngress Publishing.
- Martin, N., & Morich, K. (2011). Unconscious mental processes in consumer choice: Toward a new model of consumer behavior. *Journal of Brand Management*, 18(7), 483-505.
- Milosavljevic, M., Koch, C., & Rangel, A. (2011). Consumers can make decisions in as little as a third of a second. *Judgment and Decision making*, 6(6), 520-530.
- Oard, D. W., & Kim, J. (1998). Implicit feedback for recommender systems. In *Proceedings of the AAAI workshop on recommender systems* (Vol. 83, pp. 81-83).
- Orquin, J. L., & Loose, S. M. (2013). Attention and choice: A review on eye movements in decision making. *Acta psychologica*, 144(1), 190-206.
- Otto, A. R., Devine, S., Schulz, E., Bornstein, A. M., & Louie, K. (2022). Context-dependent choice and evaluation in real-world consumer behavior. *Scientific reports*, 12(1), 17744.
- Pieters, R., & Warlop, L. (1999). Visual attention during brand choice: The impact of time pressure and task motivation. *International Journal of research in Marketing*, 16(1), 1-16.
- Rossi, P. E., McCulloch, R. E., & Allenby, G. M. (1996). The value of purchase history data in target marketing. *Marketing Science*, 15(4), 321-340.
- Schafer, J. B., Konstan, J. A., & Riedl, J. (2001). E-commerce recommendation applications. *Data mining and knowledge discovery*, 5(1), 115-153.
- Schweikert, C., Shimojo, S., Glasser, H., Hendsey, R., Alsaber, R., & Hsu, D. F. (2022). Modeling prototypical preference behavior and diversity using rank score characteristic functions. In *2022 IEEE 21st International Conference on Cognitive Informatics & Cognitive Computing (ICCI* CC)*, 203-207.

- Schweikert, C., Shimojo, S., & Hsu, D. F. (2016). Detecting preferences based on eye movement using combinatorial fusion. In 2016 IEEE 15th International Conference on Cognitive Informatics & Cognitive Computing (ICCI* CC), 336-343.
- Schweikert, C., Shimojo, S., Zhang, Z., Tato, J., Hendsey, R., & Hsu, D. F. (2021). Improving preference detection with eye movement gaze and cognitive diversity. In 2021 IEEE 20th International Conference on Cognitive Informatics & Cognitive Computing (ICCI* CC), 98-102.
- Schweikert, C., Gobin, L., Xie, S., Shimojo, S., & Hsu, D. F. (2018). Preference prediction based on eye movement using multi-layer combinatorial fusion. In International conference on brain informatics, 282-293.
- Shimojo, S., Simion, C., Shimojo, E., & Scheier, C. (2003). Gaze bias both reflects and influences preference. *Nature neuroscience*, 6(12), 1317-1322.
- Shimojo, S., Simion, C., & Changizi, M. (2011) Gaze and preference – orienting behavior as a somatic precursor of preference decision. In Adams, Jr R B, Ambady N, Nakayama K & Shimojo S (eds.) *Social Vision*, Oxford Univ. Press, 151-163.
- Tversky, A., & Simonson, I. (1993). Context-dependent preferences. *Management science*, 39(10), 1179-1189.
- Wedel, M., & Kannan, P. K. (2016). Marketing analytics for data-rich environments. *Journal of marketing*, 80(6), 97-121.
- Wedel, M., Pieters, R., & van der Lans, R. (2023). Modeling eye movements during decision making: A review. *psychometrika*, 88(2), 697-729.
- Wu, Y., Ye, W., Xu, J., & Hsu, D. F. (2025). Bitcoin Price Prediction using Machine Learning and Combinatorial Fusion Analysis. In 2025 IEEE Conference on Artificial Intelligence (CAI) (pp. 61-68). IEEE.
- Wu, Y., Bouneffouf, D., & Hsu, D. F. (2026). Enhancing Value Alignment of LLMs with Multi-Agent System and Combinatorial Fusion. In ICASSP 2026-2026 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) (pp. 1756-1760). IEEE.
- Xu, J., LaFleur, M. L., Schweikert, C., & Hsu, D. F. (2025). Enhancing SDG-Text Classification with Combinatorial Fusion Analysis and Generative AI. In 2025 IEEE Conference on Pervasive and Intelligent Computing (PICom) (pp. 58-65). IEEE.
- Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of personality and social psychology*, 9(2p2), 1.
- Zhang, Z., Schweikert, C., Shimojo, S., & Hsu, D. F. (2023). Improving Prediction Quality of Face Image Preference Using Combinatorial Fusion Algorithm. In International Conference on Brain Informatics, 261-272.
- Zuschke, N. (2020). An analysis of process-tracing research on consumer decision-making. *Journal of business research*, 111, 305-320.

ASSESSMENT OF BRICS's DE-DOLLARIZATION EFFORTS: ECONOMIC OR GEOPOLITICAL LEVERAGE

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ABSTRACT

With regard to the current geopolitical environment and the emergence of BRICS as a counterweight to NATO and the EU, attention is brought to the de-dollarization strategies and the challenge of determining whether these processes are primarily economic, related to managing exchange rate risk and minimizing transaction costs, or a geopolitical strategy intended to challenge US supremacy. Using a mixed-methods approach, this study aims to answer this question by combining qualitative analysis of the official declarations and policies adopted by BRICS summits with statistical analysis of IMF COFER reserve data, SWIFT payment statistics, World Gold Council statistics, lending data of the New Development Bank, and bilateral trade settlements. The findings illustrate that after 2022, there was a significant increase in the rate of local currency settlement (up to 67% for BRICS countries and 99% for Russia-China transactions, India- Russia transition), gold purchases (amounting to over 6,000 tonnes), and alternative financial systems, while the percentage of USD in international reserves fallen gradually from 71% to 57% over 26 years, which is quite typical of economic diversification processes. De-dollarization initiatives were significantly sparked by geopolitical events including the freeze of the Russian central bank's assets and the sanctions imposed on SWIFT. highlights that the adoption of de-dollarization measures is not intended to replace the dollar but rather is focused on gradually developing alternative financial infrastructure to reduce dependency and weaponization of US dollar. We suggest that de-dollarization in the BRICS is a complex phenomena, driven by both geopolitical and economic influences.

Keywords: BRICS, geopolitical leverage, de-dollarization, gold and currency reserve, dollar hegemony.

INTRODUCTION

The relevance of international organizations like the United Nations, G7 Group, NATO, and BRICS has been further heightened by the prevailing geopolitical scenario and the nations' changing interests. Additionally, we shall comprehend the shifting geopolitical landscape and the effect of BRICS activity on the de-dollarization process in the present research paper. The US dollar functions as the world's currency for international trade, which is a crucial aspect of the US economy and backbone to make the USA as global economic and geopolitical power. However, in recent decades, a number of nations have made an effort to lessen the US dollar's influence globally; as a result, they are either looking for alternative currencies or choosing to trade with other nations that have extensive local currency cooperation. The Chinese yuan is attempting to emerge as a substitute, but doing so creates a new denominator in trade between nations. As a result, a number of nations are considering the BRICS currency as a substitute as it will include many currencies and perhaps offset the influence of any one nation over global economic network. But, still there are no clear framework or guideline for the launch of BRICS currencies has been announced officially in the recent conferences.

BRIC originally started in 2006 and became the BRICS in 2011 with the inclusion of South Africa (Van A. 2012), it is intergovernmental economic and geopolitical blocs of east which challenging the domination of US and WEST countries (Saaida, M. 2024), however in the recent year 2024-2025, the organization expanded with the inclusion of Egypt, Ethiopia, Iran, Saudi Arabia, UAE and Indonesia. With the addition of new countries, the relevance of the organization is continuously increasing in the global aspects. Fundamentally, this intergovernmental

organization formed to deepen economic corporation, cultural exchange, enhancing security, and reducing the dependency on the US dollar for the trade.

The process of de-dollarization does not work in isolation, rather than, it has a butterfly effect which can bring challenge to established financial system and institutions. It will have the multiple effect on international monetary system, global trade patterns, alteration of exchange rate volatility and potential risk to global financial crisis (Korab et al. 2023; Saaida, 2024). However, the very complex geopolitical situation including among the BRICS countries presents a big challenge among the countries in the implementation of the de-dollarization extensively and rapidly. In the case of BRICS organization India, and China are regional competitors and they are trying to increase the influence in the regional and global economics & politics, moreover, the Russia is involved in the conflict with Ukraine and thus, Russia have their own challenges in the financial and political fronts, which limit the process of de-dollarization at large scale. Moreover, dependency of India and China for the trade bring the limitation of use of local or BRICS currencies.

This article delves into the impact of de-dollarization on the BRICS trades patterns, economics growth and use of local currencies or BRICS currency in the global trade to understand the real intention of the BRICS nation, whether the BRICS currency is more the economic revolution or the geopolitical tools to negotiate with the US. The impact of the de-dollarization and use of BRICS currencies can reshape global power and economics at a large scale.

Research Questions and Hypotheses

Researchers expressed disagreement on whether the de-dollarization effort was justified by geopolitical or economic leverage. Recent developments, particularly the freezing of more than \$300 billion in Russian central bank assets in 2022, are often seen as a turning point that demonstrated to all countries that dollar reserves are susceptible to political expropriation. In this research, we are trying to address related research questions the three research issues are mentioned:

RQ1: In terms of trade settlement, financing, reserves, and payment infrastructure, what measurable shifts have taken place in the dollar dependency of BRICS members?

RQ2: How much of these changes have been attributed to economic aspects (exchange-rate risk, U.S. fiscal deterioration, transaction costs) vs geopolitical instability (sanctions, asset freezes, dollar weaponization)?

RQ3: Does BRICS de-dollarization be better described as a geopolitical counter-hegemonic initiative, an economic hedging strategy, or a combination of the two?

The aforementioned are the hypotheses based on the research questions:

Hypothesis H1 (Economic Primacy):

Economic factors are the primary reason for the decreasing dollar utilization among the BRICS nations.

Hypothesis H2 (Geopolitical Primacy):

The rapid decline of the dollar after 2022 is a planned geopolitical move to counter U.S. sanctions and the use of the dollar as a weapon.

Hypothesis H3 (Hybrid Gradualism):

BRICS de-dollarization is best understood as a pragmatic gradualism strategy that concurrently mitigates economic drawbacks and promotes geopolitical independence, rather than seeking to substitute the dollar system.

METHODOLOGY

Research Design

This study combines a mixed-methods research methodology that combines qualitative case study and documentary analysis with quantitative data analysis, including gold reserves, monetary reserves, and financial transitions in international trade among the BRICS nations and globally. While the qualitative component examines political responses, think tank publications, and policy documents to understand the reasons behind observed changes, the quantitative component monitors important indices of dollar dependency among BRICS nations from 2006 to 2026.

Data Collection

The dollar's share of authorized reserves from 1999 to 2025 is reported quarterly and annually by the IMF Currency Composition of Official Foreign Exchange Reserves (COFER). Data on currency involvement in foreign exchange transactions is available from the Bank for International Settlements (BIS) Triennial Survey. The SWIFT RMB Tracker is an additional resource that provides monthly information on the amount of money utilized in overseas transactions. The Gold Council, which may provide quarterly and annual reports on gold reserves and acquisitions undertaken by national central banks. Information on shares of local currency loans is included in the New Development Bank's (NDB) yearly reports and announcements. Trade settlement figures for Russia-China, India-Russia, and other BRICS bilateral channels are reported by Bloomberg and Reuters. Information about foreign ownership of US Treasury securities is available from the U.S. Treasury Department.

Data Analysis

More than one analytical techniques were employed in this study to analyze the qualitative and quantitative data, including trend analysis of the dollar's share in global reserves, trade invoicing, and BRICS-specific indicators over the 2006–2026 period; event-centered analysis investigating changes in key indicators around significant geopolitical events (2014 Crimea sanctions, 2022 Russian asset freeze, 2025 Trump tariffs); comparative institutional evaluation comparing alternative financial infrastructure (BRICS Pay, CIPS, and NDB local-currency lending); and thematic analysis of public discourse in order for identifying stated justifications for de-dollarization policies.

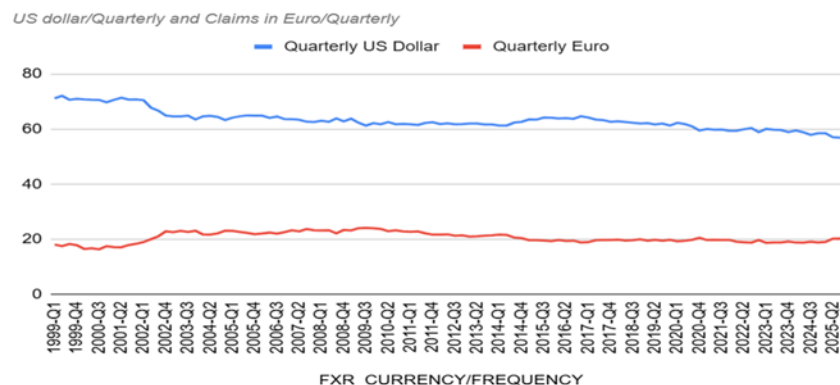
RESULTS AND DISCUSSION

In this section of research paper, we discuss the qualitative and quantitative outcomes observed from the analysis of the collected data around the research questions and check the hypothesis. Based on official BRICS summit declarations, IMF COFER reserve data, SWIFT payment records, and gold reserve information from the World Gold Council, the study shows significant outcomes as mentioned in this section.

Decline of the U.S. Dollar in Global Reserves

The most widely adopted indicator which shows the strength of the US dollar is share of US dollar in the allocated global foreign exchange reserve. From the observed result, we can see the declining share of the US dollar indicating the reducing influence of US dollar in the global economy and international trades. The aforementioned dollar's share has decreased by 14 percentage points over 26 years, from a peak comprising more 71.18 percent in 1999 to around 56.77 percent in Q4 of 2025, according to IMF COFER statistics. The dollar allocated 58.51 percent of stated foreign reserves as of Q1 2025, with the euro coming in the second spot at 20.24 percent, the pound at approximately 5.19 percent, and the yen at 5.15 percent. Figure 1 shows the graphical representation of the change over time from 1999 till 2025.

Figure 1: Alteration in the share of US dollar and Euro in global reserves from 1999-2025.



BRICS Gold Reserves Accumulation

Among the BRICS nations, certain acceleration observed towards the purchase of gold as a dollar alternative. If we observed the data of last five year from the 2021 to 2025, it clearly showing alone China added 358 tonnes, India added 126 tonnes and Egypt added 48 tonnes of gold in their reserves, it indicates clear reliance on the gold reserve rather than the keeping dollar to stabilize their economy.

Figure 2: Gold Reserve (in tonnes) of the BRICS+ countries from 2006 to 2025.

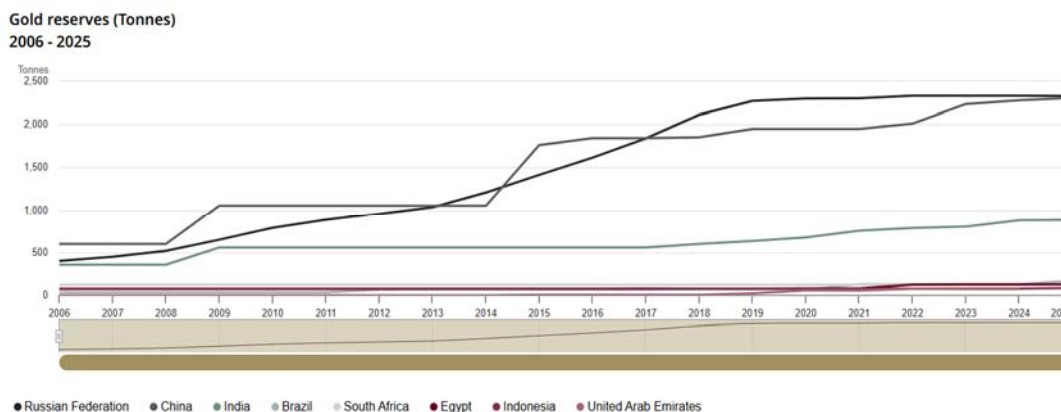


Table 1: Gold Reserves in BRICS + countries in last 5 years.

Country	2021 (tonnes)	2025 (latest) (tonnes)	Absolute Change (tonnes)	% Change
China	1,948.31	2,306.30	+357.99	+18.4%
India	754.10	880.17	+126.07	+16.7%
Egypt	80.91	129.36	+48.45	+59.9%
Brazil	129.65	172.44	+42.79	+33.0%
Russian Federation	2,301.64	2,326.52	+24.88	+1.1%
UAE (latest 2024)	55.43	74.40	+18.97	+34.2%
Indonesia	78.57	85.53	+6.96	+8.9%
South Africa	125.35	125.50	+0.15	+0.1%
Saudi Arabia (latest 2024)	323.07	323.07	0	0

The combined gold holdings of the BRICS countries now surpass 6,000 tonnes, accounting for around 20–21% of the total gold reserves held by central banks worldwide. Continuing sales of U.S. Treasury securities have coincided with buying of gold across the BRICS nations. In 2025, alone China cut its U.S. Treasury holdings by more over \$70 billion, while India raised its gold holdings by 8 tonnes and decreased it's the reserves of dollars by about \$30–40 billion.

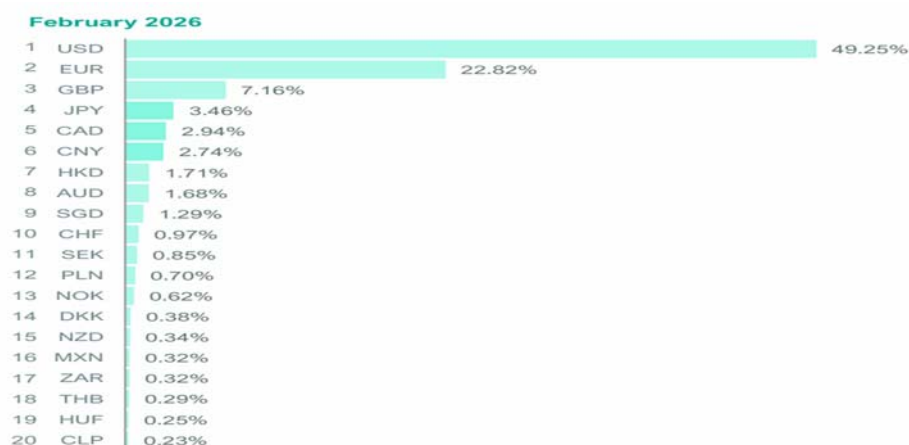
Local-Currency Trade Settlement

Local-currency trade settlement is most concrete indicator of the de-dollarization. Post 2022, after the war started among Russia- Ukraine, SWIFT payment system has been sanctioned in Russia, which forced the countries to settle their trade in the local currencies. India, China, Russia, UAE and other countries used the Vostro account to make the payment in the local currencies. China and Russia bilateral trade reached 99.1% settlement in rubles and yuan by late 2025 which effectively eliminated the US dollar as the trading currency. Similar changes have occurred in the Russia-India trade network, where rupee-ruble systems have replaced dollar inter mediation for energy imports. This

is significant since 80% of India's energy demands are met by imported fossil fuels. India and Russia also settling their other trade in the rupees and rubles payment system and using Dirham as the third currency to settle their trade. UAE and Saudi Arabia also settling their trade among the BRICS nation in the local currencies rather than the US dollar, recent China-Saudi Arabia's signed swap agreement worth 50 billion yuan to settle their trade in the local currencies in the tenure of 3 years to strengthen their financial corporate that directly challenging the dominance US dollar as the global trade currencies.

Although it has gotten stronger as an international currency, the Chinese yuan is still significantly behind the US dollar. According to the report in February 2026, the yuan emerged as the Sixth most active currency for international payments, comprising of worldwide payments by value, as reported by SWIFT data. This represents a notable gain over prior years, although it is still overshadowed by the dollar's 49.25% share. Figure 3 summarizes the comparative presentation of the currencies used for the international trade settlement.

Figure 3: Global Payment currency in February 2026.



Source: https://www.swift.com/sites/default/files/files/global-currency-tracker_march-2026_final_v3.pdf

Moreover, another report presented in February 2026 revealed that Russia's 60 percent import is based on the local currency; even from Europe, more than 69 percent of import payment settlement is happening in the local currency, and European countries are also finding channels to escape the use of the US dollar to make the trade with Russia. However, the percentages with Asia and Africa are 54 percent and 82 percent, respectively (BTCC Academy).

The 2022 Russian Asset Freeze as a Watershed

Using the assets in the dollar as weapon by the US and their allies after the invasion of the Russian to the Ukraine in 2022, irrevocably shattered the theory of the neutrality of dollar among the nations globally. Allies of US and USA froze over 300 billion US dollar Russian central bank assets which forces the other countries to reevaluate their strategy using the US dollar for their assets to keep them politically independent from the pressure of US and its allies. Once thought regarded as a neutral public benefit, the dollar is now clearly recognized as a tool of forceful diplomacy. This opinion was strengthened by the big Russian banks' absence from SWIFT. The possibility of such a repercussion generated substantial incentives for states that depend on dollar-based systems for essential commerce, especially energy-importing countries like China, India, and the other BRICS nations.

Furthermore, due of the decisions made during his administration, Trump's reelection as US president adds even another level of difficulty. Trump keeps threatening the BRICS countries, especially China, Russia, and India, for their efforts to progress de-dollarization. Nonetheless, countries in the global south realized how vulnerable the dollar was, which led them to look for other currencies to mitigate the risk for a stable economy and international trade.

CIPS vs CHIPS/SWIFT: Quantitative Evidence of Incremental, Not Preeminent

Comparative studies of the CIPS and CHIPS are not very accurate but can provide significant guidelines in drawing conclusions on the de-dollarization activities carried out by China and other BRICS countries. SWIFT handles about \$5 trillion worldwide every single day, while this data is comparatively very small for the CIPS, which handles about \$178 billion worldwide every day as support for the H3. Moreover, payment instructions are dominated by the US dollar, which is about 48%, compared to the US dollar, the Chinese yuan occupies 3% of the global flow. While clearly outclassing the competition. CIPS is trying to become the alternative for the western countries and BRICS partners, but still the countries are heavily dependent on the CHIPS payment system, which shows the intention and mild strategic intensity of the BRICS partners towards de-dollarization.

Official Discourse: Pragmatism over Revolution

According to the official report of BRICS, de-dollarization is framed as a question of risk management and financial resilience instead of fundamental upheaval. Countries like Russia and India, which were vocal about de-dollarization previously, also softened their voice on de-dollarization. India clearly rejected de-dollarization as the goal of the BRICS bloc; moreover, Russia also stated that the goal of BRICS is not going away from the domination of the SWIFT financial system but rather mitigating the risk of weaponization of the dollar for the stable global economy.

CONCLUSION

In conclusion, we have substantial support with the information that supports H1, H2 and H3 - but H3 provides the most accurate and most significant characterization. BRICS de-dollarization is neither purely economic nor purely geopolitical but more hybrid strategy to balance the risk of the economic turmoil and mitigate the geopolitical pressure to take their autonomous decision without feeling the interference of US and its allies. BRICS is creating a less dollar-dependent working environment for its members and partners rather than a post-dollar order currently. However, H1 is also supported by fact that the long-term drop in the dollar's reserve share started in the early 2000s, prior to any geopolitical shocks, although the timing and severity of post-2022 developments cannot be adequately explained by the economic primacy concept. The dollar declined gradually from 2000 and 2021, but after 2022, local currency trade settlement, gold purchases, and the establishment of substitute payment infrastructure all increased, indicating that geopolitical shocks were significant facilitators. Similar results have been observed with H2; however, the geopolitical thesis exaggerates its argument. The dollar's long-term reserve share previously declined. Prior to 2022, China has proved building the Cross-Border Interbank Payment System (CIPS) and expanding its reserves. Furthermore, the most conservative members (India, Brazil, South Africa) openly oppose dollar swapping as an objective, whereas the most geopolitically driven countries (Russia, Iran) possess the greatest de-dollarization plans. The most compelling evidence for H3 arises from the inherent conflicts within BRICS itself. This disparity, the simultaneous development of alternative infrastructure and public encouragement to USA is not inconsistency but rather a strategic approach: pragmatic hedging within a multipolar system.

REFERENCES

- Central Bank Gold Reserves by Country. (2026). <https://www.gold.org/goldhub/data/gold-reserves-by-country>
- Korab, P., Fidrmuc, J., & Dibooglu, S. (2023). Growth and inflation tradeoffs of dollarization: Meta-analysis evidence. *Journal of International Money and Finance*, 137, 102915.
- Saaida, M. (2024). BRICS Plus: de-dollarization and global power shifts in new economic landscape. *BRICS Journal of Economics*, 5(1), 13-33.
- Srinivas, P. S. (2022). Can China's CIPS help Russia after its ban from SWIFT. Massachusetts East Asia Institute, National University of Singapore.

WatcherWGuru. (2026). Breaking: BRICS Nation Now Settles 60% of Foreign Trade in Local Currency, Ditching US Dollar. <https://www.btcc.com/en-CA/amp/square/WatcherWGuru/1629491>

Van Agtmael, A. (2012). Think again: the BRICS. *Foreign Policy*, (196), 76.

RESEARCH ON THE IMPACT OF ESG ON COMPANY PERFORMANCE-BASED ON THE MEDIATING EFFECT OF SUPPLY CHAIN FINANCE

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ABSTRACT

Utilizing a sample of A-share listed companies in the Shanghai and Shenzhen markets from 2010 to 2024, this paper examines the impact of ESG performance on corporate financial performance and its underlying mechanisms. Furthermore, it explores the heterogeneous effects across different ownership structures and industry pollution levels. By constructing a mediating effect model, it is found that the ESG performance of companies has a significant positive impact on financial performance; supply chain finance plays a mediating role in the relationship between ESG performance and companies performance; the enhancing effect of ESG performance on companies performance is significantly stronger for non-state-owned enterprises than for state-owned enterprises, and for non-polluting enterprises than for polluting enterprises. This study not only broadens the research perspective of ESG performance, but also provides new theoretical evidence and empirical support for understanding the transmission path of supply chain finance in the process of ESG empowering companies performance.

Keywords: ESG, corporate performance, supply chain finance, mediating effect list.

INTRODUCTION

ESG measures the development quality of a company from three dimensions: environment, society, and corporate governance. It requires enterprises to pay attention to economic benefits while also taking into account environmental issues and social responsibilities, gradually becoming one of the standards for evaluating company development. With the frequent occurrence of extreme weather and the inclusion of ESG in credit ratings by the state, ESG has transformed from an optional choice to an indispensable element. However, at the same time, environmental protection investment may increase the operating costs of enterprises. Therefore, can enterprises achieve growth in performance while fulfilling their ESG responsibilities?

Current research generally holds that excellent ESG performance has a positive impact on a company's performance. Liu (2025) found that ESG performance improves financial performance through financing constraints and information transparency, with the relationship being influenced by the nature of the enterprise. Hu and Qin (2025) argue that ESG performance can also indirectly enhance corporate performance by reducing agency costs. Regarding high-tech sectors, Jin and Li (2026) found that excellent ESG performance promotes R&D investment, thereby enhancing company performance. Through the mediation effect, Hu et al. (2025) show that the above effect is realized by enterprise green innovation, and is especially pronounced in non-heavy pollution industries. However, some studies suggest that there is no significant relationship between the two. Ruhaya et al. (2018) conducted a study on Malaysian companies and found that there was no significant relationship between ESG performance and corporate performance. Liu and Zhang (2025) discovered that there was an imbalance between costs and benefits between the to in the short term.

Some studies have also confirmed the multi-faceted impacts of ESG ratings on supply chains. In terms of supply chain resilience, Deng and Jiang (2024) found that the quality of ESG disclosure can reduce the supply chain resilience of enterprises by reducing the degree of analyst prediction disagreement. In terms of supply chain efficiency, Wang and Rong (2025) believe that ESG performance significantly improves supply chain efficiency through mechanisms such as alleviating financing constraints, reducing transaction costs, and promoting technological

innovation. Additionally, some scholars have conducted research on supply chain financing. Chen and Huang (2026) found that enterprises with high ESG performance have significantly stronger supply chain financing capabilities.

Research on supply chain finance mainly focuses on the financial perspective and the supply chain perspective. From the financial perspective, Lu et al. (2019) believe that supply chain finance can optimize the financing structure and cash flow of enterprises and provide new ideas for enterprise financing. Liang and Fang (2024) found through research that supply chain finance can reduce enterprise period expenses and improve enterprise performance. From the supply chain perspective, supply chain finance takes the transaction relationships among enterprises in the supply chain as the credit basis, making it face the coordination of multiple relationships in the supply chain rather than focusing on two-party games (Xu et al., 2023). Yu and Kang (2017) found that supply chain finance can alleviate moral hazard. In summary, supply chain finance is highly beneficial to the development of the real economy.

In conclusion, ESG ratings will have an impact on financial performance through various mechanisms, good ESG performance can also enhance supply chain resilience, supply chain efficiency, and supply chain financing. However, few studies have analyzed the impact of ESG performance on supply chain finance, and even fewer have conducted research that integrates ESG performance, supply chain finance, and enterprise performance into a unified analytical framework. Therefore, exploring how ESG can influence enterprise performance through the supply chain finance path has important theoretical value and practical significance. This study contributes to the ESG-performance literature by introducing supply chain finance as a mediating channel, thereby extending the analysis from firm-level financing constraints to supply-chain-level value transmission. Based on the above analysis, this study intends to utilize the data of listed companies in Shanghai and Shenzhen A-share markets from 2010 to 2024, by establishing an intermediary model, to explore the impact of ESG performance on supply chain finance, as well as whether ESG can influence enterprise performance through the supply chain finance channel.

THEORY AND HYPOTHESIS

According to stakeholder theory, when managers fulfill their duties, they not only need to consider the interests of the enterprise owners, directors, etc., but also those of shareholders, employees, suppliers, and even the community (Tao et al., 2025). Actively fulfilling ESG responsibilities helps enterprises integrate various resources, promote the smooth progress of production activities, and ultimately translate into outstanding financial performance. Zhong et al. (2021) through the study of listed companies from 2012 to 2018, found that high-quality information disclosure can inhibit the behavior of lacking social responsibility, and thereby have a positive effect on enterprise performance. Based on the above analysis, this paper proposes:

Hypothesis 1: ESG performance positively affects corporate performance.

In the analysis of the relationship between ESG performance and supply chain finance, ESG performance actually plays the function of signal transmission. Excellent ESG ratings send positive signals to financial institutions and other enterprises in the supply chain that the enterprise has a stable operating capacity and low compliance risks (Song et al., 2023). Since high-quality enterprises usually have a longer-term strategic vision and more standardized management systems, they will pay more attention to ESG investment, and their ESG performance is often better (LINS et al., 2017). Based on the above analysis, this article proposes:

Hypothesis 2: ESG performance positively affects supply chain financial activities.

Supply chain finance can leverage the credit spillover effect of core enterprises to coordinate the financing needs of upstream and downstream enterprises (Yang, 2025), which requires a high level of information transparency. Against this backdrop, ESG information, as an effective supplement to financial data, fills the information gap from multiple dimensions of environment, society and governance (Wang & Hu, 2024). The driving force of supply chain finance on enterprise performance mainly stems from the relationship effect and the financing effect (Zhu & Chen, 2023). Specifically, it can directly improve financial performance by optimizing capital liquidity and enhancing information transparency (Chen & Wei, 2025), and can also reduce period expenses generated during the production and operation process of the core enterprise, thereby enhancing the financial performance of the enterprise (Lu et al.,

2022). In summary, the promoting effect of ESG performance on enterprise performance largely depends on the intermediary transmission of supply chain finance. Based on the above analysis, this article proposes:

Hypothesis 3: Supply chain finance acts as a mediator between ESG performance and enterprise performance.

ANALYSIS

Data

This study selected the data of 2010 to 2024 for 15 consecutive years of listed companies on the Shanghai and Shenzhen A-share markets as the sample data. Based on this dataset, this study conducts descriptive statistics, baseline regression analysis, mediation-effect tests, robustness checks, and heterogeneity analyses to empirically examine the relationship among ESG, supply chain finance, and corporate performance. The following processing was carried out on the data: (1) Removing abnormal operating samples such as ST and *ST; (2) observations with missing values were removed; (3) Considering the particularity of the financial industry, excluding the data of this industry; (4) Performing 1% and 99% tail trimming on continuous variables. After data processing, a total of 35,696 sample data were obtained. The ESG data used in this study comes from the Wind database, and other data comes from the CSMAR database.

Variables

The dependent variable is measured by ROA. Following Li et al. (2021), the return on assets (ROA), calculated as net profit divided by total assets, is used to measure the corporate performance. As a key indicator for evaluating an enterprise's operating performance, ROA can reflect the profit rate generated by the combined funds of the equity investors and bond investors of the enterprise (Zhou et al., 2025). The higher the indicator value is, the better the performance of the enterprise will be.

The core explanatory variable of this study is the ESG performance of companies, which is specifically measured by the Huazheng ESG rating score. The Huazheng ESG rating system is developed with reference to international frameworks while adapting to the Chinese market context, it deeply combines China's unique macroeconomic environment, policy orientation, and the actual governance structure of listed companies, and constructs an assessment framework with high local applicability (Liu, 2025).

The mediating variable in this study is supply chain finance (SCF). In order to more intuitively and accurately capture the actual participation of supply chain finance at the enterprise level and its specific impact on business performance, this paper follows the idea of Xu et al. (2023), selects the total value of note payable, accounts payable, and unearned receipts in the enterprise's financial statements, and then divides it by total assets to serve as the proxy variable for SCF.

Based on relevant studies (Hu et al., 2025; Yang, 2025; Zhu & Chen, 2023), the selection of control variables are as follows: fixed asset ratio, which is negatively correlated with corporate earnings (Wang, 2011); financial leverage, under the premise of ensuring reasonable debt costs, the debt ratio is positively correlated with corporate profitability (Qi et al., 2018); enterprise age, enterprise age can promote the enhancement of enterprise value, and enterprises with a longer establishment time are more likely to accumulate relevant experience for ESG investment (Guo & Zhang, 2017); proportion of independent directors on the board, independent directors can provide the enterprise with scarce resources such as relevant work experience and professional knowledge, and can also effectively supervise managers, which is of great benefit to the enterprise performance (Wang & Han, 2019); enterprise size, which has a positive moderating effect on the relationship between corporate social responsibility and operating performance (Yang & Yang, 2018); inventory ratio, inventory as the asset with the weakest liquidity and poorest liquidity among current assets, the proportion of inventory assets is negatively correlated with the enterprise's financial performance (Liu & Lai, 2017); audit fees, a good ESG performance of the enterprise can reduce audit fees (Wu et al., 2023). The variables of this research are shown in Table 1.

Table 1: Variable Description.

Variable Type	Variable Name	Variable Symbol	Variable Definition
Dependent Variable	Corporate Performance	ROA	Net profit / Total assets
Explanatory Variable	ESG Performance	ESG	Huazheng ESG Rating
Mediating Variable	Supply Chain Finance	SCF	(Notes Payable + Accounts Payable + Unearned receipts) / Total Assets
Control Variables	Fixed Asset Ratio	Fix	Fixed assets at year-end / Total assets
	Financial Leverage	Lev	Total liabilities at year-end / Total assets at year-end
	Enterprise Age	Age	ln(Current Year - Year of Establishment)
	Proportion of Independent Directors on the Board	Ddbl	Number of Independent Directors / Total Number of Board Members
	Enterprise Size	Size	ln (Total Assets)
	Inventory Ratio	Inv	Net inventory / Total assets
	Audit Fees	Audit	ln(Total Audit Fees)

Model

Following the approach of Li (2025), a benchmark regression model was constructed to examine the direct impact of ESG performance on enterprise performance. The model is set up as follows:

$$(1) ROA_{it} = \alpha_0 + \alpha_1 ESG_{it} + \Sigma \beta_k Control_{it} + \gamma_j + \delta_t + \varepsilon_{it} +$$

In the formula (1), ROA_{it} represents the enterprise performance of enterprise i in year t ; ESG_{it} represents the ESG evaluation score of the enterprise; $Control_{it}$ represents the set of control variables; γ_j represents the industry fixed effect; δ_t represents the year fixed effect; ε_{it} represents the error term. Besides, in order to control for the systematic differences among different industries due to factors such as industry characteristics, policy environment, and competitive landscape, this study has incorporated industry fixed effects into the model. Specifically, this study classified enterprises based on the “Guidelines for Industry Classification of Listed Companies” issued by the China Securities Regulatory Commission (CSRC) in 2012.

To explore the mediating role of supply chain finance between ESG performance and enterprise performance, this paper uses the three-step regression method proposed by Baron and Kenny to establish and summarize the effect model. The model is as follows:

$$(2) SCF_{it} = \beta_0 + \beta_1 ESG_{it} + \Sigma \beta_k Control_{it} + \gamma_j + \delta_t + \varepsilon_{it}$$

$$(3) ROA_{it} = \theta_0 + \theta_1 ESG_{it} + \theta_2 SCF_{it} + \Sigma \theta_k Control_{it} + \gamma_j + \delta_t + \varepsilon_{it}$$

RESULTS

Descriptive Statistics

The descriptive statistics of the dependent variable, explanatory variables, and control variables are presented in Table 2. The minimum value of the dependent variable ROA is -0.1985, the maximum value is 0.1970, and the median value is 0.0354. This indicates that the operating conditions of different listed companies vary significantly. The median value of the explanatory variable ESG is 4, suggesting that listed companies as a whole are at a medium level in terms of ESG. The mean value of the mediating variable Supply Chain Finance (SCF) is 0.1479, the minimum value is

0.0056, and the maximum value is 0.5004. This shows that the implementation level of supply chain finance by most listed companies is relatively low. And based on the above date, it can be found that the characteristics levels of different companies in the research sample show a certain degree of difference. In summary, the descriptive statistical analysis results obtained in this study are basically consistent with the actual situation of listed enterprises and have certain authenticity and reliability.

Table 2: Summary Statistics

VarName	Obs	Mean	SD	Min	Median	Max
ROA	35696	0.0358	0.0588	-0.1985	0.0354	0.1970
ESG	35696	4.1882	1.0906	1.0000	4.0000	7.0000
SCF	35696	0.1479	0.1087	0.0056	0.1207	0.5004
Fix	35696	0.2108	0.1553	0.0024	0.1800	0.6784
Lev	35696	0.4175	0.2001	0.0567	0.4104	0.8719
lnage	35696	2.1976	0.7950	0.6931	2.3026	3.4340
Ddbl	35696	37.7700	5.3480	33.3300	36.3600	57.1400
Size	35696	22.3588	1.2877	20.1621	22.1435	26.4074
Inv	35696	0.1338	0.1193	0.0000	0.1076	0.6487
Audit	35696	13.9313	0.6774	12.6115	13.8155	16.3079

Regression Analysis

This paper conducts a benchmark regression analysis based on the previous model (1), and the test results are shown in Column (1) of Table 3. It can be seen that ESG performance has a significant positive impact on corporate performance (ROA). The estimated coefficient of ESG is 0.0051, meaning that without considering other factors, for every one-unit increase in ESG performance, the enterprise performance will increase by 0.0051 units. From the actual situation, enterprises actively fulfilling ESG responsibilities is an embodiment of practicing the sustainable development concept. By enhancing their own soft power and promoting smooth production activities, it helps to improve enterprise performance. Hypothesis H1 is thus established.

The regression results in the Column (2) of Table 3 clearly demonstrate the significant promoting effect of ESG performance on supply chain finance (SCF). The ESG coefficient is 0.0041, and it is highly significant at the 1% level. This result strongly supports Hypothesis 2. This finding indicates that enterprises with good ESG performance can effectively promote the implementation of supply chain finance activities. Excellent ESG ratings convey positive signals of stable operation and low compliance risks to financial institutions and supply chain partners. Consequently, financial institutions become more willing to provide supply chain financial services, thereby promoting the development of supply chain finance. This result not only validates the value of ESG in the field of supply chain finance but also provides a theoretical basis for enterprises to obtain more financial support by improving their ESG performance.

The Column (3) of Table 3 integrates ESG performance, supply chain finance, and corporate performance into a unified analytical framework, revealing the transmission mechanism among the three. Firstly, the coefficient of ESG performance remains significantly positive (0.0049), indicating that even after controlling for the influence of supply chain finance, the direct impact of ESG on corporate performance still exists. More importantly, the coefficient of supply chain finance (SCF) is significantly positive (0.0588), suggesting that supply chain finance has a significant positive impact on corporate performance. This result reveals the path through which ESG performance affects corporate performance via supply chain finance: ESG performance promotes the development of supply chain finance, and the enhancement of supply chain finance further improves corporate performance. This transmission mechanism indicates that the information conveyed by ESG ratings are transmitted through supply chain finance and ultimately lead to an improvement in enterprise performance, thereby verifying Hypothesis 3.

Table 3: Regression Results.

	Baseline Regression	Mediation Regression	
	(1)	(2)	(3)
	ROA	SCF	ROA
ESG	0.0051*** (0.0006)	0.0041*** (0.0009)	0.0049*** (0.0005)
SCF			0.0588*** (0.0066)
Fix	-0.0358*** (0.0056)	-0.0856*** (0.0159)	-0.0307*** (0.0057)
Lev	-0.1237*** (0.0043)	0.2875*** (0.0173)	-0.1406*** (0.0045)
Inage	-0.0093*** (0.0010)	-0.0015 (0.0022)	-0.0092*** (0.0010)
Ddbl	-0.0001 (0.0001)	-0.0005*** (0.0002)	-0.0001 (0.0001)
Size	0.0183*** (0.0011)	0.0032 (0.0025)	0.0181*** (0.0011)
Inv	0.0142* (0.0078)	0.0817*** (0.0219)	0.0094 (0.0073)
Audit	-0.0137*** (0.0017)	-0.0145*** (0.0033)	-0.0128*** (0.0017)
cons	-0.1232*** (0.0167)	0.1709*** (0.0379)	-0.1332*** (0.0165)
Industry fixed effect	YES	YES	YES
Year fixed effect	YES	YES	YES
r2 a	0.2626	0.4813	0.2687
F	292.8434	49.9803	305.6052
N	35696	35696	35696

Note: Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; ROA: Corporate Performance; ESG: ESG performance; SCF: Supply Chain Finance; Fix: Fixed Asset Ratio; Lev: Financial Leverage; Age: Enterprise Age; Ddbl: Proportion of Independent Directors on the Board; Size: Enterprise Size; Inv: Inventory Ratio; Audit: Audit Fees.

A bootstrap test further confirms the mediating effect. The indirect effect is 0.0002411, and the 95% confidence interval does not include zero, indicating that the mediation effect of supply chain finance is statistically significant.

Robustness Test

Given that there may be endogeneity issues due to bidirectional causality between the dependent variable, enterprise performance ROA, and the independent variable, ESG performance, as well as the fact that ESG data often has reporting lags or update delays, this paper refers to Liu (2025) for data processing of the independent variables and related control variables by lagging one period and two periods. The results show that the impact of ESG performance on enterprise financial performance remains significantly positive at the 1% level, and the research conclusion still holds, indicating the robustness of the baseline regression and partially eliminating its endogeneity.

To test the robustness of the regression results, this paper uses ROE (Return on Equity) instead of ROA as the dependent variable for the regression analysis. The results show that the impact of ESG performance on ROE remains significantly positive after controlling for the variables. Moreover, ESG can still enhance the performance of supply chain finance, and the positive impact of supply chain finance on ROE is also significantly present.

To further test the robustness, this paper employs a differentiated ESG scoring system to evaluate the ESG performance of enterprises. Following the method of Liu et al. (2025) for replacing explanatory variables, the percentage-based ESG score is used to replace the traditional scoring method, providing a more comprehensive analysis of the comprehensive performance of enterprises. And after replacing the explanatory variables, the research conclusion of this paper still holds.

Heterogeneity Analysis

The heterogeneity analysis of this article is conducted based on the nature of enterprises (Liu, 2025) and the degree of industry pollution (Yang et al., 2023), and the Table 4 is the results. The results show that the positive impact of ESG performance on the financial performance of non-state-owned enterprises is significantly stronger (0.0062) than that on state-owned enterprises (0.0034), and the positive impact of ESG performance on the financial performance of non-high-pollution industries (0.0062) is significantly stronger than that on high-pollution industries (0.0024). This proves the existence of enterprise heterogeneity and industry heterogeneity. This indicates that by improving the ESG performance of enterprises, non-state-owned enterprises and non-high-pollution industries can more effectively enhance their corporate reputation and financing capabilities, thereby translating into more significant improvements in financial performance.

In contrast, state-owned enterprises, due to their greater responsibility and policy obligations, have relatively weaker economic benefits from their ESG performance. And high-pollution industries, due to bearing more environmental governance costs and policy tasks, have relatively weaker economic benefits from ESG performance.

Table 4: Heterogeneity Analysis Results.

	(1)	(2)	(3)	(4)
	Non-SOE	SOE	High-Pollution	Non-High-Pollution
	ROA	ROA	ROA	ROA
ESG	0.0062*** (0.0006)	0.0034*** (0.0007)	0.0024*** (0.0007)	0.0062*** (0.0005)
Control Variables	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES
N	23105	12591	7924	27772

CONCLUSIONS AND IMPLICATIONS

The study reaches the following conclusions. First, ESG performance has a significant positive impact on a company's financial performance. Excellent ESG performance not only aligns with the concept of sustainability but also converts non-financial advantages into actual financial returns. Secondly, ESG performance can effectively promote the development of supply chain financial activities. Excellent ESG ratings send positive signals to financial institutions that the enterprise operates stably and has a low default risk, thereby stimulating the willingness of funding parties to grant credit. Thirdly, supply chain finance plays a significant mediating role in the relationship between ESG performance and enterprise performance. ESG performance enables enterprises to overcome financing barriers and obtain supply chain finance resources. Supply chain finance, leveraging its financing effect and ability to coordinate multiple interests, ultimately translates ESG strategic investment into a substantial improvement in financial performance. Fourth, the heterogeneity analysis shows that the positive impact of ESG performance on enterprise performance is significantly stronger in non-state-owned enterprises compared to state-owned enterprises, and is also significantly stronger in non-high-pollution enterprises compared to polluting enterprises.

The suggestions are as follows. Firstly, enterprises should elevate ESG to a strategic level and view it as the key to building long-term competitive advantages. Non-state-owned enterprises and non-high-pollution industries should take the initiative to benchmark against international standards (such as the International Financial Reporting Standards), and systematically disclose ESG information. Secondly, enterprises should use ESG as a tool to solve financing problems, in order to reduce information asymmetry with financial institutions and supply chain partners,

and thereby lower financing costs. Thirdly, the Chinese government and financial institutions should draw on the disclosure frameworks and standards of developed countries (such as the Corporate Sustainability Reporting Directive of the European Union), to lay the foundation for high-quality ESG reports, while preventing supply chain financial risks.

In addition, this study has the following limitations: first, due to the relatively limited ESG information disclosure by Chinese enterprises, the sample size is restricted; second, the differentiated impacts of each ESG dimension (environment, social, governance) have not been thoroughly explored; finally, there is no unified standard for measuring supply chain finance, and different studies have different focuses on it. Future research can adopt other measurement standards and conduct more in-depth studies with specific focuses.

REFERENCES

- Chen, J., & Wei, X. (2025). Does ESG Rating Divergence Affect Corporate Performance? *Reform*(06), 148–163.
- Chen, R., & Huang, H. (2026). ESG Performance and Corporate Supply Chain Financing Capability: An Examination from the Perspectives of Signaling and Risk Mitigation. *Journal of Ningbo University(Liberal Arts Edition)*, 39(01), 101–118.
- Deng, Q., & Jiang, M. (2024). The quality of enterprise ESG information disclosure and supply chain resilience. *Finance and Accounting Monthly*, 45(11), 33–39.
- Guo, M., & Zhang, C. (2017). An Empirical Study on the Relationship between Enterprise Age, R&D Investment and Performance: Based on the Experience Data of A-share Listed Companies in Zhejiang Province. *Communication of Finance and Accounting*(36), 52–56.
- Hu, H., Zheng, X., & Hu, S. (2025). The impact of ESG performance on corporate performance: Analysis from the perspective of green innovation. *Journal of Anhui Business College*, 24(04), 44–50.
- Hu, J., & Qin, J. (2025). Research on the Impact Mechanism of ESG on Enterprise Performance under the "Dual Carbon" Goals. *Productivity Research*(11), 119–124.
- Jin, J., & Li, Y. (2026). ESG performance, R&D investment and enterprise performance. *Journal of Heilongjiang University of Technology(Comprehensive Edition)*, 1–6.
- Li, J., Yang, Z., Chen, J., & Cui, W. (2021). Study on the Mechanism of ESG Promoting Corporate Performance: Based on the Perspective of Corporate Innovation. *Science of Science and Management of S.& T.*, 42(09), 71–89.
- Li, Y. (2025). Research on the Impact of Corporate ESG Performance on Financial Performance. *Business & Economy*(08), 172–174+184.
- Liang, Y., & Fang, J. (2024). The Impact of Supply Chain Finance on the Financial Performance of Core Enterprises Adoption Examinations. *Science Technology and Industry*, 24(08), 65–71.
- LINS, K. V., SERVAES, H., & TAMAYO, A. (2017). Social Capital, Trust, and Firm Performance: The Value of Corporate Social Responsibility during the Financial Crisis. *The Journal of Finance*, 72(4), 1785–1824.
- Liu, C., & Lai, D. (2017). Research on the Impact of the Asset Structure of China's Rare Earth Enterprises on Financial Performance from the Perspective of the Industrial Chain. *Journal of Jiangxi University of Science and Technology*, 38(04), 52–58.
- Liu, H., & Zhang, S. (2025). Does ESG Performance Improve Corporate Financial Performance?-A Multilevel Quadratic Growth Analysis in Ownership. *Journal of Hebei University of Technology(Social Sciences Edition)*, 17(01), 1–12.

- Liu, Y. (2025). Research on the Impact of ESG Performance on Corporate Financial Performance: A Dual-Mechanism Test Based on Financing Constraints and Information Transparency. *Journal of Entrepreneurship in Science & Technology*, 38(08), 184–191.
- Liu, Y., Wei, S., Li, X., Zhang, Y., & Xu, X. (2025). Research on the Impact of ESG Ratings on the Financial Performance of Heavy Polluting Enterprises - From the Perspective of Debt Financing Costs. *Modern Business*(22), 187–192.
- Lu, Q., Liu, B., & Song, H. (2019). The Impact of SME's Capability on Its Supply Chain Financing Performance: A Study Based on Information Perspective. *Nankai Business Review*, 22(03), 122–136.
- Lu, Q., Yang, X., & Zhou, L. (2022). The Impact of Relationship Governance and Contract Governance on Supply Chain Financing Performance. *Management Review*, 34(08), 313–326.
- Qi, S., Lin, S., & Cui, J. (2018). Do Environmental Rights Trading Schemes Induce Green Innovation? Evidence from Listed Firms in China. *Economic Research Journal*, 53(12), 129–143.
- Ruhaya, A., Mahmudul, A. M., Jamaliah, S., & Mohamed, Z. (2018). The impacts of environmental, social, and governance factors on firm performance: Panel study of Malaysian companies. *Management of Environmental Quality: An International Journal*, 29(2), 182–194.
- Song, H., Han, S., Liu, W., & Ganguly, A. (2023). What role do FinTech companies play in supply chain finance? A signaling intermediary perspective. *The Journal of Business & Industrial Marketing*, 38(6), 1279–1294.
- Tao, X., Chen, Y., Li, D., & Feng, X. (2025). The Relationship among Corporate ESG Performance, Green Technology Innovation and Corporate Performance. *Science & Technology Progress and Policy*, 42(15), 87–97.
- Wang, S. (2011). Empirical Study on the Impact of Asset Structure on Earnings. *Statistics & Decision*(18), 145–148.
- Wang, Y., & Han, Y. (2019). Impact of Technological Innovation on Enterprise Performance Based on the Governance Structure Perspective. *Journal of Heilongjiang Bayi Agricultural University*, 31(06), 96–104.
- Wang, Y., & Hu, Z. (2024). Empirical Examination of the Impact of Corporate ESG Performance on Supply Chain Resilience. *Statistics & Decision*, 40(08), 179–183.
- Wang, Y., & Rong, Y. (2025). Does ESG Responsibility Fulfillment Improve Supply Chain Efficiency?-Empirical Evidence from Listed Companies. *Journal of Harbin University of Commerce(Social Science Edition)*(02), 96–113.
- Wu, P., Yang, K., Qiao, Z., Luo, J., & Jiang, J. (2023). Research on the Impact of Corporate ESG Performance on Audit Fees: Empirical Evidence from A-share Listed Companies. *Friends of Accounting*(14), 18–27.
- Xu, P., Sun, N., & Ao, Y. (2023). Supply Chain Finance and Enterprise Innovation Input. *Foreign Economics & Management*, 45(11), 49–61.
- Yang, J., & Yang, W. (2018). Social Responsibility, Firm Size and Operating Performance. *Commercial Science Research*, 25(04), 97–102.
- Yang, R. (2025). The impact of supply chain finance on corporate performance-Based on the data of Shanghai and Shenzhen A-share manufacturing enterprises. *China Journal of Commerce*, 34(20), 124–128.
- Yang, R., Deng, C., & Hou, X. (2023). The Impact of ESG Performance on Firm Performance. *Journal of Technology Economics*, 42(08), 124–134.
- Yu, H., & Kang, C. (2017). Research on Financing Mechanism of SME Based on Supply Chain Finance. *Nankai Economic Studies*(04), 141–152.

Zhong, P., Wu, T., & Li, X. (2021). An Empirical Study on the Relationship among Corporate Social Responsibility Report, Social Irresponsibility and Financial Performance of Listed Companies. *Frontiers of Science and Technology of Engineering Management*, 40(01), 17–23.

Zhou, C., Yang, J., Wang, S., Chen, F., & Zhu, T. (2025). The Impact of ESG Ratings on Enterprise Performance. *China Market*(22), 84–87.

Zhu, X., & Chen, J. (2023). Has supply chain finance improved the business performance of enterprises? *Management and Administration*(07), 13–19.

CRITICAL AND STRATEGIC PERSPECTIVE: SHAPING THE FUTURE OF UNIVERSAL ORGANIZATION AND EXPERTISE IN SOUTH AFRICA

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ABSTRACT

Critical and strategic viewpoints centered on utilizing technology transfer, coordinating skill development with innovation demands (especially the Fourth Industrial Revolution, or 4IR), and creating a capable, moral, and progressive state are necessary to shape the future of universal organization and expertise in South Africa. In the 4IR, South Africa is at a crucial point. In order to increase productivity and generate new job prospects while controlling the displacement of traditional jobs, strategic planning places a strong emphasis on spearheading digital transformation, including robotics, AI, and the Internet of Things (IoT). In order to provide universal access, particularly in underserved areas, the Universal Service and Access Agency of South Africa (USAASA) are essential in developing digital. Addressing the mismatch between present abilities and the demand of a changing economy is a key tactic. This paper will adopt desk top method research to have an in-depth understand as well as to contribute immensely on the researched issue. Preliminary findings are that the National Development Plan (NDP) 2030, which speaks to the overarching plan to eliminate poverty and reduce inequality by 2030 through various interventions, including growing an inclusive economy and building capabilities. The National Digital and Future Skills Strategy lay forth a strategy to get South Africa's labour force ready for the opportunities and challenges brought about by the 4IR. The 2025–2030 National Skills Fund (NSF) Strategic Plan: a plan for effective skill development that promotes economic growth and is in line with national interests.

Keywords: USAASA, National Development Plan (NDP), policy analysis, Fourth Industrial Revolution (4IR), National Skills Fund (NSF).

INTRODUCTION

Strategic management is the greatest level of critical inquiry, decision-making, and planning inside a corporation, while implemented effectively, strategic management blends a company's goal, vision, and values with the reality of the competitive market and business needs. The approach highlights the significance of digital skills for developing new professions in the twenty-first century and integrating digital capabilities with critical thinking and problem-solving abilities (Department of Communications and Digital Technologies, 2020; pg. 8).

Harvard Business Review in Quantive WorkBoard (2025) found the strategic management as how a corporation planned, puts into action, and checks its big-picture decisions. It's a continual process that helps a business attain its long-term goals. In a simple manner it is about making sure what the organisation can offer meets what the market requires, so that the organisation could stay ahead of a competition over time.

The Policy Analysis on the Influences of Strategic Management Efficacy and Efficiency of Performance in South Africa

The influence of strategic management on performance efficiency and effectiveness. Strategic planning, focused on the organization's objectives and strategies, delineates the necessary actions for their attainment; thus, effective strategic management improves overall organizational performance. It is expected that adherence to these procedures will enhance the organization's performance. The significance of strategic management is evident, as an ineffective

strategy necessitates revision and reorganization to align with the performance enhancement requirements of the corporation (Synergy to Excellence, 2025).

According to Department of National Treasury (2019, pg. 10) Despite frameworks aiming for outcome-based planning and accountability, policy analysis in South Africa shows that while strategic management is required, its effectiveness in driving performance particularly pertaining service delivery is found to be hampered by misalignment, weak implementation, resource constraints like Human Resources finance, and poor monitoring. Integrating performance management systems (PMS) with more general policy, resolving capacity shortages (SOEs lag), cultivating political will, and going beyond mere planning to real, quantifiable results highlighting Monitoring and Evaluation (M&E) as essential for connecting strategy to concrete outcomes are some of the major obstacles.

LITERATURE REVIEW ON POLICY ANALYSIS FROM A CRITICAL AND STRATEGIC PERSPECTIVES INFLUENCING THE FUTURE OF GLOBAL BUSINESS AND TECHNOLOGY: SOUTH AFRICAN CONTEXT

The literature review on policy analysis from a critical and strategic perspectives in the South African context is a comprehensive examination of the factors influencing policy implementation and the broader implications for global business and technology. It highlights the need for a deeper understanding of the interplay between policy intentions and implementation, as well as the role of civil society in shaping public policy. The review also emphasizes the importance of strategic choices and operational decisions in policymaking, and the need for a model that addresses the complexities of policy implementation in the public sector. A shift from inflexible, conventional structures to robust, learning-oriented systems is emphasized in literature about the future of South African organizations and expertise. This change is framed by the urgent need to adjust to global technological disruption as well as the necessity to confront historical socioeconomic legacies.

Industrial Policy Interventions of the South African Government Since 1994; Focusing on the Sixth Administration (2019-24)

According to the Department of Trade Industry and Competition (2024, pg1) Industrial policy's function is to stimulate the state and encourage private investment in order to increase economic growth and inclusivity, that was crucial for fostering investor trust and providing a foundation for employment growth. Moreover, during the Sixth Administration, global instability, system-level shocks, and trends, as well as innovation within the limitations of an increasingly complicated setting, defined industrial strategy. Through a strategic focus on aligning South Africa with the global green economic and technological revolutions and connecting its trade policy to Africa's positive economic development and growth story while continuing to strengthen government institutional capability and its fruitful partnerships with the private sector, significant lessons have been learned that will inform the next stage of the development of industrial policy, with a strategic focus on connecting South Africa's trade policy to Africa's positive economic development and growth story and aligning the country with the global green economic and technological revolutions. At the same time, government institutional capability and its fruitful partnerships with the private sector will be strengthened.

Policy Analysis Strategy-Implementation Gap

Although there are required strategic plans, service delivery goals are frequently not met, which results in underspending and subpar results. Even when plans are coordinated on paper, they often fail due to flaws in Performance Management Systems (PMS) and strategy alignment. What is the difference between outcomes-based planning and monitoring and evaluation (M&E), which are crucial for integrating strategy, planning, and performance but are frequently neglected or poorly implemented? needs to be more capable and concentrate on outcomes rather than merely actions.

Science for Society and Policymaking in South Africa

According to Council for Scientific and Industrial Research (CSIR) (2025) Nations across the world are increasingly attempting to use science as a tool for development and progress. Additionally, science plays a crucial role in the worldwide endeavours to promote sustainable development. Thus, there has never been a more important time to examine the relationship between science and society and the function of science in society. According to them, interested parties would have to be welcomed to attend the "public science" event, which offers a forum for discussion and debate on the function of science in South African and African society as well as worldwide. The program features an exhibition, public outreach initiatives, and more than some number of participants for discussion and debate.

Gaps in the Implementation of Policy Analysis Strategies in Southern Africa

A substantial "policy-implementation gap" exists in Southern Africa, especially in South Africa, where theoretically good policies do not provide the desired results, severely impeding policy implementation. Political, institutional, and capability limitations are some of the main gaps that cause a discrepancy between the high-level, planned goals and the real, useful outcomes of service delivery (Nokele, 2022). Community institutions, which are primarily located within the community, have a greater influence on the execution of public policies. The belief that institutions belong to a unique category of valid pressure groups. Because of their specific output, community institutions have a more specialized role in executing public policy than other interest groups. Churches, the military, journalists, policy analysts, powerful politicians, the public administration itself, and even local government are all part of the institutional group. Moreover, Institutions stand for institutional-based theory models of politics and public policy as well as elite group theory. Consequently, "stability and regular politics" have come to be linked with communal institutions. The following model serves as a practical guide to centralising the function of policy players in the policy implementation stages.

South Africa's Policymaking and Implementation Process: Obstacles and Justice-Based Remedies

According to Maele (2025) implementing policies achieves "policy objectives through the planning of operations and projects so that desired impacts and agreed upon outcomes are achieved." The acts or activities that actors or stakeholders must carry out to achieve the objectives of a policy or set of policies are recognized in this article as policy implementation. The conversion of mostly financial and physical resources into tangible outputs intended to accomplish policy goals or into tangible service delivery outputs in the form of facilities and services is known as public policy implementation. Policies are implemented by "what transpires between the establishment of an apparent intention on the part of the government to do something or stop doing something and the ultimate impact of the world of actions," according to certain discourses. Actions taken by public or private persons (or groups) with the intention of achieving the goals specified in previous policy choices are referred to as policy implementation. The precise definition of policy implementation is "carrying out, accomplishing, fulfilling, reducing, or completing a given task."

The Policy Gaps in South Africa

Brynard (2023) allude to the fact that in Southern Africa, there is a significant "policy-practice gap," whereby top-down, ambitious programs fall short because of inadequate administrative capabilities, a lack of funding, and a lack of interagency collaboration. Corruption, a lack of political commitment, and centralized planning that disregards local reality are major obstacles. In order for plans to improve, these bottlenecks must be addressed through improved resource allocation, increased stakeholder engagement, and more robust, transparent monitoring methods.

Further issues have been identified by (Public Admin Institute, 2025) that among the difficulties causing this disparity could also be resource and capacity constraints, that could be associated with the poor administrative systems, a lack of staff, and inadequate financing are major obstacles to successful implementation. Top-Down, Centralized Planning, here it has been realised that there was a gap between the creation of national policies and their implementation at the local level, which frequently ignores stakeholder input and local settings. Political and Bureaucratic Barriers has to do with the implementation of policies which are particularly hampered by a lack of

political will, corruption, and bureaucratic structural resistance. Particularly the coordination failures have, however, led to the ineffective, disjointed execution results from a lack of coordination amongst several government entities.

CONCLUSION AND RECOMMENDATIONS

Make digital literacy and skill development a priority. Pay particular attention to STEM and 4IR skills. To fill high-demand, low-competition positions, actively teach young people in digital skills, AI, mechatronics, and renewable energy.

Implement Lifelong Learning: Instead of depending only on conventional, static certifications, create a micro-credentialed, industry-aligned skills system that encourages ongoing retraining.

Public-Private Partnership: To guarantee that training directly corresponds with in-demand roles, TVET universities and industry should work together more closely. Make digital literacy and skill development a priority. Pay particular attention to STEM and 4IR skills. To fill high-demand, low-competition positions, actively teach young people in digital skills, AI, mechatronics, and renewable energy.

Implement Lifelong Learning: Instead of depending only on conventional, static certifications, create a micro-credentialed, industry-aligned skills system that encourages ongoing retraining.

Public-Private Partnership: To guarantee that training directly corresponds with in-demand roles, TVET universities and industry should work together more closely. Create Organizational Structures That Are Resilient and Adaptive:

Transition from Compliance to Performance: Transition from reporting that is solely compliance-based to management that is performance-driven and outcome-based.

Promote Agility: Instead of inhibiting the development of new organizational cultures that are adaptable to technological change, promote it.

Boost Strategic Execution and Governance:

Depoliticize Important Positions: Make sure that competence and merit, not political affiliation, are used to fill senior roles in the public sector.

Enhance Execution Discipline: Establish a culture of accountability and close the gap between strategy, planning, and action through organized monitoring and assessment.

Strengthening implementation, improving accountability, and encouraging participatory governance are necessary to close the gap between policy rhetoric and practice in South Africa. Reducing bureaucratic inefficiencies in land reform, fighting corruption, enhancing resource allocation for service delivery, and promoting an inclusive economy to address inequality are some of the main ideas.

Bridge Policy Gaps

Improve implementation mechanisms by putting more emphasis on carrying out policies rather than creating them, especially in the case of land reform, which may call for the use of third parties to cut down on red tape. Boost accountability and anti-corruption by instilling in the strict measures in place to fight corruption, which impedes the provision of services, and guarantee openness in the governance of the public, private, and informal sectors. Encourage participatory governance, also to guarantee that policies are in line with community needs, actively involve residents, civil society, and stakeholders in the development and oversight of policy implementation. Socio-economic inequality could be addressed according to studies like this Oxfam South Africa article, reducing poverty and improving economic, sustainability, and development outcomes require a focus on equitable taxation, job creation, and investments in basic services (health, education, infrastructure). Building capacity would make sure that government agencies have enough money and staff to fulfil their responsibilities by addressing resource constraints.

Finally, the adaptation to new challenges would greatly assist to create flexible, forward-thinking policies that tackle contemporary difficulties like digital regulation, climate change, and service delivery problems associated with urbanization.

REFERENCES

- Brynard, P.A. (2023). The Policy Gap in South African. UP Space Repository: <https://repository.up.ac.za/server/api/core/bitstreams/5c3e0666-dffc-4cc5-a855-246633d587e2/content>. Accessed: 12/02/2026.
- Council for Scientific and Industrial Research. (2025). Science Forum South Africa. Pretoria: Science Forum South Africa.
- Department of International Relations. (2025). South Africa's National Interest Framework Document on South Africa's National Interest and its advancement in Global environment. Pretoria: South African Government.
- Department of Trade Industry and Competition. (2024). Industrial Policy & Strategy Review Transforming Vision into Action: Charting South Africa's Industrial. Pretoria: South Africa
- Department of National Treasury. (2019). Framework for Strategic Plans and Annual Performance Plans South Africa. Pretoria: South Africa
- Department of National Planning Commission. Our future - make it work National Planning Commission: National Development Plan 2030. Pretoria: South African Government.
- Harvard Business Review. (2025). Strategic Management Explained: Concepts, Examples, and Trends for Business Success. <https://quantive.com/resources/articles/strategic-management>
- Maele, K.D. (2025). Policy-making vs implementation in South Africa: Challenges and justice-based solutions. Research in Business & Social Science IJRBS VOL 14 NO 5, ISSN: 2147-4478. <https://www.ssbfnct.com/ojs/index.php/ijrbs>
- Nokele, S.K. (2022). Context and Realities of Policy Implementation in South Africa: Quo Vadis. American Journal of Multidisciplinary Research and Innovation, 1(6), 76-81. <https://journals.e-palli.com/home/index.php/ajmri/article/view/898>
- Synergy to Excellence. (2025). Strategic management impact on the efficiency and effectiveness of performance. <https://synexcell.sa/strategic-management-impact-on-the-efficiency-and-effectiveness-of-performance-2/>