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Volume 21, Number 2
2025
ISSN 1553-5495 (Print)
ISSN 2616-2733 (Online)

Journal of Global Business and Technology

SELECTED CONTENTS

In Cooperation with the Global Business and Technology Association

Journal of Global Business and Technology *Volume 21, Number 2, 2025*

The Journal of Global Business and Technology

Volume 21, Number 2, 2025

Publisher

Global Business and Technology Association, Inc. (GBATA)
22 Cobblers Lane
Dix Hills, New York 11746
U.S.A.

Publication Details

Continous Publication Schedule
ISSN 1553-5495 (Print)
ISSN 2616-2733 (Online)

Published in the United States of America, 2025

Website

Further information is available on the Global Business and Technology Association website at: www.gbata.org

All full papers submitted to the Journal of Global Business and Technology are subject to a double-blind peer reviewing process, using subject specialists selected for their expert knowledge.

The Journal of Global Business and Technology, in cooperation with the Global Business and Technology Association, is listed with [1] Scopus, [2] Cabell's International Journalytics, [3] EBSCO's Academic Search, and [4] ProQuest's database including the International Bibliography of Social Sciences (IBSS). This allows researchers from throughout the world to access articles from the journal.

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Abstract: *This study investigates the factors influencing the e-entrepreneurial intention of Vietnamese youth in the context of the rapidly growing online business environment, which has attracted significant interest, particularly from young people seeking to enter this market. The primary objective is to identify and evaluate both the number and the degree of influence of these factors on the intention of Vietnamese youth to engage in e-entrepreneurship. A mixed-method approach combining qualitative and quantitative techniques was applied, with data collected through an online survey of 404 young Vietnamese individuals who expressed an intention to start an online business. The Structural Equation Modelling (SEM) technique was employed for data analysis using SmartPLS software. After the analysis, one hypothesis was not supported, while 12 were confirmed as significant. Therefore, the results confirmed all 12 proposed hypotheses. Among these, factors such as attitude, technological trends, and subjective norms were found to have a stronger influence than other variables. These findings offer a comprehensive overview and provide practical managerial implications for young individuals and digital platforms supporting e-entrepreneurial activities.*

Abstract: This study explores the mechanisms through which digital leadership influences innovative work behaviour among early-career research and development professionals in Indonesia's automotive industry. Drawing on social cognitive theory, the research examines the serial mediating roles of creative self-efficacy and employee creativity, and the moderating role of knowledge sharing as a cross-level contextual variable. Utilizing structural equation modelling on data collected from 256 employees through purposive sampling, across four leading automotive firms, the study confirms that digital leadership significantly fosters innovative work behaviour through a two-stage mediation: first by enhancing employees' belief in their creative self-efficacy, which subsequently promotes actual creative behavior, leading to greater innovation at work. Notably, while creative self-efficacy independently mediates this relationship, employee creativity only becomes significant as part of a sequential mediation process. Furthermore, the study identifies a nuanced moderating role of knowledge sharing, at lower levels of knowledge sharing, digital leadership exerts a stronger influence on creative self-efficacy, whereas this effect diminishes at higher

Abstract: This paper examines a third way to manage commodity risk: an Upstream Equity Hedge (UEH), i.e., a minority upstream stake that offsets input-price shocks while keeping market-based procurement. Using Indofood's stake in Brazil's Companhia Mineira de Açúcar e Álcool (CMAA) as a single embedded case, we link ICE #11 sugar futures to Indofood's equity-method results and carrying amount. After analyzing 11 years (2013-2024) of context, with a focus on results from 2020-2024, evidence centers on the 2023 sugar-price spike and its 2024 normalization: the carrying amount increases materially in 2023 and partially retraces in 2024, consistent with directional cushioning in high-price regimes. An Offset Ratio that relates changes in associate income and carrying amount to a modeled sugar-attributable cost shock is formalized, providing an auditable, direction-of-change metric rather than a one-for-one hedge claim. Managerially, UEH offers a portable design that stabilizes internal funds during stress while maintaining competitive sourcing and supplier optionality.

Abstract: Celebrity endorsements can positively influence consumer attitudes and purchase intentions. However, the extent to which this effect applies to green products has not been widely explored in Vietnam. Therefore, this study aims to examine the impact of celebrity endorsers on consumers' attitudes and purchase intentions for green products. Data were collected through an online survey using convenience sampling and analyzed with Smart PLS. Results indicate that the attractiveness of celebrity endorsements positively affects consumers' attitudes toward advertisements. Meanwhile, the celebrity-brand fit of celebrity endorsements positively impacts both consumers' attitudes toward advertisements and their attitudes toward green brands. In turn, consumers' attitudes toward advertisements and attitudes toward green brands positively influence green purchase intentions. Furthermore, both attitudes toward advertisements and green brand attitudes serve as key mediating variables. The study also finds that trustworthiness and expertise do not affect attitudes or purchase intentions for green products. These findings provide important theoretical and practical implications within the context of celebrity endorsements for green products.

Abstract: This study examines gender disparities in Nepal's labor migration using fiscal year 2080/81 (July 2023 – July 2024, GC) approval data. Women made up only 10.8% of total approvals, highlighting their underrepresentation. Men mostly migrate cyclically to GCC countries via re-entry permits, while women go through agencies to Kuwait, Jordan, and the UAE for domestic work. Chi-square tests reveal a significant link between gender and recruitment type, and spatial analysis shows female migration is concentrated in western Terai and Kathmandu. The study urges gender-responsive migration policies that address structural barriers and expand safe, equitable pathways for women.

NOTE FROM THE EDITORS

As an interdisciplinary indexed journal, *The Journal of Global Business and Technology (JGBAT)* serves academicians and practitioners in the fields of global business and technology management and their related areas. JGBAT is also an appropriate outlet for manuscripts designed to be of interest, concern, and applied value to its audience of professionals and scholars. Readers will note that our attempt to bridge the gap between theory and practice has been successful.

We cannot thank our reviewers enough for having been so professional and effective in reiterating to contributors the need to provide managerial applications of their research. As is now obvious, the majority of the articles include a section on managerial implications of research. We wish to reiterate once again our sincere thanks to JGBAT reviewers for having induced contributors to answer the "so what?" question that every *Journal of Global Business and Technology* article is required to address.

Thank you for your interest in the journal and we are looking forward to receiving your submissions. For submissions guidelines and requirements, please refer to the Manuscript Guidelines at the end of this publication.

N. Delener, Ph.D., Editor-in-Chief
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EDITORS

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INVESTIGATING E-ENTREPRENEURSHIP INTENTION OF YOUNG VIETNAMESE: A STRUCTURAL EQUATION MODELING ANALYSIS

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Received September 16th, 2025; First Revision October 16th, 2025; Second Revision October 30th, 2025; Accepted November 10th, 2025

ABSTRACT

This study investigates the factors influencing the e-entrepreneurial intention of Vietnamese youth in the context of the rapidly growing online business environment, which has attracted significant interest, particularly from young people seeking to enter this market. The primary objective is to identify and evaluate both the number and the degree of influence of these factors on the intention of Vietnamese youth to engage in e-entrepreneurship. A mixed-method approach combining qualitative and quantitative techniques was applied, with data collected through an online survey of 404 young Vietnamese individuals who expressed an intention to start an online business. The Structural Equation Modelling (SEM) technique was employed for data analysis using SmartPLS software. After the analysis, one hypothesis was not supported, while 12 were confirmed as significant. Therefore, the results confirmed all 12 proposed hypotheses. Among these, factors such as attitude, technological trends, and subjective norms were found to have a stronger influence than other variables. These findings offer a comprehensive overview and provide practical managerial implications for young individuals and digital platforms supporting e-entrepreneurial activities.

JEL J24, L25, M13, O15

Keywords: Vietnamese Youth, Digital Platforms, E-Entrepreneurial Iintentions, Online Business, E-commerce Applications.

INTRODUCTION

Entrepreneurship has become a globally significant topic, attracting increasing interest across various sectors. In the context of the rapid advancement of the Internet and widespread digital transformation, electronic entrepreneurship is gradually becoming an inevitable trend of the modern era. As a result, traditional businesses and small to medium-sized enterprises are actively adapting to or expanding their operations through digital platforms. Online entrepreneurship has become a vibrant arena

for creativity and youthful enthusiasm, especially among the young generation in Vietnam. Unlike traditional business forms, electronic entrepreneurship is entirely based on digital infrastructure, offering considerable advantages in terms of cost efficiency, market expansion speed, and customer accessibility (Matlay & Westhead, 2007; Farooq et al., 2018; Tan & Li, 2022; Mahlatji & Mahlatji, 2024). As a developing economy with a demographic advantage (General Statistics Office, 2021), particularly the population segment aged 18 to 35, Vietnam holds great potential for cultivating a high-quality future workforce (Curto et al., 2021). Against this backdrop, a growing need exists to explore the factors influencing electronic entrepreneurial intention (EEI) among Vietnamese youth. Although prior studies have examined entrepreneurial intention using classical behavioral frameworks such as the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM), most have focused on general entrepreneurial contexts or technology adoption rather than the intersection of behavioral and technological determinants shaping e-entrepreneurial intention. Moreover, limited research has been conducted in emerging economies like Vietnam, where digital transformation and youth entrepreneurship are accelerating rapidly. To address these gaps, this study develops and empirically tests an integrated model that combines behavioral and technological perspectives by extending the Theory of Reasoned Action (TRA), TPB, and TAM with additional constructs such as trust, technological innovativeness, and entrepreneurial motivation. This approach contributes new insights into how Vietnamese youth perceive and engage in digital entrepreneurship, thereby enriching the theoretical understanding of e-entrepreneurial intention and offering practical implications for policymakers, educators, and digital platform developers. In response to this context, our research team has selected the topic: "Vietnamese Youth and Electronic Entrepreneurial Intention: A Study of Influencing Factors." The objective is to identify key determinants and assess the level of interest among young people in Vietnam toward engaging in digital entrepreneurship.

LITERATURE REVIEW

Electronic Entrepreneurship and Entrepreneurial Intention

Matlay was among the first scholars to emphasize that electronic entrepreneurship creates new ventures within the Net Economy, where all business activities are inherently tied to digital platforms (Matlay, 2004). Electronic entrepreneurship involves establishing new businesses based on innovative ideas implemented in the digital economy. Everything from data management and product or service delivery to overall business operations is built upon an information technology infrastructure in this model. It is profoundly influenced by the information technology revolution (Kollmann, 2006). The rapid growth of the Internet has encouraged individuals and organisations to prioritise electronic business models when launching entrepreneurial ventures (Tan & Li, 2022). According to the findings of the scientific study conducted in Vietnam by Nguyen (2021), although the intention to conduct online business has existed for a considerable time, a clear and consistent conceptualisation of this notion has yet to be fully developed. Most existing literature refers to and adopts the definition proposed by Zhao et al. (2010), which states that "electronic entrepreneurial intention refers to the intention to start a new business activity based on the Internet." In general, the term "online business intention" describes an idea or plan to engage in commercial activities via the Internet or online business websites. Within the scope of this study, electronic entrepreneurial intention is understood as an individual's desire or plan to establish a business in the digital economy environment (Solesvik, 2013).

Theory of reasoned action (TRA)

The Theory of Reasoned Action (TRA) was developed by Fishbein and Ajzen in 1975, which helps researchers better understand individual behaviour. In this model, behaviour intention (BI) is the most crucial factor in predicting human behaviour. This behavioural intention is influenced by two fundamental factors: Attitude Toward Behaviour (AB) and Subjective Norm (SN). According to this theory, actual

behaviour will occur if the individual has a prior intention to act, as personal intention leads to an action and ultimately a specific behaviour.

Theory of planned behaviour (TPB)

In 1991, the Theory of Planned Behaviour (TPB) was developed by Ajzen as an extension of the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1975). The model was expanded by adding the element of Perceived Behavioural Control, which reflects an individual's perception of how easy or difficult it is to perform a specific behaviour, based on available resources and opportunities. This factor also indicates whether an individual can recognise or control their actions (Nguyen & Huynh, 2024). The TPB model is an important theory that helps researchers understand and predict human behaviour (Nguyen & Huynh, 2024). In Vietnamese context, Nguyen (2017) insist that TPB model can predit the entrepreneurial intention among students.

Technology acceptance model (TAM)

In 1989, Davis introduced the Technology Acceptance Model (TAM). The TAM model consists of two main factors: (1) Perceived Usefulness: The extent to which users believe that using a particular system will enhance their performance or outcomes (Davis, 1989); (2) Perceived Ease of Use: The degree to which users believe that using a specific system will not require significant effort (Davis, 1989). Additionally, the model includes two intermediary factors: Attitude and Behavioural Intention, which influence the adoption of new technology.

Hypothesis development

- Attitude

The Technology Acceptance Model (TAM) defines user attitude as the positive or negative perception of using a particular product or service (Davis et al., 1989). This model posits that attitude influences the intention to adopt a technology. In e-commerce, attitude refers to users' favourable or unfavourable evaluations when shopping online through retail websites or Internet-based applications (Lin, 2007). Attitude has positively impacted electronic entrepreneurship, as confirmed in the study Electronic Entrepreneurial Intention among Students: The Role of Self-Efficacy and Education by Pham et al. (2023). A study on entrepreneurial intention among female university students in Saudi Arabia also demonstrated that attitude directly influences entrepreneurial intention (Alzamel et al., 2020). Furthermore, in the context of the rapid development of the Fourth Industrial Revolution, creating a viral effect and widespread positive perception (attitude) toward online shopping can enhance consumer attention and improve evaluations. This, in turn, fosters the intention to purchase on e-commerce platforms (Nguyen & Do, 2019). In another related study on Saudi women's intention to engage in e-business, Alzamel (2021) concluded that attitude is significantly associated with electronic entrepreneurial intention. However, negative attitudes can reduce usage intention and may even lead to rejecting online retail strategies (Alateeg et al., 2023). Therefore, the following hypothesis is proposed:

H1: Attitude has a positive relationship with the intention to be an e-entrepreneur among Vietnamese youth.

- Perceived usefulness

In e-commerce, perceived usefulness includes convenience, product and service variety, and rich information availability (Tunsakul, 2020). The Expectation-Confirmation Model (ECM) explains the continued usage behaviour of technology users, stating that perceived usefulness significantly impacts the intention to use technology (Bhattacherjee, 2001). According to Monsuwe et al. (2004), perceived

usefulness and the intention to use e-commerce platforms among young consumers play a critical role in online business activities. Similarly, perceived usefulness has been shown to significantly impact the intention to engage in electronic entrepreneurship among future entrepreneurs in Morocco (Bennani et al., 2014). This finding is consistent with research conducted in Saudi Arabia (Zamzami, 2021). Adopting electronic platforms for business reflects young entrepreneurs' trust in the Internet to enhance work performance and support entrepreneurial development within digital environments. When entrepreneurs perceive that digital technologies provide practical value, they are more likely to accept and continue using them for electronic entrepreneurial activities (Putro & Takahashi, 2024). Thus, the proposed hypothesis is:

H2: Perceived usefulness has a positive relationship with The intention to be an e-entrepreneur among Vietnamese youth.

The Technology Acceptance Model (TAM) acknowledges a direct relationship between "Perceived Usefulness" and "Attitude" (Davis et al., 1989). In addition, the Technology Continuance Theory (TCT) further clarifies the factors influencing users' continued use of technological applications, emphasising that perceived usefulness significantly affects individual attitudes. Perceived usefulness is also a key determinant of user attitudes in e-commerce-related activities (Luqman et al., 2016). According to Kim et al. (2010), when users perceive a system or platform as applicable, they naturally form a favourable attitude and are more inclined to use it. Sun and Zhang (2006) also concluded that perceived usefulness strongly influences customer attitudes toward usage. Research conducted in southern Italy also confirmed that the perceived usefulness of social media platforms for business purposes plays an important role in shaping entrepreneurs' attitudes toward incorporating these platforms into their business strategies (Di Stefano et al., 2023). Based on these insights, the following hypothesis is proposed:

H12: Perceived usefulness has a positive relationship with Attitudes.

According to Pham et al. (2023), perceived usefulness reflects the belief of potential entrepreneurs that integrating new technologies into online start-up activities can enhance business performance. Zamzami (2021) also emphasized that this factor is crucial in shaping individuals' intentions to engage in electronic business. When individuals perceive that technology enables them to achieve business goals more efficiently and effectively, they tend to develop a stronger entrepreneurial motivation based on that technology (Venkatesh & Davis, 2000). In the growing trend of electronic entrepreneurship, perceived usefulness reflects the extent to which an individual believes that using technology will improve their business outcomes, thereby contributing to stronger entrepreneurial motivation. Based on this understanding, the following hypothesis is proposed:

H13: Perceived usefulness has a positive relationship with Entrepreneurial motivation.

- Perceived ease of use

Perceived ease of use is "the degree to which a person believes that using a particular system will be effortless" (Davis, 1989). According to TAM (Davis, 1989), perceived ease of use refers to a user's belief that applying an IT product will be simple and not require significant effort. According to Yusoff et al. (2021), perceived ease of use positively influences the intention to adopt e-commerce among rural entrepreneurs. Similarly, Basarir-Ozel et al. (2017) confirmed that perceived ease of use significantly impacts the adoption of e-commerce among Turkish users. Additionally, Nazir et al. (2012) found that ease of use positively affects both attitude and intention among online shoppers, influencing businesses as they begin adopting e-commerce platforms for sales. Thus, the proposed hypothesis is:

H3: Perceived ease of use has a positive relationship with The intention to be an e-entrepreneur among Vietnamese youth.

Perceived usefulness is "the extent to which a person believes that using a specific application system will enhance their performance or productivity in a particular task" (Davis, 1989). Abdullah and Ahmed (2016) confirm that ease of use influences usefulness. Additionally, Amin et al. (2014) identified the relationship between attitude and perceived ease of use regarding services. This demonstrates that perceived ease of use correlates positively with perceived usefulness. Thus, the proposed hypothesis is

H9: Perceived ease of use has a positive relationship with Perceived usefulness.

Trust is essential in creating a positive image of products, services, and e-commerce businesses in customers' minds. Research by N. Wilson (2019) shows that perceived ease of use positively impacts the intention to use e-commerce services through trust. Similarly, Nangin et al. (2020) found that perceived ease of use significantly influences customers' trust in financial technology. The study by Jarvenpaa et al. (2000) also indicates that trust significantly affects online shoppers' attitudes and beliefs. Pavlou and Fygenson (2006) support this view. Thus, the proposed hypothesis is:

H10: Perceived ease of use has a positive relationship with Trust.

Fishbein & Ajzen (1975) state that consumer attitude significantly impacts their intention. The Technology Continuance Theory (TCT) by Liao et al. (2009) identifies perceived ease of use as a crucial factor influencing user attitude. In this context, attitude is an intermediate factor directly influencing the continued use of technology products. The Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1975) highlights attitude as one of the two critical factors shaping consumer tendencies. In the Theory of Reasoned Action (TRA), attitude is measured based on perceptions of a product's attributes, including their perceived benefits and importance. Perceived ease of use has been found to significantly and positively influence the attitude of entrepreneurs operating within the social commerce environment (Liu & Lin, 2025). Therefore, the following hypothesis is proposed:

H11: Perceived ease of use has a positive relationship with Attitudes.

Technological innovativeness

Numerous opportunities for entrepreneurial ventures have emerged in an era characterised by rapid and continuous technological advancement (Tan & Li, 2022). According Nguyen and Nguyen (2022), the positive influence of Industry 4.0 technologies on students' intentions to engage in online business has been documented. A study by Shahzad et al. (2021) found that individuals' readiness to access and apply emerging technologies is a contributing factor that fosters digital entrepreneurial intention. Supporting this view, Duong (2024) found that adopting tools such as ChatGPT has significantly impacted the digital entrepreneurial spirit. The Shapero and Sokol (1982) Entrepreneurial Event Model (SEE) suggests that external factors play a crucial role in shaping entrepreneurial decisions, as they may either facilitate or hinder the launch of a new business. Based on this theoretical foundation, the following hypothesis is proposed:

H8: Innovativeness has a positive relationship with The intention to be an e-entrepreneur among Vietnamese youth.

- Trust

Trust refers to an organisation's perception of reliability in its brand, products, or services (Flavian, Guinaliu, & Gurrea, 2006). Trust is the willingness of one party to believe that the other party will fulfil a specific action as promised, even in the presence of risk (Chai & Kim, 2010). In e-commerce, trust reflects

confidence in a business's intentions and actions during transactions (Wijoseno & Ariyanti, 2017). According to Nguyen et al. (2022), the more entrepreneurs trust mobile software and e-commerce services, the stronger their intention to use them. Azizah et al. (2022) also found that trust strongly influences the intention to use e-commerce applications and services. Based on these findings, the research team proposes the following hypothesis:

H4: Trust has a positive relationship with The intention to be an e-entrepreneur among Vietnamese youth.

Perceived behavioural control

Perceived behavioural control refers to an individual's perception of how easy or difficult it is to perform a specific behaviour (Ajzen, 1991). According to the Theory of Planned Behaviour (TPB) (Ajzen, 1991), perceived behavioural control affects behavioural intention. According to Nguyen et al. (2024), in research on key factors influencing cross-border e-commerce adoption among SMEs, perceived behavioural control significantly impacts adoption intentions. In a study on the digitalisation of the economy and entrepreneurial intention, the authors found that perceived behavioural control is a key factor influencing entrepreneurial intention (Youssef et al., 2021). Lai and To (2020) also concluded that perceived behavioural control strongly affects e-business intentions among Chinese youth. Thus, the proposed hypothesis is:

H5: Perceived behavioural control has a positive relationship with The intention to be an e-entrepreneur among Vietnamese youth.

- Subjective norms

According to Fishbein and Ajzen (1975) and Krueger et al. (2000), subjective norms refer to social pressure from family, social relationships, and influential individuals that affect personal behaviour. Subjective norms reflect an individual's intention to perform a behaviour based on opinions from important people (Ajzen, 1991). Liñán and Chen (2006) argue that subjective norms indicate whether family and friends support or oppose business activities. The Theory of Reasoned Action (TRA) identifies subjective norms as a key factor influencing behavioural intentions (Fishbein & Ajzen, 1975). Subjective norm significantly reinforces the electronic entrepreneurial intention of university students in Iraq (Halbusi et al., 2023). Thus, the proposed hypothesis is:

H6: Subjective norms has a positive relationship with The intention to be an e-entrepreneur among Vietnamese youth.

- Entrepreneurial motivation

According to Karan et al. (2024), a survey conducted among students from various institutions in India revealed a positive relationship between entrepreneurial motivation and intention. Similarly, Batz Liñeiro et al. (2024) emphasized that entrepreneurial motivation plays a pivotal role in fostering entrepreneurial intention, thereby increasing the number of new ventures. Adding to the body of empirical evidence, Martínez-Canas et al. (2023) affirmed that entrepreneurial motivation is a fundamental factor in shaping entrepreneurial intention among university students. In the same line of research, Singh et al. (2024) found that the increase in digital entrepreneurial intention is primarily influenced by entrepreneurial motivation. These findings suggest that individuals with higher entrepreneurial motivation are more likely to develop stronger entrepreneurial intentions. Based on this theoretical foundation, the following hypothesis is proposed:

H7: Entrepreneurial motivation has a positive relationship with The intention to be an e-entrepreneur among Vietnamese youth.

Proposed research model

From the above research overview, the proposed research model (Figure 1) is presented as follows:

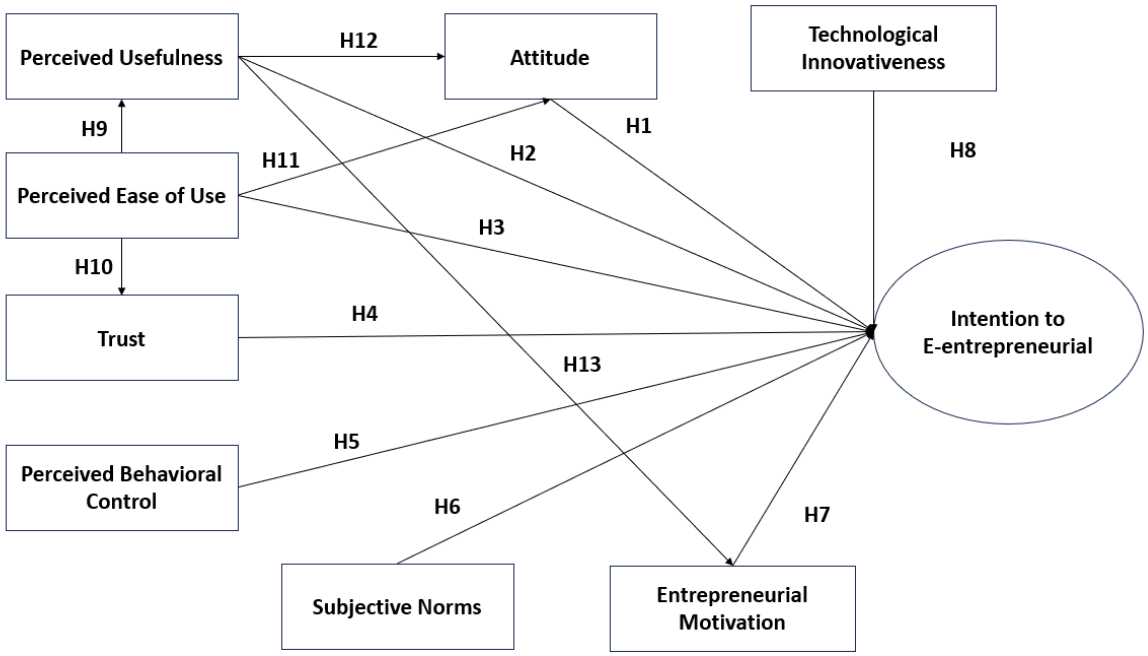

Figure 1: Proposed research model

METHODOLOGY

Scale development

Based on the reviewed literature and relevant research papers, the research team has adopted and developed measurement scales for the factors in the proposed research model.

Table 1: Constructs and items

Construct	Code	Items	References
Attitude	AT1	In my opinion, e-entrepreneurship is a smart choice.	Duong (2024)
	AT2	Starting an e-business in the future is something I desire.	
	AT3	If I have the opportunity and resources, I will be willing to start an e-business.	
Perceived Usefulness	PU1	E-entrepreneurship allows me to be flexible in terms of time and location.	Davis (1989)
	PU2	E-entrepreneurship reduces operational costs compared to opening a traditional store.	
	PU3	E-entrepreneurship enhances the customer shopping experience.	
	PU4	E-entrepreneurship facilitates tracking and analysing customer purchasing behaviour data..	

Perceived Ease of Use	PE1	I find the functions for doing business on e-commerce websites to be clear and understandable.	Davis (1989), Nguyen et al. (2019)
	PE2	I find the registration procedures for e-entrepreneurship services to be quite simple.	
	PE3	I find it easy to explore new products and features on digital platforms.	
	PE4	I can easily become proficient in using digital platforms for e-entrepreneurship.	
Trust	TR1	I believe that e-entrepreneurship can meet my expectations.	Nguyen and Chung (2022)
	TR2	I believe that e-entrepreneurship platforms are trustworthy.	
	TR3	I believe that digital platforms provide clear information on regulations and policies.	
	TR4	I believe that e-entrepreneurship platforms will honour their commitments.	
Perceived Behavioural Control	PBC1	I am capable of starting an e-business.	Ashraf et al. (2021)
	PBC2	Setting up and operating a digital store is within my control.	
	PBC3	I have sufficient resources, knowledge, and skills to run a business online.	
Subjective Norms	SN1	My family would support my intention to start an e-business.	Ajzen (1991)
	SN2	Media influences my intention to engage in e-entrepreneurship.	
	SN3	I see many people who have successfully started businesses on digital platforms.	
	SN4	My friends would support me in starting an e-business.	
Entrepreneurial Motivation	EM1	I intend to start an e-business to enjoy the excitement it brings.	Cardon et al. (2013). Ooi & Ahmad's (2012)
	EM2	I intend to start an e-business to prove that I am capable.	
	EM3	I want to start an online business to create value for society.	
	EM4	I want to start an e-business to increase my income.	
Technological Innovativeness	TI1	I enjoy using technology to support my digital entrepreneurship.	Minh Phạm et al. (2023)
	TI2	I am willing to try new information technologies for e-business.	
	TI3	I am willing to invest time in learning and applying new technologies to my business model.	
	TI4	Being knowledgeable about technology makes me more confident when starting a business project.	
Intention to E-entrepreneurial	EI1	I intend to start an e-business in the near future.	Lin (2007), Liñán & Chen (2009) Lai &To (2020), Ronaghi & Forouharfar (2024)
	EI2	I am planning to engage in e-business soon.	
	EI3	I will recommend others to use digital platforms for e-entrepreneurship soon.	

Source: Author's own conception

Data collection method

The secondary data collected by the research team includes definitions and theories related to business intentions, the use of digital platforms for online business, and electronic entrepreneurship. The primary data was collected through an online survey using a Likert scale with five levels, distributed to the

target respondents via the Internet. Before proceeding to the full questionnaire, respondents were asked whether they had ever considered or planned to start an online business. Only those who expressed at least some level of interest in online entrepreneurship were invited to complete the survey. This screening ensured that participants were relevant to the study while still capturing variation in their level of entrepreneurial intention. The research subjects were individuals aged 18 to 35 years old. The collected data was then analysed using statistical methods, including: PLS-Algorithm for evaluating the measurement model, Bootstrapping test, and Structural Equation Modelling (SEM) to determine the relationships between variables. The research team utilised Smart PLS and the Structural Equation Model (SEM) to examine the factors influencing the electronic entrepreneurial intention of Vietnamese youth. The results revealed eight key factors that influence the intention: (1) Attitude, (2) Perceived Usefulness, (3) Perceived Ease of Use, (4) Trust, (5) Perceived Behavioral Control, (6) Subjective Norms, (7) Entrepreneurial Motivation, and (8) Innovativeness.

DATA ANALYSIS

Data description

After collecting the data, the questionnaires were cleaned and analysed. Table 2 below shows preliminary statistics on the study sample through criteria such as gender, income, and age.

Table 2: The demographic profile of respondents

Profile of respondents		Number	Percentage (%)
Gender	Male	156	38,6%
	Female	248	61,4%
Age	18 - 21 years old	82	20,3%
	22 - 30 years old	167	41,3%
	31 - 35 years old	155	38,4%
Income	Less than 3 million	69	17,1%
	3 - 5 million	71	20,1%
	5 - 10 million	84	23,3%
	10 - 15 million	89	22,3%
	Over 15 million	81	17.20%

Verification of the reliability of the scale and the convergence value of the research scale

The first stage of the analysis process involves evaluating the measurement model. In the SEM approach, the measurement model is assessed through three key criteria: reliability, convergent validity, and discriminant validity (Hair et al., 2016). The reliability of the measurement scales is examined using two indicators: Cronbach's Alpha and Composite Reliability. The reliability of the scale is evaluated through two indicators, Cronbach's Alpha and Composite Reliability: (1) Cronbach's Alpha ≥ 0.7 (DeVellis, 2012) and (2) Composite Reliability CR ≥ 0.7 (Bagozzi & Yi, 1988). According to Hock & Ringle (2010), a scale is considered to reach a convergence value when the Average Variance Extracted (AVE) reaches or exceeds the threshold of 0.5 (AVE ≥ 0.5).

Table 3: Construct validity and reliability

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
SN	0,936	0,937	0,954	0,840
EM	0,945	0,946	0,960	0,858
PU	0,931	0,931	0,951	0,829
PE	0,941	0,942	0,958	0,850
PBC	0,905	0,905	0,940	0,840
AT	0,910	0,910	0,943	0,847
TR	0,931	0,931	0,951	0,829
TI	0,936	0,937	0,954	0,838
EI	0,917	0,917	0,948	0,858

Source: Author's own conception, based on Smart PLS software

The analysis results indicate that all measurement scales meet the required reliability standards, with the lowest Composite Reliability (CR) value being 0,940, well above the recommended threshold of 0,7. In addition, the Average Variance Extracted (AVE) values for the nine latent constructs range from 0,829 to 0,858, exceeding the minimum criterion of 0.5, which reflects strong convergent validity. Furthermore, all constructs have Cronbach's Alpha values greater than 0.7. The calculation results shown from the aggregate reliability table and the extracted variance of the component scales show that the scales in the concept all meet the requirements of convergence value and reliability.

Structural model analysis

- Measurement model validation

According to Hair et al. (2016), the Outer Loading Coefficient needs to reach a value of ≥ 0.7 to evaluate the quality of the observed variables. The table results show that all the observed variables are of good quality and are not eliminated in the study model.

Table 4: Outer Loadings

	SN	EM	PE	PU	PBC	AT	TR	IN	EI
SN1	0,914								
SN2	0,924								
SN3	0,918								
SN4	0,910								
EM1		0,922							
EM2		0,940							
EM3		0,941							
EM4		0,901							
PE1			0,902						
PE2			0,929						
PE3			0,916						
PE4			0,894						
PU1				0,909					

PU2				0,939					
PU3				0,930					
PU4				0,910					
PBC1					0,907				
PBC2					0,924				
PBC3					0,919				
AT1						0,911			
AT2						0,925			
AT3						0,925			
TR1							0,904		
TR2							0,917		
TR3							0,906		
TR4							0,915		
TI1								0,888	
TI2								0,929	
TI3								0,938	
TI4								0,906	
EI1									0,917
EI2									0,931
EI3									0,930

According to Fornell and Lacker (1981), "discrimination is ensured when the square root of AVE for each potential variable is higher than all correlations between potential variables with each other". As a result of the table below, the first number of each column is the quadratic root value of AVE (0,916, 0,926, 0,910, 0,922, 0,917, 0,921, 0,910, 0,916, 0,926) and is higher than the numbers below, which are correlations between potential variables

Table 5: Discriminant validity (Fornell-Larcker criterion

	SN	**EM**	**PE**	**PU**	**PBC**	**AT**	**TR**	**TI**	**EI**
SN	0,916								
EM	0,746	0,926							
PE	0,739	0,781	0,910						
PU	0,313	0,432	0,372	0,922					
PBC	0,514	0,574	0,557	0,284	0,917				
AT	0,602	0,720	0,671	0,412	0,633	0,921			
TR	0,722	0,675	0,742	0,234	0,531	0,599	0,910		
TI	0,710	0,706	0,690	0,268	0,516	0,655	0,716	0,916	
EI	0,761	0,786	0,776	0,265	0,673	0,800	0,759	0,784	0,926

Table 6: Correlation matrix between conceptual structures according to the Heterotrait-Monotrait index method (HTMT)

	SN	**EM**	**PE**	**PU**	**PBC**	**AT**	**TR**	**TI**	**EI**
SN									

EM	0,792								
PE	0,792	0,833							
PU	0,333	0,457	0,397						
PBC	0,558	0,620	0,607	0,307					
AT	0,652	0,776	0,729	0,445	0,697				
TR	0,773	0,719	0,796	0,250	0,578	0,650			
TI	0,758	0,751	0,739	0,285	0,560	0,709	0,766		
EI	0,821	0,844	0,840	0,285	0,738	0,875	0,821	0,846	

In addition, discriminant validity is also assessed using the Heterotrait–Monotrait (HTMT) ratio, as proposed by Henseler et al. (2015). For the Heterotraite - Monotrait Index (HTMT), if the HTMT index ≤ 0.85, it ensures the differentiation between potential variables in the model. The factor has no distinguishing value if the HTMT index is greater than 0.85. The results from incomplete Table 6 show that the HTMT indices all have a value of less than 0.85. Thus, the structures in the model achieve a differentiating value.

- **Structural model testing**

Next, the authors proceeded to evaluate the structural model. Path coefficients were estimated based on the regression of each dependent variable on its respective predictor variables (Hair et al., 2014). If there is a multi-collinear phenomenon in the independent variables, it will lead to the failure to ensure the path coefficients. According to Hair et al. (2019), a VIF greater than 5 indicates the presence of multicollinearity, which could seriously affect the model. The VIF results also show that the alignment of the prediction factors does not violate the assumption of multicollinearity, because all coefficients are within the acceptable range, i.e. VIF = 1,509 –3,799 <5. Therefore, it can be concluded that multicollinearity does not affect the model.

Table 7: VIF coefficient

	SN	**EM**	**PE**	**PU**	**PBC**	**AT**	**TR**	**TI**	**EI**
SN									3,089
EM									3,799
PE				1,000		1,160	1,000		3,577
PU		1,000				1,160			1,299
PBC									1,814
AT									2,728
TR									2,964
TI									2,832
EI									

According to the results, the value of the electronic entrepreneurial intention's R-squared is 0,842. This indicates that the influencing factors included in the model explain 84,2% of the variance in the dependent variable, and the remaining 15,8% is due to the remaining variables not being included in the model.

Table 8: R Square and R Square Adjusted

	R Square	**R Square Adjusted**
EM	0,186	0,184
PU	0,138	0,136

AT	0,481	0,478
TR	0,550	0,549
EI	0,845	0,842

According to Cohen's (1988) guidelines, the f-squared value determines the effect size of independent variables. Specifically, an f-squared value less than 0.02 indicates a minimal effect; values between 0.02 and 0.15 suggest a small effect; values from 0.15 to 0.35 indicate a medium effect; and values greater than 0.35 represent a significant effect. Based on the f-squared values obtained from the SEM model, the results in the table below show that all variables affect the dependent variable (EI).

Table 9: f Square

	SN	**EM**	**PE**	**PU**	**PBC**	**AT**	**TR**	**TI**	**EI**
SN									**0,044**
EM									**0,027**
PE				**0,160**		**0,600**	**1,222**		**0,021**
PU		**0,229**				**0,059**			**0,076**
PBC									**0,070**
AT									**0,241**
TR									**0,033**
TI									**0,076**
EI									

To understand the relationships between variables in the research model, indirect and total effects were analysed and presented in Table 11. In this context, a mediating variable functions as an intermediary that connects the independent and dependent variables, meaning the independent variable influences the mediator, affecting the dependent variable (Nitzl et al., 2007). An indirect effect is considered statistically significant when the p-value is less than 0.05 ($P < 0.05$). The analysis identified nine notable indirect relationships: Perceived Ease of Use → Perceived Usefulness → Entrepreneurial Motivation. Perceived Ease of Use → Perceived Usefulness → Attitude. Perceived usefulness → Entrepreneurial Motivation → Intention. Perceived Ease of Use → Perceived Usefulness → Entrepreneurial Motivation → Intention. Perceived Ease of Use → Perceived Usefulness → Intention. Perceived Ease of Use → Attitude → Intention. Perceived Usefulness → Attitude → Intention. Perceived Ease of Use → Perceived Usefulness → Attitude → Intention. Perceived Ease of Use → Trust → Intention. These findings shed light on the mediating roles of certain variables in explaining the complex interrelationships among constructs within the theoretical model.

Table 10: Results of the indirect impact of relationships

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**
PE -> PU -> EM	0,160	0,162	0,037	4,335	0,000
PE -> PU -> AT	0,070	0,071	0,019	3,648	0,000
PU -> EM -> EI	0,055	0,054	0,016	3,319	0,001
PE -> PU -> EM -> EI	0,020	0,020	0,008	2,660	0,008
PE -> PU -> EI	-0,046	-0,046	0,010	4,434	0,000
PE -> AT -> EI	0,192	0,192	0,021	8,999	0,000
PU -> AT ->EI	0,060	0,061	0,015	4,113	0,000

PE -> PU ->AT ->EI	0,022	0,023	0,007	3,293	0,001
PE -> TR -> EI	0,091	0,090	0,021	4,231	0,000

The Smart PLS method uses non-parametric bootstrap analysis to determine the coefficients' importance (Hair et al., 2014). To assess whether the path coefficients significantly deviate from 0, the t-value is calculated through bootstrapping testing. In this study, the non-parametric bootstrapping technique was applied with 5000 subsamples to ensure the linear structure model validation requirement. Hypotheses are considered statistically significant when P-values are less than 0.05. However, Hypothesis H2, which proposed a positive relationship between perceived usefulness and electronic entrepreneurial intention, yielded a negative Original Sample coefficient, indicating an effect opposite to theoretical expectations. As a result, the direction of the effect was inconsistent with the hypothesis; H2 was not supported. This discrepancy may be attributed to unexamined mediating variables or specific contextual factors in which users perceive the system as applicable but still lack the intention to engage in e-entrepreneurship. Therefore, Hypothesis H2 was removed from the model to ensure the validity and clarity of the result interpretation.

Table 11: Results of the direct impact of relationships

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Hypothesis	Result
SN -> EI	0,145	0,145	0,031	4,710	0,000	**H6**	Accept
EM -> EI	0,126	0,126	0,036	3,547	0,000	**H7**	Accept
PE -> PU	0,372	0,371	0,050	7,415	0,000	**H9**	Accept
PE -> AT	0,601	0,600	0,033	18,199	0,000	**H11**	Accept
PE -> TR	0,742	0,742	0,027	27,273	0,000	**H10**	Accept
PE ->EI	0,107	0,107	0,033	3,243	0,001	**H3**	Accept
PU ->EM	0,432	0,431	0,047	9,152	0,000	**H13**	Accept
PU-> AT	0,188	0,189	0,040	4,746	0,000	**H12**	Accept
PU->EI	-0,123	-0.123	0,020	6,264	0,000	**H2**	Reject
PBC -> EI	0,140	0,140	0,026	5,453	0,000	**H5**	Accept
AT -> EI	0,319	0,320	0,032	9,993	0,000	**H1**	Accept
TR -> EI	0,122	0,122	0,028	4,299	0,000	**H4**	Accept
TI -> EI	0,182	0,183	0,031	5,831	0,000	**H8**	Accept

We compare the influence of the variables on electronic entrepreneurial intention in descending order of standardised path coefficients (β) as follows: the strongest relationship was found between Perceived Ease of Use and Trust (β = 0.742), followed by Perceived Ease of Use to impact attitude (β = 0.601), Perceived Usefulness to Entrepreneurial Motivation (β = 0.432), and Perceived Ease of Use to Perceived Usefulness (β = 0.372). Other notable relationships include Attitude to Intention (β = 0.319), Perceived Usefulness to Attitude (β = 0.188), Innovativeness to Intention (β = 0.182), Subjective Norms to Intention (β = 0.145), Perceived Behavioral Control to Intention (β = 0.140), Entrepreneurial Motivation to Intention (β = 0.126), Trust to Intention (β = 0.122), and finally Perceived Ease of Use to Intention (β = 0.107). Thus, the results of the linear structure analysis and tests show that all assumptions from H1, H3, H4, H5, H6, H7, H8, H9, H10, H11, H12, H13 are accepted because of their statistical value of t > 1.96 (or P value < 5%).

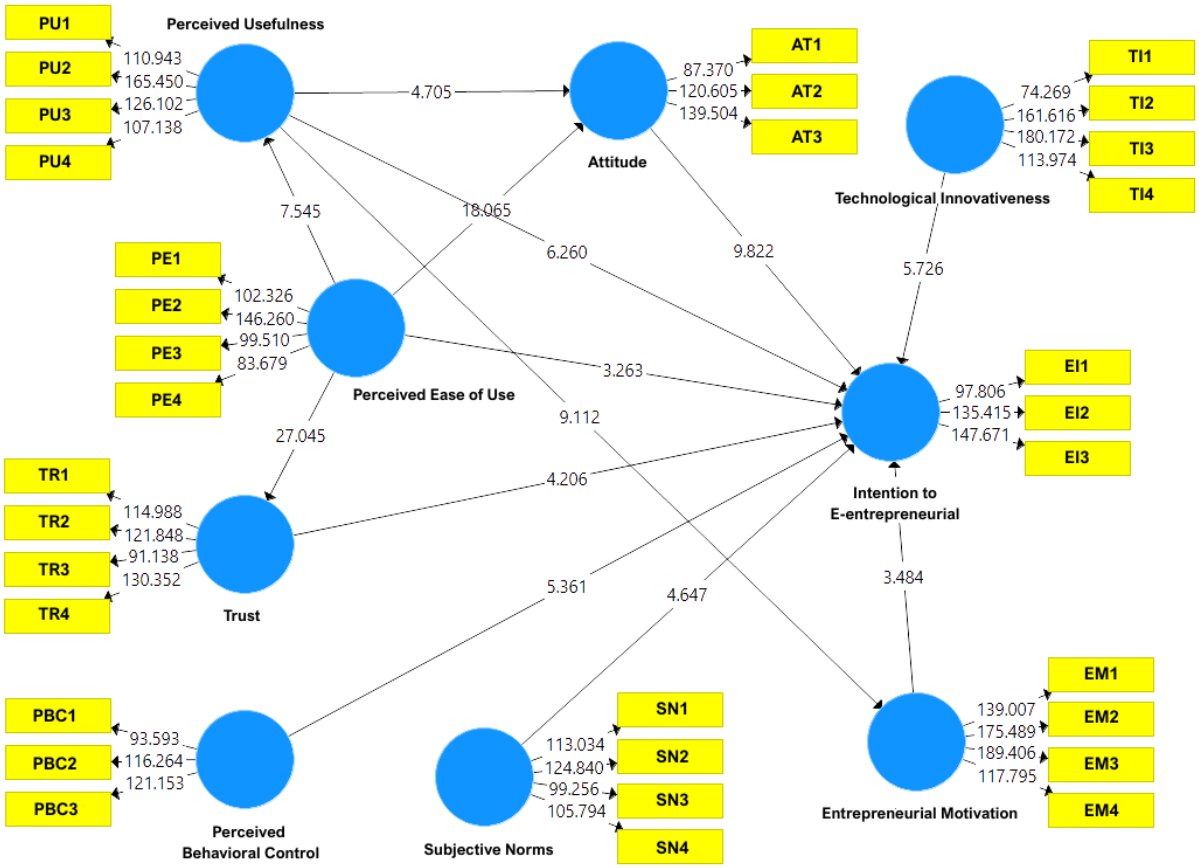

Figure 2: PLS-SEM Results

DISCUSSION AND RECOMMENDATIONS

This study extends existing behavioral theories by integrating the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), and the Technology Acceptance Model (TAM) with additional constructs—trust, technological innovativeness, and entrepreneurial motivation. The results demonstrate that this integration offers a more comprehensive explanation of e-entrepreneurial intention among Vietnamese youth. The strong effects of attitude and subjective norms reaffirm the predictive validity of TPB in explaining behavioral intention, while the inclusion of technological innovativeness and trust underscores the relevance of technology-related and psychological dimensions in contemporary entrepreneurial behavior. These findings contribute to the expanding body of literature on digital entrepreneurship in emerging economies like Malaysia (Yusoff et al., 2021), Indonesia (Wilson, 2019) and in India (Karan et al., 2024). Beside, it also provides empirical support for extending classical behavioral models to technology-driven entrepreneurial contexts. Based on the data analysis results, the research team identified several factors influencing the electronic entrepreneurial intention of Vietnamese youth. These factors include: (1) Attitude, (2) Technological Innovativeness, (3) Subjective Norms, (4) Perceived Behavioural Control, (5) Entrepreneurial Motivation, (6) Trust, and (7) Perceived Ease of Use. These findings are consistent with previous studies which are conducted in similar contexts (Alzamel, 2021; Tan & Li, 2022; Halbusi et al., 2023; Lai & To, 2020; Zamzami, 2021; Nangin et al., 2020; Sebake, 2024). After testing the hypotheses and examining the relationships within the model, the findings reveal that all

variables positively affect young people's intention to engage in e-entrepreneurship. In addition, the study also examined the interrelationships among independent variables, highlighting the following connections: Ease of Use influences Trust; Ease of Use is related to Perceived Usefulness; Ease of Use affects Attitude; Usefulness influences attitude; and usefulness is associated with Entrepreneurial Motivation. Therefore, the research results confirm that out of the thirteen proposed hypotheses, twelve were supported. Attitude, Technological Innovativeness, and Subjective Norms are the most influential factors on electronic entrepreneurial intention.This study aims to identify the factors and the extent of their influence on the electronic entrepreneurial intention of Vietnamese youth. Based on previous theories and research, the research team developed a proposed model consisting of seven factors: Attitude, Technological Innovativeness, Subjective Norms, Perceived Behavioural Control, Entrepreneurial Motivation, Trust, and Perceived Ease of Use. Digital platforms have become an integral tool in developing electronic entrepreneurship in rapid technological advancement. Furthermore, the government plays a significant role in fostering entrepreneurial spirit, particularly among Vietnamese youth. Based on the ranking of standardized path coefficients from the structural model, the managerial and policy implications were developed to ensure close alignment with the empirical findings. The research team summarised the ranking of the impact of independent variables on the dependent variable based on the Original Sample. The team arranged the most to least influential factors and proposed the following managerial implications.

Attitude emerged as the most influential factor affecting the electronic entrepreneurial intention of Vietnamese youth. Therefore, technology enterprises aiming to attract potential entrepreneurs to e-commerce platforms should develop policies, business models, and innovative support tools tailored to digital environments, particularly e-commerce platforms, social media, and AI-based tools. Businesses, entrepreneurs, and digital consumers must be assured of fairness and mutual benefits when operating on these platforms. Additionally, enhancing customer service and support systems for online sellers is essential. Timely resolution of business owners' issues and focusing on personalised experiences should be prioritised. The government needs to develop formal educational programs on digital entrepreneurship to shift public perception from "entrepreneurship as a risk" to "entrepreneurship as an opportunity".

Technological Innovativeness ranked second in influence, e-entrepreneurship is becoming a breakthrough pathway for young people in the digital era, where technology plays a pivotal role in supporting business activities. Digital platforms should create experimental environments for emerging technologies, enabling young individuals to experience, validate, and better envision their entrepreneurial models. In addition, integrating artificial intelligence (AI) and big data analytics should be emphasized, and continuous updates should be made to provide a competitive advantage for young entrepreneurs.

Subjective Norms as the next key factor, digital platforms should build and maintain a trustworthy brand image by promoting reliable services for buyers and sellers across social media and communication channels. At the same time, partnering with KOLs and influencers to share their online business journeys can inspire young people to think boldly and take entrepreneurial action. Because Perceived Behavioural Control also playing a role, platforms should enhance customer support resources, including user guides for platform navigation, technical support, and FAQs to help users feel confident and comfortable engaging in online business. Entrepreneurial motivation is ranked fifth in impact. Tech companies can foster this by organising start-up programs tailored for young people and providing AI tools to facilitate online selling. Additionally, adjusting platform algorithms to support personal brand building can help young individuals with long-term growth potential thrive on digital platforms.

Trust is the next influential factor. E-commerce platforms should provide clear, transparent policies on business operations, commitments, and regulations to build credibility, especially for young entrepreneurs. Ensuring mutual benefits for both platform owners and users is essential. Investing in 24/7 customer support, trustworthy seller tools, and transparent review systems will strengthen user confidence and encourage youth to pursue e-entrepreneurship.

Perceived Ease of Use having the least impact on Vietnamese youth's electronic entrepreneurial intention, digital platforms should improve interface design and optimise user experience to ensure intuitive, easy-to-use features that even first-time users can quickly grasp. This will empower young entrepreneurs to manage their business operations confidently. Platform owners should invest in UI/UX design, integrate step-by-step guidance, and offer responsive chatbot support to help young users adapt and thrive in a fast-changing digital business environment.Despite its valuable contributions, this study has several limitations.

Finally, Perceived Usefulness are not proven to have positive impact on entrepreneurial intention. Meanwhile, perceived usefulness not only play a critical role in online business activities but also significantly impact the intention to engage in electronic entrepreneurship among future entrepreneurs in Morocco (Bennani et al., 2014) and Saudi Arabia (Zamzami, 2021). This finding calls for further research on the impact of perceived usefulness on entrepreneurial intention in Vietnamese context. The sample focused on individuals who already expressed an intention to start an online business, which may have introduced selection bias and restricted the variance of entrepreneurial intention. This limited variability could potentially inflate the strength of observed relationships and reduce external validity. Future research should expand the sampling frame to include individuals at different stages of entrepreneurial readiness—including those without prior intention—to enhance generalizability and confirm the robustness of the findings.

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EVALUATING A MODEL OF INNOVATIVE WORK BEHAVIOR THROUGH DIGITAL LEADERSHIP: MODERATED SERIAL MEDIATION OF CREATIVE SELF-EFFICACY, CREATIVITY, AND KNOWLEDGE SHARING

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Received September 16th, 2025; Revised October 15th, 2025; Accepted November 24th, 2025

ABSTRACT

This study explores the mechanisms through which digital leadership influences innovative work behaviour among early-career research and development professionals in Indonesia's automotive industry. Drawing on social cognitive theory, the research examines the serial mediating roles of creative self-efficacy and employee creativity, and the moderating role of knowledge sharing as a cross-level contextual variable. Utilizing structural equation modelling on data collected from 256 employees through purposive sampling, across four leading automotive firms, the study confirms that digital leadership significantly fosters innovative work behaviour through a two-stage mediation: first by enhancing employees' belief in their creative self-efficacy, which subsequently promotes actual creative behavior, leading to greater innovation at work. Notably, while creative self-efficacy independently mediates this relationship, employee creativity only becomes significant as part of a sequential mediation process. Furthermore, the study identifies a nuanced moderating role of knowledge sharing, at lower levels of knowledge sharing, digital leadership exerts a stronger influence on creative self-efficacy, whereas this effect diminishes at higher levels of knowledge sharing, suggesting a substitution effect in line with substitute-for-leadership theory. These findings provide both theoretical contributions to the understanding of micro-foundations of innovation and practical insights for developing leadership and knowledge ecosystems that support innovation.

Keywords: Digital Leadership, Creative Self-Efficacy, Employee Creativity, Knowledge Sharing, Innovative Work Behaviour, Automotive, Research and Development, Indonesia

JEL Classifiaction : O31, D83, L62

INTRODUCTION

The automotive industry represents one of the most dynamic and innovation-intensive sectors, particularly in emerging economies such as Indonesia. As a major contributor to national Gross Domestic Product and employment, the sector plays a strategic role in advancing the country's industrial modernization and digital transformation agenda(Nguyen, 2023). However, Indonesia's automotive sector remains largely assembly-oriented, relying heavily on imported components and foreign technology. This structure underscores the need to enhance local innovation capabilities through stronger leadership, creativity, and knowledge-sharing practices. Rapid technological shifts toward automation, digital integration, and sustainability have further compelled automotive firms to rethink traditional management and innovation strategies. Within this context, research and development (R&D) departments serve as the core drivers of technological adaptation and organizational renewal. Consequently, the cultivation of a workforce characterized by consistently high levels of Innovative Work Behaviour (IWB) is not merely desirable but essential (Wijaya et al., 2025). IWB conceptualized as the intentional generation, advocacy, and implementation of novel ideas within one's work role, team, or organization has emerged as a foundational antecedent of organizational resilience, adaptability, and sustained performance in dynamic industrial ecosystems (Al-Shami & Rashid, 2022).

This previous research by Erhan et al., (2022) examined in the automotive industry and found that employee-driven innovation plays a crucial role in fostering organizational growth. Another key supporting factor in innovation is employee creativity, as highlighted by Islam and Asad (2024), identify employee creativity as a fundamental antecedent to innovation, highlighting its significance in enhancing organizational adaptability and performance. This relationship is further substantiated by Khan et al. (2023), demonstrate that creativity occupies a central role in catalyzing innovative processes. The present study adopts Social Cognitive Theory (SCT) as a theoretical framework to elucidate the reciprocal interplay between personal cognition, behavior, and environmental factors within organizational contexts. According to SCT's triadic reciprocal causation model (Bandura, 1986, 1997), individual behavior is both shaped by and shapes cognitive and environmental variables, producing a dynamic feedback loop that informs organizational functioning. Viewed through a multilevel lens, this research conceptualizes IWB as a salient behavioral manifestation of personal agency, wherein employees actively seek, generate, and implement novel ideas in response to contextual challenges and opportunities. This conceptualization positions IWB not merely as an outcome, but as an ongoing process embedded in the broader organizational ecosystem.

Extant literature conceptualizes creativity as an individual's cognitive capacity to generate original ideas and novel solutions to complex problems. In contrast, employee creativity refers to the contextualized enactment of this capacity within organizational settings, emphasizing the translation of novel ideas into actionable processes that enhance organizational efficiency, effectiveness, and overall performance (El-Kassar et al., 2022). The distinction between the two lies primarily in scope: whereas creativity is a broad, domain-general construct applicable across various life domains, employee creativity is situated within the professional environment, shaped by organizational norms, expectations, and objectives. At the team level, employees are more likely to exhibit creative behaviors when guided by leaders who articulate a clear strategic vision, align individual goals with the broader organizational mission, and model exemplary performance standards. In digitally transforming organizations, digital leadership has emerged as a pivotal catalyst in fostering both creativity and innovative work behaviour (Matyushenko et al., 2022; Wijaya et al., 2023). As workplaces increasingly integrate digital technologies, digital leaders are instrumental in cultivating an environment that encourages proactive thinking, experimentation, and solution-oriented mindsets(Gandasari et al., 2023). Such leaders not only remain adept at leveraging emerging technologies but also serve as enablers who guide their teams in harnessing digital tools to amplify innovation and enhance collective productivity (Zeike et al., 2019).

Moreover, creativity is not solely an intrinsic or self-initiated endeavour; rather, it is profoundly shaped by an individual's perceived self-efficacy. Self-efficacy, defined as the belief in one's capacity to execute tasks and achieve desired outcomes, functions as a critical enabler of creative engagement (Abulela, 2023). Individuals possessing high levels of self-efficacy are more likely to undertake creative risks, pursue unconventional problem-solving approaches, and persist in the face of uncertainty (Karwowski et al., 2018). Conversely, individuals with diminished self-efficacy may exhibit aversion to novel strategies, constrained by fear of failure or self-doubt, thereby inhibiting their creative potential. Within organizational contexts, cultivating self-efficacy through structured interventions, such as skill-building programs, developmental feedback, mentoring, and experiential learning, is essential for empowering employees to ideate, articulate, and implement innovative contributions with confidence and resilience.

Furthermore, while existing research has underscored the importance of knowledge sharing (KS) in enhancing creative outcomes, significant theoretical and empirical gaps remain. For instance, Hao et al. (2019) emphasize that knowledge sharing facilitates the bidirectional exchange of expertise between leaders and team members, serving as a foundational mechanism for creative idea development. This process of idea generation critically depends on the active acquisition, dissemination, and integration of knowledge within organizational networks (Fischer, 2024). Within this dynamic, leaders serve as critical enablers of knowledge flow, shaping environments that encourage open dialogue while simultaneously safeguarding against knowledge leakage (Żywiołek et al., 2022).

Functioning as a cross-level moderator, knowledge sharing bridges individual cognition and team-level processes, enhancing innovative outcomes by enabling individuals to draw upon a broader base of shared intellectual capital (Öngel et al., 2024). Digital tools, interactive platforms, and collaborative routines further amplify this effect by facilitating the synthesis of diverse perspectives and capabilities. Moreover, knowledge sharing reinforces creative self-efficacy by validating individual contributions, fostering mutual recognition, and cultivating an organizational culture characterized by continuous learning, psychological safety, and adaptive responsiveness (Son et al., 2020).

This study offers two significant theoretical contributions to the innovation literature. First, it refines the conceptualization of knowledge sharing by positioning it as a critical boundary condition that moderates the relationship between digital leadership and individual-level psychological mechanisms. Rather than conceptualizing knowledge sharing as a mere operational process, this study redefines it as a pivotal contextual variable that conditions the manifestation of leadership influence within environments characterized by intensive collaboration and knowledge interdependence. Specifically, within the automotive industry, where technological advancement, cross-functional integration, and rapid innovation cycles are paramount, knowledge sharing serves as a critical mechanism through which digital leadership translates into employees' innovative work behavior. Accordingly, the study seeks to elucidate this moderating role, thereby advancing theoretical understanding of how leadership and knowledge dynamics coalesce to foster innovation in complex organizational systems.

Second, the study introduces a serial mediation model that explicates the cognitive-behavioral pathway through which digital leadership exerts its influence on innovative work behaviour. By delineating the sequential mediating roles of creative self-efficacy and employee creativity, the model extends the theoretical reach of SCT within organizational behavior scholarship. This process-oriented framework provides a robust explanatory mechanism for understanding how internal cognitive beliefs and externalized creative actions jointly facilitate innovation.

LITERATURE REVIEW

Innovative Work Behaviour

IWB refers to the intentional efforts of employees to initiate, introduce, and apply new ideas, processes, or products that are beneficial to the performance of the individual, team, or organization. Although IWB is conceptually acknowledged as a multidimensional construct, most existing measurement tools continue to adopt a unidimensional approach. Researchers (Basu & Green, 1997; Janssen, 2000; Reuvers et al., 2008; Scott & Bruce, 1994; Vallas et al., 2022) have treated IWB as a holistic behaviour without disaggregating its specific stages as one single construct rather than analyzing these separate phases of the innovation process. Conversely, scholars (Dahiya & Raghuvanshi, 2022; De Jong & Den Hartog, 2010; Dorenbosch et al., 2005; Kleysen & Street, 2001; Krause, 2004; Messmann & Mulder, 2011; Steyn & de Bruin, 2019) have proposed more nuanced, multidimensional frameworks.

Building on this progression, recent developments in the literature have expanded IWB to include additional dimensions. First, De Jong and Den Hartog (2010) proposed four dimensions: idea exploration, idea generation, idea championing, and idea realization. Another research, Lambriex-Schmitz et al. (2020a) extended the model to five dimensions: opportunity exploration (OE), idea generation (IG), idea promotion (IP), idea realization (IR), and idea sustainability (IS). More recently, Dahiya and Raghuvanshi (2022) introduced a sixth dimension, comprising of information investigation (II), resulting in a comprehensive framework comprising OE, IG, II, idea championing (IC), idea implementation and application (IA)

Addressing the conceptual and empirical gaps in the literature, this study proposes a novel seventh -dimensional model of IWB, combining De Jong and Den Hartog (2010), Lambriex-Schmitz et al.(2020a), and Dahiya and Raghuvanshi (2022), which includes: Opportunity Exploration (OE), Idea Generation (IG), Information Investigation (II), Idea Championing (IC), Idea Realization Learning-Based Communication (IR-LBC), Idea Realization Criterion-Based Implementation (IR-CBI), and Idea Sustainability (IS). This expanded framework allows for a more granular understanding of how innovative behaviours unfold within organizational contexts, particularly in R&D-intensive sectors such as automotive engineering.

Digital Leadership on other variables

Digital leadership extends beyond technological expertise; it represents the capability to inspire, empower, and guide employees in leveraging digital technologies for innovation and problem-solving(Wijaya, 2024). As organizations increasingly navigate digital transformation, traditional leadership styles that focus solely on control or supervision are becoming insufficient. Instead, leaders must integrate digital literacy with visionary thinking, adaptability, and a focus on fostering employee creativity and psychological empowerment (Eberl & Drews, 2021; Tagscherer & Carbon, 2023).

Digital leadership has been shown to exert a direct and positive influence on IWBdefined as the intentional creation, promotion, and realization of novel ideas within a work. This study aims to explore the importance of digital leadership and its impact on innovative work behavior, which is increasingly recognized as a key determinant of organizational success in knowledge-driven environments.

Leadership is widely acknowledged as a key determinant of employee behavior and performance(Dwiedienawati et al., 2021). Empirical studies (Bak et al., 2022; Hughes et al., 2018) consistently demonstrate that effective leadership can enhance innovation-related outcomes by cultivating environments conducive to experimentation and collaboration. Within this context, digital leadership serves as a strategic enabler of innovation, aligning technological change with human potential(Park & Wallace, 2020). It empowers employees to generate, articulate, and implement innovative ideas that directly contribute to organizational competitiveness and adaptability.

Digital leaders achieve this by fostering cultures of psychological safety, in which employees feel encouraged to take creative risks without fear of criticism or failure.Tóth-Kaszás et al. (2022), assert that such environments enhance engagement and work enthusiasm, while (Weber et al., 2022) emphasize that digital leaders who model the effective use of technology inspire employees to think creatively and pursue innovative solutions. By integrating digital tools and platforms into everyday processes, leaders enable

employees to collaborate more effectively, share insights, and refine creative ideas. This approach broadens opportunities for creative problem-solving and drives the emergence of new work practices and innovative outcomes(Zhu et al., 2022).

Accordingly, digital leadership has been shown to exert a direct and positive influence on IWB defined as the intentional creation, promotion, and realization of novel ideas within a work role (Erhan et al., 2022). Leaders who combine digital competencies with participative and empowering behaviors play a central role in encouraging employees to adopt innovative approaches to their tasks and responsibilities.

H1: Digital leadership has a positive and significant effect on innovative work behaviour.

Beyond its impact on innovation outcomes, digital leadership also plays a crucial role in enhancing employee creativity, which refers to the generation of new and useful ideas that improve work processes and organizational performance. Beyond its impact on innovation outcomes, digital leadership also plays a crucial role in enhancing employee creativity, which refers to the generation of new and useful ideas that improve work processes and organizational performance (Amabile & Pratt, (2016). By encouraging autonomy, experimentation, and the sharing of knowledge through digital collaboration tools, digital leaders help employees transform creative potential into actionable ideas. These leaders establish conditions that promote cognitive flexibility and curiosity, two psychological foundations essential for creativity Tagscherer and Carbon (2023).

H2: Digital leadership has a positive and significant effect on employee creativity.

In addition, digital leadership contributes to the development of creative self-efficacy (CSE) the individual's belief in their capability to produce original and valuable outcomes (Tierney & Farmer, 2002). As Bandura's (1994) SCT posits, such self-beliefs are fundamental in determining motivation and persistence in creative endeavours'. Studies by Zhou and Shalley(2003) affirm that leaders who encourage, constructive feedback, and recognition significantly strengthen employees' confidence in their creative abilities. Digital leaders, therefore, act as psychological catalysts, reinforcing employees' sense of competence and inspiring sustained creative engagement.

H3: Digital leadership has a positive and significant effect on creative self-efficacy.

Creative self-efficacy on other variables

CSE, which refers to an individual's belief in their ability to produce original and valuable outcomes (Tierney & Farmer, 2002, 2011) has consistently been identified as a significant predictor of both innovative work behavior and job performance. A study (S. Abdullah, 2019) involving employees who self-evaluated their creative self-efficacy and innovative behavior, alongside supervisor assessments of their job performance, revealed a clear positive association. Employees with higher levels of belief in their creative abilities were found to engage more frequently in innovative practices and perform more effectively in their roles.

Supporting this relationship, research (Newman et al., 2018) also demonstrates that individuals with stronger confidence in their creative capabilities are more likely to take on creative tasks and exhibit innovation in the workplace. These findings align with Bandura, (1994)) social cognitive theory, which emphasizes that self-beliefs significantly influence motivation, perseverance, and performance outcomes. Individuals who perceive themselves as capable of creativity are more inclined to initiate, sustain, and succeed in creative endeavours', even in challenging work environments. Tierney and Farmer (2011) further argue that belief in one's creative ability functions as a motivational force, driving sustained creative performance in the face of contextual obstacles.

Moreover, the process of generating new and useful ideas serves as a foundational component of innovative behavior in the workplace. According to Elidemir et al. (2020) intrinsic motivation is a key factor that fuels employee creativity, which subsequently leads to innovative action. When employees possess strong creative self-beliefs, they are more likely to propose, refine, and implement novel solutions, contributing meaningfully to organizational innovation. In line with this perspective, El-Kassar et al. (2022) found that higher levels of creativity among employees are associated with deeper engagement in work activities and a greater likelihood of displaying innovative behaviors. Likewise, Papachristopoulos et al. (2023) highlight that creatively confident employees enhance organizational performance by consistently generating and applying novel ideas to solve problems and improve work processes.

H4: Creative self-efficacy has a positive and significant effect on innovative work behaviour.
H5: Creative self-efficacy has a positive and significant effect on employee creativity.
H6: Employee creativity has a positive and significant effect on innovative work behaviour.

Knowledge Sharing as a moderator between digital leadership and creative self-efficacy

Knowledge sharing, as defined by Li and Gao (2022) is the intentional process by which individuals exchange information, experiences, and insights with the goal of co-constructing new understanding. Such behavior fosters problem-solving, enhances performance, and directly contributes to the development of creative self-beliefs by exposing individuals to varied cognitive strategies and successful models of innovation. In this light, knowledge sharing becomes more than a facilitator of organizational learning; it acts as a formative influence on individual creativity.

In a team mechanism, knowledge sharing assumes a vital moderating role for leaders who cultivate an environment of open knowledge exchange to help build employee confidence in their capacity to generate and apply creative ideas. Empirical evidence (Mittal & Dhar, 2015) demonstrates that transformational leadership enhances employee creativity by fostering an environment in which beliefs about personal creative capability are strengthened, and the benefits of shared learning are maximized. Similarly, ((Khan et al. (2023))((Khan et al. (2023))((Khan et al. (2023))) observed that knowledge sharing significantly reinforces the positive relationship between self-leadership and innovative behavior by supporting the development of strong creative self-beliefs.

Within the framework of digital leadership defined the strategic application of digital tools enables innovation and transforms knowledge sharing as a vital moderating role. Leaders who cultivate an environment of open knowledge exchange help build employee confidence in their capacity to generate and apply creative ideas. Empirical evidence (Gumusluoglu & Ilsev, 2009; Hughes et al., 2018)(Gumusluoglu & Ilsev, 2009; Hughes et al., 2018)(Gumusluoglu & Ilsev, 2009; Hughes et al., 2018) demonstrates that leadership enhances employee creativity by fostering an environment in which beliefs about personal creative capability are strengthened, and the benefits of shared learning are maximized.

H7: Knowledge sharing positively moderates the relationship between digital leadership and creative self-efficacy.

Employee creativity as a mediator

Employee creativity, the intentional generation and implementation of novel and useful ideas within one's professional role has become a pivotal catalyst for organizational innovation and long-term competitive advantage in the digital era. Unlike general creativity, which encompasses broad ideation across contexts, employee creativity is inherently contextualized, purposeful, and action-oriented. It is closely aligned with specific job functions, strategic objectives, and organizational challenges, making it a key driver of adaptive change and process improvement (Wang et al., 2018(Wang et al., 2018(Wang et al., 2018). As emphasized by Elidemir et al.(2020)Elidemir et al.(2020)Elidemir et al.(2020), while many individuals possess inherent creative potential, the transformation of that potential into meaningful

organizational outcomes depends on environmental enablers. Specifically, innovation-supportive structures, responsive leadership, and developmental policies are crucial in translating individual creativity into tangible innovation. When leaders cultivate a climate that encourages experimentation, tolerates failure as part of the learning process, and provides resources for creative exploration, employees are far more likely to generate original and impactful ideas(Türk, 2023)(Türk, 2023)(Türk, 2023).

This creative transformation is significantly shaped by the quality of leadership within the organization, particularly in contexts characterized by digital transformation. The strategic use of digital technologies to inspire, empower, and guide employees has been increasingly recognized as a mechanism that nurtures creative behavior. Leaders who integrate digital tools into managerial processes not only modernize operational systems but also serve as role models for innovation, signalling to employees that creativity and adaptation are valued behaviors (Bogar, 2023) (Bogar, 2023) (Bogar, 2023)). Such leaders cultivate psychologically safe environments where risk-taking is encouraged, and the fear of failure is minimized. Within these environments, employees feel supported in exploring new approaches and experimenting with unconventional ideas. Yesuf et al. (2024)Yesuf et al. (2024)Yesuf et al. (2024) further highlight that employees' belief in their creative abilities CSE acts as a key psychological mediator linking digital leadership to innovation outcomes. This belief, often shaped by prior success, constructive feedback, and leader affirmation, strengthens an individual's confidence to engage in creative action, thereby bridging leadership behavior and innovative work outcomes.

Furthermore, the effectiveness of digital leadership in fostering employee creativity is amplified in organizations with strong cultures of knowledge sharing. As highlighted (Asad et al., 2021; Hu & Zhao, 2016),(Asad et al., 2021; Hu & Zhao, 2016),(Asad et al., 2021; Hu & Zhao, 2016), open exchanges of ideas, expertise, and experiences enable employees to build on collective insights, enhance their cognitive resources, and refine their creative thinking. Knowledge sharing reinforces a sense of collective efficacy and mutual support, essential for sustaining long-term creative engagement. When employees perceive that their ideas are valued and their contributions influence organizational practices, their intrinsic motivation and creative commitment are significantly strengthened. Knowledge sharing thus functions as a critical moderating mechanism that bridges team-level collaboration and individual innovation. Through digital platforms, collaborative discussions, and structured knowledge networks, this process integrates diverse perspectives and skill sets, driving the co-creation of innovative outcome (Asad et al., 2021)(Asad et al., 2021)(Asad et al., 2021). Furthermore, collective validation of creative contributions enhances individuals' belief in their creative potential, fostering a culture of continuous learning, adaptability, and trust (Arshad et al., 2021).(Arshad et al., 2021).(Arshad et al., 2021).

H8: CSE mediates the relationship between digital leadership and employee creativity

H9 : CSEmediates the relationship between digital leadership and IWB.

H10: Employee creativity mediates the relationship between digital leadership and IWB.

H11: Employee creativity mediates the relationship between CSE and innovative work behavior.

H12: CSE and employee creativity sequentially mediate the relationship between digital leadership and IWB

H13: Knowledge Sharing does not moderate the indirect effect of digital leadership on IWB through CSE and employee creativity.

The proposed model and hypotheses, which illustrate the observed relationships within the automotive sector, are presented in Fig. 1.

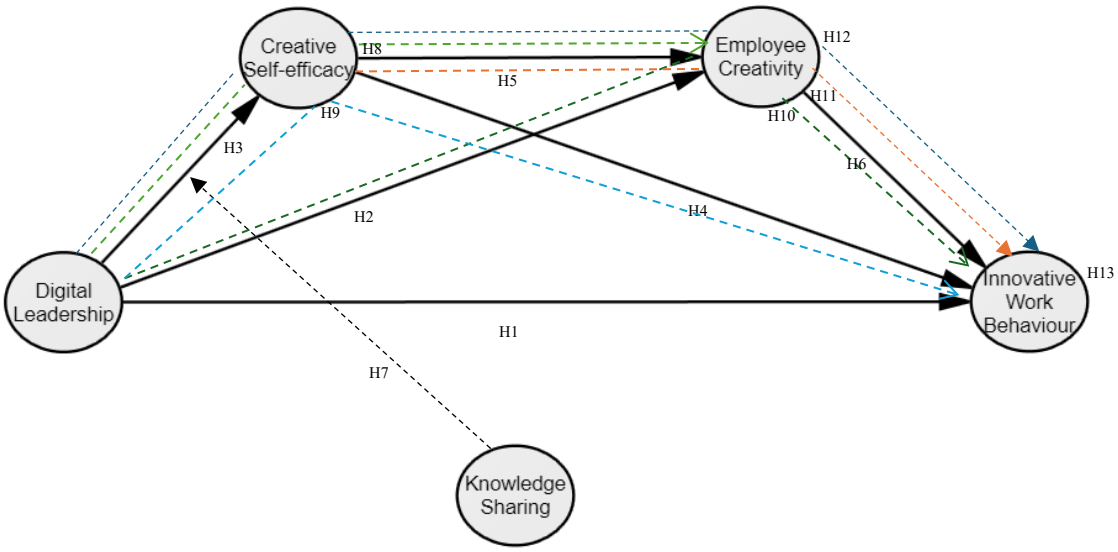

Fig. 1. Research Constellation
Adopted: Social Cognitive Theory (Bandura, 1986)

METHODS

A positivist research paradigm was adopted in this study, and a quantitative, cross-sectional design was employed to empirically examine the interrelationships among digital leadership, CSE, knowledge sharing, employee creativity, and innovative work behavior. Given the inherent complexity of the proposed moderated mediation model, this methodological approach was deemed suitable to enable rigorous evaluation of hypothesized causal pathways within the domain of organizational behavior. Data were collected from employees working in R&D divisions of medium to large-scale automotive firms operating in Indonesia, comprising a total population of 282 employees**.** These organizations were purposively selected due to their strategic orientation toward innovation, sustained technological advancement, and ongoing investments in digital leadership initiatives, factors that align closely with the theoretical constructs under investigation.

Moreover, such firms have historically demonstrated high participation rates in organizational research, with return rates averaging approximately 90%, thereby enhancing the feasibility of attaining the desired sample size. Consistent with this expectation, the final dataset comprised 256 valid responses, exceeding the minimum threshold recommended by Hair et al. (2019) for SEM and ensuring the robustness of the subsequent statistical analyses.

Purposive sampling was applied to select participants who possessed specific characteristics, knowledge, or experience relevant to the aims of the study. Respondents were carefully choosen, including professionals with at least three years of experience in R&D departments, holding positions such as engineers, product developers, and innovation specialists, and possessing educational backgrounds in engineering, technology, or management. however, that blue-collar workers were not included in the sample**,** as the study primarily focused on white-collar employees engaged in knowledge-intensive innovation activities**.**

Before data collection, a pilot test was conducted involving 30 respondents, according to ((Johanson and&and ((Brooks, 2009)((Johanson and&and ((Brooks, 2009)((Johanson and&and ((Brooks, 2009) a sample size of approximately 30 participants provides adequate statistical stability for identifying potential issues in the questionnaire, such as ambiguous wording, item reliability, or response bias,while remaining manageable in terms of cost and logistics.

Moreover, to ensure that the clarity, comprehensibility, and appropriateness of the survey instrument were evaluated and refined by the researchers, the pilot study was carried out by the research team in January 2024, before the main data collection phase, during which the clarity, reliability, and linguistic appropriateness of the questionnaire were systematically assessed to ensure its validity and suitability for the target respondents. Necessary adjustments were made based on feedback, ensuring the quality and reliability of the main survey. The finalized questionnaire was administered online, using Bahasa Indonesia (Indonesian Language) to accommodate linguistic preferences and ensure clarity among respondents. The back-translation procedure was conducted ensuring linguistic equivalence of the measurement instruments,. First, the original English questionnaire was translated into Indonesian by a bilingual expert in organizational psychology. Second, a separate bilingual translator, who had no access to the original version, translated the Indonesian version back into English. Third, the two English versions were compared item by item to identify discrepancies in meaning, tone, and conceptual equivalence. Any inconsistencies were discussed and resolved through consensus among the translators and the research team. This process ensured that all items retained their semantic, idiomatic, and conceptual accuracy for use in the Indonesian context. All variables were measured using established multi-item scales from the existing literature, rated on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). IWB was assessed using 17 items adapted from Dahiya and Raghuvanshi (2022), De Jong and Den Hartog (2010), and Lambriex-Schmitz et al. (2020), capturing stages from idea generation to implementation. Digital Leadership was measured via a 7-item scale adapted from Wang et al. (2022) and Zeike et al. (2019), encompassing digital visionary capability, effective digital communication, and transformative leadership behaviors. Knowledge Sharing comprised 10 items adapted from Bock and Kim (2002), Yi (2009), and Fischer (2024), covering tacit and explicit knowledge exchange. Creative Self-Efficacy involved a 12-item measure derived from Tierney and Farmer (2002), Karwowski et al. (2018), Shaw et al. (2021), and Abulela (2023), reflecting individuals' beliefs in their creative capacities. Employee Creativity was measured with 8 items adapted from Farmer et al. (2003), Gonlepa et al. (2023), and Yesuf et al. (2024), assessing frequency and originality of applied ideas.

Data analysis was conducted using IBM SPSS (version 26) and AMOS (version 26). Confirmatory Factor Analysis (CFA) evaluated construct validity and reliability. Convergent validity was confirmed through factor loadings exceeding 0.50 and Average Variance Extracted (AVE) values above 0.50. Reliability was established with Cronbach's Alpha and Composite Reliability (CR), both surpassing the recommended 0.70 thresholds. Discriminant validity was assessed via the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio, with HTMT values below 0.85. Model fit was determined using indices including $\chi^2/df < 3.0$, Comparative Fit Index (CFI > 0.90), Tucker-Lewis Index (TLI > 0.90), Root Mean Square Error of Approximation (RMSEA < 0.08), and Standardized Root Mean Square Residual (SRMR < 0.08). Potential common method bias (CMB) was examined using Harman's single-factor test and marker variable technique, with no significant concerns detected. Mediation and moderation hypotheses were tested using Hayes' PROCESS macro (Model 83), employing a bias-corrected bootstrapping approach with 5,000 resamples to generate confidence intervals, enhancing analytical robustness and empirical rigor.

The research protocol received ethical clearance from the institutional review board of Universitas Negeri Jakarta. Participation was entirely voluntary, and informed consent was collected from all

respondents and processed in aggregated form, ensuring that individual responses could not be traced back to any participant, in line with confidentiality, anonymity, and ethical research requirements.

RESULTS

An analysis of the demographic characteristics of the 256 respondents indicated a predominantly male composition, with males accounting for 80.5% and females comprising 19.5% of the sample. Institutional representation was relatively evenly distributed among prominent firms within the automotive sector, notably Astra (32.2%), Honda (26.7%), Hyundai (22.0%), and Daihatsu (19.2%). With respect to educational attainment, the majority of respondents possessed a Bachelor's degree (S1), constituting 87.1% of the sample, complemented by smaller proportions holding a Master's degree (S2; 8.2%), Diploma (2.0%), or Doctoral degree (S3; 0.8%), thereby reflecting a highly educated participant group. Concerning professional tenure, 62.9% of participants had accumulated over five years of experience, while the remaining 37.1% reported five years or less, underscoring a mature and professionally experienced workforce familiar with organizational practices and technological innovations. Collectively, this demographic profile underscores a predominantly male, academically qualified, and professionally seasoned workforce within key automotive R&D institutions in Indonesia (see Table 1).

Table 1. Descriptive Analysis

Category	Sub-category	Frequency (n)	Percentage (%)
Gender	Male	206	80.5%
	Female	50	19.5%
Education	Bachelor's (S1)	223	87.1%
	Master's (S2)	21	8.2%
	Diploma	5	2.0%
	Doctoral (S3)	2	0.8%
Tenure	> 5 years	161	62.9%
	≤ 5 years	95	37.1%

Validity and Reliability Test Result

The measurement model was assessed through a CFA to ensure the reliability and validity of the constructs. The results indicated strong internal consistency, with CR values for all constructs exceeding the threshold of 0.70 as recommended by Hair et al. (2019). Specifically, CR values ranged from 0.754 to 0.792, suggesting that the measurement items for innovative work behavior, digital leadership, knowledge sharing, creative self-efficacy, and employee creativity consistently reflected their respective latent variables.

Convergent validity was also confirmed through the AVE, with all constructs exceeding the minimum acceptable value of 0.50 (Fornell & Larcker, 1981). The AVE values ranged from 0.744 to 0.851 (see Table 2), indicating that a substantial portion of variance in the indicators was explained by their respective constructs. Furthermore, the factor loadings of all items were above 0.50, supporting item reliability and confirming convergent validity (Martin & Rubin, 1995; Rosenbach et al., 2009).

To assess discriminant validity, the Fornell–Larcker criterion was employed by comparing the square root of each construct's AVE to the inter-construct correlations. The results demonstrated that the square root of AVE for each construct was greater than its correlations with other constructs, confirming discriminant validity (Hair et al., 2012; Larcker & Fornell, 1981).(Hair et al., 2012; Larcker & Fornell,

1981).(Hair et al., 2012; Larcker & Fornell, 1981). Additionally, the HTMT was also used to further evaluate discriminant validity, as outlined in the methodology section. The detailed HTMT results are presented and discussed in the results section (see Table 5), ensuring transparency and completeness of the validity assessment

Lastly, the pattern of positive inter-construct correlations aligned with theoretical expectations, suggesting that nomological validity was established. Taken together, the results of the CFA provided strong evidence for the reliability, convergent validity, and discriminant validity of the measurement model, affirming its suitability for further hypothesis testing using SEM.

Table 2. Validity and Reliability Test

No	Variable	No of Scales	CR	AVE	√AVE
1	IWB	17	0,789	0,822	0,907
2	DL	7	0,781	0,762	0,872
3	KS	8	0,754	0,744	0,863
4	CSE	12	0,792	0,851	0,922
5	EC	10	0,769	0,783	0,885

A comprehensive factorial model was developed encompassing the observed indicators of IWB, digital leadership, knowledge sharing, employee creativity, and CSE in accordance with the item purification standards outlined by Jöreskog and Sörbom (1993) and the convergent validity guidelines proposed by Steenkamp and Geyskens (2006) (see Tables 3). The model demonstrated robust psychometric properties across all dimensions. First, the weak convergence criterion was satisfied, as all indicators exhibited statistically significant factorial regression coefficients, with *t*-values exceeding the critical threshold of 2.58 ($p \leq 0.01$), thus ensuring parameter estimation stability and confirming the meaningful association between each item and its latent construct. Second, the strong convergence criterion was met, with all standardized factor loadings surpassing the recommended threshold of 0.50, ranging from .801 to .879, indicating that each item substantially represented its corresponding theoretical dimension. Third, the explained variance criterion was fulfilled, with all indicators yielding R^2 values greater than 0.30, most falling within the range of .642 to .741, demonstrating adequate item-level explanatory power and justifying the retention of all items in the measurement model. Finally, convergent validity was confirmed, as each item showed both statistical significance at the 0.01 level and standardized loadings exceeding 0.50 (see Table 3)

Table 3. Construct Dimension and Indicator

Construct Dimension and Indicator	Item Code	Item Description	Standardized Coefficients	R^2
Innovative Work Behaviour				
Opportunity Exploration	OE1	I seek opportunities to smoothen processes.	.842*	.658
	OE2	I identify opportunities to make a positive contribution.	.871*	.702
Idea Generation	IG1	I generate appropriate solutions for problems.	.855*	.685
	IG2	I find improvements in methods of task implementation.	.868*	.710
Information Investigation	II1	I identify problems to generate ideas.	.801*	.642

	II2	I evaluate the usefulness of innovative ideas before implementation.	.827*	.684
	II3	I initiate quality assurance systems to support sustainability of implemented ideas.	.812*	.671
Idea Championing	IC1	I try to transform innovative ideas into real applications.	.845*	.673
	IC2	I promote innovative ideas to colleagues.	.879*	.728
	IC3	I actively support the development of innovative ideas.	.866*	.705
Idea Realization – CBI	IR1	I test new solutions in product development.	.873*	.718
	IR2	I evaluate the strengths and weaknesses of proposed ideas.	.861*	.703
	IR3	I prove the effectiveness of implemented ideas through supporting data or metrics.	.849*	.687
Idea Realization – LBC	IR4	I collaborate with colleagues in implementing ideas.	.834*	.675
	IR5	I discuss ideas with team members to build enthusiasm for innovation.	.857*	.694
Idea Sustainability	IS1	I compare the results of implemented ideas with the initial objectives.	.877*	.734
	IS2	I look for the most appropriate working methods or analytical techniques.	.863*	.709
Digital Leadership				
Attitudes	DL1	My leader actively uses current technologies in their work.	.825*	.681
Digital Competency	DL2	My leader is a digital technology expert.	.841*	.707
	DL3	My leader has good digital competence.	.828*	.684
Behaviour	DL4	My leader keeps up with knowledge developments in the digital world.	.814*	.667
Vision	DL5	My leader proactively promotes digital transformation in the work unit.	.820*	.673
Digital Capabilities	DL6	My leader inspires others about digital transformation.	.818*	.671
	DL7	My leader has a clear understanding of structures and processes in digital transformation.	.838*	.701
Knowledge Sharing				
Written Knowledge	KS1	I actively submit reports related to work to the organization's database.	.841*	.707
	KS2	I actively disseminate information to team members.	.859*	.738
	KS3	I actively share ideas during team meetings.	.847*	.722

Organizational Communications	KS4	I actively express my insights in team meetings.	.848*	.719
	KS5	I actively present analysis results in meetings.	.842*	.712
	KS6	I actively deliver strategic recommendations in formal organizational forums.	.844*	.715
Personal Interactions	KS7	I actively exchange ideas and information with colleagues informally.	.850*	.723
	KS8	I actively acquire knowledge with colleagues in both formal and informal events.	.858*	.733
Communities of Practice	KS9	After attending training, I share knowledge with colleagues.	.846*	.718
Creative Self Efficacy				
Creative Thinking	EC1	I am confident in generating innovative ideas for product development.	.822*	.676
	EC2	I can think flexibly to solve problems.	.838*	.702
	EC3	I can combine different concepts into new ideas.	.835*	.698
	EC4	I can find new approaches in work processes.	.849*	.719
Creative Performance	EC5	I can apply creative ideas in my work.	.841*	.707
	EC6	I am confident in completing tasks in an innovative way.	.842*	.708
	EC7	I can adapt quickly when facing challenges.	.850*	.723
	EC8	I remain motivated even when results don't meet expectations.	.846*	.717
Previous Creative Experience	EC9	My previous work experience often required me to generate original ideas.	.823*	.677
	EC10	I have successfully solved problems in innovative ways before.	.838*	.703
Organizational Support	EC11	My supervisor supports me in trying creative solutions.	.840*	.705
	EC12	The organization provides resources to help me implement innovative ideas.	.844*	.710
Employee Creativity				
Domain-Relevant Skills	CSE1	I try out new ideas or methods first.	.823*	.678
	CSE2	I am able to develop creative ideas that align with work needs.	.819*	.670
	CSE3	I search for new ideas and ways to solve problems.	.831*	.691
Creativity-Relevant Skills	CSE4	I can generate breakthrough ideas in my work.	.838*	.703

Intrinsic Task Motivation	CSE5	I can think outside the box when solving problems.	.836*	.700
	CSE6	I am a source of creative ideas for my team.	.840*	.707
	CSE7	I am personally motivated to complete tasks.	.827*	.684
	CSE8	I feel internally driven to complete tasks without needing orders.	.832*	.693

Table 4 presents the means, inter-construct correlations, and the square roots of the AVE on the diagonal (bold values). According to the Fornell-Larcker criterion, discriminant validity is established when each construct's square root of AVE exceeds its correlations with other constructs (Fornell & Larcker, 1981). This condition ensures that each latent construct shares more variance with its indicators than with other constructs in the model.

Table 4. Fornell-Larcker criterion

No	**Variable**	**Mean**	1	2	3	4	5
1	IWB	4,86	.702				
2	DL	4,74	.292*	.751			
3	KS	4,78	.246*	.342*	.737		
4	CSE	4,63	.185*	.254*	.192*	.714	
5	EC	4,72	.146*	.343*	.225*	.258*	.761

Note. IWB = Innovative Work Behavior; DL = Digital Leadership; KS = Knowledge Sharing; CSE = Creative Self-Efficacy; EC = Employee Creativity.

All HTMT values presented are below the conservative threshold of 0.85, indicating robust discriminant validity across all constructs (See Table 5)

Table 5.: HTMT Criterion

	IWB	**DL**	**KS**	**CSE**	**EC**
IWB	—				
DL	0.832	—			
KS	0.790	0.841	—		
CSE	0.752	0.778	0.807	—	
EC	0.793	0.837	0.815	0.791	—

Structural Equation Model Evaluation

A six-step modelling was employed to assess the structural relationships between digital leadership and IWB. The analysis sequentially tested direct, mediating, and moderating pathways, including serial and moderated mediation effects. Six competing structural configurations were estimated and evaluated using multiple goodness-of-fit criteria (e.g., χ^2, RMSEA, CFI, SRMR) to identify the most parsimonious and empirically robust model.

Model 1: Direct Effect (DL → IWB)

First, this study tested **Model 1** (see Fig. 2) which examined the direct effect of digital leadership on IWB without incorporating any mediators or moderators. Although the path from digital leadership to IWB was positive and significant, the model fit indices, $\chi^2 = 704.22$, df = 398, CFI = 0.93, RMSEA = 0.056, SRMR = 0.050are demonstrated at (Table 6). indicated a relatively weak model fit.

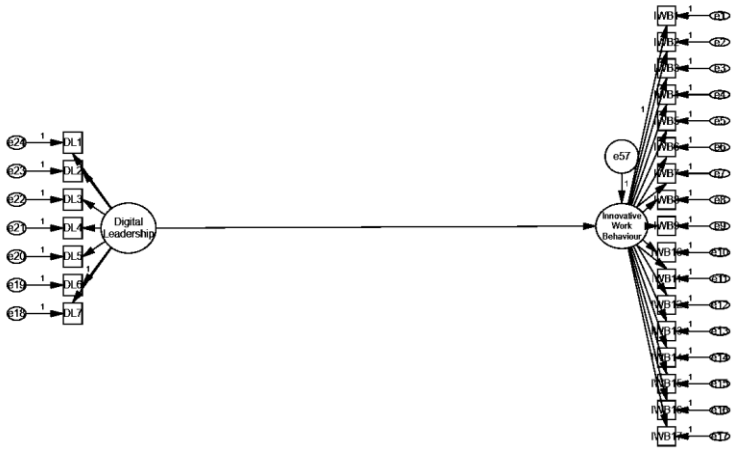

Fig. 2. The direct effect of Digital Leadership (DL) on IWB

Model 2: Creative Self-Efficacy as Mediator

Model 2 (Fig. 3) introduced CSE as a mediator between digital leadership and innovative work behavior. The mediating effect of CSEwas statistically significant (β = .35, $p < .01$), and the overall model demonstrated improved fit: $\chi^2(397) = 693.10$, CFI = .93, RMSEA = .055, SRMR = .049, reflected at (Table 6). This finding suggests that self-perceived creative confidence partially transmits the effects of leadership on innovative outcomes.

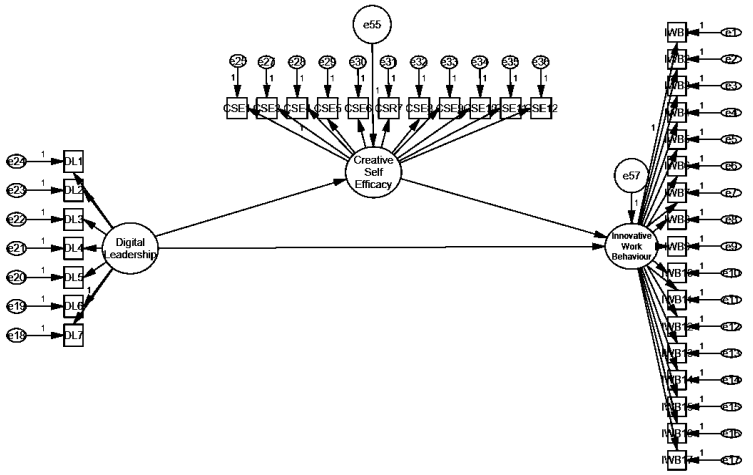

Fig. 3. The mediating role of CSEin the relationship between Digital Leadership and IWB

Model 3: Employee Creativity as Mediator (DL → Employee Creativity → IWB)

Model 3 tested employee creativity as the sole mediator (see Fig. 4). Both the path from digital leadership to employee creativity (β = .38, $p < .01$) and from employee creativity to innovative work behavior (β = .41, $p < .01$) were significant. The model fit indices improved accordingly: $\chi^2(397) = 673.88$, CFI = .94, RMSEA = .053, SRMR = .047, illustrated at (Table 6), indicating that behavioral mechanisms are crucial in linking leadership to innovation.

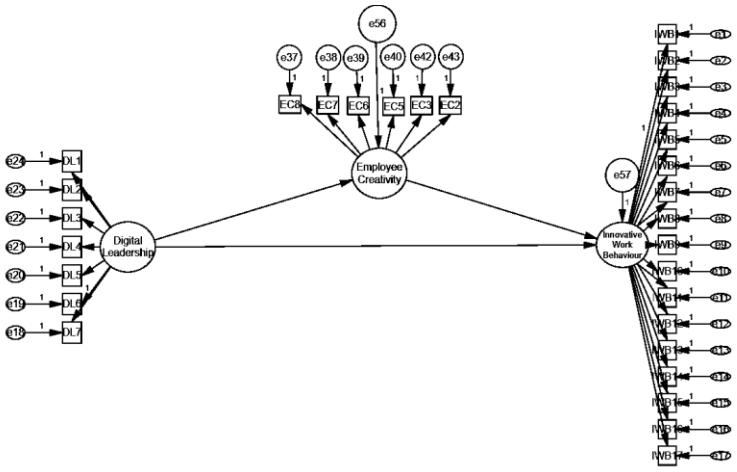

Fig 4. The mediating role of Employee Creativity in the relationship between Digital Leadership and IWB

Model 4: Serial Mediation without Moderation (DL → CSE → Employee Creativity → IWB)

Model 4 (Fig. 5) included both CSEand employee creativity in a serial mediation structure. The indirect paths, creative self-efficacy to employee creativity (β = .42, $p < .01$) and employee creativity to innovative work behavior (β = .39, $p < .01$) were statistically significant. Model fit improved further: $\chi^2(396) = 643.91$, CFI = .95, RMSEA = .050, SRMR = .046, revealed at (Table 6), supporting a sequential cognitive-to-behavioral process in the leadership–innovation linkage.

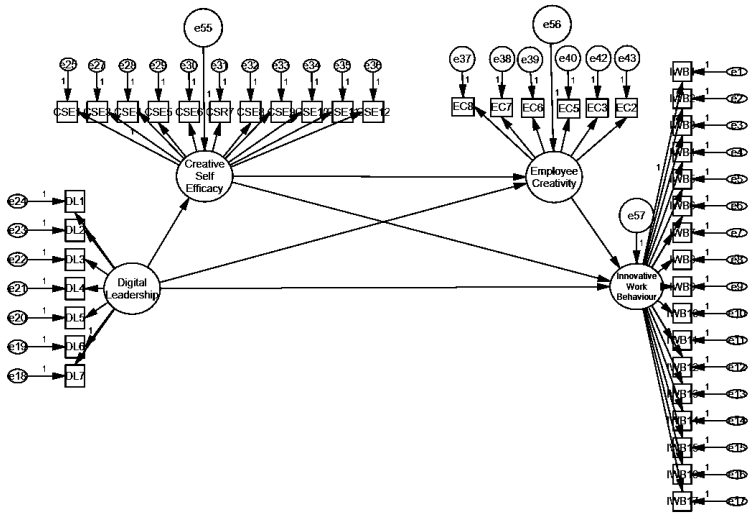

Fig. 5. The serial mediation effect of CSEand Employee Creativity on the relationship between Digital Leadership and IWB

Model 5: CSE Mediation with Moderation (DL → CSE → IWB, moderated by KS)

Model 5 incorporated knowledge sharing as a moderator in the relationship between digital leadership and creative self-efficacy (see Fig.6) . The moderation effect was significant (β = −.27, $p < .01$), indicating that the strength of digital leadership's influence on creative self-efficacy is contingent upon levels of knowledge sharing. Model fit was good: $\chi^2(395) = 620.78$, CFI = .95, RMSEA = .049, SRMR = .044, as shown at (Table 6), which shows the added value of including contextual variables.

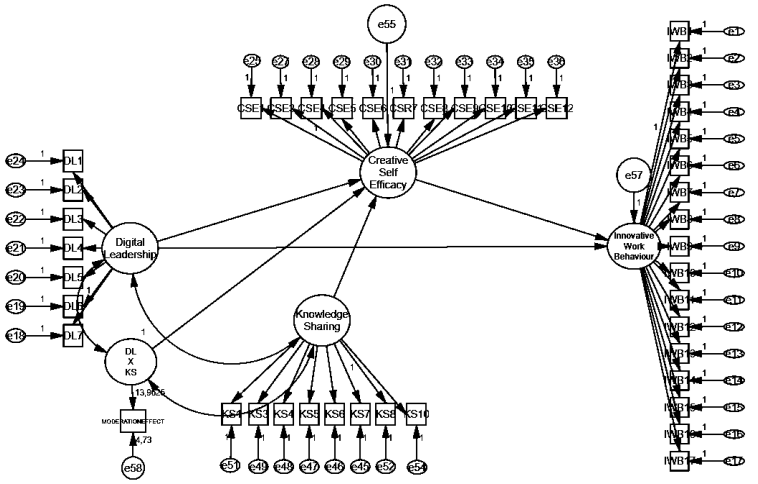

Fig. 6. Moderated mediation model the indirect effect of Digital Leadership on Innovative Work Behaviour through Creative Self-Efficacy, moderated by Knowledge Sharing

Model 6: Serial Mediation with Moderation (DL → CSE → Employee Creativity → IWB, moderated by KS)

Model 6, the full model, combined the serial mediation (digital leadership → creative self-efficacy → employee creativity → innovative work behavior) and the moderation of knowledge sharing on the digital leadership–creative self-efficacy path (See Fig. 7). All hypothesized paths were statistically significant, and the model demonstrated the best fit overall: $\chi^2(392) = 598.34$, CFI = .96, RMSEA = .045, SRMR = .041 (presented at Table 6), This comprehensive model confirms that the influence of digital leadership on innovative work behavior is both mediated by individual psychological and behavioral mechanisms and moderated by the organizational knowledge-sharing environment.

As a result, Model 6 offered the most conceptually integrated and empirically supported explanation of how digital leadership shapes the emergence of innovative work behavior. This model operationalizes a full moderated serial mediation framework, wherein CSEand employee creativity function as sequential mediators, and knowledge sharing moderates the initial link between digital leadership and self-efficacy. The model demonstrated superior fit indices ($\chi^2 = 598.34$, df = 392, CFI = .96, RMSEA = .045, SRMR = .041) can be observed (Table 5), affirming both its statistical adequacy and conceptual coherence. These findings suggest that digital leadership exerts its most potent influence on innovation not through direct intervention alone, but through the cultivation of employees' confidence in their creative capacities. This enhanced sense of efficacy subsequently translates into greater creative engagement, which serves as the behavioral engine driving innovation within the workplace. The integrated structure of this model underscores the necessity of accounting for both individual-level psychological processes and contextual enablers in understanding how leadership fosters innovation in complex, knowledge-intensive organizational environments.

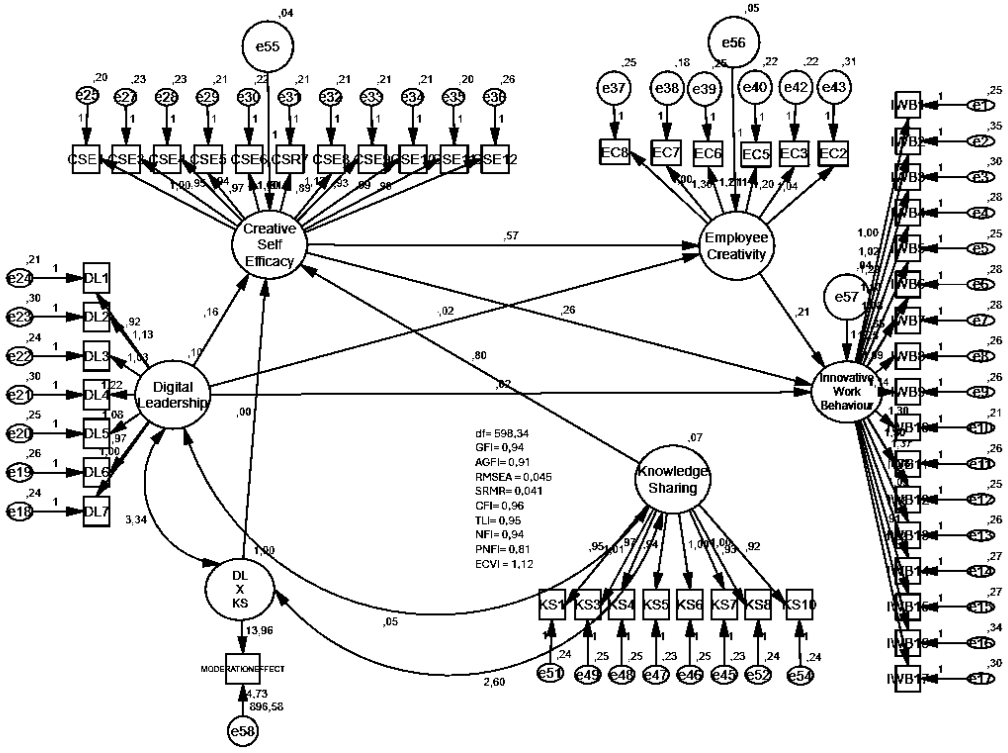

Figure 7. Moderated serial mediation model showing the conditional pathway from Digital Leadership to IWB through CSE and employee creativity, moderated by knowledge sharing

Table 5. Comparison of Structural Models Linking Digital Leadership to IWB

Model	Structural Pathways	Key Findings	χ^2 (df)	CFI	RMSEA	SRMR	$\Delta\chi^2$	Δdf	p
Model 1	DL → IWB	Direct effect only; poorest fit; baseline model	704.22 (398)	.93	.056	.050	–	–	–
Model 2	DL → CSE → IWB	Adds CSE as a mediator; slightly better fit than Model 1	693.10 (397)	.93	.055	.049	11.12	1	<.001
Model 3	DL → Employee Creativity → IWB	Substitutes EC for CSE as sole mediator; better fit	673.88 (397)	.94	.053	.047	19.22	0	<.001
Model 4	DL → CSE → Employee Creativity → IWB	Serial mediation; notable improvement in model fit	643.91 (396)	.95	.050	.046	29.97	1	<.001
Model 5	DL → CSE → IWB; DL × KS → CSE	Adds KS moderation; further improves fit	620.78 (395)	.95	.049	.044	23.13	1	<.001
Model 6	DL → CSE → EC → IWB; DL × KS → CSE	Full moderated serial mediation; best overall fit	598.34 (392)	.96	.045	.041	22.44	3	<.001

Note. DL = Digital Leadership; CSE = Creative Self-Efficacy; EC = Employee Creativity; IWB = Innovative Work Behavior; KS = Knowledge Sharing. $\Delta\chi^2$ and Δdf reflect comparison with the immediately preceding model. CFI = Comparative Fit Index

Hypothesis Testing

The results of the hypothesis testing presented in path analysis (see Table 6), including the examination of the sequential indirect effect as well as the index of moderated mediation

Table 6. Path Analysis

Hypothesis	Path	Estimate	SE	95% CI		p	Decision
				LL	UL		
H1	*DL->IWB*	.190	.0887	-.1055	.2435	.4373	Declined
H2	*DL->EC*	.240	.0478	.1461	.3343	.0000	Accepted
H3	*DL->CSE*	. 212	.1052	.8018	12.158	.0000	Accepted
H4	*CSE->IWB*	.237	.0682	.6484	.9167	. 0000	Accepted
H5	*CSE->EC*	.521	.0257	.4474	.5486	.0000	Accepted
H6	*EC->IWB*	.211	.029	.4793	.8779	.0000	Accepted
H7	*DLXKS->CSE*	.054	.6040	-.2046	-.0153	.0000	Accepted
H8	*DL->CSE->EC*	.303	.3034	.7765	19.706	.0000	Accepted
H9	*DL->CSE->IWB*	.604	.1839	10.309	17.474	.0000	Accepted
H10	*DL->EC->IWB*	.138	.0676	.0675	.3251	1.1137	Declined
H11	*CSE->EC->IWB*	.018	.5587	-29.579	-.7594	.0000	Accepted
H12	*DL->CSE->EC->IWB*	.611	.1293	.3569	.8530	.0000	Accepted
H13	*DL-> DL X KS ->CSE->EC->IWB*	.067	.0016	-.0099	-.0037	. 0000	Accepted

The empirical results from hypotheses testing offer nuanced insights into the role of digital leadership, CSEand employee creativity in shaping IWB within Indonesia's automotive sector.

The analysis revealed no significant direct relationship between digital leadership and innovative work behavior. This result contrasts with prior empirical evidence from Turkish (Erhan et al., 2022; Saeedikiya et al., 2024)(Erhan et al., 2022; Saeedikiya et al., 2024)(Erhan et al., 2022; Saeedikiya et al., 2024) and China (Wang et al., 2022), where digital leadership was positively associated with innovation outcomes. The explanation lies in the contextual distinctiveness of Indonesia's automotive industry, which is characterized by a mix of multinational joint ventures, state-regulated labor dynamics, and varying degrees of technological integration across firms. In many Indonesian automotive firms, particularly tier-2 and tier-3 suppliers, digital leadership practices may remain emergent or insufficiently institutionalized, limiting their capacity to independently drive innovative behaviors at the employee level.

Hypothesis 2 found digital leadership to have an impact on employee creativity, aligning with research conducted in Turkey (Öngel et al., 2024), China (Zhu et al., 2022) and India (Mittal & Dhar, 2015). Yet, this effect appears particularly amplified in Indonesia's automotive manufacturing sector, where organizations are navigating the dual challenge of global competitiveness and domestic structural rigidity.. Within this context, the role of digital leaders extends beyond introducing technology; they must reshape organizational routines and mindsets that have historically prioritized control, compliance, and operational efficiency over creative exploration. Leaders capable of articulating a compelling digital vision, fostering interdisciplinary collaboration, and encouraging constructive risk-taking are crucial for cultivating workplace environments where creativity is not only permitted but actively supported.

Digital leadership was found to significantly enhance creative self-efficacy, a psychological mechanism critical for fostering innovation in a dynamic organizational environment, in line with results (Bozdoğan, 2021; Islam & Asad, 2024) text, creative self-efficacy becomes particularly salient as firms transition from labor-intensive manufacturing models to digitally integrated production systems.

Employees are increasingly required to engage with unfamiliar technologies, adapt to new workflows, and contribute ideas for continuous improvement. However, such expectations often clash with deeply embedded hierarchical norms and rigid task structures that have historically constrained individual initiative. Here, digital leadership functions as a key enabler by creating the psychological conditions necessary for employees to feel capable of contributing creatively within a high-pressure, transformation-driven environment. Through behaviors such as articulating a clear digital vision, providing access to learning resources, encouraging trial-and-error learning, and modeling openness to new ideas, digital leaders help foster a climate in which employees develop confidence in their creative abilities.

CSE was found to have a significant and positive influence on innovative work behavior, reaffirming the importance of internal psychological resources in fostering employee-driven innovation. This relationship is especially salient within Indonesia's automotive manufacturing sector, where innovation is increasingly demanded at the operational level amidst digital transformation pressures and global value chain integration. In such settings, creative self-efficacy enables employees to move beyond rigid task structures and engage more actively in problem-solving, ideation, and continuous improvement.

Rather than being driven solely by external directives or formal innovation systems, IWB in this environment is shaped by employees' belief in their ability to make meaningful contributions. When individuals feel confident in their creative capacities, they are more likely to initiate change, challenge outdated processes, and persist through implementation barriers. This highlights the need for organizations to cultivate psychological readiness alongside technical upskilling. Through leadership support, peer learning, and a culture that rewards experimentation, firms can strengthen CSEas a foundational condition for sustained innovation from within.

Findings revealed a significant positive linkage between CSEand employee creativity, thereby reinforcing and extending prior empirical evidence (AlNuaimi et al., 2022; Gong et al., 2009; Islam & Asad, 2024). Individuals who hold strong beliefs in their creative capacities are more likely to engage in the generation of novel and valuable ideas, particularly when confronted with technological turbulence and volatile market conditions. These results suggest that digital leadership, in isolation, may be insufficient to directly foster innovation. Rather, its effectiveness is significantly amplified when it contributes to the development of individual psychological resources, most notably CSE, which, in turn, catalyze higher levels of employee creativity and innovative behavior.

Employee creativity was found to significantly predict IWB, reaffirming its central role in driving organizational innovation (Amabile, 1996; Anderson et al., 2014; Newman et al., 2020). This finding holds relevance for Indonesia's automotive industry, where firms are under mounting pressure to respond to digital transformation, meet international production standards, and adapt to increasingly complex global supply chains. In such a demanding and transitional environment, employees' ability to generate novel and useful ideas is a vital resource for organizational responsiveness and resilience.

The moderating role of knowledge sharing in the relationship between digital leadership and creative self-efficacy was found to be statistically significant, reinforcing the notion that interpersonal and cross-functional knowledge flow can strengthen the psychological mechanisms that underpin innovation. While the effect size may appear modest, its relevance is magnified within Indonesia's automotive industry, an environment characterized by complex production networks, high technical interdependence, and the growing imperative for digital integration. These findings are consistent with previous research (e.g., Park & Jo, 2020; Chen et al., 2022), which similarly reported that knowledge sharing enhances the positive influence of leadership on employees' creative confidence and innovation outcomes. Hence, this study supports and extends earlier evidence by confirming the moderating impact of knowledge sharing within a digitally evolving industrial context. In this setting, the ability of digital leaders to foster open knowledge exchange becomes critical in enabling employees to develop confidence in their creative abilities.

Knowledge sharing emerges not as a peripheral organizational element but as a dynamic enabler that amplifies the influence of digital leadership on employees' creative confidence and idea generation. When individuals are immersed in environments where insights, technical skills, and experiential learning are openly exchanged, they are more likely to internalize a sense of competence and ownership in innovation efforts. These findings align with previous research, which has consistently demonstrated that knowledge-sharing environments strengthen the positive relationship between leadership practices and innovative outcomes (e.g., Zhang et al., 2021; Lee & Kim, 2022). In contrast to earlier studies that focused primarily on Western contexts, this study extends the discourse by confirming similar patterns within Indonesia's automotive industry**.** It advances a deeper understanding of the innovation process by emphasizing that leadership is most effective when embedded in ecosystems that encourage collective learning and cross-functional collaboration. In such contexts, even incremental improvements in knowledge-sharing culture can serve as powerful accelerants, fueling employees' belief in their creative capacities and unlocking greater participation in innovation-oriented behaviors.

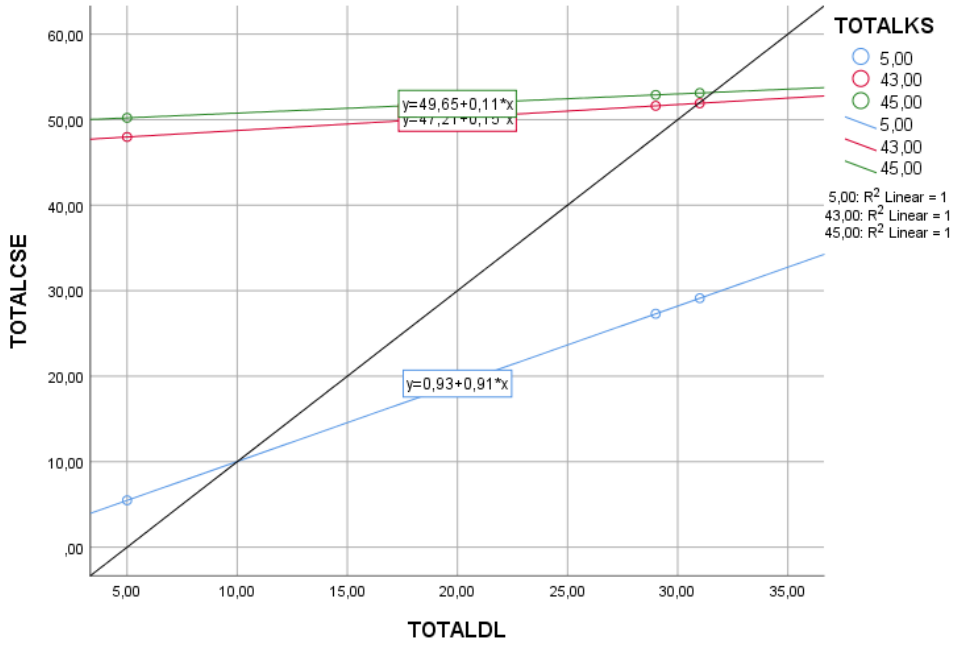

Figure 8. Interaction Plot

The interaction plot and regression estimate clearly demonstrate a negative moderation effect of knowledge sharing on the relationship between digital leadership and creative self-efficacy. When the level of knowledge sharing (TOTALKS) is low (e.g., 5.00)**,** the positive impact of digital leadership on creative self-efficacy is strong and pronounced. The corresponding regression equation is y = 0.93 + 0.91x**,** indicating that for every one-unit increase in digital leadership, creative self-efficacy increases by 0.91 units (see Fig. 8). This reflects a robust and statistically significant relationship, where leadership has a substantial role in shaping employees' confidence in their creative capabilities.

However, this relationship becomes notably weaker as the level of knowledge sharing increases. At a moderate level of knowledge sharing (e.g., 43.00)**,** the regression equation changes to y = 47.21 + 0.13x**,** showing a dramatic decline in the strength of the relationship. Digital leadership now contributes merely a 0.13 unit increase in creative self-efficacy per unit of leadership. The diminishing trend continues when knowledge sharing reaches a high level (e.g., 45.00)**,** with the regression model further reduced to y = 49.65 + 0.11x (see Fig. 8). This suggests that the direct effect of digital leadership on CSEbecomes minimal in environments characterized by intensive knowledge exchange.

These patterns underscore a negative moderation, as knowledge sharing increases, the direct influence of digital leadership on creative self-efficacy progressively weakens. This implies that in organizational contexts where knowledge sharing is already extensive, the psychological and motivational effects of leadership are, to some extent, substituted by the peer-based information exchange and social learning processes. Employees in such environments may derive their confidence from collective insights, shared expertise, and collaborative validation, rather than from formal leadership cues. Consequently, while digital leadership is critical in fostering creative self-beliefs under low knowledge-sharing conditions, its influence becomes less decisive as the organizational culture shifts toward greater information decentralization and collective intelligence. This finding offers important strategic implications: in highly collaborative work environments, organizations should consider reconfiguring leadership roles from directive to enabling, where leaders act more as facilitators of knowledge ecosystems than sole agents of creative motivation.

In alignment with SCT (Bandura, 1986) and Substitute for Leadership Theory (Kerr & Jermier, 1978), high levels of knowledge sharing diminish the direct necessity of leadership intervention by fulfilling informational and motivational functions through peer interaction. This dynamic suggests that in knowledge-rich environments, leadership becomes less directive and more facilitative, shifting the locus of self-efficacy development from top-down influence to peer-driven support.

CSEemerged as a pivotal mediating mechanism linking digital leadership to employee creativity, underscoring the significance of internal psychological processes in enabling innovation. Rather than exerting influence through directive authority alone, digital leaders appear to cultivate creative capacity by shaping how employees perceive their own potential for ideation and problem-solving. In Indonesia's automotive industry, where digital transformation intersects with high task complexity and operational uncertainty, this indirect pathway takes on heightened importance. By fostering environments that promote learning, experimentation, and openness to failure, digital leaders strengthen employees'belief in their creative abilities lay the groundwork for more consistent and confident engagement in creative tasks. This mediating role highlights that the true impact of digital leadership extends beyond structural change; it resides in its ability to shape a psychological climate in which creativity is not only encouraged but internalized as part of employees' professional identity. This result is consistent with findings in the existing literature (e.g., Tierney & Farmer, 2011; Mittal & Dhar, 2015; Liu et al., 2020), which similarly emphasize that leadership behaviors fostering empowerment and autonomy enhance employees' creative self-efficacy, ultimately leading to stronger innovative work behavior. Thus, CSEacts as a crucial conduit through which leadership influence is translated into meaningful, bottom-up innovation.

CSEwas found to mediate the relationship between digital leadership and IWB, offering deeper insight into how leadership drives innovation through psychological empowerment. This finding suggests that digital leadership does not merely prompt innovation through strategic directives or technological support, but more meaningfully through its influence on employees' confidence in their own creative potential. In Indonesia's automotive sector, where digitalization, automation, and lean production increasingly define organizational priorities, this indirect pathway becomes particularly vital. CSEserves as a psychological conduit through which leadership influence is internalized, enabling employees to move beyond compliance and engage in ideation, adaptive problem-solving, and initiative-taking. Conversely, employee creativity did not significantly mediate the relationship between digital leadership and IWB, suggesting that fostering creativity alone may be insufficient to drive innovation in certain organizational contexts. While digital leaders may succeed in stimulating idea generation, the absence of a significant indirect effect implies a disconnect between creative output and the actual implementation of novel practices or solutions. This gap is particularly relevant in Indonesia's automotive manufacturing sector, where deeply embedded structural barriers, such as rigid procedural hierarchies, limited employee autonomy, and underdeveloped innovation pipelines can prevent creative ideas from progressing beyond the conceptual stage. These findings are consistent with previous literature (e.g.,Anderson et al., 2014;

Janses, 2000; Kim & Park, 2021), which also identified organizational rigidity and hierarchical control as major inhibitors of innovative work behavior. By aligning with these studies, the present research reinforces the notion that structural and cultural constraints remain key challenges to fostering sustainable innovation within a developing industrial context.

Moreover, this finding challenges the assumption that creativity will naturally evolve into innovation and underscores the need for organizations to establish formal systems that support, evaluate, and operationalize creative input. Without mechanisms such as idea incubation programs, cross-functional review panels, or incentives for implemented innovations, creativity remains a latent asset. Therefore, while digital leadership may cultivate a creative workforce, its potential to translate into innovation is contingent on the presence of enabling organizational infrastructures. Interestingly, employee creativity was found to mediate the relationship between creative self-efficacy and innovative work behavior, offering a more nuanced understanding of how internal psychological resources translate into tangible innovation outcomes. This finding suggests that creative self-efficacy alone does not directly lead to innovative behavior; rather, it must first activate creative action in the workplace. In other words, employees who believe in their creative potential are more likely to engage in ideation and experimentation, which then serve as precursors to observable innovation. This result is consistent with prior studies (e.g., Tierney & Farmer, 2002; Gong et al., 2009; Hsu et al., 2011), which similarly emphasized that creative self-efficacy influences innovation indirectly through creative engagement and behavior. By aligning with these findings, the present study reinforces the theoretical view that self-belief in creativity functions as a psychological catalyst that transforms potential into realized innovation.

Another insight extends and integrates three previously established relationships: the link between CSEand employee creativity (AlNuaimi et al., 2022; Gong et al., 2009; Islam & Asad, 2024), between Creative Self-Efficacy and IWB (Abdullah et al., 2019; Khan et al., 2023), and between employee creativity and IWB(Ali Taha et al., 2016; Elidemir et al., 2020; Volery & Tarabashkina, 2021). In the context of Indonesia's high-demand, technology-intensive automotive industry, this pathway becomes particularly salient. Here, employees are increasingly expected to adapt, problem-solve, and propose solutions amidst evolving digital systems and lean production requirements. Therefore, fostering CSEmust be coupled with supportive organizational mechanisms that encourage the expression and development of creative ideas. Platforms such as innovation contests, project-based creative training, cross-functional collaboration, and managerial empowerment are critical to translating individual confidence into meaningful contributions. Recognizing employee creativity as a behavioral bridge between self-belief and innovation offers a powerful lever for designing innovation ecosystems that are both psychologically and operationally aligned with the demands of modern manufacturing.

A compelling aspect of the results is that CSEand employee creativity were found to jointly mediate the relationship between digital leadership and innovative work behavior, offering critical insight into the sequential psychological and behavioral processes that drive innovation. While earlier analyses demonstrated that CSEalone served as a robust mediator and employee creativity, in isolation, did not this finding confirms that the two constructs, when aligned in a serial pathway, form a significant mechanism through which digital leadership influences innovation outcomes in the workplace.

In this pathway, digital leadership first enhances employees' belief in their creative abilities, which in turn activates their engagement in creative tasks and idea generation. This layered process reflects a deeper psychological logic: creative self-efficacy builds the internal readiness to take creative initiative, while employee creativity represents the behavioral expression of that readiness. Notably, although employee creativity may not independently mediate the leadership–innovation link, it gains mediating potency when it follows the development of self-efficacy, highlighting the importance of sequencing in the innovation process. In Indonesia's automotive manufacturing sector, where innovation is both urgent and structurally constrained, this finding carries practical significance. It suggests that organizations must first

invest in strengthening employees' creative confidence before expecting consistent creative output and innovative behavior.

Theoretically, this result reinforces SCT (Bandura, 1986) positioning creative self-efficacy as a cognitive-affective bridge that translates macro-level leadership influence into micro-level behavioral outcomes. It aligns with prior research suggesting that digital leadership does not drive innovation directly, but by shaping self-perceptions that encourage employees to act creatively in response to complex challenges (Newman et al., 2018; Volery & Tarabashkina, 2021; Alobeidli et al., 2024). Practically, this underscores the need for a dual-pronged strategy: first, cultivating creative self-efficacy through leadership coaching, empowerment interventions, and psychological capital development; and second, reinforcing that confidence through operational mechanisms such as mentoring, innovation labs, and structured rewards for idea implementation. Efforts to stimulate creativity in isolation, without reinforcing the underlying belief in one's capacity to innovate are unlikely to yield sustainable outcomes. For organizations in digitally evolving sectors like Indonesia's automotive industry, integrating self-efficacy development with creativity-enabling systems is essential to closing the gap between potential and performance.

A key insight from this analysis is that knowledge sharing moderates the indirect effect of digital leadership on innovative work behavior through CSEand employee creativity. The results demonstrate that the strength of this serial mediation pathway is contingent on the level of knowledge sharing within the organization (see Table 7). At low levels of knowledge sharing, the indirect effect was strong and statistically significant, suggesting that in environments with limited knowledge flow, digital leadership plays a critical role in cultivating self-efficacy and creativity as drivers of innovation. As knowledge sharing increased to a moderate level, the indirect effect weakened but remained significant, indicating that employees began to rely on collective knowledge mechanisms alongside leadership-driven psychological resources. However, at high levels of knowledge sharing, the mediation effect was no longer statistically significant, as the confidence interval encompassed zero, implying that leadership's psychological influence may be substituted by shared systems of learning, collaboration, and team-based innovation.

Table 7. Indirect Effect Table

INDIRECT EFFECT:

TOTALDL -> TOTALCSE -> TOTALEC -> TOTALIWB

TOTALKS	Effect	BootSE	BootLLCI	BootULCI
5,0000	,3072	,0710	,1742	,4481
43,0000	,0513	,0328	,0029	,1318
45,0000	,0378	,0327	-,0104	,1178

Index of moderated mediation:

	Index	BootSE	BootLLCI	BootULCI
TOTALKS	-,0067	,0016	-,0099	-,0037

At low levels of knowledge sharing, the serial mediation pathway was strong and statistically significant, suggesting that in environments where information exchange is limited, the leadership-driven development of self-efficacy and creativity plays a crucial role in fostering innovation. When knowledge sharing reached a moderate level, the indirect effect weakened but remained significant, indicating that collective knowledge exchange begins to serve as an alternative pathway for innovation. However, at high levels of knowledge sharing, the serial mediation effect was no longer statistically significant, with the confidence interval encompassing zero. This indicates that in knowledge-rich environments, the influence of digital leadership on innovation operates through different mechanisms, indicating collective problem-solving, shared mental models, or team-based innovation processes rather than through individual

psychological constructs alone.

This finding contributes to a more refined understanding of how context shapes the efficacy of leadership. It advances the propositions of Substitutes for Leadership Theory (Kerr & Jermier, 1978), which argues that certain organizational conditions can diminish or even neutralize the influence of formal leadership. In the case of this study, robust knowledge-sharing environments appear to act as such substitutes, creating a decentralized flow of information, support, and expertise that lessens employees' reliance on direct leadership cues to engage in innovation-related behavior. In these settings, collective structures such as shared mental models, peer mentoring, and cross-functional collaboration provide the psychological and informational scaffolding typically offered by leaders, thereby attenuating the mediating influence of constructs like CSE.

At the same time, the moderated mediation pathway enriches SCT(Bandura, 1986) by demonstrating that the activation of self-efficacy beliefs is not solely a function of interpersonal influence, such as leadership modeling or encouragement, but is significantly conditioned by broader environmental variables. Specifically, in knowledge-rich environments, the self-regulatory role of self-efficacy may become diluted, not because it is unimportant, but because other social learning mechanisms are already embedded in the organizational fabric. These mechanisms offer alternative sources of vicarious learning, mastery experiences, and verbal persuasion, which traditionally fall within the domain of leadership influence. Therefore, the interplay between environmental enablers and internal psychological states must be reconsidered as dynamic and interdependent rather than linear and additive.

Many traditional manufacturers still rely on hierarchical structures and maintain limited interaction across departments at the Indonesian automotive industry. In contrast, more digitally mature organizations, often multinational subsidiaries or joint ventures, tend to implement formalized systems that facilitate knowledge sharing. These systems reduce the necessity for leadership to serve as the primary catalyst for innovation. This diversity highlights the importance of aligning leadership approaches with the organization's prevailing knowledge environment. In contexts where knowledge exchange is limited, digital leaders must adopt a more hands-on role by actively fostering employee confidence and nurturing creative behavior. However, in settings where knowledge flows freely, the leadership function is more likely to focus on orchestrating collective efforts, supporting peer-based learning, and sustaining innovation through shared platforms and routines. Therefore, leadership effectiveness should not be seen as diminished but rather understood differently in relation to contextual demands. It evolves from functioning as a direct change agent to operating as a designer of collaborative, innovation-enabling systems.

DISCUSSION

Theoretical Contributions

This study provides new insights into the psychological and contextual mechanisms through which digital leadership influences IWB, particularly in digitally transforming industries such as Indonesia's automotive sector. Drawing from SCT (Bandura, 1986, 1997) and Substitutes for Leadership Theory (Kerr & Jermier, 1978), the findings emphasize that leadership alone is not sufficient to promote innovation-oriented behavior unless it activates core psychological resources and adapts to the organization's knowledge-sharing environment. Notably, the discovery of the strong mediating role of CSE in the relationship between digital leadership and innovative work behaviour represents a novel contribution, as this specific linkage has not been explicitly discussed in the existing literature**.** This new insight advances theoretical understanding by revealing how psychological empowerment mechanisms translate digital leadership into tangible innovative outcomes. This supports the foundational argument of Bandura (1997) that individuals' beliefs about their capabilities directly influence their motivation and actions. In alignment with Tierney and Farmer (2002) and Gong et al. (2009), the results confirm that digital leaders can foster

employee confidence in their creative potential by providing vision, encouragement, and support. However, the current study advances this stream by demonstrating that CSE does not operate in isolation but rather as a gateway to employee creativity, which in turn enables IWB. This serial mediation model (DL → CSE → EC → IWB) illustrates that innovation at the individual level is not the result of a single influence but a layered cognitive-behavioral process.

Contrary to expectations from earlier work (Wang, 2023; Elidemir et al., 2020), employee creativity alone did not mediate the relationship between DL and IWB. This finding suggests that creativity defined as the generation of novel ideas does not directly translate into innovation unless preceded by strong self-beliefs and accompanied by contextual support. Anderson et al. (2014) distinguished between creativity and innovation, and the current study reinforces this distinction by empirically showing that creativity is necessary but not sufficient for the enactment of innovative behavior. This has important implications for how organizations design interventions: cultivating creativity alone may be insufficient unless employee confidence and empowerment are simultaneously developed. Equally important is the role of knowledge sharing as a contextual moderator. The analysis reveals that when knowledge sharing is high, the impact of digital leadership on CSE becomes significantly weaker. This result suggeststhe theory of Substitutes for Leadership Theory (Kerr & Jermier, 1978) and recent extensions (Kim & Park, 2017; Al-Omari et al., 2023) rather than digital leadership, which argues that leadership effects are contingent on the presence of substitute mechanisms such as peer-based learning. In high-KS environments, employees may derive confidence and motivation from collective insights and peer interactions rather than from top-down leadership cues. This finding is particularly relevant for digitally mature organizations, where knowledge is decentralized, and learning is often distributed across teams and platforms. It implies that leadership approaches must be dynamically adjusted based on the organization's knowledge ecosystem.

Managerial Contributions

The findings provide nuanced insights for organizations striving to foster innovation amidst the accelerating pace of digital transformation. First, the confirmation of a serial mediation pathway, linking digital leadership to innovative work behavior through creative self-efficacy and employee creativity, highlights the foundational role of psychological empowerment in driving innovation. This implies that effective leadership must extend beyond performance monitoring and task delegation to include the intentional cultivation of employees' self-belief in their creative capacities. When individuals possess strong creative self-efficacy, they are more likely to engage in ideation, take initiative, and persist in solving complex problems, even in uncertain or high-pressure environments. Leadership, therefore, becomes a developmental process aimed at unlocking latent creative potential through encouragement, mentoring, and the provision of learning opportunities. Second, the moderating influence of knowledge sharing brings attention to the contextual dynamics that shape the impact of leadership behaviors. In environments where knowledge exchange is constrained; such as in rigid, hierarchical organizations or silos with poor communication, leaders must adopt a more active role in facilitating innovation by personally guiding, motivating, and supporting employees. Here, leadership becomes essential in compensating for structural deficits in collaboration and learning. Conversely, in settings where knowledge sharing is embedded in the organizational culture, leadership may take a more facilitative form, focusing on enabling team-based learning, cross-functional collaboration, and shared innovation ownership. This shift reinforces the notion that leadership effectiveness is not fixed, but contingent upon the organization's social and informational architecture.

Third, the findings point to a broader understanding of innovation as a capability that is not solely driven by structural design, technological investment, or strategic vision, but also by the quality of the organizational climate. Innovation thrives in cultures that actively promote experimentation, tolerate failure as a learning process, and create psychological safety for employees to express ideas without fear of

judgment or penalty. Such environments encourage risk-taking, continuous learning, and the iterative refinement of ideas, conditions that are essential for sustaining innovation in dynamic, technology-intensive sectors.

CONCLUSION

This study provides compelling evidence that digital leadership exerts its influence on IWB primarily through the psychological mechanism of CSE. In line with academic convention, the conclusion also revisits key aspects discussed in the introduction and methodology sections, summarizing the study's context, theoretical foundations, and analytical approach**.** By integrating these elements, the study reinforces its central argument that leadership in the digital era shapes innovation not merely through structural or technological factors, but by fostering employees' belief in their creative capabilities and encouraging proactive engagement in innovative actions. Rather than acting as a simple, direct driver of innovation, digital leadership initiates a sequential process in which CSE boosts employees' confidence in their creative abilities, which in turn facilitates creative expression that culminates in innovation-related behavior. Importantly, the results confirm that employee creativity alone does not suffice to mediate the leadership–innovation link. Innovation, in this sense, is not merely a product of ideation but the outcome of internalized confidence and contextual support. This distinction reinforces the view that CSE is the critical gateway through which leadership exerts its behavioral influence, thereby extending the explanatory scope of Social Cognitive Theory within digital organizational settings. Moreover, the study reveals that knowledge sharing (KS) moderates the relationship between digital leadership and CSE. When KS is high, the role of leadership in building creative self-efficacy diminishes, implying that in knowledge-rich environments, peer learning and collaborative exchanges can substitute for formal leadership influence. This finding validates and extends theoretical focus has been grounded in SCT which explains how individual cognition, self-belief, and environmental factors interact to shape innovative work behaviour. Theoretically, this research contributes an integrative model that connects leadership behavior, individual cognitive-affective states, and contextual knowledge dynamics. It provides a process-based explanation of IWB, reconceptualizing innovation as an emergent behavior influenced by both internal and external conditions. Practically, the study underscores the importance of tailoring leadership strategies to the organization's knowledge-sharing maturity. In low-knowledge sharing environments, digital leaders must take a more active, transformational approach to build self-efficacy and stimulate creativity. In contrast, high-knowledge sharing settings require leaders to shift toward facilitative roles, cultivating environments of psychological safety, decentralized knowledge exchange, and collective learning. Overall, this study advances the understanding of how digital leadership catalyzes innovative work behaviour by activating self-efficacy, enabling creativity, and adapting to contextual knowledge dynamics. These insights are particularly relevant for organizations navigating digital transformation, where fostering innovation is not just a technological challenge, but a human and cultural one as well.

Nonetheless, several limitations must be acknowledged, which also offer fertile ground for future research. First, the study's cross-sectional design limits the ability to infer causality among the examined constructs. Longitudinal or time-lagged designs would be instrumental in capturing the temporal evolution of how leadership behavior influences psychological and behavioral outcomes, especially in dynamic, fast-changing digital environments. Second, while stratified random sampling and a high response rate within Indonesia's automotive R&D sector enhance internal validity, the findings may not generalize to other industries or cultural contexts with different leadership norms, innovation climates, or digital maturity levels. Future research should replicate the model in diverse sectors and across cross-cultural settings to establish broader external validity. Third, reliance on self-reported data introduces potential for social desirability bias and common method variance (CMV), although statistical tests indicated minimal concern. Subsequent studies could incorporate multi-source data, such as supervisor ratings or objective innovation metrics, to triangulate findings. Finally, although validated multi-item instruments were used and construct validity was rigorously tested, constructs like digital leadership and knowledge sharing are context-sensitive and multifaceted. Mixed-method or qualitative designs could further illuminate how employees interpret

and respond to leadership behaviors and peer knowledge flows in real-world contexts. Addressing these limitations will not only enhance empirical rigor but also enrich theoretical development and practical applicability in the field of organizational innovation.

Building on these insights, several future research directions are warranted. First, scholars should explore how other psychological mechanisms, such as intrinsic motivation, psychological empowerment, or digital resilience mediate or moderate the leadership–innovation link, particularly in virtual or hybrid work environments. Second, investigating the role of team-level dynamics (e.g., team psychological safety, team diversity, or collective efficacy) may offer a multilevel perspective on how digital leadership shapes innovation outcomes. Third, future studies could examine how various leadership styles, such as servant leadership, authentic leadership, or ambidextrous leadership interact with digital capabilities and knowledge-sharing structures to foster innovation. Fourth, comparative research across industries with different levels of digital intensity (e.g., fintech, healthcare, education) or across national cultures with different values (e.g., power distance, collectivism) can help contextualize and refine the generalizability of the proposed model. Lastly, incorporating emerging technologies, such as AI-enabled decision support systems or enterprise collaboration tools into leadership and innovation frameworks may uncover new affordances and constraints in digital-age innovation behavior. These avenues will deepen understanding of the evolving interface between leadership, psychology, and organizational innovation in increasingly complex and digitalized work environments.

Acknowledgment(s)

The authors would like to thank the anonymous reviewers and editors for their excellent comments which significantly improved the quality of this paper”

Fundings

This research was conducted without financial support from any funding agency, commercial or non-profit sectors

Conflicts of interest

The authors declare no conflicts of interest in this study

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APPENDIX

Table 1. Summary of statistics

This table summarizes variables, including performance measures and firm-specific control variables.

Variables	*Obs.*	*Mean*	*Median*	*Std.Dev.*	*Min.*	*Max.*	25	50	75
ESG	1001	19.28	17.77	8.37	9.09	50.83	14.46	17.77	20.66
Environ	834	13.03	10.85	9.23	1.55	51.94	8.53	10.85	14.73
Social	777	15.54	12.28	12.78	3.13	67.19	5.26	12.28	18.42
Governance	1001	45.98	44.64	5.63	10.71	67.86	44.64	44.64	48.21
SalesGr	996	0.19	0.12	0.52	−1.00	9.34	0.02	0.12	0.24
Leverage	1001	0.20	0.17	0.16	0.00	0.83	0.07	0.17	0.31
Profitability	1001	0.08	0.08	0.06	−0.13	0.44	0.04	0.08	0.12
R&D	1001	0.00	0.00	0.01	0.00	0.09	0.00	0.00	0.00
DivPayout	1001	0.48	0.18	3.85	0.00	109.88	0.08	0.18	0.28
LnAsset	1001	10.71	10.62	1.67	6.90	15.67	9.47	10.62	11.79
FirmAge	999	41.91	31.00	28.59	2.00	155.00	23.00	31.00	55.00
Market-to-book ratio	1001	0.77	0.50	0.72	0.02	5.06	0.25	0.50	1.09

Table 2. Correlation analysis

This table provides a correlation analysis of the variables used.

	ESG	*Environ*	*Social*	*Governance*	*Sales Gr*	*Leverage*	*Profitability*	*R&D*	*Div Payout*	*LnAsset*	*Firm Age*	*Market-to-book ratio*
ESG	1											
Environ	0.94**	1										
Social	0.84**	0.66**	1									
Governance	0.60**	0.60**	0.50**	1								
SalesGr	−0.04	0.02	−0.02	0.02	1							
Leverage	−0.01	0.04	0.02	0.12**	0.03	1						
Profitability	0.04	0.08*	−0.04	0.07*	0.06	−0.37**	1					
R&D	0.04	0.09**	0.05	0.02	−0.03	−0.19**	0.18**	1				
DivPayout	0.11**	0.10**	0.08*	0.10**	−0.02	0.02	−0.05	−0.02	1			
LnAsset	0.39**	0.37**	0.54**	0.32**	0.03	0.39**	−0.29**	−0.05	0.04	1		
FirmAge	0.11**	0.038	0.11**	0.014	−0.03	0.01	−0.13**	−0.02	0.08*	0.01	1	
Market-to-book ratio	0.05	.108**	0.11**	0.10**	0.02	−0.43**	0.48**	0.29**	−0.04	−0.19**	−0.06*	1

Notes: Significant at * p<0.05 (t >. 1.96), **p<0.01 (t>. 3.29).

Table 3. Determinants of founder CEOs

This table reports the determinants of founder CEOs using the firm-specific control variables. A logit regression model is employed.

Variables	*Founder CEOs*
C	3.38***
	(4.56)
SalesGr	−0.21
	(−1.40)
Leverage	1.81***
	(3.39)
Profitability	0.15
	(0.10)
R&D	3.59
	(0.69)
LnAsset	−0.39***
	(−6.84)
LnAge	0.24**
	(2.21)
Market-to-book ratio	−0.51***
	(−3.90)
ForeignOwn	0.54***
	(2.87)
Industry effect	Yes
Pseudo. R squared	0.07

Notes: Significant at * p<0.1 (t>1.64), ** p<0.05 (t >. 1.96), *** p<0.01 (t>. 3.29).

Table 4. Comparison between founder CEOs and non-founder CEOs

This table compares performance measures and firm-specific control variables for founder and non-founder CEOs groups.

	Firms with founder CEOs			Firms with non-founder CEOs			*Difference* Tests *p-value*	
	N	*Mean*	*Median*	*N*	*Mean*	*Median*	*t-test*	*Mann-Whitney U test*
ESG	487	18.29	17.36	514	20.22	17.77	0.00	0.02
Environ	415	11.66	10.85	419	14.39	11.63	0.00	0.00
Social	388	13.22	8.77	389	17.85	12.28	0.00	0.00
Governance	487	45.49	44.64	514	46.45	44.65	0.01	0.00
SalesGr	487	0.16	0.14	509	0.21	0.11	0.17	0.04
Leverage	487	0.21	0.18	514	0.19	0.14	0.07	0.00
Profitability	487	0.08	0.07	514	0.09	0.08	0.01	0.08
R&D	487	0.01	0.00	514	0.01	0.0001	0.15	0.00
DivPayout	487	0.52	18.68	514	0.44	16.98	0.76	0.34
LnAsset	487	10.53	10.35	514	10.89	10.83	0.00	0.00
FirmAge	486	42.30	32.00	513	41.53	30.00	0.67	0.05
Market-to-book ratio	487	0.67	0.42	514	0.87	0.58	0.00	0.00
ForeignOwn	487	0.22	0.00	508	0.18	0.00	0.19	-

Notes: Significant at * p<0.1 (t>1.64), ** p<0.05 (t >. 1.96), ***p<0.01 (t>. 3.29).

Table 5. The relationship between founder CEOs and ESG performance using the fixed effect model

This table reports the impact of founder CEOs and other control variables on the firm's *ESG*, *Environmental*, *Social*, and *Governance* performance. The results are interpreted using the panel fixed effect model (Fahlenbrach, 2009).

Variables	*ESG*		*Environmental*		*Social*		*Governance*	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
C	20.22***	−18.37***	14.37***	−19.96***	17.90***	−38.25***	46.44***	29.28***
	(55.18)	−(7.30)	(32.33)	−(6.35)	(28.35)	−(9.37)	(188.28)	(16.10)
Founder CEOs	−1.94***	−1.01**	−2.69***	−1.66***	−4.73*	−2.38***	−0.95***	−0.26
	−(3.69)	−(2.06)	−(4.27)	−(2.75)	−(5.29)	−(3.05)	−(2.68)	−(0.73)
SalesGr		−0.40		0.23		−0.78		−0.21
		−(0.83)		(0.38)		−(0.74)		−(0.61)
Leverage		−5.20***		0.15		−4.90		2.75**
		−(2.83)		(0.06)		−(1.56)		(2.07)
Profitability		18.37***		19.87***		18.16***		17.81***
		(3.67)		(3.25)		(2.27)		(4.92)
R&D		27.66		78.14*		86.51*		−8.02
		(0.93)		(1.91)		(1.86)		−(0.37)
DivPayout		0.23***		0.22***		0.21**		0.13***
		(3.86)		(3.26)		(2.47)		(3.01)
LnAsset		2.59***		2.32***		4.08***		1.28**
		(13.96)		(9.95)		(13.75)		(9.53)
FirmAge		1.83***		1.03**		1.57**		0.25
		(4.97)		(2.17)		(2.56)		(0.95)
Market-to-book ratio		0.79*		1.29**		2.87***		0.75**
		(1.81)		(2.25)		(3.91)		(2.37)
ForeignOwn		−0.56		0.36		1.67		0.49
		−(0.89)		(0.44)		(1.60)		(1.06)
Fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R squared	0.01	0.272	0.03	0.134	0.22	0.06	0.01	0.16
# of Obs	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001
# of Firms	215	215	215	215	215	215	215	215

Notes: Significant at * p<0.1 (t>1.64), ** p<0.05 (t >. 1.96), ***p<0.01 (t>. 3.29).

Table 6. The effect of growth opportunities on the relationship between founder CEOs and ESG performance using the fixed effect model

This table reports the effect of growth opportunities on the relationship between founder CEOs and *ESG*, *Environmental*, *Social,* and *Governance* performance. The results are interpreted using the panel fixed effect model (Fahlenbrach, 2009).

Variables	*ESG*	*Environ*	*Social*	*Governance*
	(1)	(2)	(3)	(4)
C	−18.90***	−20.89***	−38.56***	29.02***
	−(7.50)	−(6.64)	−(9.35)	(15.91)
Founder CEOs× Market-to-book ratio	−1.72**	−2.52***	−0.63	−0.85*
	−(2.50)	−(2.73)	−(0.55)	−(1.69)
Founder CEOs	0.25	0.05	−1.92*	0.36
	(0.36)	(0.06)	−(1.71)	(0.70)
Salesgr	−0.40	0.22	−0.78	−0.21
	−(0.83)	(0.37)	−(0.75)	−(0.61)
Leverage	−5.16***	0.17	−4.89	2.77**
	−(2.82)	(0.07)	−(1.56)	(2.08)
Profitability	18.49***	20.00***	18.31**	17.87***
	(3.70)	(3.28)	(2.29)	(4.94)
R&D	27.37	72.52*	85.81*	−8.16
	(0.92)	(1.78)	(1.84)	−(0.38)
DivPayout	0.23***	0.21***	0.21**	0.13***
	(3.77)	(3.13)	(2.44)	(2.94)
LnAsset	2.57***	2.29***	4.07***	1.27***
	(13.87)	(9.88)	(13.71)	(9.46)
FirmAge	1.90***	1.18**	1.62***	0.29
	(5.16)	(2.47)	(2.61)	(1.08)
Market-to-book ratio	1.39***	2.21***	3.10***	1.04***
	(2.80)	(3.33)	(3.67)	(2.89)
ForeignOwn	−0.56	0.24	1.64	0.49
	−(0.88)	(0.29)	(1.57)	(1.07)
Fixed effect	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes
Adj. R squared	0.28	0.23	0.38	0.17

Notes: Significant at * p<0.1 (t>1.64), ** p<0.05 (t >. 1.96), ***p<0.01 (t>. 3.29).

Table 7. The effect of foreign ownership on the relationship between founder CEOs and ESG performance using the fixed effect model

This table reports the effect of foreign ownership on the relationship between founder CEOs and *ESG*, *Environmental*, *Social,* and *Governance* performance. The results are interpreted using the panel fixed effect model (Fahlenbrach, 2009).

Variables	*ESG* *(1)*	*Environ* *(2)*	*Social* *(3)*	*Governance* *(4)*
C	−18.36***	−19.67***	−38.03***	29.29***
	−(7.34)	−(6.31)	−(9.32)	(16.16)
Founder CEOs×ForeignOwn	4.21***	5.72***	3.05	2.43***
	(3.50)	(3.67)	(1.52)	(2.78)
Founder CEOs	−1.81***	−2.64***	−2.91***	−0.72*
	−(3.36)	−(4.03)	−(3.41)	−(1.85)
SalesGr	−0.40	0.15	−0.79	−0.22
	−(0.84)	(0.25)	−(0.76)	−(0.62)
Leverage	−5.15***	−0.58	−5.20*	2.78**
	−(2.82)	−(0.23)	−(1.66)	(2.10)
Profitability	19.61***	20.60***	18.49**	18.52***
	(3.93)	(3.39)	(2.32)	(5.12)
R&D	25.32	72.76	85.02*	−9.37
	(0.86)	(1.79)	(1.83)	−(0.44)
DivPayout	0.23***	0.22***	0.21**	0.13***
	(3.85)	(3.22)	(2.44)	(2.99)
LnAsset	2.64***	2.36***	4.09***	1.31***
	(14.29)	(10.20)	(13.79)	(9.77)
FirmAge	1.82***	1.13**	1.65***	0.25
	(4.98)	(2.38)	(2.67)	(0.94)
Market-to-book ratio	0.71	1.25**	2.83***	0.70**
	(1.64)	(2.19)	(3.85)	(2.23)
ForeignOwn	−2.87***	−2.79**	−0.02	−0.84
	−(3.14)	−(2.36)	−(0.01)	−(1.27)
Fixed effect	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes
Adj. R squared	0.28	0.23	0.38	0.17

Notes: Significant at * p<0.1 (t>1.64), ** p<0.05 (t >. 1.96), ***p<0.01 (t>. 3.29).

Table 8. Robustness checks on the relationship between founder CEOs, growth opportunities, and ESG performance using the panel GMM model

This table reports the results of our robustness check on the relationship between founder CEOs, growth opportunities, and *ESG* (*Environmental*, *Social*, and *Governance* performance. Arellano and Bond (1991) Panel GMM is used in our analysis to account for endogeneity problems.

Panel A. The relationship between founder CEOs and ESG performance

Variables	*ESG*	*Environ*	*Social*	*Governance*
	(1)	*(2)*	*(3)*	*(4)*
C	−18.25***	−19.96***	−38.25***	29.36***
	−(7.24)	−(6.35)	−(9.37)	(16.11)
Founder CEOs	−1.01**	−1.66***	−2.38***	−0.26
	−(2.06)	−(2.75)	−(3.05)	−(0.74)
SalesGr	−0.33	0.23	−0.78	−0.17
	−(0.67)	(0.38)	−(0.74)	−(0.47)
Leverage	−5.36***	0.15	−4.90	2.64**
	−(2.90)	(0.06)	−(1.56)	(1.98)
Profitability	18.17***	19.87***	18.16**	17.67***
	(3.62)	(3.25)	(2.27)	(4.87)
R&D	27.73	78.14*	86.51*	−7.98
	(0.93)	(1.91)	(1.86)	−(0.37)
DivPayout	0.23***	0.22***	0.21**	0.13***
	(3.86)	(3.26)	(2.47)	(3.01)
LnAsset	2.60***	2.32***	4.08***	1.28***
	(13.98)	(9.95)	(13.75)	(9.55)
FirmAge	1.79***	1.03**	1.57**	0.23
	(4.86)	(2.17)	(2.56)	(0.86)
Market-to-book ratio	0.77*	1.29**	2.87***	0.73**
	(1.77)	(2.25)	(3.91)	(2.33)
ForeignOwn	−0.54	0.36	1.67	0.50
	−(0.85)	(0.44)	(1.60)	(1.10)
Fixed effect	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes
Adj. R squared	0.27	0.22	0.38	0.17

Notes: Significant at * p<0.1 (t>1.64), ** p<0.05 (t >. 1.96), ***p<0.01 (t>. 3.29).

Panel B. The effect of growth opportunities on the relationship between Founder CEOs and ESG performance

Variables	*ESG*	*Environ*	*Social*	*Governance*
	(1)	*(2)*	*(3)*	*(4)*
C	−18.79***	−20.89***	−38.56***	29.10***
	−(7.44	−(6.64)	−(9.35)	(15.92)
Founder CEOs×Market-to-book ratio	−1.71**	−2.52***	−0.63	−0.83*
	−(2.47)	−(2.73)	−(0.55)	−(1.66)
Founder CEOs	0.23	0.05	−1.92*	0.35
	(0.33)	(0.06)	−(1.71)	(0.68)
SalesGr	−0.34	0.22	−0.78	−0.17
	−(0.69	(0.37)	−(0.75)	−(0.48)
Leverage	−5.30*	0.17	−4.89	2.67*
	−(2.87)	(0.07)	−(1.56)	(2.00)
Profitability	18.31***	20.00***	18.31**	17.74***
	(3.66)	(3.28)	(2.29)	(4.90)
R&D	27.43	72.52*	85.81*	−8.12
	(0.35)	(1.78)	(1.84)	−(0.38)
DivPayout	0.23***	0.21***	0.21**	0.13***
	(3.77)	(3.13)	(2.44)	(2.94)
LnAsset	2.57***	2.29***	4.07***	1.27***
	(13.89)	(9.88)	(13.71)	(9.47)
FirmAge	1.87***	1.18**	1.62***	0.27
	(5.06)	(2.47)	(2.61)	(1.00)
Market-to-book ratio	1.37***	2.21***	3.10***	1.02***
	(2.75)	(3.33)	(3.67)	(2.85)
ForeignOwn	−0.54	0.24	1.64	0.51
	−(0.40)	(0.29)	(1.57)	(1.10)
Fixed effect	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes
Adj. R squared	0.28	0.22	0.38	0.17

Notes: Significant at * p<0.1 (t>1.64), ** p<0.05 (t >. 1.96), ***p<0.01 (t>. 3.29).

Panel C. The effect of foreign ownership on the relationship between Founder CEOs and ESG performance

Variables	*ESG* *(1)*	*Environ* *(2)*	*Social* *(3)*	*Governance* *(4)*
C	−18.28***	−19.67***	−38.03***	29.35***
	−(7.29)	−(6.31)	−(9.32)	(16.16)
Founder CEOs×ForeignOwn	4.17***	5.72***	3.05	2.40***
	(3.45)	(3.67)	(1.52)	(2.74)
Founder CEOs	−1.80***	−2.64***	−2.91***	−0.72*
	−(3.35)	−(4.03)	−(3.41)	−(1.84)
SalesGr	−0.35	0.15	−0.79	−0.18
	−(0.72)	(0.25)	−(0.76)	−(0.51)
Leverage	−5.25***	−0.58	−5.20*	2.70**
	−(2.86)	−(0.23)	−(1.66)	(2.03)
Profitability	19.45***	20.60***	18.49**	18.41***
	(3.89)	(3.39)	(2.32)	(5.08)
R&D	25.39	72.76*	85.02*	−9.32
	(0.86)	(1.79)	(1.83)	−(0.43)
DivPayout	0.23***	0.22***	0.21**	0.13***
	(3.85)	(3.22)	(2.44)	(2.99)
LnAsset	2.65***	2.36***	4.09***	1.31***
	(14.29)	(10.20)	(13.79)	(9.78)
FirmAge	1.80***	1.13**	1.65***	0.23
	(4.89)	(2.38)	(2.67)	(0.87)
Market-to-book ratio	0.70	1.25**	2.83***	0.69**
	(1.61)	(2.19)	(3.85)	(2.20)
ForeignOwn	−2.83***	−2.79**	−0.02	−0.81
	−(3.09)	−(2.36)	−(0.01)	−(1.22)
Fixed effect	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes
Adj. R squared	0.28	0.23	0.38	0.17

Notes: Significant at * p<0.1 (t>1.64), ** p<0.05 (t >. 1.96), ***p<0.01 (t>. 3.29).

ENTREPRENEURIAL LEADERSHIP AND EMPLOYEES' CREATIVITY: THE ROLE OF INTRINSIC MOTIVATION AND ORGANIZATIONAL MOTIVATION TO INNOVATE

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Received October 13th, 2025; Revised November 12th, 2025; Accepted November 23rd, 2025

ABSTRACT

Creativity is vital for the success and competitiveness of agricultural research organizations, particularly in addressing the growing need for innovative solutions to address pressing challenges. This study examines the relationship between entrepreneurial leadership (EL) and employee creativity (EC), focusing on the mediating role of intrinsic motivation (IM) and the moderating effect of organizational motivation to innovate (OMI). Using a quantitative, cross-sectional design, data were collected through a structured questionnaire and analyzed via Partial Least Squares Structural Equation Modeling (PLS-SEM). The results reveal a positive relationship between EL and EC, with IM as a significant partial mediator. Interestingly, the study finds that OMI negatively moderates the EL–EC link, a factor often neglected in existing research. These findings provide insights into how leadership style and motivational dynamics shape creativity. The study recommends that leaders in agricultural research institutions adopt an entrepreneurial leadership approach to foster a more creative and innovation-friendly environment among employees.

Keywords: Creativity; entrepreneurial leadership; intrinsic motivation; organizational motivation to innovate

INTRODUCTION

Most organizations struggle to keep pace with changes and foster employee creativity (Agostini et al., 2020; Faulks et al., 2021; Füller et al., 2022; Mergel, 2018; Naveed et al., 2022). To maintain efficiency, competitiveness, and long-term success, businesses must continuously innovate, adapt, and grow. Effective leadership is essential across organizations, regardless of size or nature, to encourage employee creativity and sustain high performance (Blanchard, 2018). In today's dynamic and ever-changing economic and technological environment, employees' creativity is even more critical to ensure organizational sustainability and achieve a competitive edge (Mehmood et al., 2020).

Employee creativity is a personal resource for developing original and practical ideas, and it varies among firms. Creativity involves generating novel ideas for problems and developing them into final products (Amabile & Pratt, 2016). Although they are often used interchangeably, creativity and innovation are distinct concepts. Idea generation is the former, while successful execution is the latter (West & Richter,

2024). Rooted in cognitive processes such as information gathering, problem identification, and concept evaluation, creativity is crucial for a business's breadth and sustained viability (Mutonyi et al., 2020; Yesuf et al., 2024b).

Empirical evidence suggests that leadership is a crucial variable influencing employee creativity (Fatoki, 2020; Islam & Asad, 2024; Tierney, 2024). The influence of different leadership philosophies on sustaining creativity has been the subject of investigation (Alheet et al., 2021; Mehmood et al., 2021; Mittal & Dhar, 2015; Żywiołek et al., 2022). Although studies on the most effective approaches for encouraging creativity are still inconclusive, entrepreneurial leadership is often regarded as being highly beneficial (Islam & Asad, 2024; Joel & Oguanobi, 2024; Tierney, 2024; Tse et al., 2018). To address these limitations, an approach that synthesizes knowledge from entrepreneurship and leadership has emerged (Mehmood et al., 2021).

EL is a unique leadership style in which leaders possess the skills to encourage and guide employees toward achieving organizational objectives, including identifying and leveraging entrepreneurial opportunities (Pauceanu et al., 2021). However, a significant challenge to fostering creativity in organizations is the fear of risk and uncertainty about the outcomes of creative endeavors. Therefore, organizations aiming to enhance employees' creativity and innovation must seek ELs who inspire and encourage individuals to recognize and capitalize on entrepreneurial opportunities for organizational success (Islam & Asad, 2024). Nevertheless, the specific mechanisms through which ELs motivate their employees to be creative remain unexplored (Mehmood et al., 2021). Consequently, the primary objective of this study is to scrutinize the influence of EL on EC.

Many relevant studies have also revealed that IM is significant in enabling employees to be creative (Amabile, 1988). Furthermore, several recent studies (Fischer et al., 2019; Yesuf et al., 2023; Yuan et al., 2019) also support this finding. That said, there are conflicting findings in research concerning the influence of IM. For example, the study by Siyal et al. (2021) yields positive mediation results, whereas Al Harbi et al. (2019) find no significant positive mediating results. Paramitha and Indarti's (2014) study finds a partially mediated effect of IM. Hence, the significance of IM needs further analysis. Furthermore, Su et al. (2020) argued that additional mediating variables must be examined to predict EC. Islam and Asad (2024) also emphasized the importance of considering additional mediating factors to develop robust associations between the results of entrepreneurial leadership.

Likewise, researchers need to conduct further studies to identify how OMI enhances employee creativity by moderating its effects on employee creativity. Although the literature now in publication emphasizes the significance of organizational drive in promoting creativity, its direct effects as a combination element must be investigated. Extrinsic motivation, such as supervisor support, can act as a catalyst for enhancing creative performance (Hassi, 2019). Additionally, a study suggests that the social work context has a significant impact on the frequency and intensity of employee creativity (Chen et al., 2021). Furthermore, team relationships, expectations for rewards, and overall creative outcomes are all impacted by the complexity of creative tasks (Malek et al., 2020). Although these findings exist, there is a lack of empirical studies on how OMI affects the relationship between EL and EC (Islam & Asad, 2024). Addressing this gap is crucial for understanding how businesses can strategically enhance their creative behaviors. Thus, this research aims to examine the mediating role of OMI to better understand its impact on EC and innovation outcomes.

This research aims to advance theoretical insights by analyzing the relationship between EL and EC, with a specific focus on the intermediary function of IM. Furthermore, it offers new insights into the literature by examining how OMI moderates the connection between EL and EC within agricultural research institutions. Creativity is essential in ensuring the survival and competitiveness of these institutions, notably in addressing the growing demand for innovative solutions (Lans et al., 2020).

However, many ideas often collapse due to insufficient backing, and research institutions frequently face difficulties, including maintaining creativity and meeting growing demands. To navigate these challenges effectively, strong leadership is crucial for driving change and adapting to global developments. Therefore, this study focuses on agricultural research institutions to gain a deeper understanding of these dynamics.

The Ethiopian Institute of Agricultural Research (EIAR), established in the mid-1960s, has experienced significant structural and organizational evolution. Over time, it has developed a diverse portfolio of crop varieties and related production technologies, supported by a substantial accumulation of expertise and a well-established research culture (Abate et al., 2011). In recent years, EIAR has spearheaded efforts to reorient agricultural research toward broader developmental goals by fostering expansive partnerships within innovation systems and value chain frameworks. This shift has been facilitated through a series of training programs and iterative practical experimentation, promoting a collaborative learning process among researchers and scientists (Kebebe, 2019; Regasa et al., 2020).

Agriculture remains the cornerstone of Ethiopia's economy, directly supporting approximately 75 percent of the population and contributing 40 percent to the gross domestic product (GDP) as well as 80 percent of export earnings (USAID, 2022). Recognizing its central importance, the Ethiopian government has made substantial investments aimed at modernizing the sector. Agriculture is expected to ensure food and nutrition security, supply raw materials for industrial development, generate foreign exchange, and create employment for the majority of the population (Fadda et al., 2020). These strategic priorities have driven notable improvements in agricultural production and productivity in recent years.

Despite these advances, realizing the nation's ambitious food and nutrition security targets and strengthening Ethiopia's competitiveness in global markets requires a profound transformation of the agricultural sector. This transformation must deliver significant, high-impact outcomes that promote sustainable growth (Kebebe, 2019; Regasa et al., 2020). The future trajectory of agriculture envisions continual improvements in productivity and revenue generation while simultaneously reducing input use, including energy, water, and land per unit of output. Concurrently, this transformation seeks to mitigate economic, environmental, and social externalities, decrease vulnerability to climate change, and enhance adaptive capacity. Scientific research plays a pivotal role in achieving these Sustainable Development Goals by generating innovative solutions that boost productivity, improve efficiency, and promote climate-resilient agricultural practices across diverse landscapes (Fadda et al., 2020). The integration of research-driven innovation with systemic approaches to agricultural development is essential for ensuring long-term sustainability and inclusiveness in Ethiopia's agricultural sector.

BACKGROUND LITERATURE AND HYPOTHESES

Employee creativity (EC)

Several literature studies emphasize the importance of EC as essential for an organization's overall success (e.g., Fischer et al., 2019; Ghosh et al., 2020; Litchfield et al., 2015; Malik et al., 2019). Employee creativity is often regarded as the development of original concepts, products, and methods that benefit the organization (Kilic & Gök, 2022). Examples of employee creativity that are frequently examined include generating new ideas for business, developing innovative commercials to market products, and devising unique approaches to meet departmental objectives. On the other hand, research in the literature shows that workers apply their creativity to various other activities. For instance, dishonesty and the dark triad personality traits have also been connected to creativity (Kapoor, 2015). Sometimes, employees may find creative ways to exploit business resources for personal gain rather than contributing to their companies' success (e.g., Vincent & Goncalo, 2014).

Many studies recognize creativity as playing a vital role for both employees and organizations (e.g., Escribá-Esteve & Montoro-Sánchez, 2012; James et al., 2004). Gilson (2024) illustrated that creativity has been, and will continue to be, an essential element in the success of employees and their organizations. Zhou et al. (2012) argued that creativity is vital to people, professions, and industries. Woodman et al. (1993) agreed that creativity is essential for individuals and organizations because it demonstrates a salient aspect of organizational change that may hold the key to comprehending change processes and, eventually, organizational performance and survival.

Studies on workplace creativity show that various factors influence employees' creative performance within an organization. The key determinants include expertise, cognitive styles, and motivation (intrinsic or extrinsic) (Bettiol et al., 2012); self-efficacy (Appu & Sia, 2017; Gupta et al., 2018; Jain & Sharma, 2012; Uzkurt et al., 2013); role complexity (Tang & Chang, 2010; Yang et al., 2020); autonomy (Goncalo & Krause, 2010; Thuan, 2020); leadership, and social support (Amabile, 1988; Gupta et al., 2012). In addition to these determinants, employees' traits, including a broad range of interests, a preference for complexity, initiative, self-awareness, aesthetic sensitivity, tolerance for uncertainty, and self-confidence, may influence their creative performance (Shalley, 2024).

As evidenced by recent findings (e.g., Fontana & Musa, 2017; Nguyen et al., 2021), EL must be defined as a unique leadership style to fulfill its critical function in management studies. According to Renko (2017), ELs are seen as guiding and supporting their teams to accomplish strategic goals by identifying and seizing potential opportunities through their creative thinking. This opportunity-driven strategy encourages employees to initiate innovative projects, such as developing fresh concepts, strategies, and value-driven solutions that enhance performance (Mintzberg et al., 2020). This perspective on EL aligns with the creativity-oriented leadership approach explored in creativity research (Bignetti et al., 2021; Islam et al., 2024; Malibari & Bajaba, 2022). According to this perspective, entrepreneurial leaders should motivate and challenge individuals responsible for creative tasks to generate novel outcomes.

Entrepreneurial leadership (EL) and employees' creativity (EC)

The significance of creativity within organizations, described as the creation of novel ideas to address work-related challenges (Amabile & Pratt, 2016), cannot be overstated, as it is instrumental in a company's sustained growth and adaptability. Creativity is essential for driving innovation by enabling the development of entirely new or enhanced processes, services, and products, which in turn support the continuous growth of a company. In increasingly complex and unpredictable business environments, leaders face challenges in independently addressing every issue (Yesuf et al., 2024). Consequently, creativity and innovation have become integral for all staff members across organizational levels, extending beyond traditional boundaries such as research and development (Han & Bai, 2020). Importantly, research highlights the crucial role of leadership in engaging employees in creative endeavors (Akbari et al., 2021; Mehmood et al., 2021). Prior study results indicate that effective leadership creates favorable conditions that motivate workers to develop their creativity (Tierney, 2024).

Leaders actively identify and exploit opportunities as central objectives to drive innovation within their workplaces (Al-Jinini et al., 2019). Their focus extends beyond improving business performance to envisioning future possibilities and generating novel ideas. Recognizing EL's central role in driving creativity and innovation forward (Cai et al., 2019), leaders in this domain actively empower their subordinates to identify opportunities and commit to creating new services, products, and business models that support organizational objectives (Bagheri, 2017; Renko et al., 2015). This approach drives innovation and nurtures a culture where staff members are empowered to contribute to creating novel solutions and strategic advancements.

In engaging in creative and opportunity-driven tasks, entrepreneurial leaders actively nurture the creative capabilities of their staff members, motivating them to recognize novel concepts and innovative methods (Hoang et al., 2022). This approach adheres to the principles of situational leadership theory, which suggests that employees react to external stimuli within diverse work environments and leverage their knowledge to shape forthcoming decisions and efforts. These cognitive mechanisms involve anticipating the behaviors and outcomes of various options, even if not implemented. Entrepreneurial leaders inspire their team members to explore new ideas and ventures, reflecting their willingness to take risks (Mehmood et al., 2021; Wahab et al., 2023). This dynamic builds a culture of experimentation and forward-thinking within the organization.

Indeed, by witnessing their leaders' risk-taking behaviors and creative initiatives, it is anticipated that employees will be encouraged to generate and implement innovative solutions. Leadership that models a willingness to take risks and explore creative avenues is a powerful catalyst, inspiring and empowering team members to embrace a similar mindset (Ismail et al., 2023). This observation fosters an innovative culture throughout the organization and contributes to developing a workforce that feels empowered to think creatively and contribute proactively to realizing new and valuable concepts. Furthermore, in the value creation process, entrepreneurial leaders offer essential support for creativity (Akbari et al., 2021). This involves designing and adapting attainable goals to encourage employee persistence, collaborating with them to generate diverse perspectives, and resolving uncertainties, problems, and challenges. Drawing from these observations, we put forward the subsequent hypothesis:

H1: Entrepreneurial leadership (EL) positively relates to employees' creativity (EC).

The role of intrinsic motivation (IM)

Employees driven by intrinsic motivation tend to engage more diligently in their tasks because they perceive higher levels of autonomy at work. A strong appreciation for personal engagement and investment is a hallmark of IM (Ryan & Deci, 2017). Several research works have revealed a strong positive association between employees' IM and their creative capabilities (Liu et al., 2016; Shafi et al., 2020). The dynamic componential model proposed by Amabile and Pratt (2016) further supports this close theoretical relationship. Furthermore, Maan et al. (2020) found a favorable influence on the extent to which a job involves assisting others. After all, research has shown that leaders are essential to building intrinsic motivation within their workforce (Ma & Jiang, 2018; Shafi et al., 2020).

According to Malibari and Bajaba (2022), entrepreneurial leaders encourage their staff members to explore and seize opportunities, taking calculated risks. Entrepreneurial leaders convey a sense of purpose to their workforce by highlighting tasks critical to the success of their departments and organizations (Mehmood et al., 2021). By being creative themselves, entrepreneurial leaders set an example for their staff and boost their confidence, rather than relying entirely on their workers' abilities and dedication to complete all entrepreneurial tasks (Islam & Asad, 2024). Additionally, entrepreneurial leaders foster the growth of self-determination in their workforce by removing obstacles that impede productivity and encouraging them to pursue alternative opportunities rather than completing repetitive tasks (Manganelli et al., 2018). They also support and guide their employees in exploring and implementing alternative approaches to achieve their goals (Mehmood et al., 2021). These acts provide value to the company and employees, allowing them to perceive ownership over initiatives that ultimately impact the organization's overall value.

Through intrinsic motivation, fostering employees' creative potential is another key expectation of entrepreneurial leaders. Intrinsically motivated employees tend to create innovative solutions for new products and processes (Amabile & Pratt, 2016; Santos et al., 2024; Yesuf et al., 2023). Workers are more motivated to find solutions to the company's challenges when they believe their work has purpose and

recognize that they have autonomy over their tasks (Ma & Jiang, 2018). Employees driven by intrinsic motivation tend to embrace risks and seek innovative ideas to complex challenges, as they possess more confidence in their abilities (Liu et al., 2021).

Moreover, employees tend to participate more in creative endeavors when they recognize that their job contributes to overall organizational outcomes and when they have the autonomy to carry out their responsibilities (Tuan, 2023). Previous evidence suggests that workers with IM demonstrate greater enthusiasm for completing inventive activities (Mehmood et al., 2020; Yesuf et al., 2023). According to this research, employees tend to become motivated and empowered when participating in observing to inspire creative actions and collaborating with entrepreneurial leaders. Accordingly, the following hypothesis is proposed based on previously discussed issues and the relevant literature.

H2: Employees' intrinsic motivation (IM) mediates the relationship between entrepreneurial leadership (EL) and employees' creativity (EC).

The role of organizational motivation to innovate (OMI)

According to Amabile and Pratt's (2016) study, organizational motivation is a workplace feature that encompasses both organizational encouragement and the absence of obstacles. However, most studies have emphasized the direct correlation between EC and specific aspects of an organization's motivation to innovate, such as rewards (Fischer et al., 2019; Pan et al., 2020). Additionally, earlier empirical studies have examined the effects of various factors on EC, often yielding contradictory results. Therefore, further investigation is required to examine potential moderating roles that may influence the nature of these relationships (Su et al., 2020).

Given that this concept is significantly more intricate than just compensation, pay, or routine annual appraisals, it is essential to investigate OMI's effects on EC more thoroughly. Few studies have investigated the direct connection between OMI, viewed as a composite construct, and creativity in this area (e.g., ElMelegy et al., 2016; Siyal et al., 2021; Tierney, 2024). Although the topic is significant, to the best of the researchers' knowledge, no empirical research has investigated OMI's role as a moderator. Accordingly, this research aims to address this shortfall by investigating the impact of OMI on the relationship between EL and EC.

H3: Organizational motivation to innovate (OMI) positively moderates the impact of entrepreneurial leadership (EL) on employees' creativity (EC).

Figure 1 illustrates the study's conceptual framework, designating EL as the independent variable and EC as the dependent variable. Employee IM is the mediating variable, whereas OMI moderates the relationship between EL and E.

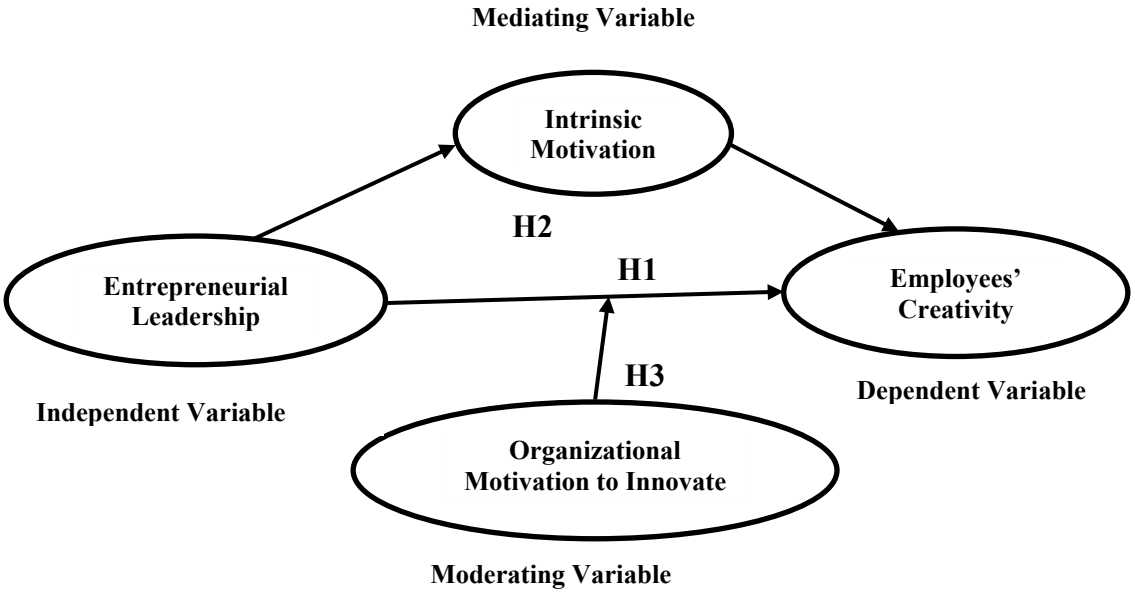

Figure 1. Research conceptual model.

METHODOLOGY

This research adopts a quantitative design, incorporating both descriptive and causal methods. Researchers collect data using a self-administered questionnaire in the survey. This survey was conducted at all seven research centers and five sub-centers within the Amhara Agricultural Research Institute (ARARI), located in the Amhara Region of Ethiopia. Data for this study were collected over a three-month period, from September to November 2024. Informed consent was obtained verbally from all participants prior to their involvement in the study. Ethical approval was granted by the College of Business and Economics Research Ethics Committee at Woldia University.

The survey employed a proportionate systematic random sampling technique, as outlined by Singh & Masuku (2014). Firstly, purposive sampling was used to select respondents at ARARI. In the next stage, stratified sampling was applied to create strata based on employees' qualifications. Finally, sampling was conducted using a proportionate systematic random method, stratified by employees' experience. The target group consisted of full-time workers working eight hours per day. The sample comprised staff holding diverse job titles to confirm representation across different work-related activities.

The research sample size was established by applying Yamane's formula (1967, as referenced in Israel, 1992) to a population of 492 researchers, resulting in an estimated sample size of 220.63 participants. To account for potential non-responses, the sample size was increased by 30%, in line with Israel's (1992) recommendations, resulting in a total of 290 participants. Based on this adjustment, 290 questionnaires were administered. Of these, 240 were returned; however, 28 were incomplete and thus excluded. As a result, 212 fully completed and usable questionnaires were obtained and utilized for the analysis.

All variables included in the study were operationalized using established measurement scales. The assessments relied entirely on respondents' subjective evaluations, requiring them to provide personal judgments for each corresponding item. EL was measured using an eight-item scale developed initially by

Renko et al. (2015). A sample item from this scale is: "My supervisor challenges and pushes me to act more innovatively." Intrinsic Task Motivation was assessed using four items developed by Eisenberger and Rhoades (2001), capturing the extent to which individuals perceive their work as interesting, enjoyable, dull, or unpleasant. An example item is: "My job is interesting." OMI represents a key organizational condition that fosters creativity and innovation. It includes two dimensions, organizational encouragement (OE) and the absence of organizational impediments (LOI), as conceptualized by Amabile et al. (1996).

a) Organizational Encouragement: Measured using a twelve-item scale. A sample item is: "People are encouraged to solve problems creatively in this institute."

b) Lack of Organizational Impediments: Measured using an eleven-item scale. A sample item is: "There are a few political problems in this organization."

Creativity was measured using a six-item scale developed by Amabile et al. (1996). A sample item is: "My area of this organization is creative." The instrument employed a five-point Likert scale to rate and assess the items across the relevant factors and creativity dimensions. Respondents indicated their level of agreement or frequency using the following scale: 1 = Never, 2 = Sometimes, 3 = Neutral, 4 = Often, and 5 = Always.

This research used PLS-SEM as the primary analytical method. PLS-SEM is particularly appropriate for predictive and exploratory research as it enhances the explanatory power of key constructs (Manley et al., 2021). The analysis adheres to established guidelines for evaluating PLS-SEM outcomes, as outlined by scholars such as Hair et al. (2021). Unlike CB-SEM, PLS-SEM offers greater flexibility and is advantageous in contexts where assumptions regarding sample size, data distribution, or scale level are not strictly met (Sarstedt et al., 2021). Consequently, this study adopts PLS-SEM due to the following considerations:

The study initially employed EL to predict employee creativity, following the recommendation to use PLS-SEM for prediction (Manley et al., 2021). Additionally, the research model includes latent variables and multidimensional constructs, such as mediators and moderators, which add complexity (Sarstedt et al., 2021). Third, since the theoretical foundations of the links among the model constructs are still emerging, the study presents an opportunity to investigate and further develop new ideas (Sarstedt et al., 2022). The study employed the product indicator method for mediation and moderation analysis, using latent variable scores for predictive assessment (Wong, 2016). Sarstedt et al. (2021) emphasized that PLS-SEM was chosen due to its flexibility, as it imposes fewer restrictions and allows model estimation without additional constraints.

Analysis and results

Hair et al. (2017) describe a three-phase approach to performing PLS-SEM. The first phase involves verifying the measurement model to ensure that the constructs used in the analysis are reliable and valid. This step focuses on confirming internal consistency and assessing both convergent and discriminant validity, which are essential to confirm that the indicators appropriately reflect the intended constructs and are distinct. The second phase involves shifting consideration to the structural model, where the relationships between constructs are examined. This involves evaluating metrics such as the coefficient of determination (R^2), which reflects the model's explanatory power; the effect size (f^2), which indicates the strength of each predictor; and predictive relevance (Q^2), which measures the model's ability to predict data points. The significance of path coefficients is also tested to determine whether the hypothesized relationships are statistically meaningful. Finally, the third phase assesses the overall model fit. This includes examining the model's predictive strength and using fit indices, such as the standardized root mean square residual (SRMR), to determine how well the model aligns with the empirical findings. A good fit indicates that the theoretical framework closely matches the empirical evidence. These steps help ensure the results are reliable and applicable to theoretical and practical contexts.

Evaluation of the measurement model

Within the framework of PLS-SEM, the evaluation of the measurement model was conducted using several key indicators, such as composite reliability (CR), indicator reliability, average variance extracted (AVE), and discriminant validity. To determine the internal consistency of the reflective constructs, both Cronbach's alpha (CA) and composite reliability were utilized, with a threshold of 0.70 set for acceptable reliability, as recommended by Hair et al. (2021). The findings revealed that all constructs met or exceeded this benchmark for both CA and CR, demonstrating satisfactory internal consistency and convergent validity (refer to Table 1).

The evaluation of convergent validity was carried out by analyzing the Average Variance Extracted (AVE). As noted by Fornell & Larcker (1981), an AVE value of 0.50 or higher indicates that a construct explains at least 50% of the variance in its associated measurement items. In this research, all constructs achieved AVE values above the 0.50 threshold, confirming acceptable convergent validity (see Table 1). Discriminant validity was assessed in line with the criteria provided by Hair et al. (2020), utilizing the Fornell–Larcker approach. Fornell & Larcker (1981) suggest that the square root of a construct's variance must exceed its correlation with all other constructs, a condition met by all constructs in this study. Furthermore, as shown in Table 2, each indicator's loading was higher on its corresponding construct than on others, with cross-loading differences exceeding the recommended cutoff of 0.10 (Rönkkö & Cho, 2022), providing additional evidence for discriminant validity.

Table 1. Measurement model results.

Constructs	Item	Loading	Outer Weights	CA	CR	AVE
Creativity				**0.911**	**0.917**	**0.695**
	Creativity1	0.821	0.186			
	Creativity2	0.733	0.183			
	Creativity3	0.778	0.184			
	Creativity4	0.849	0.205			
	Creativity5	0.918	0.227			
	Creativity6	0.887	0.210			
Entrepreneurial Leadership				**0.929**	**0.934**	**0.669**
	EntLea1	0.856	0.175			
	EntLea2	0.807	0.139			
	EntLea3	0.731	0.140			
	EntLea4	0.786	0.147			
	EntLea5	0.857	0.163			
	EntLea6	0.888	0.164			
	EntLea7	0.749	0.124			
	EntLea8	0.855	0.164			
Intrinsic Motivation				**0.897**	**0.913**	**0.768**
	IntTaM1	0.901	0.302			
	IntTaM2	0.769	0.237			
	IntTaM3	0.874	0.275			
	IntTaM4	0.951	0.321			

Organizational Motivation to Innovate			**0.955**	**0.961**	**0.600**
	LacOrgIm10	0.797	0.086		
	LacOrgIm11	0.866	0.092		
	LacOrgIm3	0.717	0.089		
	LacOrgIm4	0.805	0.098		
	LacOrgIm5	0.729	0.081		
	LacOrgIm7	0.902	0.093		
	LacOrgIm8	0.783	0.091		
	LacOrgIm9	0.812	0.095		
	OrgEnc1	0.719	0.091		
	OrgEnc10	0.712	0.066		
	OrgEnc11	0.735	0.058		
	OrgEnc5	0.773	0.073		
	OrgEnc6	0.706	0.059		
	OrgEnc7	0.700	0.057		
	OrgEnc8	0.892	0.089		
	OrgEnc9	0.703	0.063		

Table 2. Fornell-Larcker Criterion.

	Creativity	**EntLea**	**IntTaM**	**OrgMotv**
Creativity	0.932935			
EntLea	0.820146	0.890089		
IntTaM	0.833677	0.796359	0.876216	
OrgMotv	0.906401	0.817776	0.76119	0.77483

Table 3. Collinearity statistics (VIF) outer model - list.

Item	**VIF**	**Item**	**VIF**
Creativity1	3.140714	LacOrgIm10	3.200788
Creativity2	1.687403	LacOrgIm11	4.615108
Creativity3	1.956605	LacOrgIm3	2.407709
Creativity4	3.14228	LacOrgIm4	3.789963
Creativity5	5.223792	LacOrgIm5	2.314744
Creativity6	3.873286	LacOrgIm7	6.664551
EntLea1	4.121005	LacOrgIm8	2.822007
EntLea2	5.213723	LacOrgIm9	2.997354
EntLea3	2.378433	OrgEnc1	2.678128
EntLea4	3.939475	OrgEnc10	3.911505
EntLea5	3.200269	OrgEnc11	6.234459
EntLea6	6.232129	OrgEnc5	4.859541
EntLea7	4.226528	OrgEnc6	5.537709

EntLea8	3.408631	OrgEnc7	6.950825
IntTaM1	3.597057	OrgEnc8	7.51884
IntTaM2	1.851287	OrgEnc9	3.137095
IntTaM3	2.671826		
IntTaM4	5.307314		

Table 4. Collinearity statistics (VIF) inner model list.

Inner model - List	VIF
EntLea -> Creativity	5.004
EntLea -> IntTaM	4.899
IntTaM -> Creativity	4.608
OrgMotv -> Creativity	2.864
OrgMotv x EntLea -> Creativity	1.091

Assessment of the structural model

To address multicollinearity, the study employed the VIF. According to Shrestha (2020), VIF values of ≤5 indicate moderate multicollinearity. All VIFs measured in this study were within acceptable limits, suggesting that multicollinearity was not a significant concern (see Tables 3 and 4). Model fit was evaluated using the SRMR. For sample sizes greater than 100, an A value below 0.08 for SRMR suggests an acceptable fit (Ximénez et al., 2022). The SRMR value in this research was 0.068, reflecting a satisfactory model fit. The R^2 statistic was employed to assess the predictive strength of the model regarding the dependent constructs. Hair et al. (2019) recommend interpreting R^2 values of 0.50 and 0.75 as indicating moderate and substantial levels of predictive accuracy, respectively. As shown in Table 5, adjusted R^2 for creativity was 0.795 (substantial), and for intrinsic motivation, it was 0.791 (substantial), confirming strong in-sample predictive power. Finally, predictive relevance was assessed using the Q^2 statistic, which should exceed zero to indicate meaningful predictive power (Falk & Miller, 1992). The results met this criterion, validating the model's predictive capability (see Table 5).

Table 5. R^2 and model fit evaluation results.

Construct	R^2	R^2 adjusted	Q^2 predict	SRMR
Creativity	0.798	0.795	0.786	
				0.078
IntTaM	0.792	0.791	0.692	

Analysis of the structural model

The study analyzed both the magnitude and statistical validity of the path estimates to analyze the proposed hypotheses. A bootstrapping method with 5,000 resamples was employed to assess statistical significance. The structural model outcomes are visually presented in Figure 2, while Table 6 provides a

comprehensive set of results, including path coefficients, standard deviations, t-values, and corresponding p-values.

The PLS-SEM analysis revealed a significant positive relationship between EL and EC (H1), with results of β = 0.477, t = 8.261, and p < 0.001. IM was found to significantly mediate this relationship (β = 0.339, t = 6.602, p = 0.001), demonstrating that it plays a partial explanatory role and thus supports H2. Additionally, the results indicated a significant adverse moderating effect of OMI (β = –0.048, t = 2.737, p = 0.006). Based on these results, H1 and H2 were confirmed, whereas H3 was not supported.

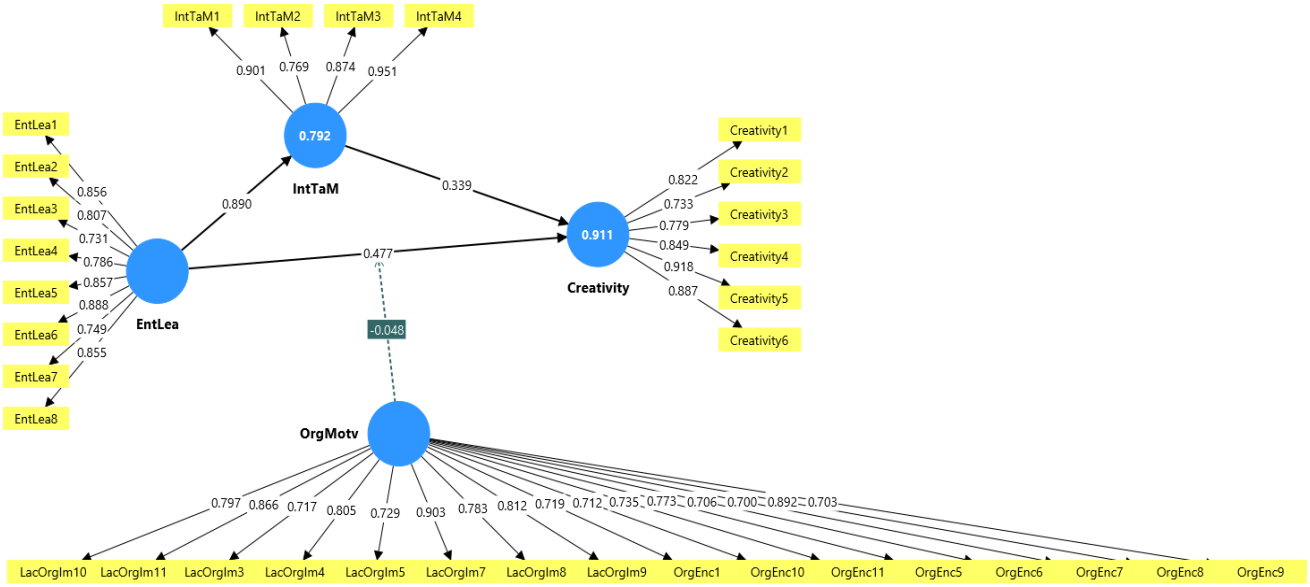

Figure 2. Path analysis outcomes of the model.

Table 6. Hypothesized constructs.

Hypothesis	Relationships	Beta	Sample mean (M)	STDEV	t-Values	P Values	Decision
H1	EntLea -> Creativity	0.477	0.475	0.058	8.261	0.000	H1; supported
H2	EntLea -> IntTaM -> Creativity	0.302	0.304	0.046	6.586	0.000	H2; supported
H3	OrgMotv x EntLea -> Creativity	-0.048	-0.049	0.018	2.737	0.006	H3; not supported

DISCUSSION AND IMPLICATIONS OF THE STUDY

EL has proven to be a distinct leadership approach, evolving from traditional Entrepreneurship and leadership dynamics theories to address contemporary problems in organizations (Mehmood et al., 2021). This research aimed to develop a comprehensive model examining the relationships among EL, EC, IM, and OMI within Ethiopia's agricultural research institutes. The results supported H1, showing that EL is positively associated with EC. This finding aligns with previous research (e.g., Cai et al., 2019; Islam & Asad, 2024). Being creative, entrepreneurial leaders develop visionary objectives focused on identifying and seizing opportunities (Pauceanu et al., 2021). Entrepreneurial leaders encourage active involvement, adjust roles to fit changing situations, and motivate their teams through clear communication, helping people develop their creative abilities. By promoting active engagement, redefining roles in response to

changing circumstances, and inspiring their teams through effective communication, they also help individuals realize their full creative potential (Mehmood et al., 2022). Furthermore, because entrepreneurial leaders frequently function as exemplars, their actions and behaviors encourage staff members to develop their creative potential (Akbari et al., 2021).

The findings also validate H2, suggesting that IM is a mediator between EL and EC. This evidence supports the earlier study by Hoang et al. (2022). EL articulates goals centered on identifying and pursuing entrepreneurial opportunities, and it expects employees to be intrinsically motivated to work toward these objectives (Akbari et al., 2021). These behaviors cultivate a sense of support among employees, enhancing their insight into entrepreneurial leaders as encouraging and empowering. As a result, employees become intrinsically motivated to create innovative and valuable ideas for the organization. Moreover, entrepreneurial leaders play a crucial role in mentoring and guiding their teams throughout the creative process (Harrison et al., 2023; Nguyen et al., 2021). By strengthening intrinsic motivation and employee competence, these leaders create a work environment that nurtures and sustains creative engagement.

Furthermore, this is the first study to demonstrate a significant adverse moderating effect of OMI, defined as a combination of supportive practices and the absence of structural impediments (Amabile & Pratt, 2016), analyzing the dynamic between EL and EC. This research considers long-held beliefs in the creativity literature, which view organizational motivation as a positive contextual factor that fosters creativity. Previous empirical findings reveal that intrinsic motivation can moderate the impact of leadership. For instance, Tu & Lu (2016) reported that IM shaped the association between ethical leadership and employees' extra-role behavior. Likewise, Shafi et al. (2020) observed that IM positively moderated the connection between transformational leadership and creativity. Nonetheless, prior research has not identified a negative moderating impact of OMI on the link between EL and EC.

A likely explanation for this unexpected observation is that in highly motivating organizational environments where support and encouragement for creativity are institutionalized, employees may become overly reliant on structural enablers and less responsive to the effect of EL. In such circumstances, entrepreneurial leaders' proactive and risk-taking behavior may be perceived as repetitive or harmful to established innovation routines (Kreiser et al., 2013; Morkel et al., 2021). This might reduce the unique motivational influence of entrepreneurial leadership, thereby reducing its impact on EC. Another take is that overzealous organizational support could lead to expectations or pressure that erode intrinsic motivation, a phenomenon Deci & Ryan (1985) refer to as the "over justification effect." In such situations, the creative spark inspired by EL may fade if employees see creativity as a formal obligation rather than a personally meaningful pursuit.

Considering these unexpected results, further studies are needed across diverse industries, cultural settings, and organizational frameworks to gain a deeper understanding of the constraints that may hinder the role of OMI. The negative moderation shown in this study presents new avenues for investigation, suggesting that organizational encouragement for innovation is not always beneficial and may interact with leadership styles in complex, and sometimes detrimental, ways.

The study aimed to extend existing theory by examining the mediating role of IM and the moderating role of OMI in the relationship between EL and EC within agricultural research institutes. It makes a notable contribution by delivering a deeper analysis of EL and being the first to empirically confirm the adverse moderating effect of OMI, an area previously unexplored in the literature. This research represents a pioneering study investigating how OMI influences the EL–EC relationship. The findings suggest that, counterintuitively, organizational motivation, channeled through the idealized influence of entrepreneurial leaders, can have a negative impact on EC. This paper also offers important implications for academia by providing empirical evidence of this unexpected adverse moderating effect.

The agricultural sector plays a vital role in Ethiopia's economic growth. As competition intensifies, organizations must foster creativity to remain competitive (Ababa, 2024; Shiferaw, 2017). This study highlights the importance of leaders understanding how various management styles affect employee creativity to improve organizational performance. It is recommended that leaders in agricultural research institutes adopt an EL style, as it fosters and enhances creativity among employees. Entrepreneurial leaders serve as role models and actively seek ways to inspire enthusiasm and motivate their teams to be creative. Leaders should recognize that creativity is crucial for achieving organizational goals and maintaining a competitive edge. They must also uncover the pathways through which EL affects creativity. Therefore, agricultural research institutes should prioritize empowering employees and strengthening their sense of competence to support skill development and stimulate creativity.

STUDY LIMITATIONS AND FUTURE RESEARCH

Although this research provides meaningful insights into the mediating influence of IM and the moderating effect of OMI, several areas remain open for further investigation. One key limitation is the adoption of a cross-sectional study design, which limits the ability to draw firm conclusions about causality. Future studies should employ longitudinal or experimental methods to address this gap. Second, the sample was drawn exclusively from agricultural research institutes in Ethiopia, which may limit the broad applicability of the results to different cultural or organizational settings. To strengthen the applicability of the findings, future studies should consider including participants from various industries or countries. Third, this research examined only IM as a mediating factor and OMI as a moderator. Subsequent investigations may explore additional variables that could influence the relationship between EL and EC.

CONCLUSION

This study examined the effect of EL on EC, with particular attention to the mediating role of IM and the moderating role of OMI. Using data collected from the Ethiopian Agricultural Research Institute and analyzed through PLS-SEM, the findings demonstrate that EL significantly enhances EC by cultivating a supportive environment that encourages creative behavior. IM was shown to mediate this relationship, underscoring the importance of leaders who foster autonomy, competence, and intrinsic drive among employees. Conversely, OMI weakened the EL–EC link, suggesting that specific organizational mechanisms intended to stimulate innovation may inadvertently diminish the positive influence of leadership. The overall findings emphasize that strengthening employees' intrinsic motivation is a strategic pathway for enhancing creativity within research-based institutions. Leaders, viewed by employees as role models, can inspire creativity, commitment, and adaptability by demonstrating these values themselves, thereby contributing to a more innovative and competitive organizational culture.

From a policy perspective, the results highlight the need for leadership development programs that prioritize entrepreneurial leadership competencies within public research institutions. Policies should encourage autonomous work environments, recognition systems that reinforce intrinsic motivation, and capacity-building initiatives that strengthen creativity-related skills. Additionally, policymakers should carefully review existing innovation mechanisms to ensure they truly support, rather than constrain, creative behavior. Aligning institutional policies with leadership practices that nurture creativity will enable organizations, particularly within Ethiopia's agricultural research sector, to enhance performance, adapt to emerging challenges, and sustain long-term competitiveness.

Acknowledgements

We sincerely thank the leaders and experts of the Amhara Agricultural Research Institute for their unwavering support and for providing essential documents that were vital to this study. We are also truly thankful to all the participants in the survey.

Ethical Clearance

The research complied with the ethical guidelines of the College of Business and Economics Research Ethics Committee at Woldia University. Informed consent was obtained verbally from ARARI employees who voluntarily participated by completing the questionnaires.

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COMPETITIVE STRATEGY AND ORGANIZATIONAL PERFORMANCE IN THE FOOD AND BEVERAGE SECTOR: EVIDENCE OF TECHNOLOGY PERFORMANCE AS MEDIATOR IN AN EMERGING MARKET

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Received September 9th, 2025; Revised October 22nd, 2025; Accepted November 13th, 2025

ABSTRACT

This study examines the relationship between competitive strategy (cost leadership, differentiation, and focus strategies) and organizational performance in the food and beverage (F & B) industry in Nigeria, an emerging market, with technology performance as the mediating factor. The F & B sector in Nigeria face intense competition, fluctuating consumer demands, market volatility, and supply chain fragility, necessitating the requirements for effective competitive strategy and technology performance to enhance organizational performance. Deploying the theoretical frameworks of the Resource-Based View (RBV), the Dynamic Capabilities Theory (DCT) and extant literature to develop the nine hypotheses of the study, a survey of 201 respondents who represent organizations in the F & B sector provided cross-sectional data for the study. The study employs partial least squares structural equation modeling (PLS-SEM) to analyze the direct effect of competitive strategy on organizational performance, the effect of competitive strategy on technology performance, and the mediating role of technology performance in the competitive strategy-organizational performance nexus. Findings reveal that cost leadership, differentiation, and focus strategies had significant effect on organizational performance and technology performance respectively while technology performance partially mediates the competitive strategy (differentiation and focus strategies) and organizational performance relationship. The study intersects and deepens strategic management and technology performance literature by providing empirical evidence on the interplay among competitive strategy, technology performance, and organizational performance in an emerging market context with implications on the importance of supporting Industry 4.0 adoption for the F & B sector.

Keywords: Competitive strategy, technology performance, organizational performance, food and beverage sector, Nigeria.

INTRODUCTION

The food and beverage (F & B) sector of the Nigerian economy is one of the most critical sectors of the nation's manufacturing industry. The sector is in the value chain that feeds the nation. Nigeria, Africa's most populous country has a growing population that is projected to approach 230 million by 2025 according to the Nigerian Bureau of Statistics (NBS; 2024). This vastness requires operationally efficient and effective systems that supports manufacturing but with macroeconomic volatility, institutional voids, and weak infrastructure; technology adoption can be a daunting task (Awwad & Anker, 2020; Frank et al.,

2019). Notably, the F & B sector is also the topmost contributor to the nation's Gross Domestic Product (GDP) in the manufacturing industry and examining specific attributes of the sector is important (Manufacturers Association of Nigeria [MAN], 2024). Three concepts that may help examine the competitiveness and the sustainable competitive advantage of these organizations are competitive strategy, technology performance, and organizational performance.

Industry 4.0 (I4.0), the rubric of digital technologies such as smart manufacturing, internet of things (IoT), artificial intelligence (AI), smart supply chain, augmented reality (AR), big data and analytics, and cloud technologies has been revolutionary (Bai et al., 2020; Frank et al., 2019; Rosin et al., 2020; Zheng et al., 2021). Global adoption of technology is higher in the advanced economies than the emerging economies in Africa. Matyushenko et al. (2022) posits that countries that lead in innovation and digital investment have higher Global Competitiveness Index. In Africa, the manufacturing industry has not fared better as the adoption of these technologies has not been at the global pace (Adeleye et al., 2022; Owan et al., 2022). The reasons are not far-fetched, digital technologies are capital intensive (Orji, 2019).

In previous global studies, technology's role as a moderator had been moderately examined and empirically confirmed but the mediating role in the competitive strategy – organizational performance nexus is underexplored, specifically in the F & B sector (Hossain et al., 2023; Queiroz et al., 2023). In most emerging economies with poor institutional frameworks, technology adoption can be a double-edged process with fast adoption helping to leapfrog the market while infrastructure constraints limit full scale adoption (Awwad & Anker, 2020). An exemplar is how fast mobile technology adoption accelerated growth in such economies.

The F & B sector is volatile and renowned for its supply chain fragility (Adeola et al., 2022). Considering the critical role of the F & B sector to most economies and the importance of technology adoption and its potential impact on technology performance, there is a contextual gap and an empirical gap in the study of technology performance in most emerging economies not limited to the African countries. Olanrewaju et al. (2023) examined the moderating role of technology among Small Medium Enterprises (SMEs) in Nigeria but no empirical study was found in the reviewed literature that has examined the mediating role of technology performance in the competitive strategy – organizational performance nexus in a sector-specific study in Africa.

Past studies (Adeola et al., 2022; Olanrewaju et al., 2023) in the F & B sector and other manufacturing sectors in Nigeria prioritized technology adoption barriers over performance outcomes. This study's approach of examining the mediating role of technology performance in the F & B sector in Nigeria is novel and will extend the theory in strategic management and technology management literature. In addition, examining cost leadership, differentiation, and focus strategies is relatively unique as most prior studies focused on cost leadership and differentiation.

The aim of this study is to examine the relationships among competitive strategy, technology performance, and organizational performance in the F & B sector in Nigeria while the specific objectives are threefold.

i. To examine the direct effect of competitive strategy on organizational performance in the F & B sector in Nigeria
ii. To examine the direct effect of competitive strategy on technology performance in the F & B sector in Nigeria
iii. To determine the mediating role of technology performance in the competitive strategy – organizational performance relationship in the F & B sector in Nigeria

The significance of this study is the empirical evidence it offers to the conversation on technology performance as a resource and an enabler of growth in the F & B sector in an emerging market.

LITERATURE REVIEW

Competitive Strategy – Technology Performance – Organizational Performance

Competitive strategy from the perspective of Porter (1980) is depicted in Figure 1 based on three distinct strategies; cost leadership, differentiation, and focus. Saldanha et al. (2023) explains the importance of strategic positioning in today's modern strategy vis-à-vis the tradeoffs in low cost and differentiation within a competitive scope. In evaluating most markets, cost leaders tend to be positioned for the mass market as these markets allows such organizations to drive volume and break-even (Awwad & Anker, 2020; Porter & Rivkin, 2012). Differentiation strategy is driven by the capacity of a business entity to offer unique products to the consumer. These differentiated products are the organization's source of competitive advantage (Kim & Lee, 2024). Porter (1985) distinctively explained that an organization can gain a competitive advantage if focused on its niche offerings. The targeted market may be based on geographic or demographic factors but the key factor is the capacity to leverage either low-cost or differentiation as the source of competitive advantage (Wang & Li, 2023).

Scholars such as Barney and Hesterly (2020) suggests that it may be difficult to combine different resources to pursue low-cost and differentiation simultaneously in order not to be "stuck-in-the-middle." Low-cost and differentiation were perceived as being mutually exclusive. The reason for such position could have been the different resources required to deploy the two strategies at the same time.

The adoption of I4.0 enhances productivity (Arcidiacono & Schupp, 2024). However, while frameworks such as the Technology, Organization, and Environment (TOE) framework provide a structure for technology adoption (Tornatzky & Fleischer, 1990), the value added is only measurable by technology performance (Frank et al., 2019). Zhang and Wu (2010) suggest that operational efficiency is critical to technology performance while the other critical dimensions are innovation capability, customer integration, and scalability. The operational efficiency emphasizes cost, speed, and yield but not without tradeoffs in these metrics. Innovation enables the end-to-end performance; customer integration offers the digital platforms while scalability affords efficient scaling of technology infrastructure. Technology performance is an internal resource and according to Barney and Hesterly (2020), this internal resource can be converted to capabilities, then configured by the organization to gain a competitive advantage.

Organizational performance describes the metrics that confers competitive advantage on the organization with measurable indicators comparable to its competitors. These metrics are often financial and non-financial. Kaplan and Norton (1992) as cited by Kaplan and Norton (2021) explains that combining the financial and non-financial metrics offer a balanced view of the organization's performance. However, studies in operations management have emphasized the impact of operational performance metric on organizational performance. The current study's focus on the mediating role of technology performance in the competitive strategy – organizational performance nexus optimizes the measurement of performance with such operational metrics as on-time delivery rate while the financial metric is sales growth.

Prior global studies have attempted to examine the mediating role of technology adoption and technology performance in the competitive strategy – organizational performance nexus. Extant literature on the three constructs in this study proffers deeper insights based on the past studies. Ghobakhloo and Iranmanesh (2024) in a meta-analytic study revealed that technology mediation had more significant effects on differentiation strategy than cost leadership strategy. These mediators often have full mediation effect on the strategy – performance relationship (Hult, 2024; Saldanha et al., 2023). Digital supply chain management (SCM) partially mediates cost leadership and performance in emerging economies while customer-facing technologies like augmented reality supports differentiation (Dubey et al., 2023).

García-Quevedo et al. (2023) revealed that traceability technologies had higher significant mediation effect on differentiation – performance relationship in advanced economies than developing economies with weaker infrastructure.
Smart manufacturing in particular has had significant effect on performance in some global studies (Menrad et al., 2020). AI agility as mediator fully mediated the relationship between hybrid strategy and innovation (Rodriguez et al., 2024). Cloud, AI, and technology adoption have equally mediated the relationship (Ferraris et al., 2021).

Similarly, Khan et al. (2022) and Wang and Li (2024) empirically validated the mediating role of blockchain technologies in the relationship between competitive strategy and organizational performance. The pattern of the findings in many of the global studies suggest that technology performance mediates the relationship between competitive strategy and performance but the relationship is untested in the context of developing economies such as Nigeria and many other African and Asian countries.

Table 1 presents the summary of findings on past studies on the competitive strategy – technology performance – organizational performance triad.

Table 1. Prior studies on competitive strategy – technology performance – organizational performance triad

Author (Year)	Research Focus	Research Design	Sample Size (including geographic focus or country)	Data Analysis	Summary of Findings
Ghobakhloo & Iranmanesh (2024)	Meta-analysis of I4.0 and performance	Meta-analysis	127 studies (2010 – 2023)	Meta-Analytic Structural Equation Modelling (MASEM)	On average, mediation effect was stronger for differentiation than cost leadership.
Hult (2024)	Industry 4.0 mediation in global manufacturing	Cross-sectional	1200 firms in 27 countries	PLS-SEM	I4.0 (IoT and AI) fully mediates strategy – resilience performance relationship.
Rodriguez et al. (2024)	AI agility between hybrid strategies (cost and differentiation) and innovation performance	Interview and quantitative survey	289 service firms including F & B retail and hospitality	CB-SEM Content analysis	AI agility fully mediates hybrid strategy and innovation.
Dubey et al. (2023)	Digital SCM in competitive strategy	Cross-sectional	478 manufacturers in European Union (EU), Asia and North America	PLS-SEM	Digital SCM partially mediates cost leadership and performance in emerging economies as

					customer-facing technologies like AR supports differentiation.
García-Quevedo et al. (2023)	Supply chain traceability in global F & B industry	Cross-sectional	150 F & B firms across EU and Latin America	SEM	Traceability technology partially mediates differentiation and market share relationship in the EU but had weaker effect in Latin America due to infrastructure gaps.
Hossain et al. (2023)	Digital transformation in F & B processing	Cross-sectional	215 F & B processing organizations in Bangladesh and India	PLS-SEM	Digital transformation partially mediates differentiation and performance. Cost leadership benefits more from automation than differentiation.
Saldanha et al. (2023)	Digital SCM capabilities as mediator between competitive strategies and operational performance	Mixed methods: cross-sectional survey and case studies	412 manufacturing firms including F & B in Germany, USA, and Brazil	PLS-SEM Thematic analysis	Digital capabilities partially mediate cost leadership and cost efficiency with strongest mediation from real-time analytics.
Wang & Li (2023)	Blockchain performance as mediator between competitive strategies and sustainability outcomes	Meta-analysis of 97 empirical studies	Global focus: Asia, Europe, America, Africa, inclusive of F & B sector	Meta-analytic SEM (MASEM)	Blockchain fully mediates differentiation and environmental compliance with stronger effect in regulated sectors such as F & B.
Khan et al. (2022)	Green strategy & smart technology mediation	Longitudinal	186 organizations in Germany, Japan and USA	Regression	Smart sensors and blockchain partially mediates green differentiation

					and sustainability performance.
Ferraris et al. (2021)	Digitalization in SME internalisation	Cross-sectional		PLS-SEM	Cloud and AI adoption partially mediates global differentiation and export intensity relationship.
Annosi et al. (2020)	Technology 4.0 in agri-food SMEs	Mixed-Method	98 agri-food SMEs in Italy and Netherlands	Regression and Case Studies	Technology adoption strengthen differentiation – export growth relationship
Menrad et al. (2020)	I4.0 in F & B manufacturing	Systematic Review	Global	Thematic analysis	Smart technology mediates the lean strategies – waste reduction relationship.

Source: Author's compilation (2025)

The review of past empirical works in Table 1 espouses the research gap in extant literature and the significance of this empirical study. Therefore, in addition to the extant literature, the study considered the theoretical frameworks of the Resource-Based View (RBV) (Barney et al., 1991) and the Dynamic Capabilities Theory (DCT) (Teece et al., 1997; Teece, 2020) to propose the following null hypotheses under the assumption of no relationship:

H_{1a}: Cost leadership strategy does not positively influence organizational performance.

H_{1b}: Differentiation strategy does not positively influence organizational performance.

H_{1c}: Focus strategy does not positively influence organizational performance.

H_{2a}: Cost leadership strategy does not positively influence technology performance.

H_{2b}: Differentiation strategy does not positively influence technology performance.

H_{2c}: Focus strategy does not positively influence technology performance.

H_{3a}: Technology performance does not mediate the relationship between cost leadership strategy and organizational performance.

H_{3b}: Technology performance does not mediate the relationship between differentiation strategy and organizational performance.

H_{3c}: Technology performance does not mediate the relationship between focus strategy and organizational performance.

THEORETICAL FRAMEWORK

The two theories that underpin this study are the Resource-Based View (RBV) by Barney et al. (1991) and the Dynamic Capabilities Theory (DCT) by Teece et al. (1997). The RBV theory contends that internal resources and capabilities and how they are configured by the organizations confers a competitive

advantage on the organizations (Barney, 2021). However, the static nature of these resources was critiqued as gaps in the RBV theory. The DCT addressed these gaps and explains the role of internal and external resources in a rapidly changing environment. The theory builds upon the RBV theory beyond the static resources and supports the hypercompetitive environment of the 21st century by identifying new market trends, providing resources, and continuously transforming these resources for a sustainable competitive advantage. Girod et al. (2023), Girod and Whittington (2017), and Teece (2023) contends that long-term success is predicated on not just the organization's resources but its adaptation capabilities through sensing, seizing, and transforming resources.

The conceptual framework in Figure 1 is proposed to test the direct influence of competitive strategy (through the constructs of cost leadership, differentiation, and focus) on organizational performance and technology performance respectively, and the mediating effects of technology performance.

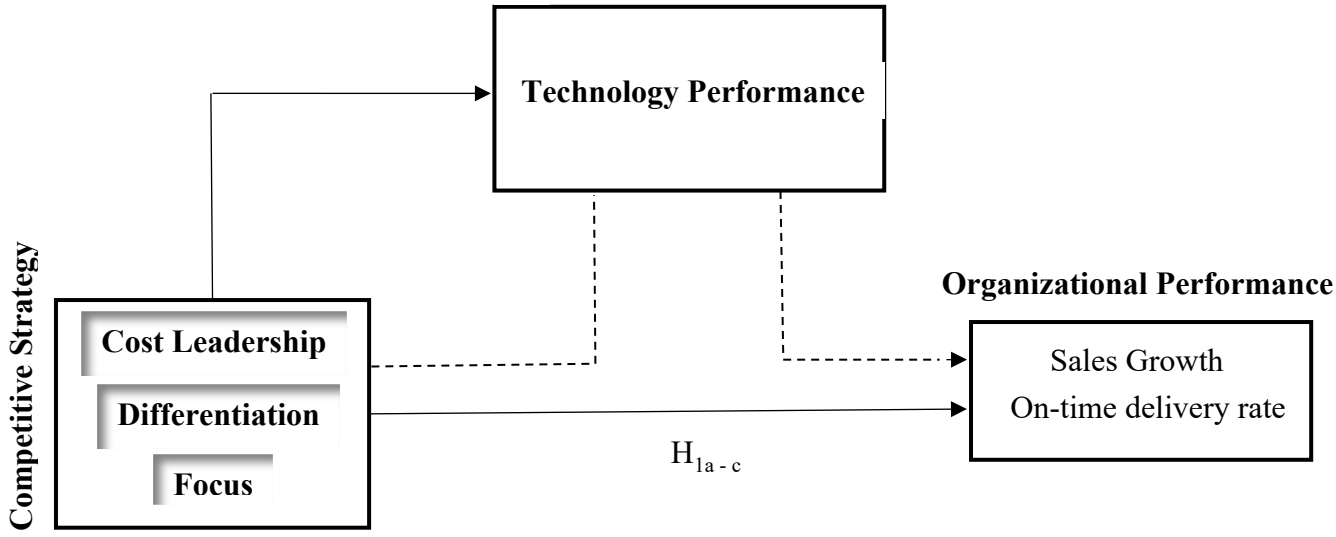

Figure 1. Research's Conceptual Framework
Source: Author (2025)

METHODOLOGY

Research Design

This cross-sectional study was based on self-reported questionnaires that were administered to 460 respondents who are senior managers in the F & B sector in Nigeria as shown in Table 2 which indicate 892 organizations according to MAN (2023). Table 3 is the stratified sampling computation for the subsector which was derived from the sample size of 276 as shown in the Taro Yamane method for sample size and increased to 460 after adjustment for potential low responses with Cook et al.'s (2000) 60% response rate.

The target sample is derived from Taro Yamane method for sample size below (Yamane, 1967):

$$n = \frac{N}{1 + Ne^2}$$

Where n = Sample size
N = Population size
e = Allowable error (at 95% confidence interval for this study)

$$n = \frac{892}{1 + 892(0.05)^2} = 276$$

In all, 238 questionnaires were returned to achieve a response rate of 51%. However, 37 questionnaires were incomplete and were discarded for not being fit-for-purpose, leading to a usable sample size of 201. Combining stratified and purposive sampling, 201 usable sample was derived from the survey for the data analysis.

Table 2. Food & Beverage Sub-sectorial Group in Nigeria

Subsector	No. of Organizations
Breweries & Distilleries	187
Grain Milling	172
Bakery & Confectionary	168
Bottled Water & Juice	142
Dairy products	108
Edible Oils & Fats	62
Sugar Refining	27
Tobacco Processing	26
Total	892

Source: MAN (2023)

Table 3. Stratified Sampling Allocation

Subsector	No. of Organizations	Proportion of Sample Size
Breweries & Distilleries	187	$\frac{187}{892} \times 460 = 96$
Grain Milling	172	$\frac{172}{892} \times 460 = 89$
Bakery & Confectionary	168	$\frac{168}{892} \times 460 = 87$
Bottled Water & Juice	142	$\frac{142}{892} \times 460 = 73$
Dairy products	108	$\frac{108}{892} \times 460 = 56$
Edible Oils & Fats	62	$\frac{62}{892} \times 460 = 32$
Sugar Refining	27	$\frac{27}{892} \times 460 = 14$
Tobacco Processing	26	$\frac{26}{892} \times 460 = 13$
Total	892	460

Note. Data on F & B organizations from the Manufacturers Association of Nigeria (MAN, 2023)

Source: Author's computation (2025)

Measurement of Variables

There are three concepts in the study; competitive strategy, technology performance, and organizational performance. Competitive strategy is the exogenous variable with three constructs namely; cost leadership, differentiation, and focus strategies. Organizational performance is the endogenous variable measured by sales growth and on-time delivery. Technology performance is the mediating variable.

The study adapted the standardized instruments of Dess and Davis (1984), revalidated by Robinson Jr and Pearce Jr (1987) with Cronbach's alpha of 0.78, 0.81, and 0.75 for cost leadership, differentiation, and focus strategies respectively to measure competitive strategy. Cost leadership and differentiation had 8 items respectively, while focus had 7 items in the scale. Technology performance was measured using scales adapted from Zhou and Wu (2010) with Cronbach's alpha of 0.89. There are eight items in the scale. Organizational performance was assessed through financial metric (Sales Growth) adapted from Morgan and Rego (2012) with Cronbach's alpha of 0.91 and non-financial metrics (On-time delivery) adapted from Safe Quality Food (SQF) and Supply Chain Operations Reference (SCOR). There are 6 items in the scale. All the five constructs in the questionnaire adopted the 7-point Likert scale of 1 to 7.

Pilot Study

In the tradition of Connelly (2008) on 10% pilot sample size, a pilot study involving 30 respondents was undertaken after ensuring face validity and content validity of the questionnaire by reviewing the questionnaire with other experts. The study reported Cronbach's alpha of 0.88, 0.85, 0.78, 0.86, and 0.81 for the constructs of cost leadership, differentiation, focus, technology performance, and organizational performance respectively for internal consistency. 37 items in the instrument were retained for the main study.

Data Analysis

Partial least squares structural equation modeling (PLS-SEM) with SmartPLS Version 4 was used to test the nine hypotheses of the study. PLS-SEM is a variance-based data analysis technique that efficiently handle models with latent constructs (Hair et al., 2022). The analysis was undertaken with the measurement model for confirmatory factor analysis and the structural model with bootstrapped 5000 samples for the test of hypotheses.

RESULTS AND DISCUSSION

Demographic Statistics

Table 4 is the demographic data of the respondents indicating the gender, age, educational qualifications, level of responsibility, subsector, and size. Most of the respondents have basic educational background to respond fittingly to the questionnaire. Breweries & Distilleries, Grain Milling, and Bakery & Confectionary were the most represented subsectors with 25.4%, 20.4%, and 17.9% respectively. The most represented organization size based on revenue is the medium subgroup with 53.2%.

Table 4. Demographic Profile of the Respondents

Variables	Response Label	Percentage
Gender		
	Male	83.1
	Female	16.9
Age (years)		
	21 – 25	2.0
	26 – 35	20.9
	36 – 49	63.2
	50 – 65	13.9
Qualifications		
	Bachelor's	83.1
	Master's	15.4

	PhD	1.5
	Others	5.3
Responsibility		
	Strategy	15.4
	Technology	36.8
	Operations	47.8
Subsector		
	Breweries & Distilleries	25.4
	Grain Milling	20.4
	Bakery & Confectionary	17.9
	Bottled Water & Juice	15.4
	Dairy Products	8.0
	Edible Oils & Fats	7.0
	Sugar Refining	3.0
	Tobacco Processing	3.0
Organization Size (Revenue)		
	Small ($68,966)	22.4
	Medium ($68,966 – $689,655)	53.2
	Large (> $689,655)	24.2

Source: Author's computation (2025)

Measurement Model

Measurement model is often used to assess the path coefficient, reliability, and validity of the research constructs. First, Hair et al. (2022) recommended that factor loadings of 0.70 and above threshold should be retained while those below should be deleted. However, Hulland (1999) recommended the retention of loadings between 0.4 – 0.7, owing to the practicability of getting loading less than 0.7 in a social science research. Consequently, factor loadings FS4, OP3, OP4, TP1, TP2, TP3, TP4, and TP5 were deleted. *See:* Figure 2 and Table 5 for details. Furthermore, convergent validity was assessed by Average Variance Extracted (AVE). Hair et al. (2022) posited that an AVE score of 0.5 or above indicates the convergent validity of a study's concepts. The AVE values for all constructs in the research exceed 0.5 benchmark. Consequently, convergent validity is confirmed. The construct reliability of this study was assessed using the composite reliability and Cronbach's alpha coefficients. Hair et al. (2022), suggested a threshold of 0.7 or above for the construct to be deemed credible and consistent. The constructs for the study fulfilled these criteria and are considered reliable and consistent.

Meanwhile, the coefficient of determination (R^2) shown in Figure 2 is 0.348 (34.8%) when organizational performance is the endogenous variable. Thus, indicating that 34.8% of the variation in organizational performance is accounted for by the exogenous variables and the mediating variable. Cohen (1988) posited that the R^2 explanatory power might be deemed modest for this range.

Furthermore, discriminant validity was assessed using the Heterotrait-Monotrait (HTMT) correlation ratio. Given the conceptual dissimilarity across the constructs, the HTMT criterion of 0.85, as proposed by Kline (2011), was used instead of the HTMT threshold of 0.9 suggested by Henseler et al. (2015) for conceptually comparable constructs. Consequently, with the results below the 0.85 criterion, discriminant validity is established in Table 6.

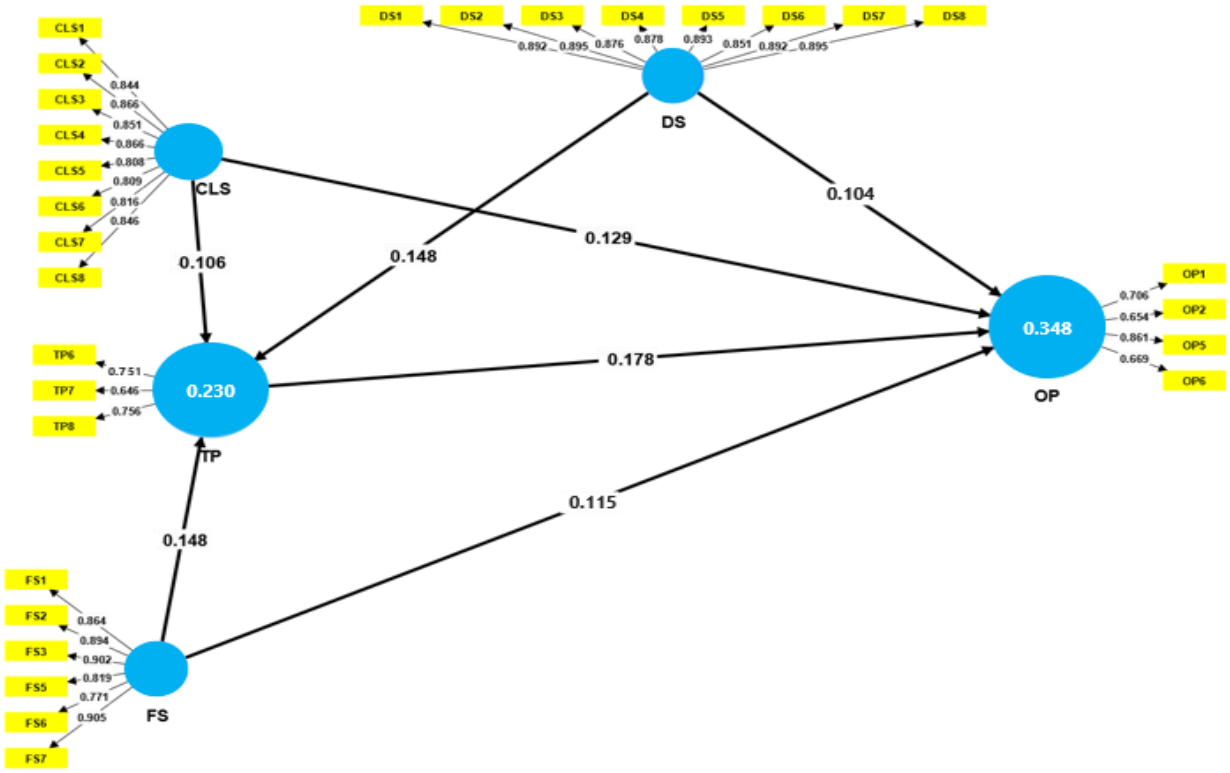

Figure 2. Path Coefficient
Source: Author's extraction (2025) from SmartPLS 4.0

Table 5. Factor loadings, Reliability and Convergent Validity

Constructs	Indicators	Outer loadings	Cronbach's alpha	Composite Reliability	AVE	Decision
Cost Leadership Strategy	CLS1	0.844	0.941	0.950	0.703	Accepted
	CLS2	0.866				
	CLS3	0.851				
	CLS4	0.866				
	CLS5	0.808				
	CLS6	0.809				
	CLS7	0.816				
	CLS8	0.846				
Differentiation Strategy	DS1	0.892	0.961	0.966	0.782	Accepted
	DS2	0.895				
	DS3	0.876				
	DS4	0.878				
	DS5	0.893				
	DS6	0.851				
	DS7	0.892				
	DS8	0.895				

Focus Strategy	FS1	0.864	0.934	0.945	0.741	Accepted
	FS2	0.894				
	FS3	0.902				
	FS5	0.819				
	FS6	0.771				
	FS7	0.905				
Organizational Performance	OP1	0.706	0.741	0.816	0.529	Accepted
	OP2	0.654				
	OP5	0.861				
	OP6	0.669				
Technological Performance	TP6	0.751	0.776	0.726	0.517	Accepted
	TP7	0.646				
	TP8	0.756				

Source: Author's extraction (2025) from SmartPLS 4.0

Table 6. Discriminant validity using HTMT correlations

Constructs	**CLS**	**DS**	**FS**	**OP**	**TP**
CLS					
DS	0.350				
FS	0.165	0.289			
OP	0.111	0.108	0.073		
TP	0.160	0.118	0.128	0.250	

Source: Author's extraction (2025) from SmartPLS 4.0

Table 7. Test of Multicollinearity

Indicators	**VIF**
CLS1	2.866
CLS2	3.674
CLS3	3.050
CLS4	3.185
CLS5	2.383
CLS6	2.835
CLS7	2.318
CLS8	2.826
DS1	3.972
DS2	3.878
DS3	3.421
DS4	3.576
DS5	3.877
DS6	3.666
DS7	4.031

DS8	4.598
FS1	3.151
FS2	3.019
FS3	3.287
FS5	2.871
FS6	2.756
FS7	3.369
OP1	1.398
OP2	1.564
OP5	1.360
OP6	1.382
TP6	1.119
TP7	1.044
TP8	1.111

Source: Author's extraction (2025) from SmartPLS 4.0

Multicollinearity test was undertaken to ascertain the level of association between the constructs via their items. Hair et al. (2014) suggested that when the VIF values are less than 5, there are no multicollinearity issues. However, with values above 10, multicollinearity is confirmed. Therefore, based on the thresholds, since VIF values are less than 5 in Table 7, the constructs are not collinear.

Evaluation of Structural Model

The structural model was used to evaluate the direct and the mediating relationship after bootstrapping 5000 was analyzed in Figure 3.

The results in Table 8 revealed that all the direct hypothesized relationships between Competitive Strategy (cost leadership strategy (CLS), differentiation strategy (DS), and focus strategy (FS)) and both Organizational Performance (OP) and Technology Performance (TP) respectively were statistically significant while mediation effects were validated for differentiation and focus strategies.

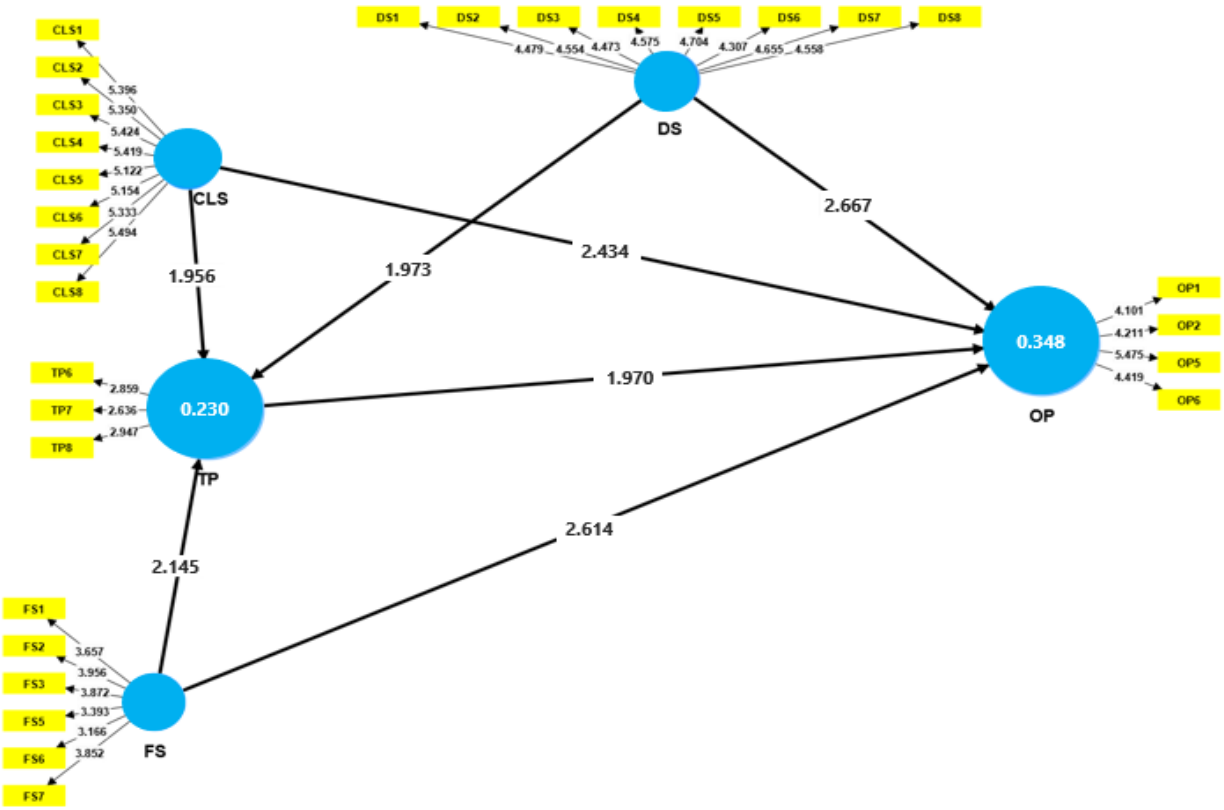

Figure 3. Structural Model
Source: Author's extraction (2025) from SmartPLS 4.0

Table 8. Hypothesized Relationship

						Confidence Interval		
Hypotheses	**Relationship**	**Beta**	**STDEV**	**T Statistics**	**P Values**	**2.50%**	**97.50%**	**Decision**
H_{1a}	CLS -> OP	0.129	0.053	2.434	0.015			Rejected
H_{1b}	DS -> OP	0.104	0.039	2.667	0.008			Rejected
H_{1c}	FS -> OP	0.115	0.044	2.614	0.009			Rejected
H_{2a}	CLS -> TP	0.106	0.054	1.956	0.050			Rejected
H_{2b}	DS -> TP	0.148	0.075	1.973	0.049			Rejected
H_{2c}	FS -> TP	0.148	0.069	2.145	0.032			Rejected
H_{3a}	CLS -> TP -> OP	0.019	0.029	0.655	0.512	-0.034	0.076	Failed to reject
H_{3b}	DS -> TP -> OP	0.264	0.058	4.552	0.275	0.021	0.074	Rejected
H_{3c}	FS -> TP -> OP	0.216	0.083	2.602	0.249	0.019	0.070	Rejected
		Q^2= 0.142						

Note. In mediation analysis with PLS-SEM, significance is typically determined by whether the bootstrap confidence interval (CI) excludes zero. In this table, the paths DS→TP→OP and FS→TP→OP are considered statistically significant because [0.021, 0.071] and [0.019, 0.070] do not include zero, even though the p-value is greater than 0.05. *P < 0.05.
Source: Author's extraction (2025) from SmartPLS 4.0

Hypotheses, H_{1a}, H_{1b}, H_{1c}

Specifically, cost leadership strategy had a positive effect on OP ($\beta = 0.129$, $p = 0.015$), suggesting that adopting strategies to minimize costs can enhance organizational outcomes in organizations. Differentiation strategy also demonstrated significant positive effect on OP ($\beta = 0.104$, $p = 0.008$), indicating that offering unique products or services can boost organizational performance. Similarly, focus strategy significantly influenced OP ($\beta = 0.115$, $p = 0.009$), implying that concentrating on specific market segments can yield performance benefits.

Hypotheses, H_{2a}, H_{2b}, H_{2c}

Cost leadership strategy had a positive and significant effect on TP ($\beta = 0.106$, $p = 0.050$), suggesting that adopting strategies to minimize costs support technological outcomes in organizations. Differentiation Strategy also had a significant positive effect on TP ($\beta = 0.148$, $p = 0.049$), indicating that offering unique products or services boost technological performance. Similarly, focus strategy significantly influenced TP ($\beta = 0.148$, $p = 0.032$), implying that concentrating on niche market segments can yield performance benefits.

Hypotheses, H_{3a}, H_{3b}, H_{3c}

Regarding the mediating effects of technology performance on the relationship between the competitive strategies and organizational performance, the findings show mixed results. The mediation pathway from cost leadership strategy through TP to OP was not significant ($\beta = 0.019$, 95% CI [-0.034, 0.076]), indicating that technological performance does not significantly mediate the effect of cost leadership on organizational outcomes.
In contrast, both differentiation strategy and focus strategy showed significant mediated effects through TP to OP (DS: $\beta = 0.264$, 95% CI [0.021, 0.074]; FS: $\beta = 0.216$, 95% CI [0.019, 0.070]). The results suggest that technology performance may act as a bridge through which differentiation and focus strategies enhance overall organizational outcomes. Technology performance was a partial mediator in the relationship with complementary effects. The Q^2 value of 0.142 indicates a moderate predictive relevance of the model, meaning the exogenous variables explain a meaningful portion of the variance in the endogenous variables. Overall, the findings underscore the importance of competitive strategies in driving both technological and organizational performance, with differentiation and focus strategies having a significant indirect influence via technology performance compared to cost leadership.

CONCLUSION AND IMPLICATIONS

The study confirms that cost leadership and focus strategies enhanced performance than differentiation strategy in Nigeria's F & B industry. This is similar to the findings of other studies such as (Saldanha et al., 2023; Wang & Li, 2023) in the context of developed markets. On technology performance, differentiation and focus strategies had higher significant effects on organizational performance than cost leadership. The two strategies (differentiation and focus) were also mediated by technology performance. This is suggestive of differentiators embracing technology to improve organizational performance. Technology performance failed to mediate the relationship between cost leadership and organizational performance, confirming Adeola et al.'s (2020) findings that revealed that most Nigerian F & B organizations cite cost as the barrier to IoT adoption.

The outcomes of this study are novel as they offer empirical validation within a different context similar to past studies on competitive strategy, technology adoption or performance, and organizational

performance. Prior studies (Dubey et al., 2023; Rodriguez, 2024; Wang & Li, 2023) covered mostly developed economies with rapid technology adoption and by impact, technology performance.

The similarities in the outcomes of these past studies with this current study are indicative of the role of technology performance in the relationship between competitive strategy and organizational performance. In the era of technology, competitive advantages come from numerous sources. Brynjolfsson and McElharan (2023) empirically validated data analytics as a source of competitive advantage. Supporting green technology may also confer a competitive advantage (Eccles & Serafiem, 2023). Kim and Lee (2024) empirically validated organizations that have embraced smart factories as top performers. In the Kim and Lee (2024) study, Siemen's adoption of 3D printing reduced inventory cost by 45% for cost leadership strategy and mass customization increased price premiums by 30% for Nike, a luxury sport producer. This current study on the Nigerian F & B sector empirically validates previous findings except for cost leadership which may be attributable to the high cost of technology adoption for cost leaders.
Teece (2023) contends that 21st century organizations will leverage technology to gain a sustainable competitive advantage. Kaplan and Norton (2021) reiterated the importance of measuring the organizational performance to assess growth. Evidently, it is important that Nigeria and Africa reposition with I4.0 as the global conversation shifts to Industry 5.0 (15.0) in the future.

Theoretical Contributions

The study extends Porter's framework by integrating technology performance mediation. One of the underpinning theories is the RBV theory and this study extends RBV by empirically validating how resources (technology in this case) convert strategy to performance.
Equally, the study further validated dynamic capabilities through technology performance as the link in the strategy – performance model. Technology performance during changing times may be classified as a resource to empirically validate the DCT. The study provides emerging market insights on competitive strategy effectiveness through the empirical validation of the requirements for technology performance as one of its dynamic capabilities for organizational performance.

Practical Implications

The broader policy implications are the actionable insights on strengthening the institutional frameworks that supports technology performance such as infrastructure, R & D, and human capacity development. However, managerial insights derived from the study's findings provides actionable guidance for F & B organizations to align competitive positioning with the technology that enhances performance. Cost leaders may emphasize supply chain automation to lower distribution cost while differentiators invest in customer-centric technologies to enhance brand value. Focus strategist may require technology that supports market niches. I4.0 adoption may correlate technology performance but aligning specific competitive strategy with the supporting technology based on the findings of this study will ensure optimal performance. Policymakers should subsidize I4.0 to support technology adoption for rapid growth and enhanced industry performance.

Limitations and Future Research

This study is limited by its single-country sample which may have implication on the generalizability of the findings to other countries. Future research may replicate this study in a sector-specific manner in the context of other sectors of the manufacturing industry or undertake a longitudinal study within the same context of this study to empirically validate the mediating role of technology performance.

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MINORITY UPSTREAM OWNERSHIP AS AN OPERATIONAL HEDGE: A BRAZIL–INDONESIA CASE OF LOOSE COUPLING UNDER COMMODITY VOLATILITY

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Received September 6th, 2025; Revised October 31st, 2025; Accepted November 10th, 2025

ABSTRACT

This paper examines a third way to manage commodity risk: an Upstream Equity Hedge (UEH), i.e., a minority upstream stake that offsets input-price shocks while keeping market-based procurement. Using Indofood's stake in Brazil's Companhia Mineira de Açúcar e Álcool (CMAA) as a single embedded case, we link ICE #11 sugar futures to Indofood's equity-method results and carrying amount. After analyzing 11 years (2013-2024) of context, with a focus on results from 2020-2024, evidence centers on the 2023 sugar-price spike and its 2024 normalization: the carrying amount increases materially in 2023 and partially retraces in 2024, consistent with directional cushioning in high-price regimes. An Offset Ratio that relates changes in associate income and carrying amount to a modeled sugar-attributable cost shock is formalized, providing an auditable, direction-of-change metric rather than a one-for-one hedge claim. Managerially, the UEH offers a portable design that stabilizes internal funds during stress while maintaining competitive sourcing and supplier optionality.

Keywords: Hedge; loose coupling; operational hedging; commodity price risk; cross-border management

INTRODUCTION

Commodity price swings normally stress food manufacturers, especially when input markets and consumer markets sit in different countries. Firms typically respond with financial hedges or full vertical integration. This paper presents a third path: a minority upstream equity stake that acts as an operational hedge - an Upstream Equity Hedge (UEH) - implemented in a loosely coupled (Orton & Weick, 1990; Weick, 2001) cross-border structure. The idea is simple: let upstream earnings move with the commodity that needs to be hedged, pass part of that movement to the parent through equity-method accounting and dividends, but keep downstream procurement market-based and flexible (Weick, 1976; Baldwin & Clark, 2000).

The main research setting is Indofood's stake in Companhia Mineira de Açúcar e Álcool (CMAA), a Brazilian sugar/ethanol group. The surge in global sugar prices in 2023 offers a useful case study for evaluating the effectiveness of the method. Some questions are presented: (i) Does a UEH co-move with benchmark prices in a way that cushions input-cost shocks? (ii) Which organizational features enable cushioning without forcing internal offtake? (iii) How visible is the hedge in financial statements, specifically the carrying amount of the associate under IAS 28/21 and the "share of results of associates"? (iv) What are the boundary conditions (FX translation, dividends, OCI) that make the hedge stronger or weaker in a given year? The stance follows the risk-management view that firms hedge to stabilize internal

funds and avoid bad states, not to engineer one-for-one price offsets (Froot, Scharfstein, & Stein, 1993; Stulz, 1996).

Empirically, the paper utilizes a single embedded case with a longitudinal design. The identification window is 2020-2024, but a longer annual panel (2013-2024) provides context. International sugar futures (ICE #11 sugar prices in US$ cents/lb) are tracked and analyzed in conjunction with Indofood's carrying amount for CMAA, and respective payouts. The analysis is complemented with process evidence on coordination and procurement. Methodologically, the work follows theoretical sampling and process tracing to explain how the design works under stress (Eisenhardt, 1989; Pettigrew, 1990; Langley, 1999; Yin, 2018), treating the Indofood–CMAA link as an extreme/critical case (Flyvbjerg, 2006).
Conceptually, UEH is formalized as an operational hedge under loose coupling: economically linked through ownership returns, but commercially separable in procurement, which allows companies to remain flexible when operationalizing their commercial strategies. This connects risk-management theory (Froot et al., 1993; Stulz, 1996) with organizational modularity (Weick, 1976; Baldwin & Clark, 2000) and integration choice (Williamson, 1985; Kogut & Kulatilaka, 1994).

Empirically, by using closing carrying balances (2020–2024), it is shown that directional co-movement - a step-up during a 2023 sugar price shock (the largest in more than a decade) and a retrace in 2024 - is consistent with cushioning during price spikes while preserving sourcing flexibility. To measure the UEH effect, an offset ratio that pairs P&L and balance-sheet lenses is proposed. It consists in the sum of i) variation of equity participation (Δ "share of results of associates"), and ii) variation of equity carrying amount (Δ "carrying amount"). This ratio can be scaled by the value of the cost that is being hedged, in this particular case it is scaled by a modeled sugar-attributable variation on Cost of Goods Sold (Δ "COGS").

Lastly, a practical playbook for emerging-market manufacturers is offered: build a cost-leading upstream pole; keep cross-pole links loose; monitor hedge strength with an auditable metric; use derivatives for short-horizon gaps. Given the international connectivity of this case, validated by an event study, results can be generalized as it is portable to other commodity poles when the input has a transparent benchmark (e.g., a futures contract), there exists an investable upstream asset, procurement can remain market-based, and FX/dividend repatriation frictions are manageable. The rest of the paper reviews related work and the UEH construct (Section 2), describes the setting, data, and design (Section 3), presents results (Section 4), discusses implications and limits (Section 5), and concludes (Section 6).

LITERATURE REVIEW

The transnational solution proposed by Bartlett & Ghoshal (1989) enables organizations to be simultaneously efficient on a global scale, highly responsive to local markets, and capable of rapidly sharing knowledge and innovation across borders, which are essential capabilities in today's complex and competitive international environment. Where the transnational assumes one integrated network with rich lateral flows, Luo and Tung (2025) argue that the retreat from hyper-globalization makes one global strategy untenable, proposing a multipolar geo-strategy in which multinationals operate with tight coupling within geopolitical poles (to capture scale and speed) and loose coupling across poles (to buffer spillovers and comply with divergent regimes). Their framework integrates loose-coupling theory with the new internalization logic, showing how firms decide what to internalize by pole while using connector countries to preserve optionality under decoupling. This is especially relevant when globalization of trade is not equally disseminated among countries (Vambery, 2018).

Through the lens of loose-coupling theory (Orton & Weick, 1990; Weick, 2001), I treat today's external fragmentation (divergent trade, data, and industrial policies across blocs) and firms' internal fragmentation (subsidiary differentiation, governance variance, localized systems) as design inputs for a

dual-tier architecture: loose at the global level to prevent shock contagion, tighter within specific geopolitical zones to capture scale under a single rule set. While analyzing decoupling at a global level, Qiu et al. (2024) find that geopolitical alignment is a major factor shaping global trade flows, with countries experiencing significantly slower growth in trade volumes when trading with geopolitically distant partners. The study also finds that countries most dependent on geopolitically distant partners are especially vulnerable to escalating tensions because they have fewer options for trade diversion, underscoring the challenges in managing geopolitical trade risks in today's fragmented world, where countries show very different risk profiles (Girard, 2018).

Related work on the intersection of geopolitics and global trade includes extensive research on trade fragmentation and the reorientation of trade along geopolitical lines. Blanga-Gubbay & Rubínová (2023) provide evidence that trade between East and West blocs has grown slower than intra-bloc trade since the onset of the Russia-Ukraine war (2022). Fernández-Villaverde et al. (2024) developed a geopolitical fragmentation index, showing significant fragmentation increases since the 2007-2008 financial crisis. Gopinath et al. (2024) and related ECB research also highlight emerging evidence for both trade and investment flows fragmenting along geopolitical bloc lines, especially after major recent geopolitical shocks. Policy-focused studies (e.g., the WTO 2023 World Trade Report) show that higher tariffs and barriers reinforce regionalization but do not necessarily signal outright deglobalization; instead, global supply chains become more complex and regional, which creates challenges, but also policy opportunities (Mashaphu et al., 2024).

Trade disruptions trigger immediate shifts in the volume and direction of cross-border flows, forcing firms to adapt sourcing and market strategies (Semeniak, 2025). Supply chains therefore need to combine resilience with flexibility, as shocks propagate rapidly through logistics networks and create cascading operational bottlenecks (Moradlou et al., 2025). In commodity markets, such shocks translate into sharp price fluctuations in spot and futures benchmarks along the value chain. Recent work shows that commodity and supply-chain disturbances - especially around major geopolitical crises - have been key drivers of persistent inflation in advanced and emerging economies, with outsized effects in energy and food (Díaz et al., 2024; Aizenman, 2024).

This is particularly consequential for food manufacturers whose input costs depend on geographically concentrated upstream sources, for example, an Indonesian producer reliant on imported sugar from a small set of large exporters. Sugar price risk has been a persistent vulnerability for Indonesia's food manufacturers because the country relies heavily on imported raw sugar. Empirical work documents a tight co-movement between domestic and international benchmarks (Jati, 2013; Ekananda, 2023; Agustin et al., 2022), consistent with import-parity pricing once freight, tariffs, distribution costs, and the exchange rate are layered onto global quotes. Several studies also highlight asymmetric transmission: domestic prices adjust more quickly when world prices rise than when they fall, implying faster pass-through of cost shocks than cost relief (Ekananda, 2023). These frictions (regulation, market power along the distribution chain, and inventory/contract rigidities) can magnify upside volatility at the factory gate even when average exposures appear hedged.

For listed consumer-goods firms, this pricing dynamic has clear corporate-finance implications. Input-cost spikes compress gross margins and stress working capital, while downturns in sugar costs expand margins and cash flow; brokerage evidence on Indofood's earnings sensitivity to sugar costs illustrates this channel (Ciptadana Sekuritas Asia, 2019). The literature therefore motivates active risk management, combining procurement strategies (timing, supplier diversification), financial hedges on sugar and FX, and pricing policies, to dampen the convex downside from price surges and preserve operating resilience (Jati, 2013; Agustin et al., 2022; Ekananda, 2023).

Indofood (PT Indofood Sukses Makmur Tbk) is Indonesia's flagship "total food solutions" company, founded in 1990 (as PT Panganjaya Intikusuma) and now operating across the full chain—from upstream agribusiness to branded staples and last-mile distribution—through four strategic business groups: Consumer Branded Products (CBP), Bogasari (flour and pasta), Agribusiness, and Distribution (Indofood, 2025a, 2025b). Its network is described as the most extensive Fast-Moving Consumer Goods (FMCG) distribution platform in the country, while CBP's noodles arm is among the world's largest, with ~34 billion packs of annual capacity across 31 factories spanning Indonesia, Malaysia, Africa, the Middle East, and Southeastern Europe (Indofood, 2025a, 2025c). Regionally, Indomie is a pan-Asian anchor brand with availability in 100+ countries, reinforcing Indofood's role as a node in the Asian packaged-food ecosystem (Indomie, n.d.). Scale is reflected financially: Indofood CBP reported Rp 67.91 trillion in net sales for 2023 (Indofood CBP, 2024). Upstream, Bogasari—part of Indofood since 1995—has long been cited as operating the world's largest flour-milling facility, underlining the group's centrality to Indonesia's food staples (Donley, 2019).

Vertical integration theory suggests that firms pursue backward integration to secure critical inputs, reduce transaction costs, and mitigate supply chain risks, particularly when dealing with commoditized inputs subject to price volatility (Williamson, 1985). Indofood's acquisition of Companhia Mineira de Açúcar e Álcool (CMAA) in Brazil back in 2013 represents a sophisticated application of this theoretical framework, where the company sought to hedge against sugar price fluctuations while securing supply chain control for its extensive food manufacturing operations. As one of Indonesia's largest food conglomerates, Indofood operates across multiple consumer product segments that require substantial sugar inputs, making commodity price volatility a significant operational risk factor. The strategic decision to pursue sugar production assets in Brazil, rather than expanding domestic Indonesian capacity, reflects careful analysis of global supply chain dynamics and cost optimization opportunities.

CMAA - Companhia Mineira de Açúcar e Álcool - is a Brazilian sugar-ethanol group founded in 2006 by the JF Citrus family, headquartered in the Triângulo Mineiro cane belt, with three operating mills: Vale do Tijuco (Uberaba), Vale do Pontal (Limeira do Oeste), and Canápolis - and an administrative center in Uberlândia (EMIS, n.d.; CMAA, n.d.-a). Capacity has expanded via greenfield and acquisition, with circa 9.7 million tonnes of annual crushing reported in recent disclosures (Indofood Agri Resources Ltd., 2024). Shareholding combines the founding JF interests with international capital: Indofood Agri Resources acquired an initial 50% in 2013 as private-equity investors exited, and today reports a 36.21% equity-method interest in CMAA (Indofood Agri Resources Ltd., 2013, 2024). Together, the ownership structure, mill footprint, and expansion pipeline position CMAA as a scale, logistics-advantaged upstream platform in Brazil's Center-South, and a natural anchor for downstream manufacturers seeking upstream equity hedging exposure.

Indofood's consumer branded products division demonstrates extensive sugar dependency across its diverse manufacturing operations, creating substantial exposure to commodity price volatility. The company's flagship Indomie instant noodles, which represent the world's largest instant noodle manufacturing operation, incorporate sugar as the second-listed ingredient in seasoning powders and as the primary component in sweet soy sauce packets (Indomie, 2021; Scientific Research Publishing, 2017). Beyond instant noodles, Indofood's dairy division produces sweetened condensed milk, flavored beverages, and dairy products that require significant sugar inputs for both taste enhancement and preservation functions (DBS Vickers Securities, 2025). The company's snack foods, confectionery items, and beverage products further amplify sugar consumption requirements, with analysts noting that sugar price fluctuations materially impact profit margins across these product categories (Ciptadana Sekuritas Asia, 2019). This extensive sugar utilization creates natural hedging opportunities through backward integration, where controlled production capacity can offset input cost volatility.

Indofood's US$71.7 million acquisition of a 50% stake in CMAA's 3.0-million-ton crushing platform is best understood as an Upstream Equity Hedge (UEH) rather than merely backward integration. Under UEH, the firm holds an equity-method stake in an upstream producer whose earnings and carrying value co-move with the input benchmark (here, ICE #11 sugar futures). This creates an ownership-based offset to downstream cost shocks without requiring captive offtake or internal transfer pricing. When sugar prices are elevated, CMAA's profitability and Indofood's recognized share of results rise, cushioning pressure on Indofood's COGS and margins; when prices normalize, the hedge leg moderates accordingly. The all-cash deal further avoided financing frictions, allowing the hedge to operate through operating cash flows and the equity-method line rather than through short-dated financial derivatives.

Two core ideas guide how we interpret the upstream-equity hedge (UEH). First, firms should hedge the risks that threaten internal cash flow and investment, not chase variance reductions for their own sake (Froot, Scharfstein, & Stein, 1993). When external finance is costly or slow, stabilizing operating cash flows helps the firm keep funding positive-NPV projects and routine working capital. In our setting, the UEH channels part of a sugar price upswing into associate earnings and the carrying amount, while dividends provide cash. That cushions the downstream business when input costs rise, coordinating risk management with investment and financing rather than treating hedging as a standalone activity (Froot et al., 1993).

Second, the goal of risk management is to avoid bad states - the left tail where liquidity is tight, strategy is disrupted, or distress costs mount - rather than to engineer one-for-one price offsets (Stulz, 1996). The UEH fits that logic: it is a directional hedge that strengthens in price spikes (as in 2023) and eases when prices normalize (2024). Because accounting and FX can mute or amplify the reported effect in any single year, we judge success by whether the structure reduces the likelihood and severity of costly states while preserving procurement flexibility. In short, UEH protects capacity to operate and invest when it matters most, consistent with both the investment-smoothing view of Froot et al. (1993) and the downside-protection view of Stulz (1996). Seen through an international alliance portfolio network lens (van Aduard et al., 2016), a UEH is a minority, loosely coupled equity tie that adds diversity to the firm's alliance set while keeping procurement market based. The portfolio view suggests it creates value when diversity is high but manageable and alliance-management capabilities (information rights, dividend alignment, simple monitoring) keep coordination costs in check - so UEH acts as a network-level hedge that complements derivatives without forcing captive offtake.

Indofood's 2013 acquisition of a 50% stake in Brazil's CMAA was timed to leverage the country's dominance in global sugar exports and its position as the lowest-cost producer, while also preparing for ASEAN Economic Integration in 2015. Chairman Edward Lee emphasized Brazil's strategic importance and tariff advantages, while CEO Mark Wakeford highlighted the move as Indofood's first overseas agribusiness investment, providing both market access and operational learning in mechanized cane harvesting that could be adapted in Indonesia. Structured as a joint venture, the deal was negotiated at arm's length and reflected Indofood's broader diversification strategy to reduce single-crop risks and optimize plantation resources[2].

METHODOLOGY

This paper uses embedded case study (Yin, 2018) to examine how multinational enterprises deploy loose-coupling as a commodity-risk tool. A single case is preferable here because the aim is theory elaboration about mechanisms - not hypothesis testing across many units (Eisenhardt, 1989). The focal case

[2] Indofood Agri Resources Ltd. (2013, June 26). Completion of acquisition of a 50% interest in CMAA Group [Press Release].

is Indofood's Upstream Equity Hedge (UEH) via CMAA. This structure yields within-case variation across organizational levels, functions, and geographies, depth that multi-case designs often trade away for breadth (Scholz & Tietje, 2002).

Our design is longitudinal. Following Pettigrew (1990), process evolution is traced from design to stress-test over 2020–2024, bracketing periods (Langley, 1999) to show not just whether the arrangement works, but how it works under changing conditions. A longer annual panel (2013–2024) is also assembled to contextualize the 2020–2024 analysis.

The 2023 sugar shock (prices above ~24 US$ cents/lb) - driven by El Niño-related drought in Asia with documented production losses in India, Thailand, and China (Indian Sugar Mills Association, 2023; U.S. Department of Agriculture, 2023) - provides a natural experiment for stress-testing UEH effectiveness. Consistent with critical/extreme case logic (Flyvbjerg, 2006), this setting maximizes learning and clarifies boundary conditions; if loose-coupling works here, its mechanisms should generalize to milder contexts. The goal is analytical (not statistical) generalization to theory (Yin, 2018).

The method links the annual ICE #11 sugar futures benchmark (US$ cents/lb) to Indofood's consolidated investment in its associate CMAA (accounted for under IAS 28 with translation under IAS 21) over 2013–2024. Under the equity method, the carrying amount rolls forward from the prior year by (i) adding Indofood's share of CMAA profit or loss (also reported in "share of results of associates"), (ii) adding Other Comprehensive Income (OCI) items (e.g., cash-flow hedge reserves, biological-asset fair-value changes), (iii) subtracting dividends (which reduce the asset and bypass Indofood's P&L), and (iv) capturing other movements (capital injections, dilution, reclassifications, impairment). The resulting balance is then translated at the local currency (IDR) FX rate, with translation effects recognized in equity. Because this stock measure blends operating co-movement with FX and accounting remeasurement, the tests emphasize level co-movement and event-year directionality rather than fine attribution of each component.

The empirical strategy combines pattern matching between theoretical predictions and observed outcomes with an event-study of the 2023 shock. Firstly, a co-movement between sugar benchmarks and CMAA's carrying value is established. Secondly, such linkage is connected to organizational mechanisms that preserve operational independence, i.e., loose-coupling rather than vertical integration. Lastly, the hedge performance is validated under stress (2023) and partial reversal (2024).

To address a quantification caveat on how much the upstream equity stake cushions sugar-driven cost shocks, an annual Offset Ratio is proposed:

$$Offset_t = \frac{\Delta(share\ of\ associates\ from\ CMAA)_t + \Delta(CMAA\ carrying)_t}{\Delta(sugar - attributable\ COGS)_t} \quad (1)$$

All terms are in a common currency. The numerator is observable (equity-method P&L plus change in carrying, which already nets dividends); the denominator requires a modeled sugar COGS shock, which is not publicly available. Rather than impose strong pass-through assumptions, the construction is presented theoretically. The directional protection aligns with the view that firms hedge to stabilize internal funds and avoid bad states, not to engineer perfect offsets (Froot, Scharfstein, & Stein, 1993; Stulz, 1996). The 2023 spike shows a clear step-up in the carrying amount, with a retracement in 2024 as prices eased, which highlights a directional cushion that is strongest in stress and moderates in normalization.

RESULTS

CMAA's dividend payments and equity-method carrying value co-moves with international sugar prices, with a marked step-up in 2023 and retrace in 2024, while day-to-day procurement remains unconstrained - evidence that minority stakes can hedge commodity shocks without forcing internal offtake. Two frictions matter: (i) FX translation (IDR/BRL) amplifies or dampens the reported asset; (ii) accounting noise (hedge accounting, biological-asset fair value, other OCI) obscures high-frequency tracking. Accordingly, UEH should be read as a directional hedge: it smooths exposure across the cycle rather than delivering one-for-one offsets each period.

Table 1: International Sugar Price and Indofood's Upstream Equity Hedge Value

Sugar is ICE #11 (US$ cents/lb, annual average). CMAA carrying amount is IDR millions under the equity method (Indofood consolidated statements; year-end closing balances). CMAA financials follow a Apr–Mar fiscal cycle, while Indofood reports Jan–Dec; to align currencies, all FX translations use calendar-year average rates (R$/US$). "Indofood Dividends Share (US$ mm)" is Indofood's proportionate share of CMAA profit. "Dividends Declared (R$ mm)" are CMAA gross dividends from CMAA's financial statements; Indofood's dividend share is estimated as (CMAA dividends × Indofood Share %) and converted to USD using the BRL/USD calendar-year average. Carrying amounts already net out dividends and include OCI and translation effects; read movements as directional, not one-for-one with sugar prices.

Year	Sugar Price (US$ cents/lb)	CMAA Net Profit (R$ mm)	CMAA Dividends Declared (R$ mm)	Indofood Share (%)	Indofood Dividends Share (US$ mm)	CMAA Carrying (IDR mm)
2013	17,34	9	0	50,0%	0	na
2014	16,21	6	0	50,0%	0	na
2015	13,04	-87	0	50,0%	0	na
2016	18,28	-9	0	50,0%	0	na
2017	15,74	90	0	50,0%	0	na
2018	12,07	19	8	35,0%	1	na
2019	12,37	58	57	36,2%	4	na
2020	12,94	176	103	36,2%	7	587,432
2021	17,90	195	60	36,2%	4	286,600
2022	18,73	79	115	36,2%	8	774,802
2023	24,18	104	60	36,2%	4	992,355
2024	20,83	34	80	36,2%	5	886,916

Indofood–CMAA data support the pattern and clarify the frictions. Across 2020–2024, sugar price and CMAA's carrying value co-move positively in levels (with a strong step-up in 2023 and a retrace in 2024). CMAA's own financials show profit rising in high-price regimes and healthy dividend distributions; Indofood's equity-method line picks up its proportional share, while the carrying amount reflects the cumulative result net of dividends. Two frictions matter: (a) FX translation - the IDR/BRL FX rate amplifies or dampens the reported carrying value; and (b) accounting noise - hedge accounting, biological-asset fair value, and other OCI can mask operating co-movement at high frequency. This is why UEH is framed as a directional hedge: it smooths the firm's economic exposure across the cycle, but it is not one-for-one in every reporting period.

The hypothesis yields testable, with an event-year validation: in sugar up-swings (e.g., 2023), we should observe higher CMAA profit, higher Indofood share of results, and a step-up in the carrying amount

(subject to dividends/FX), with the inverse in down-swings (2024). Because UEH does not force internal offtake, Indofood can still optimize procurement across suppliers and grades; the hedge operates in the background through equity-method economics. UEH turns minority upstream ownership into a structural, balance-sheet-visible buffer against commodity shocks, complementary to - not a substitute for - operational and financial hedging.

Some caveats are necessary. First, FX matters: the exchange rate can alter the recognized hedge. Second, the balance-sheet lens should be paired with the P&L lens - "share of results of associates" - and, ideally, a modeled sugar-driven COGS to compute the Offset Ratio. Third, 2020–2021 behavior reflects non-sugar factors (translation, remeasurement, mix), reminding us that UEH is partial and state-contingent, not a perfect hedge. With those qualifications, the 2023–2024 pattern supports the core claim: Indofood's stake in CMAA behaves like an Upstream Equity Hedge, appreciating in high-price regimes and easing as prices normalize, precisely the balance-sheet smoothing you want in a multipolar, loosely coupled design.

DISCUSSION

The historical evidence is consistent with the idea that a minority upstream stake can act as an operational hedge. The carrying amount for CMAA rises into the 2023 sugar spike and gives back part of that gain in 2024; dividends add cash relief when prices are high. This fits the risk-management view that firms hedge to stabilize internal funds and investment capacity rather than to chase perfect price offsets (Froot, Scharfstein, & Stein, 1993; Stulz, 1996). The hedge is directional, not mechanical, because the balance is in local currency (IDR) and reflects dividends, other comprehensive income, and currency translation (IAS 28/21).

Organizationally, the Indonesia–Brazil link behaves as a loosely coupled system: economically connected but commercially separable. That structure limits shock transmission through physical flows while still passing useful co-movement through ownership returns (Weick, 1976). The design is also modular: Brazil specializes in low-cost cane and milling, while Indonesia keeps procurement flexible. Modularity preserves option value under uncertainty and supports reconfiguration when freight, policies, or prices change (Baldwin & Clark, 2000).

On the integration choice, the results line up with classic transaction-cost and real-options arguments. Full vertical integration can insure supply but reduces flexibility and raises coordination costs (Williamson, 1985). A minority stake captures many integration benefits—learning, process discipline, and the option to scale—without locking the buyer into fixed internal offtake (Kogut & Kulatilaka, 1994). Our case shows those benefits in practice: knowledge transfer and capacity expansion options co-exist with market-based sourcing.

Because accounting and FX can mask the hedge in some years, evaluation should use both P&L and balance-sheet lenses. A simple offset ratio - the change in "share of results of associates" plus the change in carrying amount, divided by a modeled sugar-driven change in COGS - keeps the test tied to operating exposure, as suggested by risk-management work that links hedging to cash-flow sensitivity and investment needs (Froot et al., 1993). This metric will be strongest in price upswings and weaker when normalization, heavy dividends, or adverse FX dominate reported movements.

The equity strategy complements financial derivatives. Commodity futures and options can certainly introduce more direct cash flow and fair value hedges, specially as far as short-term price shocks are concerned. UEH and financial derivatives are not mutually exclusive: managers should assess effectiveness over multi-year windows, monitor both the associate P&L and carrying amounts, and combine equity participation with market derivatives to handle multi-horizon gaps.

The setting functions as a demanding critical case: high volatility, long distance, multiple institutions, and translation effects. If loose coupling delivers cushioning here, theory suggests it should work in milder contexts as well (Flyvbjerg, 2006). Taken together, the evidence and design choices support a practical message: build a cost-leading upstream pole, keep cross-pole links loose, and measure the hedge explicitly, so the upstream equity stake complements operational and financial hedges without sacrificing flexibility.

While evidence rests on a single critical case, the UEH design is portable to other commodity poles when four conditions hold: (i) the input has a transparent, liquid benchmark (e.g., ICE cocoa futures, CBOT wheat futures, NYMEX crude oil futures) to anchor price shocks; (ii) there exists an investable upstream asset with minority-friendly governance and dividend visibility; (iii) downstream procurement can remain market-based (no captive offtake), preserving price discovery; and (iv) FX/dividend repatriation frictions are manageable. Under these conditions, a UEH should transmit partial upside during price spikes to the downstream P&L, analogous to our setting. For example, a food manufacturer exposed to cocoa could acquire a small stake in a West African grinder/processor; in tight markets, higher cocoa margins would lift associate earnings and carrying amounts, cushioning chocolate COGS without locking volumes. Boundary conditions include shallow or state-managed upstream markets, unstable dividend regimes, or strong basis risk between the firm's input grade and the traded benchmark, which can weaken the hedge's effectiveness. This portability logic invites comparative tests across other commodity markets, and a head-to-head evaluation versus alternatives such as long-dated supply/tolling or majority vertical integration.

MANAGERIAL IMPLICATIONS

For firms exposed to volatile input prices, a minority upstream equity hedge offers a scalable design that transmits part of upstream margin spikes to consolidated accounts while preserving procurement discipline. Because the stake is non-controlling and does not mandate volumes, managers retain competitive sourcing and price discovery ("loose coupling"), yet still benefit from upside in tight markets through the associate's earnings and carrying-amount dynamics. This configuration is attractive when long-dated supply contracts are unavailable or carry counterparty risk, and when operational integration would erode optionality or require excess capital.

Effective implementation requires measurement and integration. Managers could monitor the proposed Offset Ratio and track hedge effectiveness through time, controlling for FX translation and one-off remeasurements. Strategically, the UEH should be combined with derivatives (e.g., futures/options) that address short-horizon inventory and timing gaps, while the equity stake provides multi-year cushioning against structural price cycles. The layered approach enhances resilience with capital efficiency while maintaining supplier optionality and governance flexibility.

Accordingly, evaluation should rely on rolling-window analyses and banded targets for the Offset Ratio (e.g., "0.2–0.6 in spike years"), rather than point estimates for a single period. Managers could report a reconciliation that separates (i) associate P&L, (ii) changes in carrying amount, and (iii) OCI components, alongside FX- and dividend-policy sensitivities, to distinguish economic cushioning from accounting translation. In practice, governance triggers (e.g., payout floors) and a derivatives overlay can be used to keep the realized offset within the desired band, preserving the UEH's role as a multi-year stabilizer while maintaining procurement optionality.

LIMITATIONS AND FUTURE RESEARCH

This study is a single embedded case centered on Indofood's minority stake in CMAA, which constrains external validity, although it can be generalized with the conditions discussed above. Measurement relies on financial-statement aggregates: the numerator of the Offset Ratio combines

associate P&L and changes in the carrying amount (equity method; IAS 28), while the denominator is a modeled sugar-attributable COGS shock. As such, translation effects under IAS 21, OCI movements (e.g., hedge reserves, biological-asset remeasurement), dividend policy, and timing mismatches between fiscal calendars can all influence observed co-movement.
Additionally, basis risk between the traded ICE #11 benchmark and the firm's effective input basket, as well as potential non-sugar drivers (mix, operating changes), may attenuate or amplify the apparent hedge. The design therefore supports a directional, not one-for-one, interpretation of cushioning.

For future research, comparative studies across commodities (e.g., cocoa, palm oil, wheat) and governance settings could test portability conditions, especially when using multi-firm panels and event-year identification. Methodologically, extensions could (i) decompose the Offset Ratio into associate-earnings, carrying-amount, and OCI components; (ii) incorporate rolling-window targets with explicit FX and payout sensitivities; (iii) benchmark UEH against alternatives (long-dated supply/tolling contracts, majority integration, pure derivatives) under matched exposure; and (iv) quantify basis risk and inventory timing with high-frequency data. Structural or quasi-experimental designs (e.g., policy shocks, exchange-listing changes) can sharpen inference, while simulations linking dividend policies and currency hedging to offset stability would inform capital-allocation and risk-management playbooks.

CONCLUSION

This study shows that a minority upstream stake, structured through loose coupling, can operate as a directional hedge against commodity price shocks. In the Indofood–CMAA case, the associate's carrying amount increases meaningfully during the 2023 price surge and eases in 2024, while dividends provide a cash channel. The mechanism delivers cushioning without forcing internal offtake, allowing the downstream business to keep procurement market-based. Read through the lens of risk management, UEH stabilizes the firm's internal funds when shocks would otherwise pressure margins and investment; read through the lens of organization, it transfers useful covariance through ownership returns while containing shock transmission in physical flows.

The paper's main contribution is to connect risk-management and organization design. UEH is formalized and articulated through an offset ratio that pairs P&L and balance-sheet channels to evaluate hedge strength. Boundary conditions are also highlighted: reported movements are state-contingent because FX translation, payout policy, and OCI affect annual visibility. The implication is practical, as managers should assess effectiveness over multi-year windows, monitor both the associate P&L and carrying amounts, and use market derivatives to handle short-horizon gaps.

In the case study, sugar-attributable COGS are not available, so the offset ratio is presented as a concept rather than a computed series, which creates a limitation and unravels a research agenda. Fiscal-year misalignment and translation effects further complicate period-by-period inference. Future work should (i) obtain or model sugar COGS to operationalize the Offset Ratio, (ii) replicate across other commodities and geographies to test external validity, and (iii) compare UEH to alternative designs (supply agreements, tolling, majority integration) under different FX and payout regimes.

In short, the evidence supports a portable playbook: build a cost-leading upstream pole, keep cross-pole links loose, and measure hedge strength with a transparent, auditable metric. Done this way, an upstream equity stake becomes a structural complement to operational and financial hedging—protecting the downside while preserving flexibility.

List of Abbreviations

- UEH - Upstream Equity Hedge: minority upstream equity stake used to cushion input-price shocks while preserving market-based procurement.
- OCI - Other Comprehensive Income: items recognized in equity (AOCI) that bypass profit or loss (e.g., hedge reserves, translation differences).
- COGS - Cost of Goods Sold: direct costs attributable to goods sold by the firm.
- FX - Foreign Exchange: currency translation effects (e.g., BRL/IDR).
- IAS 21 - The Effects of Changes in Foreign Exchange Rates: standard governing translation/remeasurement of foreign-currency items.
- IAS 28 - Investments in Associates and Joint Ventures: equity-method accounting for associates.
- ICE #11 - Intercontinental Exchange No. 11 Raw Sugar Futures (US$ cents/lb), the global benchmark for raw sugar.

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CELEBRITY ENDORSEMENT, CONSUMER ATTITUDES, AND PURCHASE INTENTIONS FOR GREEN PRODUCTS

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Received September 17th, 2025; Revised October 4th, 2025; Accepted October 29th, 2025

ABSTRACT

Celebrity endorsements can positively influence consumer attitudes and purchase intentions. However, the extent to which this effect applies to green products has not been widely explored in Vietnam. Therefore, this study aims to examine the impact of celebrity endorsers on consumers' attitudes and purchase intentions for green products. Data were collected through an online survey using convenience sampling and analyzed with Smart PLS. Results indicate that the attractiveness of celebrity endorsements positively affects consumers' attitudes toward advertisements. Meanwhile, the celebrity-brand fit of celebrity endorsements positively impacts both consumers' attitudes toward advertisements and their attitudes toward green brands. In turn, consumers' attitudes toward advertisements and attitudes toward green brands positively influence green purchase intentions. Furthermore, both attitudes toward advertisements and green brand attitudes serve as key mediating variables. The study also finds that trustworthiness and expertise do not affect attitudes or purchase intentions for green products. These findings provide important theoretical and practical implications within the context of celebrity endorsements for green products.

Keywords: Endorsement, celebrity, credibility, intention, green products.

JEL: M10, M12

INTRODUCTION

Promoting green consumption not only provides consumers with an opportunity to address the severe crises caused by global climate change (Suki & Suki, 2019) but also helps raise awareness of the importance of environmental protection (Zhang et al., 2018). When consumers have a heightened awareness of environmental issues, their consumption behaviors are likely to change accordingly. Therefore, companies can influence consumers through advertising that emphasizes sustainable consumption (Kumar & Tripathi, 2022). The use of celebrity endorsements is one way to influence consumer attitudes and purchase intentions. In fact, many companies employ celebrities to endorse their products and persuade consumers to make purchases.

While the effectiveness of celebrity endorsers has been examined by numerous researchers, the findings remain inconsistent and inconclusive (Amos et al., 2008; Bergkvist & Zhou, 2016; Erdogan, 1999; Schimmelpfennig & Hunt, 2020). Thus, further research is needed on this topic to enrich the theoretical

framework of celebrity endorsement, especially in the green product sector. Using celebrities who support environmental causes to endorse green products is believed to be more effective in generating positive brand attitudes and, subsequently, green purchase intentions (Blasche & Ketelaar, 2015; Kumar & Tripathi, 2022; Lili et al., 2022). Scholars also suggest that endorser trustworthiness, expertise, and attractiveness are critical factors influencing consumer attitudes toward advertisements and green purchase intentions (Al Mamun et al., 2023; Eren-Erdogmus et al., 2016; Kumar & Tripathi, 2022; Zhang et al., 2019). Consumer responses to celebrity-endorsed advertisements may differ between Western and Eastern cultures (Liu & Liu, 2019). Therefore, the optimal use of celebrity endorsers for maximum effectiveness remains an open question. As Vrontis et al. (2021) propose, further studies are needed across various product types and diverse geographical contexts to gain a more comprehensive understanding. Overall, celebrity endorsement of green products remains underexplored, particularly in the context of Vietnam.

Although celebrity endorsements have been examined in numerous studies, most research still relies on source credibility and attractiveness theories. Schimmelpfennig and Hunt (2020) argue that relying solely on a single theory for explanation is insufficient. Thus, combining multiple theories simultaneously is a reasonable strategy to provide a more comprehensive understanding of celebrity endorsements. Moreover, the effects of key variables in the source model related to celebrity endorsers remain inconsistent. Additionally, examining the impact of individual components separately can yield deeper insights than viewing them as a single construct (Zhang et al., 2019). Therefore, this study employs an integrated approach, utilizing source credibility theory, the match-up hypothesis, and the stimuli-organism-response (S-O-R) framework to assess the individual components of the source model on consumer attitudes and purchase intentions in the green product sector.

The results of this study contribute both theoretically and practically to the field of celebrity endorsements. The research provides a deeper understanding of the relationships between elements within the source model and advertising-related attitudes, green brand attitudes, and subsequently, green purchase intentions—relationships that have been less explored in the context of green consumption, particularly in Vietnam. Furthermore, the study offers important implications for managers regarding the use of celebrity endorsers in promoting their companies' green products. To achieve these objectives, the study is structured into five sections: the first section is the introduction, followed by a literature review in section two, research methodology in section three, research findings in section four, and finally, implications and directions for future research in section five.

LITERATURE REVIEW

Theoretical background

Various theories explain the effectiveness of celebrity endorsers in advertising, such as the source credibility, source attractiveness, and match-up hypothesis (La Ferle & Choi, 2005; Lafferty, 2002). The source credibility model emphasizes that a message's persuasiveness depends on the endorser's credibility, comprising trustworthiness and expertise, which positively influence consumer attitudes (Joseph, 1982; Kahle & Homer, 1985; Kapitan & Silvera, 2016; Schimmelpfennig & Hunt, 2020). The source attractiveness model suggests that an endorser's appeal, including personality and lifestyle, can enhance brand recall and alter consumer attitudes (Erdogan, 1999; Schimmelpfennig & Hunt, 2020; Till & Busler, 2000; Tingchi Liu et al., 2007).

However, these models sometimes fail, as even credible and attractive endorsers may not guarantee success. The match-up hypothesis addresses this by highlighting compatibility between the endorser and the brand (Chang & Ko, 2016; Kamins, 1990; Misra & Beatty, 1990). Additionally, the stimuli-organism-response (S–O-R) theory offers insights, viewing celebrity credibility as a stimulus affecting consumer

attitudes (organism) and driving behavioral responses like green purchase intentions (Al Mamun et al., 2023; Burnasheva & Suh, 2022). This theory connects environmental stimuli, cognitive responses, and consumer actions (Jacoby, 2002; Mehrabian & Russell, 1975).

Hypothesis development

Although numerous studies have examined celebrity endorsement in relation to consumer attitudes and purchase intentions, the meta-analytic findings of Vrontis et al. (2021) emphasized that caution should be exercised when generalizing results across different product categories or contexts. Therefore, it is necessary to continue investigating this topic in various contexts and across different types of products (Vrontis et al., 2021; Trivedi & Sama, 2020).

Accordingly, the present study focuses on green products to gain deeper insights and to explore potential differences compared to other product types, as suggested by Vrontis et al. (2021). In the context of green products, the fit between celebrity endorsers and the brand is an essential factor to examine in relation to consumer attitudes. For instance, Choi and Rifon (2012) as well as Tingchi Liu et al. (2007) argued that even low physical attractiveness can still enhance purchase intention when there is a high level of congruence.

Nevertheless, the relationship between celebrity–brand fit and consumer attitudes has not been extensively explored in previous studies, particularly within the Vietnamese context. Moreover, Vrontis et al. (2021) also noted that different contexts may yield varying results, and therefore recommended conducting further research in diverse settings—especially in emerging economies such as Vietnam.

Celebrity Trustworthiness

The credibility of celebrity endorsers stems from their honesty, ethics, and consumer trust (Hoegele et al., 2015; Lili et al., 2022). Trustworthiness, encompassing integrity, honesty, and reliability, enhances their persuasive impact and product trust (Al Mamun et al., 2023; Kumar & Tripathi, 2022). Lili et al. (2022) note that high trustworthiness boosts advertising effectiveness. Research confirms its role in shaping attitudes toward advertising (Punjani & Kumar, 2021) and brands (Cespedes-Dominguez, 2021; Tantawi & Sadek, 2019). Therefore, trustworthiness likely improves attitudes toward advertising and green brands. Kumar and Tripathi (2022) proposed examining the relationship between the trustworthiness of celebrity endorsers and attitudes toward green brands. Similarly, Al Mamun et al. (2023) later investigated this relationship to provide further empirical evidence. The findings of Lili et al. (2022) also confirmed that the trustworthiness of celebrity endorsers positively influences attitudes toward green cosmetics. Therefore, the following hypotheses are proposed:

Hypothesis H1a: The trustworthiness of celebrity endorsers positively affects attitudes toward advertising.
Hypothesis H1b: The trustworthiness of celebrity endorsers positively affects attitudes toward green brands.

Celebrity Expertise

Expertise reflects a celebrity's knowledge, skills, and competencies about the endorsed product (Al Mamun et al., 2023; Amos et al., 2008). It is a key factor in source credibility models, with highly credible celebrities being more persuasive (Belch & Belch, 2018). Endorsers with relevant expertise are deemed more convincing and effective, promoting positive consumer attitudes (Lee & Thorson, 2008; Winterich et al., 2018). Expertise positively influences attitudes toward both the brand (Eisend & Langner, 2010) and

advertising (Al Mamun et al., 2023). The findings of Al Mamun et al. (2023) and Lili et al. (2022) both revealed a positive relationship between the expertise of celebrity endorsers and attitudes toward green brands. Based on this reasoning, the following hypotheses are proposed:

Hypothesis H2a: The expertise of celebrity endorsers positively influences consumer attitudes toward advertising.
Hypothesis H2b: The expertise of celebrity endorsers positively influences consumer attitudes toward green brands.

Celebrity Attractiveness

Attractiveness significantly enhances celebrity endorsement effectiveness (Till & Busler, 2000; Wang & Scheinbaum, 2018). Celebrities appeal to consumers through elegance, intelligence, and physical attractiveness, fostering likability (Hoegele et al., 2015; Spry et al., 2011). Attractive endorsers increase product recognition and effectiveness (Carrillat & Ilicic, 2019; De Mooij, 2019), influencing consumer approval and positive attitudes (Arora et al., 2019). However, relevance to the product is crucial (Dean & Biswas, 2001). Attractiveness positively affects consumer attitudes toward advertising, green products, and sales (Lili et al., 2022; Roll, 2015; Tantawi & Sadek, 2019). The findings of Kumar and Tripathi (2022), Lili et al. (2022) both revealed a positive relationship between the expertise of celebrity endorsers and attitudes toward green brands. Based on this reasoning, the study proposes the following hypotheses:

Hypothesis H3a: The attractiveness of celebrity endorsers positively influences attitudes toward advertising.
Hypothesis H3b: The attractiveness of celebrity endorsers positively influences attitudes toward green brands.

Celebrity - Brand Fit

The compatibility between a celebrity and the cause they represent is crucial for endorsement effectiveness. Alignment between the celebrity, product, and brand enhances consumer purchasing behavior (Yoo et al., 2018). A strong fit improves advertisement persuasiveness and communication effectiveness (Kim & Na, 2007) while ensuring the brand reflects the celebrity's image (Knoll & Matthes, 2017). Studies show that even low attractiveness can boost purchase intention if compatibility exists (Choi & Rifon, 2012; Tingchi Liu et al., 2007). Compatibility significantly influences consumer attitudes toward advertisements and brands (Ilicic & Baxter, 2014; Lili et al., 2022; Thamaraiselvan et al., 2017). The findings of Lili et al. (2022) also confirmed that the celebrity–brand fit of endorsers positively influences attitudes toward green cosmetics. Similarly, the findings of Blasche and Ketelaar (2015) indicated that the celebrity–brand fit of endorsers positively influences attitudes toward green brands. Therefore, the following hypotheses are proposed:

Hypothesis H4a: The celebrity-brand fit positively influences attitudes toward advertising.
Hypothesis H4b: The celebrity-brand fit positively influences attitudes toward green brands.

Advertisement Attitude, Brand Attitude and Purchase Intention

The S-O-R framework and Theory of Reasoned Action (TRA) explain the attitude-behavior link, often used to study purchase intentions, including green products (Isa et al., 2017). Purchase intention reflects consumer preferences and capabilities (Wang et al., 2017), with attitudes being the strongest predictor of purchase decisions. Positive attitudes toward environmental issues increase green product purchases (Kumar & Tripathi, 2022), especially when brand image aligns with social responsibility.

Effective green advertising enhances attitudes toward green brands (Kumar & Tripathi, 2022). Lili et al. (2022) show that attitudes toward green products and advertising significantly influence purchase intentions. Based on these findings, the following hypotheses are proposed:

Hypothesis H5: Consumers' attitudes toward advertising positively influence their attitudes toward green brands.
Hypothesis H6: Consumers' attitudes toward advertising positively influence their intentions to purchase green products.
Hypothesis H7: Consumers' attitudes toward green brands positively influence their intentions to purchase green products.

The research model is constructed as shown in Figure 1.

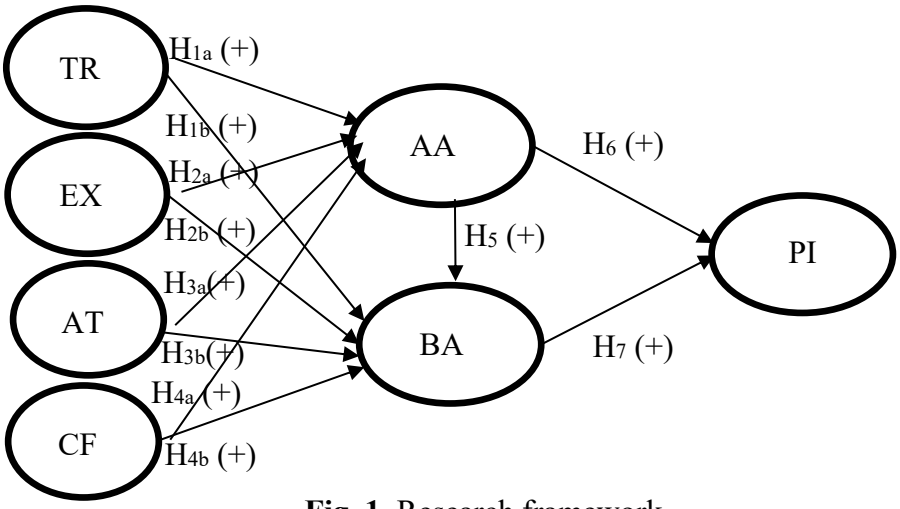

Fig. 1. Research framework

METHODOLOGY

Sample and data collection

The research sample was collected through an online survey using a convenience sampling method targeting consumers in Vietnam. All participants in the survey had previously purchased green products through celebrity endorsements. The study collected a total of 350 survey responses, of which incomplete responses were excluded, resulting in 315 valid surveys used for the formal research. The characteristics of the research sample are detailed in Table 1. Specifically, the sample included 207 female consumers, accounting for 65.7%, and 108 male consumers, accounting for 34.3%. The majority of consumers were aged between 27 and 45, representing 42.2%. Consumers over 45 years old comprised 30.2%, while those under 27 years accounted for 27.6%. Regarding the educational distribution of the sample, the majority held a university degree, making up 59.6%. Those with a postgraduate degree constituted 15.6%, and those with a college or intermediary school degree accounted for 24.8%.

Table 1. Demographic characteristics

Item		%
Gender	Male	34.3
	Female	65.7
Age Group	< 27 years old	27.6
	27-45 years old	42.2
	> 45 years old	30.2
Education	College-intermediary school	24.8
	Bachelor Degree	59.6
	Master Degree	15.6

Instrument

The study includes 7 constructs with a total of 33 items. The items in the measurement scale are derived from previous research. Specifically, the "Trustworthiness" scale comprises 5 observed variables, the "Expertise" scale consists of 5 observed variables, the "Attractiveness" scale includes 5 observed variables, the "Cause Fit" scale contains 5 observed variables, the "Attitudes toward Advertising" scale encompasses 5 observed variables, the "Attitude toward green Brand" scale has 5 observed variables, and the "Purchase Intention" scale comprises 3 observed variables, all sourced from earlier studies such as Cuomo et al. (2019), Kang & Choi (2016), Ohanian (1990) and Tantawi & Sadek (2019). The study employs a 5-point Likert scale ranging from 1, indicating "strongly disagree," to 5, indicating "strongly agree." The survey items originated in English; therefore, these items were translated and refined by experts in the field of marketing to ensure clarity and coherence before being included in the official questionnaire.

Table 2. Reliability and validity

Construct	Code	Outer loadings	Mean	CA	CR	AVE	VIF
Trustworthiness (TR)	TR1	0.817	2.925	0.913	0.935	0.741	2.167
	TR2	0.866					
	TR3	0.866					
	TR4	0.844					
	TR5	0.910					
Expertise (EX)	EX1	0.788	2.902	0.892	0.920	0.697	1.825
	EX2	0.841					
	EX3	0.854					
	EX4	0.848					
	EX5	0.842					
Attractiveness (AT)	AT1	0.817	3.311	0.900	0.926	0.714	2.021
	AT2	0.856					
	AT3	0.882					
	AT4	0.864					
	AT5	0.803					
Celebrity-Brand Fit (CF)	CF1	0.708	3.469	0.829	0.879	0.592	1.849
	CF2	0.805					
	CF3	0.762					

	CF4	0.787					
	CF5	0.781					
Attitudes toward Advertising (AA)	AA1	0.823	3.722	0.901	0.927	0.718	1.720
	AA2	0.832					
	AA3	0.864					
	AA4	0.870					
	AA5	0.844					
Attitude toward green Brand (BA)	BA1	0.777	3.770	0.861	0.900	0.644	1.720
	BA2	0.833					
	BA3	0.867					
	BA4	0.748					
	BA5	0.781					
Purchase Intention (PI)	PI1	0.933	3.889	0.917	0.948	0.858	-
	PI2	0.927					
	PI3	0.918					

Source: Author's data analysis.

Tables 2 and 3 illustrate that the indices for analyzing the measurement model meet the required standards. According to Hair et al. (2014), the adequacy of the measurement model is assessed through indices such as Cronbach's alpha, composite reliability (CR), outer loading of the factors, average variance extracted (AVE), the HTMT value, and the Fornell-Larcker Criterion. To evaluate reliability, both Cronbach's alpha and composite reliability (CR) are utilized. The results indicate that the Cronbach's alpha coefficients are greater than 0.8 (ranging from 0.829 to 0.917), and the composite reliability for all measurement scales exceeds 0.8 (ranging from 0.879 to 0.948), surpassing the acceptable threshold of 0.7, thus indicating that the data is reliable.

Table 3. Discriminant validity

	AA	AT	BA	CF	EX	PI	TR
Heterotrait-monotrait ratio (HTMT)							
AA							
AT	0.468						
BA	0.736	0.430					
CF	0.572	0.700	0.543				
EX	0.297	0.572	0.194	0.449			
PI	0.583	0.260	0.683	0.382	0.126		
TR	0.380	0.656	0.277	0.572	0.721	0.218	
Fornell-Larcker Criterion							
AA	**0.847**						
AT	0.424	**0.845**					
BA	0.647	0.377	**0.802**				
CF	0.503	0.602	0.469	**0.769**			
EX	0.272	0.517	0.166	0.390	**0.835**		
PI	0.532	0.238	0.610	0.341	0.117	**0.926**	
TR	0.347	0.597	0.247	0.505	0.653	0.204	**0.861**

Source: Author's data analysis.

Regarding construct validity, this is demonstrated through convergent validity and discriminant validity. To assess convergent validity, the AVE criterion is employed, with results showing that all AVE values for the constructs are above the minimum threshold of 0.5 (ranging from 0.592 to 0.858), indicating that the constructs achieve convergent validity. Additionally, the results show that all HTMT indices are less than the threshold of 0.85, and the diagonal values of the Fornell-Larcker Criterion are greater than the correlation coefficients between the constructs in the research model. Therefore, the constructs achieve discriminant validity.

RESULTS

The study employed the Bootstrapping method with 5,000 iterations to test the research hypotheses. The path model reveals that out of the 11 proposed hypotheses, 5 were rejected and 6 were accepted. The accepted hypotheses include:

Five hypotheses were rejected, including H1a ($\beta = 0.060$; $p = 0.433$), H1b ($\beta = -0.048$; $p = 0.543$), H2a ($\beta = 0.003$; $p = 0.958$), H2b ($\beta = -0.076$; $p = 0.290$), and H3b ($\beta = 0.101$; $p = 0.177$). This suggests that the trustworthiness and expertise of the endorser do not have a direct impact on either attitudes toward advertising or attitudes toward green brands. Additionally, the attractiveness of the endorser does not directly influence attitudes toward green brands. Table 4 presents detailed information on the direct effects.

Table 4. Path analysis

Path	Original sample (O)	Sample mean (M)	P-values	Decision
TR -> AA	0.060	0.062	**0.433**	**Rejected (H1a)**
TR -> BA	-0.048	-0.049	**0.543**	**Rejected (H1b)**
EX -> AA	0.003	0.006	**0.958**	**Rejected (H2a)**
EX -> BA	-0.076	-0.074	**0.290**	**Rejected (H2b)**
AT -> AA	0.160	0.157	0.028	Accepted (H3a)
AT -> BA	0.101	0.102	**0.177**	**Rejected (H3b)**
CF -> AA	0.376	0.380	0.000	Accepted (H4a)
CF -> BA	0.186	0.191	0.010	Accepted (H4b)
AA -> BA	0.548	0.544	0.000	Accepted (H5)
AA -> PI	0.236	0.235	0.001	Accepted (H6)
BA -> PI	0.457	0.458	0.000	Accepted (H7)

Source: Author's data analysis.

Hypothesis H3a ($\beta = 0.160$; $p = 0.028$) was accepted, indicating that the attractiveness of the endorser has a positive direct effect on attitudes toward advertising. Hypothesis H4a ($\beta = 0.376$; $p = 0.000$) was accepted, demonstrating that the celebrity-brand fit of the endorser positively influences attitudes toward advertising. Similarly, Hypothesis H4b ($\beta = 0.186$; $p = 0.010$) was accepted, meaning that the celebrity-brand fit of the endorser positively affects attitudes toward green brands.

Hypothesis H5 ($\beta = 0.548$; $p = 0.000$) was accepted, reflecting the positive direct impact of attitudes toward advertising on attitudes toward green brands. Hypotheses H6 ($\beta = 0.236$; $p = 0.001$) and H7 ($\beta = 0.457$; $p = 0.000$) were both accepted, indicating that both attitudes toward advertising and attitudes toward green brands positively influence consumers' purchase intentions for green products.

The study conducted an analysis of the indirect effects among the constructs, and the results are detailed in Table 5. A total of 8 indirect relationships were accepted. Specifically:

Regarding attitudes toward advertising: The analysis results indicate that attitudes toward advertising not only has a direct effect on purchase intention but also has an indirect effect on PI through the mediation of attitude toward green brand (β = 0.250; p = 0.000).

Regarding Attractiveness: Attractiveness does not have a direct effect on BA but does have an indirect effect on BA through the mediation of AA (β = 0.088; p = 0.032). Additionally, AT indirectly influences PI through the mediators AA and BA. However, AT does not impact PI through the individual mediation of AA or BA alone.

Regarding Celebrity-Brand Fit: Celebrity-Brand Fit not only directly affects BA but also has an indirect effect on BA through the mediation of AA (β = 0.206; p = 0.000). Furthermore, CF indirectly influences PI through the mediators AA (β = 0.089; p = 0.002) and BA (β = 0.085; p = 0.020). Additionally, CF has an indirect effect on PI through the mediation of both AA and BA.

Regarding trustworthiness and expertise: The path analysis results indicate that both trustworthiness and expertise do not affect AA, BA, and PI. In other words, neither trustworthiness nor expertise of the celebrity endorsers has a direct or indirect influence on consumers' attitudes toward green brands and their intention to purchase green products.

Table 5. Mediating effects

Path	Original sample (O)	Sample mean (M)	P values
AA -> BA -> PI	0.250	0.250	0.000
AT -> AA -> BA	0.088	0.085	0.032
AT -> BA -> PI	0.046	0.046	**0.181**
CF -> AA -> BA	0.206	0.207	0.000
AT -> AA -> PI	0.038	0.037	**0.075**
CF -> BA -> PI	0.085	0.088	0.020
EX -> AA -> BA	0.002	0.003	**0.959**
EX -> BA -> PI	-0.035	-0.035	**0.311**
CF -> AA -> PI	0.089	0.089	0.002
TR -> AA -> BA	0.033	0.034	**0.438**
EX -> AA -> PI	0.001	0.001	**0.960**
TR -> BA -> PI	-0.022	-0.022	**0.548**
TR -> AA -> PI	0.014	0.015	**0.474**
AT -> AA -> BA -> PI	0.040	0.039	0.039
CF -> AA -> BA -> PI	0.094	0.095	0.000
TR -> AA -> BA -> PI	0.015	0.016	**0.448**
EX -> AA -> BA -> PI	0.001	0.002	**0.959**

Source: Author's data analysis.

Figure 2 below presents the results of the path analysis model.

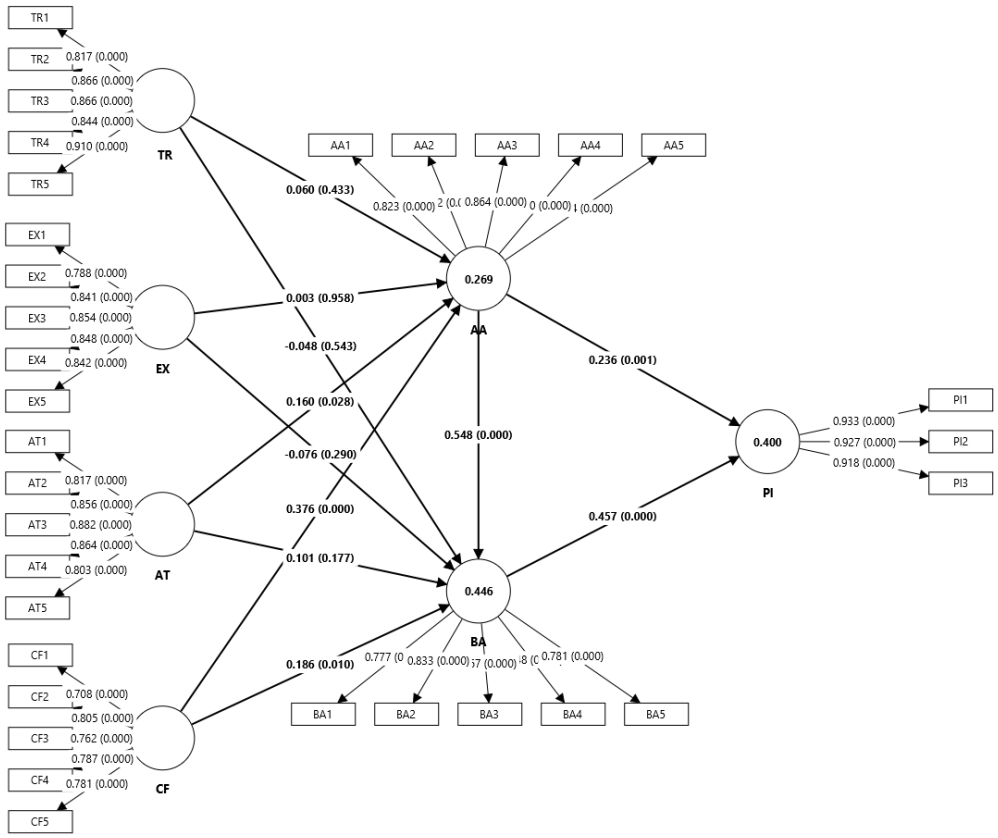

Fig. 2. Path analysis

DISCUSSION

Among the proposed hypotheses, the groups H1a, H1b, H2a, and H2b were not supported. Hypotheses H1a and H1b suggest a positive relationship between trustworthiness and attitude toward advertisement, as well as between TR and attitude toward green brand. Similarly, hypotheses H2a and H2b propose a positive relationship between EX and AA, and between EX and BA. The influence of TR and expertise on AA and BA lacks consistency across previous studies. For instance, some studies have found a positive influence between TR and AA (Al Mamun et al., 2023; Eren-Erdogmus et al., 2016; Schouten et al., 2020), as well as between TR and BA (Cespedes-Dominguez, 2021; Lili et al., 2022; Schouten et al., 2019; Wang et al., 2017). However, the relationship between TR and BA was not supported in some studies, such as Al Mamun et al. (2023) and Kumar and Tripathi (2022). In the context of green products, the research by Kumar and Tripathi (2022) indicates that the trustworthiness of celebrity endorsers does not influence attitudes toward green brands or the intention to purchase green products. The influence of EX on both AA and BA was also not supported. This result contrasts with some earlier studies that suggested the expertise of celebrity endorsers is a factor influencing attitudes toward advertising and brand attitudes (Al Mamun et al., 2023; Lili et al., 2022).

This study shows that consumers rate trustworthiness (2.925) and expertise (2.902) of celebrity endorsers relatively low in the context of green products. This suggests a lack of trust in celebrity endorsers and their expertise. Al Mamun et al. (2023) note that endorsers often promote multiple products, which may reduce trust. Schimmelpfennig and Hunt (2020) argue that consumers perceive endorsements as commercial rather than genuine. Similarly, Kumar and Tripathi (2022) state that the credibility of endorsers

does not influence attitudes toward green brands. Zhang et al. (2019) and Wang and Scheinbaum (2018) found that expertise does not affect brand attitudes or purchase intentions. The study indicates that for green products, trustworthiness and expertise have minimal impact on consumers' attitudes toward advertising or green brands in the Vietnamese market.

The study supports the positive relationship between attractiveness (AT) and attitude toward advertisement (AA) (H3a), aligning with previous studies. However, the relationship between attractiveness and attitude toward green brand (BA) (H3b) is not supported, contrasting with Lili et al. (2022), Tantawi and Sadek (2019), Wang and Scheinbaum (2018). AT influences BA indirectly through AA, consistent with Kumar and Tripathi (2022). This highlights that attitudes toward advertising can indirectly enhance attitudes toward green brands and increase the intention to purchase green products.

Source credibility includes trustworthiness, expertise, and attractiveness. While studies like Kumar and Tripathi (2022) treat it as a single construct, Zhang et al. (2019) suggest analyzing components individually for clearer insights. Schimmelpfennig and Hunt (2020) highlight that the specific effects of these components on attitudes remain unclear. This study shows that trustworthiness and expertise lack direct effects on attitudes toward advertising and green brands, but attractiveness positively impacts consumer attitudes toward advertising.

This study confirms CF as a significant factor influencing attitudes (H4a, H4b), aligning with Lili et al. (2022), who found CF to be the strongest factor affecting attitudes toward green brands. Schimmelpfennig and Hunt (2020) noted that fit, beyond credibility, is vital in shaping attitudes and purchase intentions. Fit generates favorable responses by aligning endorsers' images with consumer expectations. Thus, choosing endorsers with a strong fit to green brands or products enhances consumer attitudes and purchase intentions effectively.

Attitude strongly influences purchase intention, as confirmed by prior studies. Al Mamun et al. (2023) found a positive link between brand attitude and green product purchase intention, supported by Kumar and Tripathi (2022) and Lili et al. (2022). This study aligns, showing strong positive relationships between attitude toward advertisement (H6) and green brand (H7) with green product purchase intention. Moreover, attitude toward advertisement (H5) significantly impacts green brand attitude, which mediates the relationship between advertisement attitude and purchase intention.

CONCLUSION

This study aims to examine the influence of celebrity endorsement on consumers' attitudes and purchase intentions regarding green products, based on source credibility theory, the match-up hypothesis, and the S-O-R framework. Data were collected through an online survey using a convenience sampling method. The study analyzes the data using a structural equation modeling approach by evaluating the measurement model and structural model with Smart PLS software. The results indicate that out of 11 proposed hypotheses, 6 are supported and 5 are rejected. Specifically, hypotheses H3a, H4a, H4b, H5, H6, and H7 are supported, while hypotheses H1a, H1b, H2a, H2b, and H3b are rejected. These findings provide several important theoretical implications.

First, while celebrity endorsement has been extensively studied, the number of studies related to green products remains quite limited (Kang and Choi, 2016; Kumar and Tripathi, 2022), particularly in the context of Vietnam. Therefore, the results of this study contribute to the theory related to celebrity endorsement for a more comprehensive understanding. Second, this study employs a combination of different theories, including source credibility, the match-up hypothesis, and the S-O-R framework, to elucidate the relationships within the research model. Schimmelpfennig and Hunt (2020) assert that no

single theory can comprehensively explain celebrity endorsement. Thus, integrating various theories to clarify these relationships enhances our understanding of the issue. Third, the findings indicate that differentiating the individual components of source credibility theory (Trustworthiness, Expertise, Attractiveness) will allow for more accurate assessments of individual relationships rather than treating them as a second-order structure. This observation is also supported by Zhang et al. (2019). Fourth, attitude toward advertisement emerges as a significant mediating factor in the relationships between celebrity endorsement and green purchase intentions. This aligns with the S-O-R theoretical framework, where attitudes toward advertising serve as cognitive and emotional responses to stimulus components such as the endorser's attractiveness and fit, resulting in green purchase intentions as a form of feedback.

In addition to its theoretical contributions, this study also provides practical implications regarding the selection of celebrity endorsers related to green products. The research findings indicate that Vietnamese consumers evaluate the trustworthiness and expertise of endorsers in the field of green products relatively low, yet they place a greater emphasis on the attractiveness of the endorser. Notably, the fit between the endorser and the product emerges as a critical factor for consumers. Therefore, when an endorser possesses high levels of attractiveness and fit, it fosters more positive consumer attitudes toward the advertising and the green brand, ultimately leading to increased intentions to purchase green products. Thus, focusing on the aspects of attractiveness and fit between celebrity endorsers and green products becomes essential for companies that employ product endorsers.

Like other studies, this research has several limitations that need to be addressed. First, the study utilized a convenience sampling method for data collection, which may affect the reliability of the findings (Khojah, 2023). Second, this research focused specifically on the intention to purchase green products, so future studies could expand the scope to include additional purchase intentions, such as willingness to pay a premium price or actual consumer behavior, for a more comprehensive understanding. Finally, there may be mediating or moderating variables that warrant further exploration in the relationships between endorser factors and consumer attitudes as well as purchasing behavior.

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GENDER GAPS IN NEPALESE LABOR MIGRATION: A COUNTRY AND DISTRICT-LEVEL QUANTITATIVE ANALYSIS

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Received October 5th, 2025; Revised November 18th, 2025; Accepted November 25th, 2025

ABSTRACT

This study examines gender disparities in Nepal's labor migration using fiscal year 2080/81 (July 2023 – July 2024, GC) approval data. Women made up only 10.8% of total approvals, highlighting their underrepresentation. Men mostly migrate cyclically to GCC countries via re-entry permits, while women go through agencies to Kuwait, Jordan, and the UAE for domestic work. Chi-square tests reveal a significant link between gender and recruitment type, and spatial analysis shows female migration is concentrated in western Terai and Kathmandu. The study urges gender-responsive migration policies that address structural barriers and expand safe, equitable pathways for women.

Keywords: Gender disparity, migration, Nepal, recruitment, spatial analysis.

INTRODUCTION

Labor migration is a defining pillar of Nepal's economy and development trajectory. Each year, hundreds of thousands of Nepali citizens seek employment abroad, primarily in Gulf Cooperation Council (GCC) countries, Malaysia, and increasingly in East Asia. According to the World Bank (2023), remittances from Nepali workers abroad amounted to approximately US$11 billion, accounting for 26.6% of the country's Gross Domestic Product (GDP). This makes Nepal one of the world's most remittance-dependent economies and underscores the critical role of labor migration in sustaining national income – surpassing the combined total of official development assistance and foreign direct investment. This reliance highlights not only the economic significance of international labor migration but also the importance of understanding its composition, especially with regard to gender. Comparative evidence from other remittance-dependent economies, such as Kosovo, similarly shows that migrant worker remittances play a stronger role than foreign direct investment in sustaining exports and macroeconomic stability (Bellaqa et al., 2023).

While the scale of male labor migration from Nepal has long been documented, the role and participation of women in foreign employment have received growing attention in recent years. Globally, women make up around 41.5% of the migrant workforce (International Labour Organization, 2021), and although Nepal's proportion is considerably lower, there is increasing recognition of women's contributions to foreign employment. Administrative data from the Department of Foreign Employment (DoFE) show that women continue to receive labor permits, particularly for jobs in domestic work, caregiving, and

hospitality. However, female migrants remain significantly underrepresented, comprising only about 10.8% of all labor migration approvals in FY 2080/81 – a figure that reflects persistent structural barriers. Scholars have consistently noted that the migration experiences of Nepali women differ markedly from those of men, not only in terms of occupational sectors and destination countries, but also in the challenges posed by social stigma, regulatory constraints, and vulnerability to exploitation (Kharel, 2016; Sijapati et al., 2019).

Understanding these patterns requires not only descriptive statistics but also grounding in migration theory. The push-pull model (Lee, 1966) has traditionally explained migration as a function of factors that compel individuals to leave their home regions (e.g., poverty, lack of opportunities) and those that attract them to foreign labor markets (e.g., higher wages, demand for care work). However, this model often overlooks how gender operates as a structuring force in migration decisions and outcomes. Thus, this study also draws on gendered migration frameworks (Donato et al., 2006; Piper, 2013), which highlight how migration systems are shaped by societal norms, institutional constraints, and differential access to resources, all of which influence male and female migrants in distinct ways.

Despite recent progress in documenting women's participation in foreign employment, a major gap remains in the literature: the absence of robust, quantitative analyses of gender disparities in labor migration flows using disaggregated administrative data. Most existing studies rely on qualitative or ethnographic methods to explore women's migration experiences (Adhikary et al., 2020; Aryal et al., 2020). These contributions are valuable but often lack comprehensive, large-scale assessments of how gender differences manifest across regions and destination countries. Moreover, policy discussions on labor migration tend to focus on volume, remittances, or regulation, while overlooking spatial and gendered inequalities embedded in migration patterns (Zimmerman et al., 2011).

This study aims to address that gap by conducting a systematic, gender-disaggregated analysis of Nepalese labor migration approvals for fiscal year 2080/81 (corresponding to July 17, 2023, to July 15, 2024). Using official administrative data from the Government of Nepal's Ministry of Labour, Employment and Social Security, the study examines how gender shapes migration flows across both origin (district) and destination (country) contexts. Notably, the dataset used in this study includes all recruitment channels – such as recruiting agencies, individual-new, and re-entry approvals – providing a more comprehensive and representative picture than is commonly available. Specifically, the study is guided by four research questions: (1) What is the overall male-to-female ratio among labor migration approvals? (2) Which destination countries receive the highest proportion of female migrants? (3) How does the gender composition of approvals vary across Nepal's districts? and (4) Are certain recruitment types – such as agency-based, individual, or re-entry – associated with stronger gender disparities?

The significance of this study is threefold. First, it provides a foundational baseline for understanding the geography of female migration from Nepal using actual labor approval records, rather than estimates. Second, it contributes to evidence-based policymaking by identifying districts and countries where gender imbalances are most pronounced, thus allowing for targeted interventions. Finally, it supports the broader goal of inclusive development and gender equity by revealing how systemic structures shape who can access safe and formal migration opportunities. In doing so, this paper contributes to the literature on gender and migration in South Asia and responds to policy calls for more inclusive labor governance frameworks that reflect the diverse experiences of both male and female migrants (International Labour Organization, 2021; Sijapati et al., 2019). It also offers valuable insights for government agencies, NGOs, and international partners working to enhance the safety, visibility, and empowerment of women within Nepal's labor migration system.

LITERATURE REVIEW

Overview of Nepalese Labor Migration

Labor migration has long been a central component of Nepal's economy and employment structure. With limited domestic employment opportunities and persistent poverty, international migration has become an essential livelihood strategy for many Nepalese households. According to the International Labour Organization (2021), Nepal is among the top countries globally in terms of remittance dependency, with inflows accounting for approximately 24%-26% of the national GDP in recent years (World Bank Open Data, 2023). Predominantly, these flows have been fueled by the large-scale migration of men to Gulf countries and Malaysia for work in construction, manufacturing, and services. However, over the last two decades, women's participation in foreign employment has gradually increased, particularly in care-based and domestic sectors, though their representation remains comparatively limited.

Gendered Protectionism: The Evolution of Migration Policy for Women in Nepal

A comprehensive understanding of the current gender disparities in Nepalese labor migration requires contextualization within the nation's evolving policy landscape. Nepal's formal migration governance has undergone significant transformations, frequently enacted as reactive measures to crises concerning migrant safety, with profound implications for female migrants.

The foundational precedent for restrictive, protectionist approaches was set in 1998 with a blanket ban on women migrating to Gulf Cooperation Council (GCC) countries for domestic work, following widespread reports of exploitation (Seddon et al., 2002). This policy effectively rendered female labor migration in a major sector informal and unregulated from its inception.

Over the following decades, the outright ban was refined into a series of age-specific restrictions. A pivotal moment came in 2015 when the government prohibited women under the age of 30 from obtaining permits for domestic work in GCC countries. This age threshold was subsequently lowered to 25, and later to 24, reflecting an ongoing tension between protectionist intentions and the economic realities driving women to migrate (Sijapati & Limbu, 2012). The data analyzed in this study, from Fiscal Year 2080/81, captures the migration patterns that have emerged under this regime of age-based proscription.

Alongside these restrictive measures, more recent reforms have aimed to mitigate risks by enhancing migrant welfare and reducing financial burdens. A key initiative is the 'Free Visa, Free Ticket' policy, which mandates that employers bear these costs for migrants heading to Malaysia and GCC countries (Government of Nepal, 2015). This policy holds particular significance for women, who are often more vulnerable to debt bondage after borrowing from informal sources to cover high recruitment fees.

This historical trajectory – from blanket bans to conditional restrictions and cost-reduction efforts – forms the critical policy backdrop against which the gender-disaggregated patterns in the following analysis must be interpreted. It underscores that the contemporary gender gap is not a natural phenomenon but is, in part, a direct outcome of decades of specific regulatory choices.

Gender and Labor Migration

Gender dynamics in migration are deeply embedded in broader socio-cultural, economic, and policy contexts. Early migration literature from Nepal often rendered women invisible, portraying international labor mobility as a male-dominated domain (Chaudhary, 2022). This perspective has been increasingly challenged by emerging research documenting the diverse experiences and growing contributions of female migrants. Sijapati et al. (2019) highlight a significant shift in Nepal's migration landscape, noting a substantial rise in female migration permits following policy changes in the late 2000s. By 2016, over 176,000 women had received formal approval for foreign employment, mostly in domestic

and caregiving roles across the GCC states, Lebanon, and Malaysia. Yet, this number likely underestimates women's actual participation, as many migrate informally through India or unregistered channels to bypass restrictive government regulations (IOM, 2019).

Despite the growing visibility of female migrants, gendered constraints persist at multiple levels. Legal frameworks in Nepal have historically imposed restrictions on women's right to migrate independently, particularly to countries deemed "high-risk." Although these regulations are intended to protect women from exploitation, they often have the opposite effect – pushing them toward informal and unregulated pathways where vulnerabilities are intensified (Patil, 2022; Kharel, 2016). Similar gender-based earnings and occupational segregation persist in formal employment sectors across developing economies. For example, even in South Africa's public tourism sector, women executives continue to face significant pay gaps compared to their male counterparts (Maleka et al., 2024), while female-dominated craft enterprises, despite high participation rates, generate lower incomes than male-dominated activities (Dapira, 2024). Such routes limit women's access to legal protections, labor rights, and institutional support in host countries.

Migration and Women's Empowerment

While migration can expose women to abuse and control, it also holds the potential to transform gender norms and enhance women's autonomy. Evidence from Nepal suggests that women who migrate often experience both economic and social shifts in household roles. Kharel (2016) finds that remittances sent by women are commonly directed toward household consumption, children's education, and savings, challenging traditional assumptions about women's financial dependency. Moreover, returning female migrants often demand greater decision-making power in family and community contexts.

Studies conducted in urban and semi-urban areas such as Chitwan and Pokhara support this observation. Chaudhary (2022) notes that female migrants gain social respect and financial control, though they continue to face scrutiny regarding their morality and "respectability." Similarly, Aryal et al. (2020) found that rural women migrating to the Gulf experience long hours, job insecurity, and social isolation, yet many expressed pride in their financial independence. Still, structural inequalities – including limited access to information, weak consular support, and post-return stigma – remain significant challenges for many female migrants (Zimmerman et al., 2011).

Recruitment Channels and Gender Disparities

The mode of recruitment – whether through private agencies, government-to-government (G-to-G) arrangements, or individual applications – also reveals distinct gendered patterns. Research shows that female migrants are disproportionately recruited through private agencies, particularly for domestic and caregiving roles (Adhikary et al., 2020). However, these agencies are not always adequately regulated, and women often face exploitation during both the pre-departure and employment phases. Those recruited through unregistered sub-agents may be subject to exorbitant fees, opaque contracts, and deceptive job offers, sometimes resulting in debt bondage or forced labor conditions (International Labour Organization, 2021).

Abramsky et al. (2018) provide a comparative analysis showing that repeat female migrants are more likely to bypass formal systems entirely, relying instead on personal networks or brokers. While this may expedite the recruitment process, it also increases vulnerability due to the lack of formal contracts, orientation programs, or insurance coverage. These findings underscore the need for robust, gender-sensitive oversight of the recruitment process to address asymmetries in power, information, and protection.

Geographic Patterns of Female Migration

While most studies examine national migration patterns, few analyze regional or district-level disparities in female migration. Districts such as Jhapa, Morang, Kathmandu, and Chitwan have emerged as key origin points for both male and female migrants. However, few studies explore the gender differences in out-migration from these areas (DoFE, 2023). Destination-specific gender patterns are similarly underexamined. Anecdotal evidence suggests that countries such as Kuwait, Saudi Arabia, and the UAE attract large numbers of Nepali women for domestic work, while South Korea and Japan receive more male migrants, typically for industrial and skilled labor roles (ILO, 2021; Sijapati et al., 2019).

Despite the availability of gender-disaggregated administrative data, only a limited number of studies have utilized these sources for spatial or comparative analysis. This lack of attention to the intersection of gender, geography, and recruitment pathways represents a critical research gap and limits the scope of evidence-based policy design.

Research Gap and Contribution

Although there is a growing body of literature on female labor migration in Nepal, much of it remains qualitative, small-scale, or policy-focused. There are relatively few quantitative studies that map gender disparities across both geographic regions and destination countries using comprehensive administrative data. Furthermore, the interaction between gender and recruitment type – such as agency-based, individual, or re-entry – has not been systematically examined in the Nepalese context. This study seeks to fill these gaps by conducting a detailed, gender-disaggregated analysis of labor migration approvals based on FY 2080/81 data from the Government of Nepal. By leveraging a complete dataset that includes all recruitment categories, the study offers a spatially and institutionally grounded understanding of how migration systems reproduce gendered inequalities – providing critical insights for policy, planning, and advocacy.

METHODOLOGY

This study employs a quantitative research design based on secondary data obtained from the Department of Foreign Employment (DoFE), under Nepal's Ministry of Labour, Employment and Social Security. The dataset covers the fiscal year 2080/81, corresponding to the period from July 17, 2023, to July 15, 2024. It includes the final list of labor migration approvals disaggregated by gender, destination country, origin district, and recruitment type. As this dataset is officially maintained by the government, it offers a comprehensive and authoritative snapshot of Nepal's formal labor migration flows and has been used in previous migration research (IOM, 2019; Sijapati et al., 2019).

The dataset includes only those individuals who received formal labor approval through government-sanctioned channels. It captures both first-time migrants and re-entries, thus reflecting a more complete picture of Nepal's outbound labor force. This inclusion of re-entry approvals is particularly important in understanding sustained migration patterns, especially among male migrants. The use of this administrative dataset provides large-scale, verified data for assessing migration trends at both national and subnational levels, eliminating the need for primary data collection (ILO, 2021).

Four key variables are used in the analysis. The first is gender, recorded as either male or female, with no provision for third-gender or non-binary categories. The second is destination country, which identifies the approved country of employment; the dataset covers over 140 destination countries, enabling cross-national comparisons. The third is origin district, referring to the district in Nepal where the labor

approval was issued. All 77 districts are represented, allowing for nationwide spatial coverage. The fourth variable is type of recruitment, classified into four categories: recruiting agency, individual (new), government-to-government (G-to-G), and individual (re-entry), following DoFE's official categorization (DoFE, 2023). To analyze the data, the study applies several quantitative techniques common in migration and social science research (Bryman, 2016). Descriptive statistics are used to summarize migration approvals by gender, district, country, and recruitment channel. Gender-specific ratios – such as the female-to-male ratio and the percentage share of female approvals – are calculated to highlight disparities. These metrics help reveal structural patterns and concentration zones in gendered migration.

Cross-tabulation is employed to explore the relationship between gender and other categorical variables such as destination country and recruitment type. These tables provide insight into how male and female migrants are distributed across various pathways and geographies. Chi-square tests of independence are used where appropriate to determine whether these relationships are statistically significant (Field, 2013). This method is particularly useful for assessing whether gender distribution is independent of recruitment type or destination.

To visualize district-level differences, the study also applies spatial techniques – including choropleth maps and heatmaps – based on available geospatial boundary data for Nepal. These visual tools enhance interpretation of geographic disparities in female and male migration flows and are commonly used in migration research (IOM, 2019; Chammartin, 2005).

Several limitations of the dataset must be acknowledged. First, it records migration approvals, not actual departures. Some approved individuals may not migrate due to visa rejections, job cancellations, or personal reasons, leading to a potential overestimation of actual migration. Second, the data lack critical demographic and socioeconomic attributes such as age, education level, ethnicity, caste, and household income, limiting intersectional or causal analysis. Third, informal or undocumented migration – particularly relevant for female migrants – is not captured, as women may bypass formal channels due to legal restrictions or social stigma (Asia Foundation et al., 2019). Lastly, the dataset does not include information on employment conditions, wages, or post-migration experiences, which are essential for assessing migrant well-being and outcomes. Despite these limitations, the dataset provides a rich and reliable foundation for analyzing Nepal's formal labor migration flows. Its disaggregated structure and national scope enable a robust examination of gender disparities across districts, countries, and recruitment mechanisms – offering valuable insights to inform evidence-based, gender-sensitive migration policies.

RESULTS

Overview of Gender Distribution in Labor Migration Approvals

Based on a comprehensive review of labor migration data for FY 2080/81 from the Government of Nepal, a total of 1,482,594 labor migration approvals were issued. These include both first-time migrants and re-entry cases, captured under the 'Total with ReEntry' category in the official country-wise labor approval dataset. Of these, 1,322,250 approvals (89.18%) were granted to male migrants, and 160,344 approvals (10.82%) to female migrants. This fair representation considers all major recruitment channels and avoids duplication. The pie chart below illustrates this gender gap clearly.

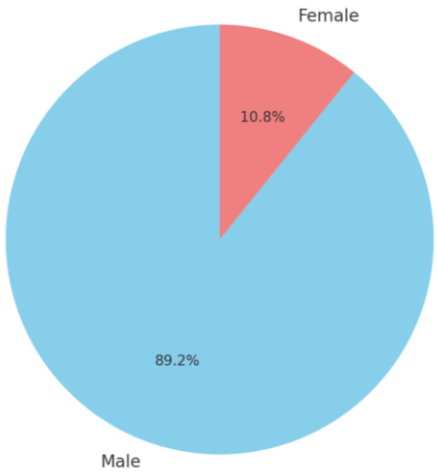

Figure 1. Gender Distribution of Labor Migration Approvals (FY 2080/81)
Including All Approval Types (with Re-Entry)

Destination Country Breakdown by Gender

From the same dataset, we extracted the 'Female 2' column, which records female migrants approved under the 'Individual-New' and other valid recruitment channels. Countries were grouped, and the top 10 destinations for female migrants were identified. UAE, Kuwait, and Jordan emerged as key destinations, reflecting demand in domestic and care sectors. The chart below visualizes this ranking.

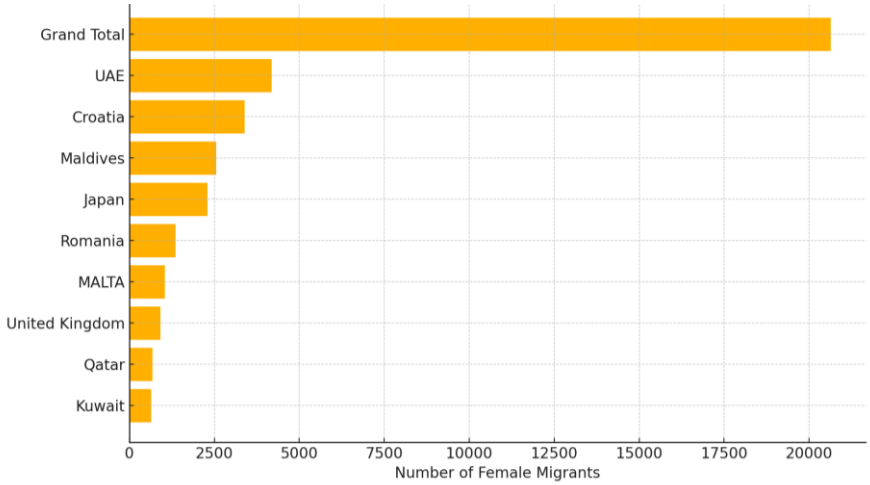

Figure 2. Top 10 Destination Countries by Number of Female Migrants

District-Level Gender Distribution

District-wise data was drawn from Table 2 of the official report. We used the 'Female 2' column again, which reflects female labor approvals through recognized recruitment channels. After cleaning and aggregating the data, the top 10 districts with the highest number of female labor approvals were identified. These included districts such as Kailali, Kanchanpur, and Rupandehi, known for both population density and strong migration networks.

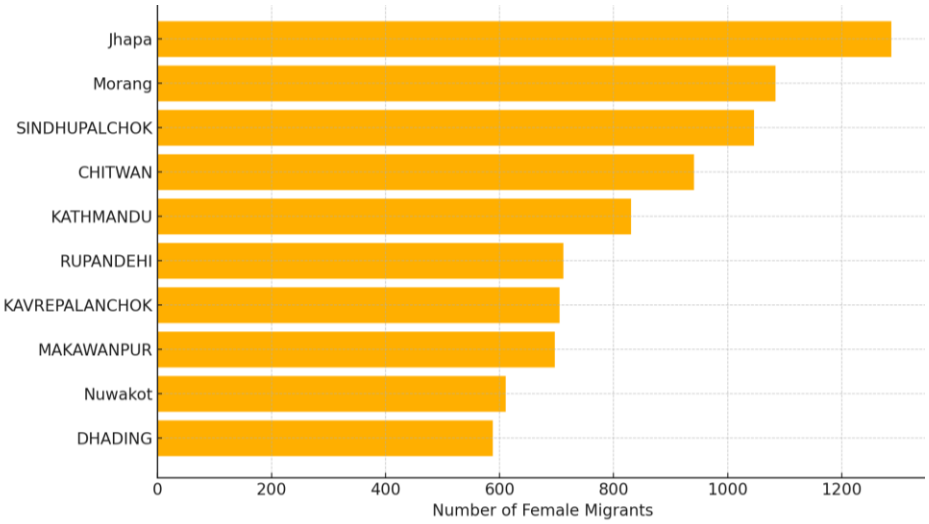

Figure 3. Top 10 Districts by Female Labor Migration Approvals

Gender and Recruitment Type

To analyze the intersection of gender and recruitment method, we reviewed multiple columns in Table 1 representing male and female approvals under Recruiting Agency, Individual-New, G-to-G, and Re-entry. These were cleaned, summed, and plotted for both genders. Recruiting Agency and Re-entry pathways dominate among male migrants, while female migrants are more reliant on agency-based and Individual-New recruitment.

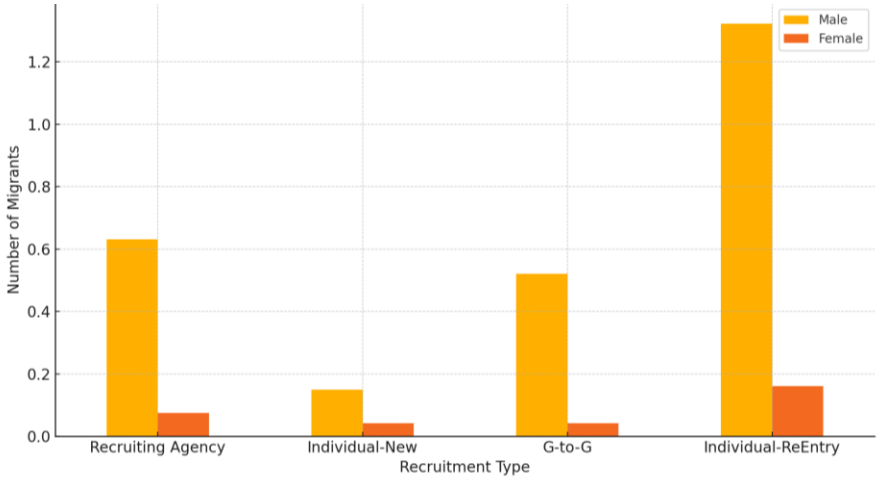

Figure 4. Labor Migration Approvals by Recruitment Type and Gender
Number of Migrants in Millions

Chi-square Residual Analysis (Gender × Recruitment Type)

To assess whether gender and recruitment type are statistically associated, we conducted a chi-square test using a contingency table constructed from the gender-recruitment data. The resulting standardized residuals show where observed counts deviate most from expected counts under independence. A heatmap displays these residuals, with red and blue tones indicating significantly higher

or lower values than expected. This visualization helps identify channels where gender imbalance is strongest.

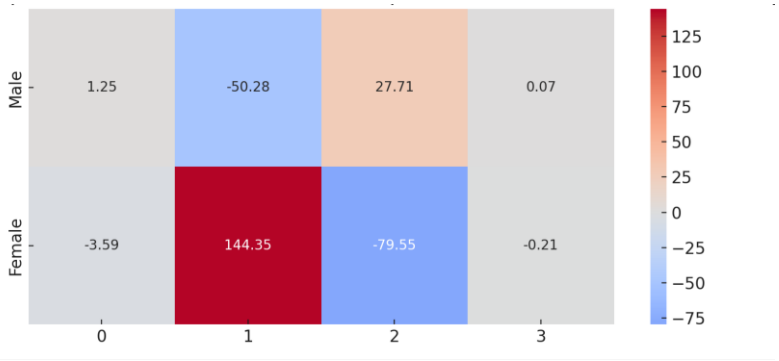

Figure 5. Heatmap of Standardized Residuals (*Chi-square Test: Gender × Recruitment Type*)

DISCUSSION

This study offers a quantitative assessment of gendered migration dynamics using comprehensive labor migration approval data from Nepal's Ministry of Labour, Employment and Social Security for FY 2080/81 (July 2023 – July 2024, GC). By incorporating all recruitment types, including re-entry approvals, the analysis provides a holistic view of structural patterns shaping male and female participation in overseas labor markets.

One of the most prominent findings is the persistent gender gap in migration approvals. Female migrants accounted for 10.8% of the total 1,482,594 approvals, with male migrants comprising 89.2%. This updated figure, derived from the "Total with ReEntry" data column, offers a more complete and accurate estimate compared to prior reporting based only on initial deployments. Despite being higher than some previous years, the percentage still underscores the systemic exclusion of women from foreign employment. Structural barriers – including restrictive norms, safety concerns, and discriminatory policies – continue to shape these imbalances. Past protective measures, such as age-based bans for women under 24 or special approval requirements, have had unintended consequences like increasing informal migration and discouraging women's labor mobility (Asia Foundation et al., 2019; IOM, 2019).

The analysis also highlights destination-specific gender segregation. Countries such as UAE, Kuwait, and Jordan rank among the top ten destinations for female migrants, particularly in sectors such as domestic work and caregiving. This pattern mirrors global trends in the care economy, where demand for female workers is high but labor protections are often weak (Chammartin, 2005; ILO, 2021). By contrast, male migrants dominate approvals to countries like Saudi Arabia, Malaysia, and South Korea, typically entering construction, manufacturing, and agricultural roles. These patterns are not random; they reflect both destination-country labor demands and Nepal’s gendered vocational training and migration policies.

At the district level, female migration is concentrated in a handful of Terai districts, with Kailali, Kanchanpur, Rupandehi, and Kathmandu leading in female labor approvals. This finding is based on data from the "Female 2" column in the district-wise dataset. These regions are known for having better access to migration-related infrastructure, well-established recruitment networks, and relatively more progressive gender norms. In contrast, districts in the hills and mountains show lower female participation, likely due to a combination of restrictive cultural attitudes, lack of institutional support, and limited outreach from recruitment agencies (Adhikari & Hobley, 2015; ILO, 2021). These findings suggest that policy responses must be tailored to regional contexts to overcome localized barriers.

Recruitment pathways are also deeply gendered. According to the analysis of recruitment type and gender, most female migrants utilize private recruiting agencies, while male migrants have significantly higher representation in re-entry approvals, indicating more cyclical or sustained migration histories. Female migration appears more fragmented and one-time, constrained by caregiving roles, social expectations, and weaker access to support systems abroad (Shah & Gartaula, 2022). Furthermore, reliance on private agencies – especially in unregulated environments – exposes women to elevated risks of exploitation, contract substitution, and debt bondage.

The Chi-square test conducted on recruitment type by gender confirms that the association between gender and migration channel is statistically significant. The heatmap of standardized residuals indicates that female representation is substantially overrepresented in some categories (e.g., agency-based recruitment) and underrepresented in others (e.g., re-entry). These patterns are not due to chance but are embedded in institutional frameworks that govern who gets to migrate, through what means, and under what conditions.

In sum, this study strengthens the empirical understanding of how gender intersects with destination, geography, recruitment systems, and policy structures to shape Nepal's labor migration outcomes. The updated results, drawn from an inclusive dataset accounting for all approval types, reinforce the urgency for gender-sensitive reforms. Such reforms must go beyond protectionist measures and focus on enabling, empowering, and safeguarding female migrants through equitable training, access, regulation, and support at all stages of the migration cycle.

CONCLUSION

This study explored the gender dimensions of formal labor migration approvals from Nepal during fiscal year 2080/81 (July 2023 – July 2024, GC). Drawing on government-issued administrative data, the research provides a comprehensive account of how men and women engage differently with Nepal's labor migration system. The findings confirm that migration remains highly male-dominated, with only 10.8% of total approvals granted to female migrants – even when all categories, including re-entry, are considered. While this represents a more accurate and inclusive figure than previously reported, it still reflects a substantial gender gap, indicating that recent policy reforms have not yet resulted in meaningful gains in women's access to overseas employment.

The analysis also underscores the gendered segmentation of both destination countries and recruitment channels. Women are disproportionately concentrated in domestic and caregiving roles in countries such as UAE, Kuwait, and Jordan, while men dominate employment in construction, manufacturing, and agriculture in destinations like Saudi Arabia, Malaysia, and South Korea. At the district level, female migration remains highly localized, with approvals concentrated in a small number of Terai districts such as Kailali, Kanchanpur, and Rupandehi, pointing to spatial inequalities in access to foreign employment.

Furthermore, the study identifies significant statistical associations between gender and recruitment pathways. Female migrants are far more likely to use private recruiting agencies, while male migrants are more prevalent among re-entry cases – suggesting a more cyclical and sustained pattern of male migration. These differences reflect not only labor demand abroad, but also entrenched gendered norms, institutional practices, and unequal access to resources within Nepal's migration governance system. Taken together, the results reinforce the need for targeted, gender-sensitive migration policies that go beyond protectionist frameworks and focus instead on enabling equitable access, support, and empowerment for female migrants at every stage of the migration process.

POLICY IMPLICATIONS AND BROADER LESSONS

The gendered structure of labor migration in Nepal necessitates a shift from reactive protectionism toward proactive and inclusive policymaking. This study's findings – particularly the fact that only 10.8% of labor approvals were granted to female migrants – highlight the need for interventions that expand women's access to safe, regulated migration opportunities. While current policies, such as age restrictions and destination-specific travel bans, aim to protect women, they may inadvertently restrict economic mobility and drive some women toward informal or undocumented migration pathways (ILO, 2023).

A more effective and empowering strategy would be to promote gender-responsive bilateral labor agreements, especially within Government-to-Government (G-to-G) frameworks. These agreements should explicitly include quotas or reserved placements for women in sectors like caregiving, hospitality, and healthcare – fields where demand exists and where women's skills align naturally. This not only diversifies the labor export portfolio but also provides safer alternatives to informal migration.

Given that most female migrants rely on private recruitment agencies, regulatory oversight of these entities is critical. Enhanced licensing standards, routine inspections, digital transparency mechanisms, and well-publicized grievance systems can reduce the risk of exploitation. Female migrants are vulnerable to contract substitution, deceptive job offers, and inflated recruitment fees in the absence of strong oversight (ILO, 2021). Moreover, the limited representation of women in re-entry approvals signals a lack of continuity in female migration trajectories. Developing formal re-entry support schemes for women – such as streamlined re-approval processes, skills recognition, and subsidized training – could promote more sustainable and cyclical migration for both genders.

Lastly, addressing regional disparities is vital. The analysis revealed that female migration remains highly concentrated in a handful of Terai districts. This calls for a decentralized approach to migration services. Expanding pre-departure orientation, legal aid, and recruitment monitoring to underrepresented districts – especially in hill and mountain regions – can help mitigate geographic and social inequalities in labor migration access.

The gendered structure of labor migration in Nepal, as detailed in this study, offers critical lessons that necessitate a shift from reactive protectionism toward proactive and inclusive policymaking, both within Nepal and for other labor-sending countries. The finding that only 10.8% of labor approvals were granted to female migrants is not just a national concern but a stark indicator of systemic barriers common across migration corridors. The Nepalese experience demonstrates a universal principle: while restrictive policies like age and destination bans aim to protect women, they often inadvertently restrict economic mobility and drive migration into informal, unregulated pathways, thereby increasing vulnerability (ILO, 2023). This serves as a crucial cautionary tale for policymakers globally, highlighting that the goal must be to create safe channels, not to close pathways altogether.

A more effective and empowering strategy, relevant for any country seeking to ethically manage labor export, is to promote gender-responsive bilateral labor agreements (BLAs), especially within Government-to-Government (G-to-G) frameworks. Nepal's current underutilization of such agreements for women points to a significant opportunity. Following models like the Philippines, which has successfully institutionalized protections for female migrants through BLAs (IOM, 2013), Nepal – and countries with similar profiles – should explicitly integrate quotas or reserved placements for women in high-demand sectors like caregiving, hospitality, and healthcare. This approach diversifies the labor export portfolio while providing a safer, regulated alternative to the risky private agency route.

The heavy reliance of Nepali women on private recruitment agencies underscores another universal imperative: the critical need for robust regulatory oversight. The exploitative risks of contract substitution, deceptive job offers, and inflated fees identified in Nepal are a global phenomenon (ILO, 2021). Therefore, a key lesson is that enhanced licensing standards, routine inspections, digital transparency mechanisms, and well-publicized grievance systems are non-negotiable components of any national migration policy aimed at protecting its citizens, particularly women.

Furthermore, the limited representation of women in re-entry approvals signals a broader issue of unsustainable migration trajectories for female workers. Developing formal re-entry support schemes – such as streamlined re-approval processes, skills recognition, and subsidized training – could promote more cyclical and career-oriented migration. This is a transferable policy insight that can help other countries enhance the long-term benefits of migration for women and their communities.

Finally, the high spatial concentration of female migration in Nepal's Terai districts reveals how geographic disparities can exacerbate social inequality. This finding highlights for all countries the importance of a decentralized approach to migration governance. Expanding pre-departure orientation, legal aid, and recruitment monitoring to underrepresented regions – such as Nepal's hill and mountain districts – is an essential strategy to ensure that the benefits of labor migration are accessible to all, regardless of their location.

In summary, the patterns observed in Nepal provide a valuable blueprint for evidence-based, gender-sensitive migration policy reform. The lessons on the pitfalls of protectionism, the power of bilateral agreements, the imperative of regulating recruitment, and the need for decentralized services offer a framework that can be adapted and applied by other migrant-sending countries interested in creating safer, more equitable, and more empowering migration systems.

LIMITATIONS AND FUTURE RESEARCH

While this study provides valuable insights into the gendered dynamics of Nepal's formal labor migration system, it is not without limitations. First, the analysis relies on government-issued approval data, which reflects authorized migration cases but does not necessarily capture actual departures. Various factors – including visa rejections, changes in personal circumstances, or financial constraints – can prevent approved individuals from migrating. Consequently, the figures presented likely represent an upper boundary rather than the precise number of individuals who went abroad.

Second, the dataset lacks essential demographic variables such as age, education, ethnicity, marital status, and income. This omission limits the ability to conduct a more nuanced, intersectional analysis of how gender interacts with other social and economic factors to influence migration patterns. Without such data, it is difficult to fully understand how opportunities and constraints vary across subgroups of men and women.

Third, the dataset does not contain information on employment sectors or occupational roles. Although the study infers patterns of occupational segregation based on destination countries, direct analysis of sector-specific migration trends is not possible with the current data. As a result, the ability to assess how gender shapes the types of jobs pursued abroad – such as caregiving, construction, or manufacturing – is limited.

Fourth, the study's scope is cross-sectional, focusing solely on data from fiscal year 2080/81 (July 2023 – July 2024, GC). While this approach is valuable for identifying current patterns and structural disparities, it does not allow for temporal analysis of how migration trends have evolved in response to

policy shifts, economic conditions, or external shocks like the COVID-19 pandemic. Longitudinal data would be better suited to exploring such dynamics.

To address these limitations, future research should adopt both quantitative and qualitative approaches. Longitudinal studies using multi-year datasets would provide insights into how gendered migration patterns change over time and in response to regulatory or global changes. Additionally, qualitative research – such as interviews with migrants, returnees, recruiters, and policymakers – can offer deeper context around the motivations, barriers, and support structures that shape migration decisions. Case studies at the district level, especially in high- and low-sending areas, could help identify local factors influencing access to migration. Finally, comparative studies involving countries like Bangladesh or Sri Lanka, which have implemented gender-sensitive migration frameworks, may offer valuable lessons that can inform Nepal's policy and programmatic development in this area.

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