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TABLE OF CONTENTS

Abstract: Trade openness plays a significant role in the growth process of countries. The purpose of this research is to examine the impact of macroeconomic determinants on trade openness. The study focuses on the Southern and Eastern European countries and the data used were from 2010 to 2020. Panel data through econometrics techniques, the fixed effect, and the Poisson approach (PPLM) are used to carry out empirical investigation and robustness testing. The main finding of the research is that macroeconomic determinants such as GDP growth, and gross savings, positively affect trade openness in Southern Europe according to the fixed effect. Furthermore, according to Poisson's approach, GDP growth, inflation, gross savings relative to the GDP, domestic credit private sector, and population growth, positively affect trade openness. Additionally, gross capital formation has also impacted trade openness negatively and significantly. The econometric results for Western Europe are showing nearly identical results with only one difference: in the Poisson approach where the variable gross savings relative to the GDP have turned out not to be significant. It implies that efficient macroeconomic management matters for higher trade openness. The sampled countries are recommended to pay favourable attention to macroeconomic variables if they want to grow in the long run through outward-oriented policies. This article is an original contribution to the context of Southern and Western European countries by focusing on the connection between macroeconomic determinants and trade openness.

Abstract: The paper develops models for toll rates that incorporate the surface area of a vehicle and the proportion of the population that uses vehicles in a region or town for concessionary road contracts. The models are applied to set toll rates across all 38 toll booths scattered across Ghana. The results obtained by analyzing 2019 traffic data for Mallam Kasoa highway show that the expected optimal profit generally increases with the number of years of concession not only for each vehicular class but also for the entire vehicular operations. Also, the shorter the number of years of the concession, the riskier the arrangement not only within vehicular classes but for the entire vehicular operations. The paper suggests that this method of toll setting is a fairer means of toll rate assignments than the current flat rate for a vehicular class which ignores the congestion in the city where the toll booth resides. It should demotivate people to drive less in highly congested cities in favour of other means of transport such as public transport. This will ease road congestion, road rage as well as other unwanted road behaviours, particularly around and within major congested cities.

Abstract: Despite being one of the major integration means for migrants, labor market integration (LMI) remains understudied in the Global South. The extant literature on the LMI of female accompanying spouses is lacking. Skilled accompanying spouses can be considered economic migrants who may seek to exercise their agency in search of empowerment and economic self-sufficiency through LMI. The main objective of this research was to determine the meso governing technologies influencing the LMI of accompanying spouses in the Free State Province, South Africa, using Michel Foucault's theory of governmentality. Since South Africa remains a key regional hub for migration in the Global South, it is imperative that its migration governance framework considers accompanying spouses. A qualitative, interpretivist approach using 13 one-on-one interviews, which each lasted two hours on average, was adopted in this study. Thematic analysis was used to generate the findings. The study found that the meso-level governing technologies affecting the tied migrants' pursuit of LMI included family ties and traditional gender roles, diaspora expectations, visa processing challenges, the non-recognition of qualifications, and employer-related exclusion—mainly linked to what were perceived to be discriminatory and exclusionary practices. This study's findings can, to some extent, highlight issues that could inform South African immigration policy.

Abstract: The Corona Virus Disease (COVID-19) led to the closure of most Small and Medium Enterprises (SMEs). The argument presented in this paper is that SMEs that are still operational have done so due to the employment of survival strategies. The study premised in the interpretivist paradigm, utilising a qualitative approach and a case study design, sought to establish the challenges faced by SME owners in the COVID-19 era and the survival strategies that they used, for the benefit of those still overwhelmed by the pandemic. Data was collected from 30 purposively selected SME owners, using semi structured questionnaires with open ended questions. Thematically analysed data revealed that SME owners predominantly faced the following challenges: a massive reduction in revenue, increased running costs, longer lead times in procurement of raw materials, as well as delivering orders to the customer, importing challenges due to the closure of national borders and travel restrictions as well as loss of lives. Conclusions drawn were that businesses can survive even during pandemics as long as appropriate survival strategies are applied. The study recommended that SME owners be equipped with digital literacy, innovative and environmental analysis skills as strategies to enable them to hedge against unexpected risks.

Abstract: This study aims to determine the association between audit committee characteristics and ethics disclosure using the theory of comfort as theoretical lens. The audit committee characteristics investigated are audit committee expertise, frequency of meetings, audit committee size, audit committee tenure, and multiple directorships of audit committee members. Ethics disclosure is measured using a disclosure checklist developed by Persons (2009). This research takes an emerging market, Indonesia, as the context to enable a comparison of the findings with previous literature in developed countries. The sample consists of 85 large-market-capitalization companies (595 observations) listed on the Indonesia

Stock Exchange (IDX) in 2014–2020. Panel data regression was used to test the hypothesis. The findings indicate that the level of ethics disclosure on average is 58.16%. The results show that there are three characteristics of audit committees that significantly influence ethics disclosure: audit committee expertise, audit committee size, and frequency of meetings. These factors play a significant role in producing comfort and confidence in the eyes of stakeholders of companies that exercise ethical business practices. This research has important implications regarding how several attributes of audit committees can encourage ethical conduct in business and hence increase ethics disclosure. This study uses a different lens—the theory of comfort—as a theoretical perspective to study audit committee characteristics, which has been scantily applied in accounting and auditing research.

EDITORIAL

Trade openness plays an important role in the process of state growth. Therefore, the purpose of the **first paper by Esat A. Durguti & Arben Malaj** is to investigate the degree of influence of macroeconomic determinants in trade opening. To conduct this research, the authors used secondary data provided by the World Bank database. The sample includes 14 of the 16 Southern Europe countries of (i.e, Albania, Bosnia and Herzegovina, Croatia, Cyprus, Greece, Italy, Kosovo, Malta, Montenegro, North Macedonia, Portugal, Serbia, Slovenia, and Spain), while 7 of the 8 Western Europe countries (i.e, Austria, Belgium, France, Germany, Luxembourg, Netherlands, Switzerland, and Liechtenstein). The study covers the period 2010 to 2020, with 154 observations for Southern European countries, and 77 observations for Western European countries. The empirically modeled approach was dynamic, using a fixed effect and Poisson PML with dependent variables trade openness $(IMP_{i,t})$ and $(EXP_{i,t})$ and other control variables. The study incorporated recent advanced estimation techniques to investigate the degree of influence of trade opening and the level of trade exchange among Southeast and Western European countries. The study used several tests to analyze the panel data, beginning with Jarque Bera, cross-sectional dependence, and unit root to determine whether the data was stationary before applying the relevant econometric approaches. Also, were applied tests for heteroskedasticity, normal distribution, multicollinearity, and serial correlation, all these tests provided satisfactory results and then regression analysis was performed for both applied models. The Hausman test was applied to decide between random effect and fixed effect, and the results of this test suggest that the most appropriate model for this case turns out to be fixed effect regression.

The econometric findings for the determinants used in this study according to the fixed effect estimation for Southern European countries showed that GDP growth and gross savings have been shown to have a positive and statistically significant influence on trade openness. Furthermore, according to the other Poisson approach (PPLM), these factors have a positive and significant impact on trade opening: GDP growth, inflation, gross savings relative to GDP, domestic credit private sector, and population growth. Additionally, gross capital formation has also impacted trade openness negatively and significantly. The econometric results for Western Europe are showing nearly identical results with only one difference: in the Poisson approach where the variable gross savings relative to the GDP have turned out not to be significant.

As a result, the authors have confidence that this research will be an original contribution to theoretical and empirical advancement, with the inclusion of two parameters that have been included in very few studies thus far. The sampled countries are recommended to pay favorable attention to macroeconomic variables if they want to grow in the long run through outward-oriented policies. This article is an original contribution to the context of Southern and Western European countries by focusing on the connection between macroeconomic determinants and trade openness.

Financing road construction is a major headache for governments in the developing world with significant infrastructure deficit. Private Public Partnership could be deployed to ameliorate this yawning infrastructure deficit. Public Private Partnerships is a temporary private ownership of public assets through concessions to build, operate and then transfer infrastructure in good form to the government at the end of the concession period. For road concessionary projects to be attractive to investors, the pricing at the toll gates must be properly set to allow the concessionaire or the investor recoup its investment and make a reasonable return on investment within the concession period. Models for road tolling on road concessionary projects that exists in the literature have excluded the space vehicles occupy in setting road rates. In addition, it does not consider the volume of vehicular usage in the region or town where the toll booth resides.

The **second paper by Charles Andoh & Susana Adobea Yamoah** develops models for toll rates that incorporate the surface area of a vehicle and the proportion of the population that use vehicles in a region or town for concessionary road contracts. The models are used to set toll rates across all 38-toll booths scattered across Ghana using data from Ghana Highway Authority, Driver and Vehicle Licensing Authority in Ghana and the Ghana Statistical Service. The desire of a concessionaire is expressed as a mathematical programming problem for the expected optimal profit and risk exposure of the concession to be obtained.

The results obtained by analyzing 2019 traffic data for Mallam Kasoa highway show that, the expected optimal profit generally increases with the number of years of concession not only for each vehicular class but also for the entire vehicular operations. Also, the shorter the number of years of the concession, the riskier the arrangement not only within vehicular classes but for the entire vehicular operations. The authors suggest that this method of toll setting, aside being a good source of revenue for parties in the road concessionary agreement, it is a fairer means of toll rate assignments than the current flat rate for a vehicular class which ignores the congestion in the city or town where the toll booth resides. In addition, it should demotivate people to drive less in highly congested cities in favor of other means of transport such as public transport. This has potential to reduce road rage as well as other unwanted road behaviors, particularly around and within major congested cities where this toll booth resides. Environmental pollution and its associated costs will hopefully decline as lesser number of vehicles use the road.

The models are good decision tools for any businessman or organization interested in partnering with the public sector in road construction. It can be adopted with slight modification to fit any country where road congestion abounds. It could potentially motivate businesses to move to less congested regions of a country in other to benefit from low toll charges in those regions. The concessionaire should also benefit from this mode of pricing as users will pay an amount commensurate with city congestion, damage, and frequency of road usage.

Labor migration has been a distinctive feature of the South African economy for many decades. Relative economic stability, relative political stability, and broad respect for human rights are among the notable pull factors contributing to the rise of post-apartheid South Africa as a key regional hub for migration and preferred destination for many labor migrants. Despite being one of the major integration means for migrants, labor market integration (LMI) remains understudied in the Global South. The extant literature on the LMI of female accompanying spouses is lacking. Skilled accompanying spouses can be considered economic migrants who may seek to exercise their agency in search of empowerment and economic self-sufficiency through LMI.

The main objective of the **third paper by Farirai Zinatsa & Musawenkosi D. Saurombe** was to determine the meso governing technologies influencing the LMI of accompanying spouses in the Free State Province, South Africa, using Michel Foucault's theory of governmentality. Since South Africa remains a key regional hub for migration in the Global South, it is imperative that its migration governance framework considers accompanying spouses. A narrative, qualitative approach was used to garner rich interpretations of reality and an understanding of the world through the lens of the respondents. The emic approach used was regarded as suitable for understanding lived experiences from an intersectional perspective. Thirteen (13) one-on-one interviews, which each lasted two hours on average, were conducted in this study. Purposive sampling was initially used to select respondents meeting the inclusion criteria to participate in the study based on the researchers' network. A snowball approach was utilized to complement the initial purposive sampling, whereby participants were asked to refer other participants who met the inclusion criteria to the researchers.

The study found a complex assemblage of governing technologies operating at the meso level by means of practices and policies. These governing technologies, including family ties and traditional gender roles, diaspora expectations, visa processing challenges, the non-recognition of qualifications, and employer-related exclusion, were instrumental in directly and indirectly shaping the conduct of accompanying spouses in the Free State province, with respect to the labor market in South Africa. Further, these governing technologies were mainly linked to what were perceived to be discriminatory and exclusionary practices and overall, appeared to have a predominantly negative impact on the labor market trajectories of tied migrants in the Free State, South Africa.

The study by Zinatsa & Saurombe contributes to the scant extant empirical knowledge on the meso-level governing technologies of tied migrants pursuing LMI in the Free State, South Africa, from a hitherto understudied South-to-South perspective and by exploring the experiences of skilled women migrants in the context of family migration. This study also considers how the DHA in South Africa is making known its intention to initiate programs designed explicitly for the integration of legal migrants. Further, it utilizes a neglected aspect of Michel Foucault's theory of governmentality—counter conducts—to investigate the integration needs of accompanying spouses. The results can, to some extent, highlight issues that could inform South African immigration policy.

The advent of the Corona Virus (COVID-19) Disease led to the sudden closure of numerous Small to Medium Enterprises (SMEs) across the globe. As the virus quickly spread from continent to continent, governments across the world under the guidance of the World Health Organisation (WHO), had to adopt stern measures in the form of lockdowns and curfews to curb the spread of the virus soon after WHO declared the virus a global pandemic. These lockdowns meant that those businesses which did not qualify under the 'essential products/services' category faced an abrupt cut in the flow of income as they were forced to close, while customers were obligated by law to stay at home. Most SMEs by virtue of their size and limited financial resources had no reserves to carry them through this series of lockdowns, as the virus mutated from one variant to another.

The **fourth paper by Gwendoline Vusumuzi Nani & Izithembisozenkosi Ndlovu** sought to investigate the challenges experienced by SME owners in the face of the corona virus and the survival strategies adopted by those businesses that managed to withstand the pandemic for the benefit of those SMEs that are struggling to survive these tough times. In-spite of geographic differences, literature reveals that the majority of SMES experienced similar challenges world-wide. These challenges cut across financial constraints, reduced demand, disrupted supply chains, unpreparedness and limited know-how on managing an unfamiliar business terrain, amongst many other challenges. Literature also reveals that similar survival strategies were also adopted by SMEs world-wide. Most SMEs had to under-go rapid digital transformation through the adoption of social media platforms as well as the adoption of massive cost cutting techniques in an attempt to stay afloat.

An interpretivist paradigm in conjunction with a qualitative approach was adopted in this study using a case study design, as the study sought to collect in-depth data. Only 30 SME owners were selected purposively as respondents. This sampling technique was chosen so as to include only those respondents that were most likely to add value to the study through their experiences. Prior to data collection, the research instrument was pilot tested on five respondents who matched the characteristics of the target population. A semi- open-ended questionnaire was used to collect data through interviewer administered interviews, under strict observation of COVID-19 regulations. In situations where this was not feasible, the same questionnaire was administered via email.

Thematic data analysis revealed that SMEs in the Bulawayo Metropolitan encountered similar challenges which include reduced demand and therefore sales, financial constraints in meeting fixed costs such as rentals and salaries despite there being little to no income. Supply chains were heavily disrupted,

causing longer lead times in acquiring raw materials, a challenge whose ripple effect caused businesses to also fail to deliver to their own customers on time. The SMEs that managed to survive the global catastrophe were forced to rapidly adopt digital marketing strategies to regularly communicate with their clients through social media. Data analysis also revealed that SMEs had to widen their product portfolio to include COVID related products which included masks, sanitisers and thermometers which are current fast movers in the COVID era. Door to door deliveries were also adopted by businesses to bring their services closer to the markets.

Nani & Ndlovu concluded that SMEs in the Bulawayo Metropolitan Province encountered challenges similar to those experienced by other SMEs across various continents despite geographical differences. The strategies adopted in-order to survive also seem to be of a similar nature world-wide. Therefore, the study concluded that with the right strategies, SMEs regardless of their size can survive the pandemic. The authors recommended that SME owners must be equipped with digital literacy, innovative and environmental analysis skills as strategies to enable them to hedge against unexpected risks.

Ethical behavior is crucial in business to maintain stakeholders' interests and corporate reputation. To ensure the accountability and transparency, companies can disclose the business ethics implemented voluntarily in corporate reports. To enhance the quality of the disclosures, audit committees as a corporate governance mechanism can play an important role. This **fifth paper by Alvianis Yusnita Bayu & Desi Adhariani** aims to determine the association between audit committee characteristics and ethics disclosure using the theory of comfort as theoretical lens.

The audit committee characteristics investigated are audit committee expertise, frequency of meetings, audit committee size, audit committee tenure, and multiple directorships of audit committee members. Ethics disclosure is measured using a disclosure checklist developed by Persons (2009). This research study takes an emerging market, Indonesia, as the context to enable a comparison of the findings with previous literature in developed countries. The sample consists of 85 large-market-capitalization companies (595 observations) listed on the Indonesia Stock Exchange (IDX) in 2014–2020.

The findings of Bayu & Adhariani indicate that the level of ethics disclosure on average is 58.16%. The results show that there are three characteristics of audit committees that significantly influence ethics disclosure: audit committee expertise, audit committee size, and frequency of meetings. These factors play a significant role in producing comfort and confidence in the eyes of stakeholders of companies that exercise ethical business practices. The study has important practical implications regarding how several attributes of audit committees can encourage ethical conduct in business and hence increase ethics disclosure. Companies can take several actions in this regard, including by structuring the audit committees based on several diversity principles and increase the frequency of audit committee's meetings to enhance the monitoring function.

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

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.

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A DYNAMIC PANEL GRAVITY MODEL APPLICATION ON TRADE OPENNESS DETERMINANTS: EVIDENCE FROM SOUTHERN AND WESTERN EUROPEAN COUNTRIES

Esat A. Durguti and Arben Malaj

ABSTRACT

Trade openness plays a significant role in the growth process of countries. The purpose of this research is to examine the impact of macroeconomic determinants on trade openness. The study focuses on the Southern and Eastern European countries and the data used were from 2010 to 2020. Panel data through econometrics techniques, the fixed effect, and the Poisson approach (PPLM) are used to carry out empirical investigation and robustness testing. The main finding of the research is that macroeconomic determinants such as GDP growth, and gross savings, positively affect trade openness in Southern Europe according to the fixed effect. Furthermore, according to Poisson's approach, GDP growth, inflation, gross savings to the GDP, domestic credit private sector, and population growth, positively affect trade openness. Additionally, gross capital formation has also impacted trade openness negatively and significantly. The econometric results for Western Europe are showing nearly identical results with only one difference: in the Poisson approach where the variable gross savings to the GDP have turned out not to be significant. It implies that efficient macroeconomic management matters for higher trade openness. The sampled countries are recommended to pay favorable attention to macroeconomic variables if they want to grow in the long run through outward-oriented policies. This article is an original contribution to the context of Southern and Western European countries by focusing on the connection between macroeconomic determinants and trade openness.

INTRODUCTION

The evolution of the development of trade dates to ancient times, and with the development of human society as well as the process of trade, it has evolved to the size of today. International trade relations between states are becoming increasingly necessary and important in a world that is rapidly changing. External (bilateral) and global issues between states have become more visible within the

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international system. During the evolution of human history, people gained knowledge from the environment where they operated and were influenced by states which had common borders. States learned and developed their livelihoods by acquiring skills and lifestyles that suited them. Even at this moment, separate states that have different demographics and histories, adapt and gain knowledge from each other. Cultural diversity among countries has its consequences on the trade in a complex way.

Moreover, trade between states has its special effects on culture. Respectively, there is a great possibility that trade between countries with common cultural characteristics will be at a higher level compared to countries that do not have common cultural characteristics. The benefits of trade can vary from state to state based on national well-being, the economic, political, regional, and strategic situation. Countries tend to agree on mutual free trade agreements when multilateral liberalization is unattainable. Additional free trade can facilitate increased national well-being. Starting with the theory of "Mercantilism" concerning the theory of trade, the role of foreign trade is constantly growing and plays a dominant role in economic debates. Moreover, many countries have recently adopted and drafted policies on market liberalization for their economic growth to benefit. Standard open trade models argue that the benefits of emerging economies if they eliminate their barriers to foreign trade, are higher compared to the benefits of developed economies to reach new markets (Weisbort and Becker., 2001). Based on this fact, the majority of countries included in the analysis are part of the European Union, where they are obliged to harmonize the legal framework according to EU directives, while the rest of the countries are signatories to the Stabilization and Association Agreement (SAA). The opening of trade is considered from the benefit perspective because the local businesses provide new markets and linearly affect the increase of productivity and the document of innovative products through perfect competition. Meanwhile, from the consumer point of view, the opening of trade has the benefits of reducing the cost of production and improving its quality. The two viewpoints on economic growth are underlined in the form of the hypothesis on the opening of trade and its position in economic growth. First, the flow and benefit of international knowledge and innovation should be encouraged. Second, allowing specialization in economies through the creation of new products and gaining knowledge along with production inputs is considered another important dimension in terms of economic growth (Ravinthirakumaran, 2014).

Trade openness undoubtedly has its benefits, but in practice, some arguments oppose the opening of trade focusing on cost and market liberalization. This view in economic theory is known as a "Protectionist theory" which relies on the following arguments: protection of local employment, support of new businesses, prevention of dumping, and correction of the balance of payments. To conduct this research, we have included two groups of panel data, corresponding to South and West European countries for the 2010-2020 period. Specifically, we have raised research questions as part of this research, namely:

> **(RQ1):** *How macroeconomic determinants affect trade openness in Southern and Western European countries.*

The contribution of this study will aim to expand the empirical literature between macroeconomic factors and trade openness, using the latest data of the countries considered in the analysis. In the study, the quantitative approach was applied using panel data to conceptualize the determined objectives. Furthermore, the study addresses trade opening issues from several perspectives as follows: first, from a theoretical point of view, it contributes to the provision of empirical evidence to resolve dilemmas related to trade opening issues; second, by giving an original contribution to econometric terms, using data for European countries in general, on the one hand, and seeing the effect of macroeconomic factors on trade opening, on the other hand, by using the fixed effect and PPL approach. Finally, the study addresses trade opening issues in terms of policy-making considerations for countries that are aspiring to be part of the EU family. Furthermore, based on the specifics emphasized in the variables selected in the analysis, our paper will be based on studies conducted by Irshad et al, (2018a). The paper is structured logically,

starting from the introduction, literature review, methodology, empirical findings, and ending with the conclusions and implications of policymaking.

THEORETICAL REVIEW AND DEVELOPMENT OF HYPOTHESES

From an academic and empirical standpoint, the connection between trade opening and economic growth has gotten a lot of attention in the previous three decades. The literature (Marelli and Signorelli, 2011, Yanikkaya, 2003, Edwards, 1993) defines trade openness as a ratio of total trade (imports plus exports) to a country's national income (GDP). Considerable courtesy on the degree to which countries are open to intercontinental trade is driven by the fact that a lot of observed revisions have their assumption that openness to intercontinental trade yields higher growth rates (Yanikkaya, 2003). It is also because of the major failures of the import substitution policies that were adopted by most of the emerging countries in the 1970s as a strategy toward economic progress. By opening up their economies, countries enhance their economic growth over the integration of markets and technologies, which improves their productivity and exports. Internationalization makes countries opt for policies to reduce tariffs on the trade of agricultural products, which in turn increases the demand, production, and trade of those products (Cabrera-Schneider, 2009). With an open economy, the vulnerability brought by negative imports is balanced by a substantial benefit of productivity and competitiveness, drawn from intercontinental trade.

Besides, higher scores of openness tend to stimulate more foreign investments, hence providing the local workforce with more sources of employment. It also brings along new technologies which positively affect productivity levels. However, it is worth noting that there is no perfect compromise when it comes to trade opening and its influence on economic growth. In academic terms, there are two philosophies relating to this issue: the first supports the view that trade opening has a direct influence on economic growth, whereas the second supports the attitude that trade opening has an indirect influence on economic growth. The impression of Solow, (1957) neoclassic growth theory, also known as the technological progress growth model, was criticized and replicated by Coe and Helpman., (1995); Grossman and Helpman., (1991a). Approaches based on the economic growth endogenous model support and argue the importance and certainty of the dependency between the acceptance of trade opening strategies and economic growth through the acquisition of technology and new knowledge in the long-term prognosis for economic growth. A considerable number of scientists have argued that these two components have a positive correlation, with specific emphasis by Harrison, (1996); Frankel and Romer, (1999); and Wacziarg, (1999). When compared to countries with a lower degree of trade openness, countries with a higher degree of trade openness are more likely to embrace advanced technology from industrialized economies, which is recognized as an advantage and leads to faster growth. All of these factors show that developing economies have a greater chance of benefiting from industrialized economies.

According to the opponents, trade liberalization in approximate situations may be detrimental to economic growth. As such, Baliamoune-Lutz and Ndikumana, (2007) evaluated the interaction of these two components for African countries, concluding that large-scale trade opening can result in detrimental economic growth. Rodriguez and Rodrik, (2000) came to an analogous conclusion, claiming that determining the important link between trade openness and economic growth is complex. In the context of the investigation, the study proposes the following hypothesis based on the aforementioned debates:

> ***Ho:*** *Trade openness has a positive effect on economic growth in Southern and Western Europe.*

As a result, it is obvious that we have a continual improvement in the literature regarding the impact of trade opening on economic growth; unfortunately, the conclusions are heterogeneous and convergent, both in terms of the econometric approach used and the economies examined. In addition,

studies by Das and Paul., (2011); Marelli and Signorelli., (2011); and Nowbutsing, (2014) support the positive linkage between them. However, some of the authors who criticize these views argue that the majority of studies have at least two fundamental problems: first, the financial indicators used to measure trade openness are inaccurate, and second, the usage of ineffective approaches and techniques leads to one-sided conclusions. The empirical evidence on the philosophical foundations of the second group of the indirect or nonlinear impact of trade opening on GDP growth is limited and argued through various intervening variables or mechanisms. Consequently, Darku and Yeboah., (2018) observe how trade opening affects GDP growth in emerging countries over the period 1980-2010, using intervening indicators of the level of initial income. According to the findings, the examined correlation is influenced by the specific initial levels of a country`s development. From a different perspective, Huang and Chang., (2014) investigated trade liberalization and its influence by taking into account a country's financial progress. Their study, which covered 46 states from 1983 to 2007, concluded that trade liberalization had no direct influence on GDP growth.

Fetahi-Vehapi et al., (2015) reported that gross formulation capital has a significant impact on SEE countries by using the GMM technique. Durguti et al., (2021) argue that gross formulation capital has a positive correlation by analyzing a panel of Western Balkan countries, using the dynamic fixed effect approach and Arrellano-Bover/Blundell-Bond estimation. Additionally, Sare et al. (2018) observed macroeconomic factors of trade opening by employing data for 46 countries from 1980 to 2015. The technique used was GMM estimation, thus the results contradict the premise that financial advance has a significant influence on trade opening, whereas gross domestic private credit has a significant influence. All in all, having highlighted two critical issues above, this study contends that despite the strong influence of inflation and gross capital formation on trade opening, gross savings and population`s annual growth are far from being strong influencing factors.

DATA AND EMPIRICAL MODEL

1. Data Source

To conduct this research, we have used secondary data provided by official World Bank statistics. The sample of this study includes 14 of the 16 Southern European countries (SEc) (i.e., Albania, Bosnia and Herzegovina, Croatia, Cyprus, Greece, Italy, Kosovo, Malta, Montenegro, North Macedonia, Portugal, Serbia, Slovenia, and Spain). Countries that are not included in the sample due to lack of data are Andorra and Gibraltar; and also 7 out of 8 Western European countries (WEc) (i.e., Austria, Belgium, France, Germany, Luxembourg, Netherlands, Switzerland, and Liechtenstein) are included in the analysis. The study covers the period 2010 to 2020, with 154 observations for Southern European countries, and 77 observations for Western European countries. The data used are strongly balanced panel data, categorized in two groups: trade openness proxies (Exp_GDP and Imp_GDP) as dependent variables, while the second group of control variables is GDP growth, inflation, gross capital formation-to-GDP, gross savings-to-GDP, domestic credit to private sector-to-GDP and population annual growth. Table 1 provides the classification, description, and expected results of each parameter in particular.

Table 1 Variable descriptions and expected sign

Variable		Denominations	Acronyms	Sign
Dependent variable	Proxies	Export-to-GDP %	*E_GDP*	
		Import-to-GDP %	*I_GDP*	
Explanatory variables	Indicators	GDP annual growth %	*G_GDP*	+/-
		Inflation %	*INF*	+
		Gross capital formation-to-GDP %	*GCF_GDP*	-
		Gross savings-to-GDP %	*GS_GDP*	+

| | | Domestic credit private sector-to-GDP % | *DCPS_GDP* | - |
| | | Population annual growth % | *POP_G* | + |

Source: Author's selection

The sorting of variables is based on a literature review of different studies conducted in the last decade by various authors, mainly such as Irshad et al, (2018a). The assessment in this study is done by taking into consideration a mixture of variables, not only common variables such as GDP, exports, and imports, but also other variables that are considered vital in this field. Compared to previous revisions, this study includes new additional variables, considered non-traditional, such as gross savings to GDP, and domestic credit to the private sector to GDP, thus giving new insight into the matter.

2. Specification of the Econometric Model

To investigate the effects of factors that affect trade components (export and import to GDP) proxies, various authors have applied different estimates and techniques to achieve more consistent results. Our research will focus on two models, fixed effects regression and Poisson-PML regression. The reason for selecting fixed effects was made as the result of the Hausman test regarding deviations turned out to be significant to random effect. Whereas, one of the advantages that Poisson PML has when it comes to panel data, this model allows for analyzing the individual degree of heterogeneity. The application of the econometric model will focus on recent empirical studies and the selection of a more adequate and appropriate approach with the defined parameters. Irshad et al, (2018b) used OLS with the time fixed-effects and gravity panel approach to testing South Korea's potential export, while Irwan et al, (2013) used fixed-effects and random-effects to analyze the export determinants between Malaysia and OIC members; and most recently Fetahi-Vehapi et al, (2015) applied the dynamic GMM estimation approach to evaluate the effects of trade openness for SEE countries. Lastly, we will also take into consideration analyzing the trade relations, through a dynamic panel Poisson method. The study will also apply the Levin Lin Chu test for cross-sectional dependencies and the Fisher ADF unit root test before investigating determinants through empirical models.

In our analysis, we did not apply the GMM method, given the fact that this assessment requires the criterion N>T (panel number to be greater than the number of time series), which in our case this condition is not met with Western European countries, consequently the application of this system can give us inadequate and inaccurate results. Therefore, we strongly doubt that the application of this technique in such cases when N<T, results in an inadequate model definition and may give unreliable results, as the time-variant is related to the residual error. If the data, or the omitted variables, do not exhibit a consistent association with the explanatory variables included in the model, OLS is the appropriate model. Therefore, in a situation, the model will provide unbiased estimates of the coefficients, incorporating all available data, and will produce lower standard errors. However, given that the data from the correlation analysis indicated a relatively steady correlation, the omitted variables are likely to produce at least some bias in the estimation. Based on this premise, we consider that OLS may be insufficient in this scenario. Because the data in this model are grouped, it provides for the heterogeneity or individuality that occurs between the variables. The fixed-effect model, on the other hand, examines for all time-invariant changes across variables, ensuring that the predicted coefficients of the fixed-effect models are not skewed by similar variables that change over time. The gravity model for exports and imports is one of the most effective estimation methods in economics, and it has long played an important role in trade literature (Anderson, 2011). Various ways to specify and estimate the gravity equation have been proposed (see Feenstra 2004, Head and Mayer, 2014). Specifications vary broadly along two dimensions. The first dimension concerns the error term. The second is the degree of a model structure that is imposed on the estimation. Among the estimation approaches available, one possibility is to use the Poisson pseudo-maximum likelihood method (Poisson-PML). Santos Silva and Tenreyro (2006) show that Poisson-PML consistently estimates the gravity equation for trade and is robust to different patterns

of heteroskedasticity and measurement error, which makes it preferable to alternative procedures such as ordinary least squares (using the log of trade flows) or non-linear least squares (in levels).

Using the conventional technique, we examined the ordinary least squares (OLS), fixed effects (FE), and random effects (RE) models using panel data. As detailed below, both the FE and the RE models appear to be adequate estimators. The preferred model is FE, which is better suited to small samples and can be predicted for unbalanced panels, whereas RE is estimated as a robustness check. Diagnostic tests have been conducted on the selected model to see whether it was misspecified. Cross-sectional dependency, serial correlation, and normality have all been evaluated as common concerns with panel estimations. Robust standard errors are employed to account for the heteroscedasticity issue. To investigate the determinants of trade openness, we begin with the standard OLS estimator and then assess if the fixed effects model is more suitable than the OLS model. To select between these two models, we examine if the deviations (FEs) are substantially significant.

The results in Tables 7 and 8 show that a FEM is supported. The use of the OLS model would produce unreliable estimates since heterogeneity across countries exists. Choosing between OLS versus FEM, Breusch and Pagan's LM statistic is performed. In this scenario Ho: rejected with test restriction that $ui=\alpha$. Fixed-effect versus random-effect models are the final models to be explored. Hausman's chi-square statistic can be used to choose between these two models. A large value from this test will support fixed-effect over random-effect. This study will apply the fixed-effect and Poisson estimation to evaluate the impact of specific determinants on trade components defined as trade openness proxies. One of the econometric advantages over the use of panel data and dynamic PPML is that it allows the degree of individual heterogeneity, which is not an available characteristic when using time-series or cross-cutting data (Baltagi, 2013). Below, we will present the concrete parameters for both models.

Fixed-effects equation:

$$E\_GDP_{it} = \alpha + \beta_1(G\_GDP_{it}) + \beta_2(INF_{it}) + \beta_3(GCF\_GDP_{it}) + \beta_4(GS\_GDP_{it}) + \beta_5(DCPS\_GDP_{it}) + \beta_6(POP\_G_{it}) + \varepsilon_{it} \tag{1}$$

$$L\_GDP_{it} = \alpha + \beta_1(G\_GDP_{it}) + \beta_2(INF_{it}) + \beta_3(GCF\_GDP_{it}) + \beta_4(GS\_GDP_{it}) + \beta_5(DCPS\_GDP_{it}) + \beta_6(POP_{G_{it}}) + +\varepsilon_{it} \tag{2}$$

Poisson PML equation:

$$E\_GDP_{ijt} = \tau_0 + \varphi_1(G\_GDP_{it}) + \varphi_2(G\_GDP_{jt}) + \varphi_3(INF_{jt}) + \varphi_4(INF_{jt}) + \varphi_5(GCF\_GDP_{it}) + \varphi_6(GCF\_GDP_{jt}) + \varphi_7(GS\_GDP_{it}) + \varphi_8(GS\_GDP_{jt}) + \varphi_9(DCPS\_GDP_{it}) + \varphi_{10}(DCPS\_GDP_{jt}) + \varphi_{11}(POP\_G_{it}) + \varphi_{12}(POP\_G_{jt}) + \varepsilon_{ijt} \tag{3}$$

$$L\_GDP_{ijt} = \tau_0 + \varphi_1(G\_GDP_{it}) + \varphi_2(G\_GDP_{jt}) + \varphi_3(INF_{jt}) + \varphi_4(INF_{jt}) + \varphi_5(GCF\_GDP_{it}) + \varphi_6(GCF\_GDP_{jt}) + \varphi_7(GS\_GDP_{it}) + \varphi_8(GS\_GDP_{jt}) + \varphi_9(DCPS\_GDP_{it}) + \varphi_{10}(DCPS\_GDP_{jt}) + \varphi_{11}(POP\_G_{it}) + \varphi_{12}(POP\_G_{jt}) + \varepsilon_{ijt} \tag{4}$$

The two last presented equations are traditional Poisson PML models, as their estimates show relatively worthy outcomes. On the other hand, the recent fragile situation in the world induces a lot of research difficulties in reaching concrete conclusions, thus as a result, many authors use altered and specific factors in their analysis.

3. Summary of General Statistics

As exhibited in table 2, it is noted that for the variable of export measurements to GDP the mean value for the Southern European countries is 48.5 % of GDP, significantly lower than the mean value for the Western European countries which reaches 78.2 % of GDP. Nearly the same trend is observed in the ratio of imports to GDP, where the mean value in the Southern European countries is 56.1 % of GDP,

while the Western European countries have a mean value of 69.2 % of GDP. Furthermore, in both panel groups, the mean value of GDP growth is nearly identical (1.4 % for SEc and 1.3 % for WEc). From the results presented in the summary table of statistics, it is noticed that INF, GCF_GDP, and GS_GDP behave around the same interval. A significant difference from these statistics is that Western European countries have the highest level of lending to the private sector compared to Southern European countries with respectively 83.8 % for SEc and 101.0 % of GDP for WEc.

Regarding some variables that do not have a normal distribution, since the p-value is > 0.1, based on some studies, no significant problems can appear in the model. According to the central limit theorem, when the sample size is 100 or more observations, normality violation is not a major concern (Altman and Bland., 1995).

Table 2 Summary of descriptive statistics

Southern Europe	E_GDP	I_GDP	G_GDP	INF	GCF_GDP	GS_GDP	DCPS_GDP	POP_G
Smallest	17.075	23.019	-9.132	-2.410	10.217	-0.768	33.006	-1.745
Largest	163.123	159.556	9.608	11.137	34.557	32.441	255.310	3.651
Mean	48.496	56.121	1.403	1.458	21.365	17.386	83.774	0.062
Std.Dev	32.348	28.101	3.139	1.925	5.307	3.531	51.292	0.819
Skewness	2.322	2.076	-0.871	1.552	0.565	-0.682	1.634	1.366
Kurtosis	7.842	7.582	4.065	8.033	2.872	3.799	5.431	7.259
Jarque-Bera	62.581	63.183	17.457	46.701	7.333	15.032	40.261	36.132
Prob.	0.0000	0.0000	0.0002	0.0000	0.0256	0.0362	0.0000	0.0010
Obs	154	154	154	154	154	154	154	154
Western Europe	E_GDP	I_GDP	G_GDP	INF	GCF_GDP	GS_GDP	DCPS_GDP	POP_G
Smallest	24.836	25.627	-5.694	-1.144	16.212	15.610	54.739	-1.854
Largest	221.196	187.165	4.865	3.532	26.735	38.973	176.012	2.431
Mean	78.284	69.258	1.347	1.248	21.935	26.071	101.025	0.769
Std.Dev	52.562	42.639	1.941	0.983	2.327	4.932	31.289	0.711
Skewness	1.675	1.603	-1.382	0.039	-0.287	0.251	1.004	0.371
Kurtosis	4.667	4.525	5.731	2.608	2.346	2.876	3.453	5.135
Jarque-Bera	22.263	21.135	21.188	0.341	3.321	0.967	10.612	14.651
Prob.	0.0000	0.0000	0.0000	0.8429	0.1898	0.6191	0.0050	0.0031
Obs	77	77	77	77	77	77	77	77

Source: Author's calculation

Furthermore, the authors (Ghasemi and Zahediasl., 2012) claim that for the size of the sample represented, relevant findings will be achieved even if there is a little deviation from a normal distribution, even if this minor deviation does not affect the assessed results. Therefore, this eliminates the concern over the normal distribution of data. Jarque-Bera results show that all variables have a normal skewness distribution within the first group of countries, while in Western European countries we do not have a normal skewness distribution in the following variables: inflation, gross capital formulation to GDP, and gross savings to GDP. Regarding the additional specifics of the series, it is essential to define the connection vis-à-vis the variables selected in the assessment. From table 3, a robust positive

correlation was detected between export and population annual growth. A moderately positive association was observed between export to GDP as the dependent variable and GDP growth, DCPS_GDP, as well as gross savings to GDP within Southern European countries. However, a low negative correlation was detected in inflation and gross capital formulation to GDP. The correlations between the additional variables and their effect among themselves are detailed in the following table.

Table 3 Correlation matrix for the dependent variable Export-to-GDP

Southern Europe	E_GDP	G_GDP	INF	GCF_GDP	GS_GDP	DCPS_GDP	POP_G
E_GDP	1.0000						
G_GDP	0.3622	1.0000					
INF	-0.0622	-0.1243	1.0000				
GCF_GDP	-0.0934	0.3369	0.1381	1.0000			
GS_GDP	0.3259	0.4172	-0.0797	0.4847	1.0000		
DCPS_GDP	0.1437	-0.3127	-0.2075	-0.4825	-0.2439	1.0000	
POP_G	0.6071	0.1751	-0.0068	0.0952	0.3501	0.3068	1.0000
Western Europe	E_GDP	G_GDP	INF	GCF_GDP	GS_GDP	DCPS_GDP	POP_G
E_GDP	1.0000						
G_GDP	0.2927	1.0000					
INF	0.1344	0.1887	1.0000				
GCF_GDP	-0.5475	0.0387	-0.0748	1.0000			
GS_GDP	-0.4673	0.0329	-0.2998	0.4083	1.0000		
DCPS_GDP	-0.0321	-0.0258	-0.5004	0.0596	0.5836	1.0000	
POP_G	0.8170	0.1934	-0.0669	-0.3110	-0.3166	0.1538	1.0000

Source: Author's calculation

In the following, we will present the correlation analysis for the other dependent variable Import-to-GDP. When we compare tables 3 and 4, it is evident that the difference exists only in the first column, with the remainder of the data being similar. As a result, the explanation of the results would be identical.

Table 4 Correlation matrix for the dependent variable Import-to-GDP

Southern Europe		I_GDP	G_GDP	INF	GCF_GDP	GS_GDP	DCPS_GDP	POP_G
I_GDP		1.0000						
G_GDP		0.4371	1.0000					
INF		0.0149	-0.1243	1.0000				
GCF_GDP		0.1507	0.3369	0.1381	1.0000			
GS_GDP		0.2692	0.4172	-0.0797	0.4847	1.0000		
DCPS_GDP		-0.0281	-0.3127	-0.2075	-0.4825	-0.2439	1.0000	
POP_G		0.5400	0.1751	-0.0068	0.0952	0.3501	0.3068	1.0000
Western Europe		I_GDP	G_GDP	INF	GCF_GDP	GS_GDP	DCPS_GDP	POP_G
I_GDP		1.0000						
G_GDP		0.2927	1.0000					
INF		0.1662	0.1887	1.0000				
GCF_GDP		-0.5044	0.0387	-0.0748	1.0000			
GS_GDP		-0.4961	0.0329	-0.2998	0.4083	1.0000		
DCPS_GDP		-0.0942	-0.0258	-0.5004	0.0596	0.5836	1.0000	
POP_G		0.8020	0.1934	-0.0669	-0.3110	-0.3166	0.1538	1.0000

behalf of the Southern European countries, show that all variables were stationary at the level, except import to GDP, which is setting the first difference, is reached stationary values. Whereas, for Western European countries all data are stationary at the level. This assessment was made at a critical level of 0.05 percent.

Table 6 Cross-sectional dependence & unit root tests results

Southern Europe	E_GDP	I_GDP	G_GDP	INF	GCF_GDP	GS_GDP	DCPS_GDP	POP_G
Levin Lin Chu test	-5.25441 (0.0000)	-2.19937 (0.0345)	-2.96257 (0.0015)	-9.11299 (0.0000)	-6.04967 (0.0000)	-1.55564 (0.0559)	-1.71903 (0.0428)	-11.0060 (0.0000)
Fisher ADF (P-value)	72.7015 (0.000)	37.7091 (0.007)	62.7075 (0.002)	104.9970 (0.000)	75.6000 (0.000)	51.9088 (0.009)	26.7276 (0.098)	36.1254 (0.003)
ADF (level)	-3.022*	-2.587[1]	-7.620*	-6.377*	-3.803*	-3.549*	-2.899*	-3.1943*
ADF (1st diff)	-3.118*	-2.930*	-5.872*	-6.461*	-3.699*	-3.805*	-3.215*	-2.3513*
Western Europe	E_GDP	I_GDP	G_GDP	INF	GCF_GDP	GS_GDP	DCPS_GDP	POP_G
Levin Lin Chu test	-3.23364 (0.0006)	-3.80857 (0.0001)	-1.4038 (0.0082)	-9.82146 (0.0000)	-1.57637 (0.0075)	-3.45471 (0.0003)	-3.74598 (0.0001)	-11.9445 (0.0000)
Fisher ADF (P-value)	37.9052 (0.000)	38.2111 (0.005)	61.4175 (0.000)	38.6973 (0.004)	20.4640 (0.016)	34.3333 (0.002)	19.7388 (0.038)	37.1127 (0.000)
ADF (level)	-9.288*	-9.396*	-4.572*	-5.962*	-8.677*	-10.225*	-9.632*	-9.632*

Notes: *The only non-stationary variable at the level is I_GDP= -2.587[1] in Southern Europe. The assessment is made 5% critical value.* Source: Author's calculation

Meanwhile, above we verified the confirmation of cross-sectorial dependence for the defined variables, cross-country fixed-effect regression, and Poisson PML with the results of trade openness. The results for the Southern European countries are presented in table 7, while for the Western European countries in table 8. Taken as general performance of the Poisson regression, the results generated seem to be adequate since the value of R-squared for fixed-effect regression is 0.5254 and 0.4214 for Poisson PML for the Southern European countries. The estimated results for Western European countries are presented in table 8, where it is noted that the R-squared is 0.3537 according to fixed-effect, while according to Poisson PML the value of the R-squared is 0.680. These results from both analyzes give us solid indications that for Southern European countries the control variables explain the dependent variables about 52.5 percent, while for Western European countries according to the first model the control variables explain over 35.4 percent, but according to Poisson, explains it by 68.0 percent. And based on these results as an overall conclusion we conclude that gravity Poisson PML is suitable for our case. In addition to this fact, to further strengthen the stability of the applied models, and in particular, for fixed-effect regression, the results of the F-test in both cases [Southern Europe F (6, 134), with p= 0.000, and Western Europe F (5,65), with p = 0.001] show that all variables have a value less than F <0.1.

Estimation Results for Southern Europe

An important impact on the evaluation parameter of export-to-GDP, according to the fixed-effect model has resulted in these factors GDP growth and gross savings to GDP. While the domestic credit private sector to GDP, gross capital formation, and population annual growth has turned out to have a negative impact. Inflation in the context of our analysis has turned out to be irrelevant in the export-to-GDP. Poisson estimation (PPLM) gives us the results with a change compared to the previous model, where these variables GDP growth, inflation, gross savings to GDP, domestic credit private sector to GDP, and population annual growth have a positive significant effect on export to GDP, while gross formulation capital to GDP has a significant negative effect on export to GDP. Import-to-GDP according

to fixed-effect is confirmed to have an important constructive effect with the factors GDP growth, and gross formulation capital to GDP, but a substantial negative effect on import has resulted in domestic credit private sector to GDP, and population annual growth. With inconsequential effects to import have resulted in inflation and gross savings to GDP. However, the results according to Poisson PML for import-to-GDP, give us satisfactory and expected results. The variables that devise a confident effect are GDP growth, inflation, and population annual growth. The important negative effect on import-to-GDP are two variables gross savings to GDP, and domestic credit private sector to GDP and the only variable that has an irrelevant effect is gross capital formulation to GDP.

Table 7 Estimation results

Variable	FE		Poisson estimation	
	1	*2*	*3*	*4*
Constant	46.806***	50.138***	4.062***	3.984***
G_GDP	0.531***	0.430***	0.056***	0.055***
INF	-0.125	0.220	0.018***	0.013***
GCF_GDP	-0.349***	0.405***	-0.038***	0.004
GS_GDP	0.764***	0.007	0.029***	-0.041**
DCP_GDP	-0.052***	-0.039***	0.007***	-0.003**
POP_G	-5.240***	-6.331***	0.260***	0.237***
Observation	154	154	154	154
R-sq	*0.5254*	*0.4196*	*0.4214*	*0.285*
F-test	*p=0.000*	*p=0.000*	*"- "*	*"- "*
Hausman test	*P=0.029*	*P=0.031*	*"- "*	*"- "*
BP Lagrangian multiplier	*P=0.000*	*P=0.000*	*"- "*	*"- "*

Note. (***), (**), (*) significant respectively at 1, 5, and 10 percent. The dependent variable in models 1 and 3 is the level of exports to GDP. The dependent variable in models 2, and 4, is the level of imports to GDP. Clarification: The use of vce analysis has caused the standard error values to decrease, however, there is no obvious difference in terms of p> | t |.
Source: Author's calculation

The results for the variable GDP growth show that they are statistically important in both models with 1 percent of the confidence interval. This means that any increase of 1 percent of GDP within these countries affects the increase of the export to GDP ratio by 0.53 percent points (since the coefficient is 0.531 ***) according to the fixed-effects model, while according to Poisson PLM, it results at an increase of 0.05 percent points. The empirical results are in line with the established expectations, and in this context, a considerable number of studies confirm these findings. The results of the study are a pattern with the study conducted by Irshad et al, (2018a) analyzing the trade potential between Pakistan and China, where it was found that GDP growth has a constructive effect on increasing the level of exports. The same results are confirmed by Fetahi-Vehapi et al, (2015) by analyzing the effects of open trade on GDP growth for SEE countries. The result on the interconnection vis-à-vis import to GDP versus GDP growth has turned out to be statistically important at the level of 1 percent of confidence, 0.430 in both applied models, and respectively 0.055 according to Poisson PML. At first glance, the result of this evaluation parameter seems to be challenging, but by analyzing the studies of these parameters, we can reach a clear conclusion and say that there is a robust positive correlation between them, especially in long-term periods. Using causality and co-integration analysis to examine the impact between GDP, exports, and imports Andrews, (2015) found that GDP harms exports, but it has a positive effect on imports. These outcomes are also in full accordance with the findings of Durguti et al, (2020) in the analysis of the Western Balkan countries, including data for the 2001-2017 period. The results confirmed by this study argue for a significant positive correlation between GDP growth and imports.

In addition to the main variables defined, the other control variables in the study reflect interesting and important results regarding the trade opening. The econometric findings on the inflation

rate according to the fixed effect model have an irrelevant effect on the level of exports and imports, whereas the inflation rate has a significant positive effect on the level of exports and imports with a reliability of 1 percent according to the Poisson estimation. To analyze the trade openness parameter and its correlation with inflation, numerous studies have been conducted, and they almost lead to the expected results. Furthermore, Rizwan et al. (2018) argued for a positive correlation between export, import, and inflation rate in the short and long term. Using the ARDL and Dumitrescu Hurlin panel causality tests, researchers Francis et al., (2021) examining Sub-Saharan African countries found that there is a positive correlation between trade openness and inflation and that our findings are consistent with the research mentioned. Durguti et al., (2021) claim similar conclusions by examining Western Balkan economies where there is a positive association between trade openness and inflation rate. Gross capital formation based on the observed results has a substantial harmful effect with the level of reliability of 1 percent on trade openness according to both estimates (fixed effect and Poisson estimation). These results argue the fact that any increase in this indicator has an impact on reducing trade openness. The next variable for assessment is gross savings to GDP according to fixed-effect has a significant positive sign in export with a significance level of 1 percent, while in terms of import according to fixed-effect has resulted to be non-significant in both estimates by evaluating all variables included in the analysis. Moreover, the parameters namely domestic private credit and population annual growth have negative and significant signs in trade openness. These findings are consistent with those of Sera et al., (2018), Fetahi-Vehapi., (2015), and Durguti et al., (2021). Their findings strongly support the notion that the apostrophized factors have a consistent relationship with the trade opening.

Estimation Results for Western Europe

According to the results, R^2 for variables and measurements of import is .6724, while for measurements of export is .6219 using the Poisson approach. This result strongly suggests that the Poisson approach is adequately specified, as the control variables explain 67.2 percent and 62.2 percent of the variable trade opening. Furthermore, the F-test in both models shows that it has the lowest value $F<0.1$.

Table 8 Estimation results

Variable	FE		Poisson estimation	
	1	*2*	*5*	*6*
Constant	9.750***	-5.558***	5.158***	4.867***
G_GDP	2.443***	2.174***	2.034**	2.031***
INF	-1.330	-1.106	0.047***	0.046***
GCF_GDP	1.245**	1.107***	-0.069***	-0.047***
GS_GDP	-0.302	-0.553	0.007**	0.001
DCP_GDP	0.427**	0.368**	-0.013***	-0.002***
POP_G	5.561**	4.746**	0.564***	0.520***
Observation	77	77	77	77
R^2	*0.3537*	*0.3630*	*0.6800*	*0.6219*
F-test	*P = 0.001*	*P = 0.000*	*"- "*	*"-"*
Hausman test	*P=0.009*	*P=0.001*	*"- "*	*"- "*
BP Lagrangian multiplier	*P=0.000*	*P=0.000*	*"- "*	*"- "*

Note. (***), (**), (*) significant respectively at 1, 5, and 10 percent. The dependent variable in models 1, and 3 is the level of exports to GDP. The dependent variable in models 2, and 4 is the level of imports to GDP. Clarification: The use of vce analysis has caused the standard error values to decrease, however, there is no obvious difference in terms of p> | t |. Source: Author's calculation

According to table 8, trade opening in Western European countries to economic growth influences the level of credibility of 1 percent on the trade openness in both estimations. These findings

support the expectations while also confirming the hypothesis presented in the first section, namely that trade opening has a significant positive influence on economic growth in Western European economies. GDP growth has a stable constructive correlation with trade opening, the results of which are consistent with studies conducted by Irshad et al, (2018a), who argued that there is a stable optimistic relationship between these parameters. According to model 1, inflation does not affect these countries, whereas according to the Poisson approach, both imports and exports have a stable connection with economic growth at the level of 1 percent. Gross capital formulation influences trade opening in both approaches and these conclusions are consistent with most studies conducted by Fetahi-Vehapi., (2015); Sumbal et al., (2020); and Sare et al., (2018), which highlight that these two parameters have a stable positive connection according to the fixed-effect model. In comparison to the economies of Southeast Europe, gross savings have had an impact on the level of export and imports, with a confidence interval of 1 percent, respectively 5 percent according to the Poisson estimation. While the last two parameters, domestic credit to the private sector and population growth, have a substantial effect on trade opening in both modeling techniques.

CONCLUSION AND POLICY IMPLICATIONS

The main goal of this study was to examine further the interaction between macroeconomic variables and trade opening, by taking into study concretely 14 of the 16 Southeast European and 7 of the 8 Western European countries for the 2010-2020 period. The empirically modeled approach was dynamic, using a fixed effect and Poisson PML with dependent variables trade openness ($IMP_{i,t}$) and ($EXP_{i,t}$) and other control variables. The study incorporated recent advanced estimation techniques to investigate the degree of influence of trade opening and the level of trade exchange among Southeast and Western European countries. The study used several tests to analyze the panel data, beginning with Jarque Bera, cross-sectional dependence, and unit root to determine whether the data was stationary before applying the relevant econometric approaches. Empirical findings support the fact that, as in many studies on trade liberalization, the Poisson regression is more appropriate and produces more reliable and significant results. It is worth mentioning that the study's findings are favorable in terms of both the degree of influence and the effect.

As a result, we have confidence that this research will be an original contribution to theoretical and empirical advancement, with the inclusion of two parameters that have been included in very few studies thus far. These parameters were shown to have a significant positive influence on trade opening in both panels' countries used within the econometric modeling. According to the Poisson regression model, respectively PML, the factors that have a significant positive influence are GDP growth, gross savings, inflation, gross domestic private credit sector, and population growth, however, the gross capital formulation has a significant negative influence. These influences are in the estimating parameter of the level of export, whereas the other variable estimating the level of import is presented in Tables 7 and 8. The hypothesis is confirmed with a significance level of 1 percent, and all other control variables' outcomes are significant with the expected results, regarding also other studies conducted by new researchers in this field.

Despite the promising findings and results, this study has had its limitations. First, the empirical analysis of trade opening carried out was on a broad context and level. In the future, a fruitful area of research would be the examination of other specific factors and their effect on economic growth. Such an analysis is useful for those who believe that trade opening has a positive influence on economic growth. Second, the modeled estimation approach conducted here may be susceptible to variable bias and endogeneity for some of the regressors. As a consequence, another useful extension of this study would be to include other important variables in an equation system whereby trade openness and capital are also determined by economic variables. From a policymaking standpoint, the study emphasized the importance of recognizing and implementing complementary policies for trade opening to influence

promotion and GDP growth. The countries in our sample, a portion of which are part of Southeast Europe, attempt to capitalize on the international market following trade opening. Furthermore, trade liberalization is critical for the implementation of socio-economic policies as well as economic growth. Developing countries might also implement strategies that sponsor macroeconomic stability, as this will help them develop a competitive advantage in the global economy. The study's results and findings undoubtedly allow for further investigation, particularly in terms of the need for country-specific thresholds that are relevant to country-specific implications.

REFERENCES

Afari, F.O., Son, J.C. & Haligah, H.Y. (2021). Empirical analysis of the relationship between openness and inflation: a case study of sub-Saharan Africa. SN Bus Econ 1, 72. https://doi.org/10.1007/s43546-021-00081-6.

Altman D G, Bland J M. (1995). Statistics notes The normal distribution; 310:298 https://doi.org/10.1136/bmj.310.6975.298.

Anderson, J. E. (2011). "The Gravity Model", Annual Review of Economics, Vol. 3, pp. 133-160. https://doi.org/10.1146/annurev-economics-111809-125114.

Andrews, A. P. (2015). Exports, Imports, and Economic Growth in Liberia: Evidence from Causality and Cointegration Analysis. Journal of Management Policy and Practice, 16 (3), p. 95-109.

Baliamoune-Lutz, M., & Ndikumana, L. (2007). The growth effects of openness to trade and the role of institutions: New evidence from African countries [Working paper]. Department of Economics, University of Massachusetts Amherst.

Baltagi, B. H. (2013). Econometric Analysis of Panel Data (5th Edition). Publisher: Wiley. New York.

Cabrera-Schneider, J.N. (2009). Economic openness and rural communities in Guatemala, Journal of Enterprising Communities: People and Places in the Global Economy, Vol. 3 No. 1, pp. 84-93. https://doi.org/10.1108/17506200910943698.

Coe, D. T., & Helpman, E. (1995). International R&D spillovers. European Economic Review, 39 (5), 859–887. https://doi.org/10.1016/0014-2921(94)00100-E.

Darku, A. B., & Yeboah, R. (2018). Economic openness and income growth in developing countries: A regional comparative analysis. Applied Economics, 50 (8), 855-869. https://doi.org/10.1080/00036846.2017.1343449.

Das, A., & Paul, B. P. (2011). Openness and growth in emerging Asian economies: Evidence from GMM estimations of a dynamic panel. Economics Bulletin, 31, 2219–2228.

Durguti, E. A., GASHI, E., Kunoviku, F. D., & Mehmeti, M. (2020). DAF Determinants Affecting Economic Growth – Evidence for Western Balkans Countries. International Journal of Finance &Amp; Banking Studies, (2147-4486), 9(1), 36–46. https://doi.org/10.20525/ijfbs.v9i1.652.

Durguti, E., Tmava, Q., Demiri-Kunoviku, F., & Krasniqi, E. (2021). Panel estimating effects of macroeconomic determinants on inflation: Evidence of Western Balkan, Cogent Economics & Finance, 9:1, https://doi.org/10.1080/23322039.2021.1942601.

Edwards, S. (1993). Openness, Trade Liberalization, and Growth in Developing Countries. Journal of Economic Literature, 31, 1358-1393.

Feenstra, Robert (2004), Advanced International Trade, Princeton University Press.

Fetahi-Vehapi, M., Sadiku, L., and Petkovski, M. (2015). Empirical Analysis of the Effects of Trade Openness on Economic Growth: An Evidence for Southeast European Countries, Procedia Economics and Finance, Volume 19, Pages 17-26, https://doi.org/10.1016/S2212-5671(15)00004-0.

Frankel, J. A., & Romer, D. H. (1999). Does trade cause growth? American Economic Review, 89(3), 379–399. https://doi.org/10.1257/aer.89.3.379.

George R. Franke, (2010). Marketing Research. Part 2. Published from Wiley Online Library. https://doi.org/10.1002/9781444316568.wiem02066.

Ghasemi A, Zahediasl S. (2012). Normality Tests for Statistical Analysis: A Guide for Non-Statisticians, Int J Endocrinol Metab. Online ahead of Print; 10(2):486-489. https://doi.org/10.5812/ijem.3505.

Grossman, G. M., & Helpman, E. I. (1991a). Innovation and growth in the global economy. MIT Press. https://mpra.ub.uni-muenchen.de/19612/.

Harrison, A. (1996). Openness and growth: A time-series, cross-country analysis for developing countries. Journal of Development Economics, 48(2), 419–447. https://doi.org/10.1016/0304-3878(95)00042-9.

Head, K., and T. Mayer (2014). "Gravity Equations: Workhorse, Toolkit, and Cookbook", Handbook of International Economics Vol. 4, eds. https://doi.org/10.1016/B978-0-444-54314-1.00003-3.

Huang, L.-C., Chang, S.-H. (2014). Revisit the nexus of trade openness and GDP growth: Does the financial system matter? The Journal of International Trade & Economic Development, 23(7), 1038–1058. https://doi.org/10.1080/09638199.2013.830638.

Irshad, M.S., Xin, Q., Hui, Zh., & Arshad, H. (2018a). An empirical analysis of Pakistan's bilateral trade and trade potential with China: A gravity model approach, Cogent Economics & Finance, 6:1, https://doi.org/10.1080/23322039.2018.1504409.

Irshad, M.S., Xin, Q., Shahriar, S., and Faizan, A. (2018b). South Korea's potential export flow: a panel gravity approach. Asian Journal of Empirical Research, 8(4), 124-139. https://doi.org/10.18488/journal.1007/2018.8.4/1007.4.124.139.

Irwan, Sh. Z., Nor'Aznin, A., and Sahlan, R. (2013). The Determinants of Exports between Malaysia and the OIC Member Countries: A Gravity Model Approach, Procedia Economics, and Finance, Volume 5, 2013, Pages 12-19, https://doi.org/10.1016/S2212-5671(13)00004-X.

J. M. C. Santos Silva, Silvana Tenreyro, (2006). The Log of Gravity. The Review of Economics and Statistics; 88 (4): 641–658. https://doi.org/10.1162/rest.88.4.641.

Marelli, E., & Signorelli, M. (2011). China and India: Openness, trade, and effects on economic growth. The European Journal of Comparative Economics, 8, 129–154.

Nowbutsing, B. M. (2014). The impact of openness on economic growth: Case of Indian Ocean countries. Journal of Economics and Development Studies, 2, 407–427.

Ravinthirakumaran, N. (2014). Applicability of Openness-led Growth Hypothesis in Sri Lanka: An ARDL Bounds Test. South Asia Economic Journal, 15 (2), 241–263. https://doi.org/10.1177/1391561414548951.

Rizwan Raheem AHMED & Saghir Pervaiz GHAURI & Jolita VVEINHARDT & Dalia STREIMIKIENE, (2018). "An Empirical Analysis of Export, Import, and Inflation: A Case of Pakistan," Journal for Economic Forecasting, Institute for Economic Forecasting, vol. 0(3), pages 117-130.

Rodriguez, F., & Rodrik, D. (2000). Trade policy and economic growth: A skeptic's guide to the cross-national evidence. NBER Macroeconomics Annual, 15, 261–325. https://doi.org/10.3386/w7081.

Sare, Y.A., and Bokpin, Mensah L. (2018). Effect of financial development on international trade in Africa: does measure of finance matter? The Journal of International Trade and Economic Development. Volume 27, 2018- Issue 8, p.917-936 https://doi.org/10.1080/09638199.2018.1474246.

Solow, R. M. (1957). Technical change and the aggregate production function. The Review of Economics and Statistics, 39 (3), 312–320. https://doi.org/10.2307/1926047.

Sumbal, F., Chen, B., Muhammad, R., and Qamar, A. (2020). The Nexus Between Trade Openness and GDP Growth: Analyzing the Role of Human Capital Accumulation. Original Paper Sage Open, 1-18. https://doi.org/10.1177/2158244020967377.

Wacziarg, R. (1999). Measuring the dynamic gains from trade. The World Bank, https://doi.org/10.1596/1813-9450-2001.

Weisbrot, M. and Baker D. (2001). "The Relative Impact of Trade Liberalization on Developing Countries.

Yanikkaya, H. (2003). Trade openness and economic growth: a cross-country empirical investigation. Journal of Development Economics, 72, 57-89. https://doi.org/10.1016/S0304-3878(03)00068-3.

SMART TOLLING FOR ROAD CONCESSIONARY PROJECTS

Charles Andoh and Susana Adobea Yamoah

ABSTRACT

The paper develops models for toll rates that incorporate the surface area of a vehicle and the proportion of the population that uses vehicles in a region or town for concessionary road contracts. The models are applied to set toll rates across all 38 toll booths scattered across Ghana. The results obtained by analyzing 2019 traffic data for Mallam Kasoa highway show that the expected optimal profit generally increases with the number of years of concession not only for each vehicular class but also for the entire vehicular operations. Also, the shorter the number of years of the concession, the riskier the arrangement not only within vehicular classes but for the entire vehicular operations. The paper suggests that this method of toll setting is a fairer means of toll rate assignments than the current flat rate for a vehicular class which ignores the congestion in the city where the toll booth resides. It should demotivate people to drive less in highly congested cities in favour of other means of transport such as public transport. This will ease road congestion, road rage as well as other unwanted road behaviours, particularly around and within major congested cities.

INTRODUCTION

Roads serve as the circulation system in the promotion of commerce, communication, and socio-economic development. Road transport is the dominant mode of transport in Sub-Saharan Africa (SSA) used by about 90 percent of the region's passengers and provides the only access to rural communities where over 70 percent of Africans live (Heggie, 1995). Though roads are very beneficial, they are costly to construct and maintain. According to Heggie (1995), the replacement costs of roads in Sub-Saharan Africa amount to nearly $150 billion and requires between $1.5 and $2.0 billion annually to maintain and keep in a stable long-term condition. The World Bank and the United Nations Economic Commission for Africa (UNECA) launched the Road Maintenance Initiative (RMI) as part of the Sub-Saharan Africa

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Transport Policy Program (SSATP) to find sustainable solutions to financing and maintaining these roads. In Ghana, the government created a Road Fund in 1985 to improve the maintenance and capacity of the nation's highways. The Road Fund currently operates under the provisions of the Road Fund Act 536 (1997). Road Fund revenues come from four sources: Fuel Levy, International Transit Fees, Road Tolls, Vehicle Registration, and Road Use Fees. According to the Ministry of Roads and Highways (MRH), the Road Fund provides 60% of the country's annual road maintenance needs (World Bank Group, 2014).

Public Private Partnerships (PPP) involve temporary private ownership of public assets through concessions to build, operate and then transfer infrastructure to the government (Perkins, 2013). PPP is one of several initiatives being pursued within Africa, concerning road sector reforms (Brocklebank, 2014). Ghana is one of the first few countries in Sub-Saharan Africa to allow the partnership between the public and private sector in the design, finance and management of public infrastructure and services. This kind of partnership dates to the early 1990s when it was largely assumed that the private sector is more efficient in the production and distribution of goods and services than the public sector (Awortwi, 2012). For road concessionary projects to be attractive to investors, the pricing at the toll gates must be properly set to allow the concessionaire to recoup its investment and make a reasonable return on investment within the concession period.

According to Rouhani (2016), the two general modeling approaches for road pricing in literature are the aggregate market equilibrium approach and network analysis. The aggregate market equilibrium approach looks at the demand and supply of road usage and how congestion charges can be set to optimize road usage and maximize social welfare whilst the network analysis models toll charge levies on only a subset of roads because these roads have an important impact on profit and the main aim of service providers (either private entities or public authorities) is to make profit /revenue. Models for road tolling on road concessionary projects that exists in the literature have excluded the space vehicles occupy in setting road rates. Andoh and Quaye (2017) developed models that incorporated the damage a vehicular class cause to a road in its usage. They argued that if a vehicular class causes greater damage to a road, then they must pay a greater portion of its maintenance and construction cost. For a given concessionary period, they decomposed operations into the various vehicular classes that exposed the riskiest operations. These models, however, excluded the space a vehicle or vehicular class occupies on the road in the price setting. In addition, it does not consider the volume of vehicular usage in the region or town where the toll booth resides. These have a consequence on the volume of vehicles on the road as they will affect vehicle owners' decision to drive or use public transport.

Smart tolling is a type of tolling that incorporates the space vehicles occupy on the road and the volume of vehicles in the region or town where the toll booth is situated. These are important as they have consequences on whether a vehicle owner will decide to drive or patronize public transport for any journey. In addition, these have a consequence on easing road congestion especially in major towns and cities where traffic congestion abounds. The work of Andoh, Mills and Quaye (2012) also ignored the density of vehicles (i.e., the proportion of the population that uses vehicles) and the space occupied by vehicles in the models they developed. Thus, it does not address the current mode of pricing at the toll booth that charges a flat rate for a vehicular class irrespective of the car density in a particular town or city. The models developed are a comprehensive way of tolling in that it incorporates the damage, frequency, the density of vehicles in an area, and the space vehicles occupy in the price setting at the toll booth.

The objective of the study is to develop models that incorporate the density of vehicles in a region or town and the space vehicles occupy in setting toll rates. The conditions under which a PPP arrangement can work for different sized vehicles will be developed taking cognizance of the car density and the space a vehicular class occupies on the road. Given specified toll rates for different sized vehicles, the number of each sized vehicle that can use the road vis-a-vis the space it occupies will be developed. A

mathematical programming problem that expresses the optimal profit of the concessionaire and risk exposure of the concession will also be developed. Moreover, methods for estimating the expected optimal profit and risk exposure for a given number of years of concession will be developed.

The following questions will be addressed by the study. How much risk does a concessionaire bear by incorporating space in its pricing? What is the expected optimal profit by incorporating space in its pricing? What minimum number of vehicles should pass a toll booth for a PPP arrangement to be viable within a given concessionary period? How should the expected optimal profit incorporating the space vehicles occupy be estimated? The study seeks to provide answers to these questions, among others.

The rest of the study is organized as follows. Section 2 discusses the literature on PPP. The development of the models for the management of PPP road contracts is contained in section 3 whereas section 4 contains the empirical results based on data collected from Ghana Highway Authority, Driver and Vehicle Licensing Authority in Ghana, and the Ghana Statistical Service. Section 5 provides a summary, conclusion and makes some recommendations.

LITERATURE REVIEW

Road pricing is not a new concept and has been greatly explored by several researchers in the literature. Different road pricing options are used for different reasons. Road tolls are used especially when funds are needed for road improvement and revenue is to be raised for the service provider. Other pricing options include area-based congestion pricing, high occupancy toll (HOT) lanes, distance-based charges, and road space rationing (Rouhani, 2016). High occupancy toll (HOT) lanes according to Brent and Gross (2017) and Zhang, Zhou, Qi, and Wang (2019) are introduced to combat congestion on urban highways and generate revenue. Low occupancy vehicles (LOVs) are allowed to pay a toll and access HOT lanes rather than general purpose (GP) lanes so that they can better utilize the remaining capacity of High occupancy vehicles (HOV) lanes. Distance or mileage charges are vehicle fees based on the distance/miles driven to cover congestion, pollution, and other environmental costs. They also provide significant economic efficiency and equity benefits (Litman, 1999). Rationing policies, including road rationing, are implemented to address congestion and other negative transportation externalities which have adverse environmental and economic impacts on the society due to excessive vehicle and road usage (Zhu, Du, & Zhang, 2013).

The welfare effects of road prices on users can be seen in three main ways: revenue use, changes in mobility patterns and travel time savings. The revenue generated from tolls can be used to improve the public transport system, decrease income tax, or reduce the cost of car travel. Tolls may change the travel behaviour of users such as destination, to avoid the charges. Travel time may be shorter since the congestion on toll roads is reduced (Eliasson & Mattsson, 2006). Pricing roads using different approaches or options should be thoroughly evaluated and according to Rouhani (2016), the best approach should serve the overall public interest or should have the greatest social welfare impact. He also suggested that when modelling road prices, factors such as effects of the scheme on all parts of the transportation system, travel demand risks, travel disutility due to higher charges as well as profit should be considered.

The interest of nations in new sources of private finance for transport infrastructure has been incited due to the ongoing financial crisis. Many governments seek to attract finance from private investors through new models of partnership to maintain investment at the same time limiting public spending (Perkins, 2013).

There has been a growing interest of developing country governments in using PPP to provide public infrastructure assets and services but particularly to solve their infrastructure challenges. PPP

provides additional sources of funding and financing when there are insufficient funds to provide the infrastructure needed. Again, PPP provides private sector analysis and innovation when limited resources are often spent on the wrong projects due to poor planning and coordination, and weak analysis underpinning project selection. Moreover, PPP offers private sector experience and incentives when there is dissatisfaction in the delivery of infrastructure assets and services provided by the government agencies. For example, when the construction of new infrastructure costs more and takes longer than expected. Also, PPP provides a long-term investment perspective when infrastructure assets are poorly maintained leading to increasing costs and reducing benefits (World Bank Group, 2014). Aside from the provision of public infrastructure assets and services, there are other types of arrangements between public and private entities that contribute to public policy goals. These include information-sharing mechanisms on health, education, agriculture, and other sectors of the economy; jointly run projects for research and innovation to draw on skills and information in both the public and private sectors; and government interventions to support private sector development in certain sectors or in general (World Bank Group, 2014).

PPP combines the public sector's regulatory actions and protection of public interest through laws and acts to ensure transparency and accountability with the private sector's enormous resources, management skills, and effective delivery. Moreover, with PPP, investment in infrastructure and services can be delivered quickly and to specified standards without resulting in high levels of government capital expenditure (UNECE, 2017). The private sector is mostly required to provide part of or all the capital funding when the PPP involves substantial capital expenditure, such as new projects and major upgrades. The public sector may make some or all its payments based on the performance of the concessionaire. It can be designed so that investment is remunerated directly from tolls (revenue-based PPP) or through periodic availability payments (annuities) from the government (Perkins, 2013). The concession agreement regulates the toll rates, and they normally specify either exact or maximum toll rates. The goal is to ensure that the toll rates are not excessive and provide good utilization of the highway with associated economic benefits (Brocklebank, 2014). Tolled highways are particularly attractive assets for private financing because a privately operated toll road can be financed with both debt (bond) and equity financing, and toll facilities are thought to be more successful when operated privately because tolls can be raised in line with costs and demand (Kirk & Mallett, 2013).

1. Theoretical Review

Two fundamental theories underpinning PPP arrangements are the principal-agent theory and the stewardship theory. These theories have been extensively reviewed by researchers like Ross (1973), Stiglitz (1975), Jensen and Meckling (1976), Mirrlees (1976), Grossman and Hart (1983), and Davis, Donaldson, and Schoorman (1997). The principal-agent theory also known as the agency theory examines the relationship between the owner (principal) of an asset and the persons (agents) contracted to make decisions that the principal most prefer and manage that asset on the owner's behalf. This theory focuses on the responsiveness of the agent's decisions to the principal's goals, explains the dynamics that occur in these relationships, and the conflicts that arise. In PPP contracts, the public sector becomes the principal, and the private sector is the agent. The private sector, which has project knowledge and expertise, is expected to act responsibly and in the best interest of the public sector (government and people). Therefore, the principal-agency theory calls for prudent decisions to be made during PPP contracts so that both the principal and the agent understand their roles and responsibilities in the agreement.

According to Stewardship theory, managers will act responsibly as stewards of the assets they control if left alone. This implies that managers, who are also stewards, will maximize the wealth of shareholders by carefully managing the resources entrusted to them. This creates trust and managers are in turn given more responsibilities and resources. Governments have been entrusted with the resources and taxes of the nation by the people and they are expected to provide for the needs of the people. The

private sector may have the money to invest in projects though it may not control the land, minerals, and other resources. Governments enter partnerships with the private sector to meet the needs of the people whilst the private sector increases their returns on their investments. Communities, therefore, benefit from private sector projects that are executed through PPP arrangements. The Stewardship theory highlights the fact that both public and private sector agents are not motivated by selfish individual interest but act as stewards and align their interests to the objectives of the contract and the public.

2. Empirical Review

Governments in various countries have used PPP to finance a lot of highway projects since highway PPPs play a pivotal role in enabling national and regional mobility. According to Brocklebank (2014), in 2005, there was a rapid eastward expansion of the city of Dakar in Senegal which caused congestion on the existing low-quality highway network and in turn, restricted growing travel demands and economic development. The Dakar-Diamniadio toll highway (DDTH) project was developed in Senegal through a PPP to provide a high-quality, tolled dual-carriageway highway from central Dakar, through the eastern suburbs to development zones and the national highway network to the east. This project had a concession period of 30 years. Similarly, the Portuguese government has used PPPs extensively to develop and manage its National Motorway System since 1990 to increase the number of private companies participating in highway infrastructure concessions to promote competition and industry development (Brown, Pieplow, Driskell, Gaj, Garvin, Holcombe & Smith, 2009).

The first draft of the Ghana Public Private Partnership Bill by the Ministry of Finance and Economic Planning (MOFEP) was published in May 2013. This bill was to provide the legislative framework to organize and implement PPP in the country and serve as the basis for future PPP procurement (World Bank Group, 2014). Subsequently, the government of Ghana has made efforts to use PPPs to undertake infrastructure projects which have increased investment in public infrastructure. For example, in 2012, there was a PPP concession for the Accra – Kumasi Highway (N6) in Ghana to create a continuous dual carriageway between the two cities and the mode of payment was through revenues obtained from tolling users (Brocklebank, 2014). Other PPP projects which have been undertaken by the government include Accra-Takoradi Motorway Project, Accra-Tema Motorway Project, Boankra Inland Port Project, Natural Resources Enclave Road Project, Takoradi Port Dry Bulk Terminal Project, and Takoradi Port Multi-Purpose Terminal (MOFEP, 2020).

The procurement of a PPP on a highway project goes through various stages. First and foremost, the project must be selected and developed to achieve transport policy objectives. Secondly, the project is prepared for the bidding process to determine the optimal structure of the concession. Thirdly, there is a bidding process where private sector participants are encouraged to bid for the concession. Afterwards, bidders from whom bids are received are shortlisted and a preferred bidder is selected. Lastly, the concession agreement is negotiated which leads to financial closure between the preferred bidder and the public sector (Brocklebank, 2014).

MODEL DEVELOPMENT

We modify the model by Andoh and Quaye (2017) and write the profit function as

$$P_{F_{ij}} = n_{l_i}s_{l_j} + n_{m_i}s_{m_j} + n_{h_i}s_{h_j} + n_{o_i}s_{o_j} - \left[T_v + t_f + \omega_i AR_c(1+r)^i\right], i = 1, \dots, n$$

with $P_{F_{ij}}$ replacing P_{F_i}. The variables in the model are defined as follows:

n_{l_i}: *The number of light vehicles that cross the toll booth in month $i, i = 1, \dots, n$ where n is the month of concession*

s_{l_j}: *Payment or toll rate paid per light vehicle for using the highway situated in location j (termed registration office **j**).*

n_{m_i}: *The number of medium vehicles that cross the toll booth in month $i, i = 1, \dots, n$.*

s_{m_j}: *Payment or toll rate paid per medium vehicle for using the highway situated in location j (termed registration office **j**).*

n_{h_i}: *The number of heavy vehicles that cross the toll booth in month $i, i = 1, \dots, n$.*

s_{h_j}: *Payment or toll rate paid per heavy vehicle for using the highway situated in location **j**.*

n_{o_i}: *The number of "other" vehicles that cross the toll booth in month $i, i = 1, \dots, n$.*

s_{o_j}: *Payment or toll rate paid per "other" vehicle for using the highway situated in location j (termed registration office j).*

T_v: *Total variable cost (minor maintenance cost, operating expenses such as stationery, printing, electricity, diesel for standby generator, equipment repairs, etc.) that varies directly as the number of vehicles that use the road at every crossing.*

t_f: *The total cost of employee wages and the maintenance of E-card centre.*

AR_c: *Asset replacement cost. That is, the cost of constructing the highway including the construction of bridges purchase of toll machines, the cost of engineering studies.*

ω_i: *The fraction of AR_c to be paid off in month **i** where $0 < \omega_i < 1, \sum_{i=1}^{n} \omega_i = 1$.*

r: *The interest rate in the economy.*

Unlike Andoh and Quaye (2017), who set the toll rate to be the same for a vehicular class irrespective of the location of the toll booth for the different sized vehicles, we incorporate the location of the toll booth (termed registration office j) for the different sized vehicles in the price setting.

The toll rate for light vehicles, s_{lj}, for registration office, j should vary directly as the median surface area, $\tilde{A}_l$ of light vehicular class. Thus, we can write

$$s_{l_j} = K_j \tilde{A}_l, j = 1, \dots, \widetilde{m} \tag{1}$$

where K_j is the car density for region or city j. Here, $\widetilde{m}$ is the number of vehicle registration offices in a country. Similarly, the toll rate for medium, heavy, and 'other' vehicles are respectively

$$s_{m_j} = K_j \tilde{A}_m, j = 1, \dots, \widetilde{m} \tag{2}$$
$$s_{h_j} = K_j \tilde{A}_h, j = 1, \dots, \widetilde{m} \tag{3}$$

and

$$s_{o_j} = K_j \tilde{A}_o, j, \dots, \widetilde{m} \tag{4}$$

K_j is estimated as $e^{\frac{N_j}{P_j}}$ where N_j is the number of vehicles in the town or city j and P_j the population in town or city j.

Remark 1: K_j penalizes the vehicle owner for crossing toll gates in regions or towns with heavy vehicular movement. This is meant to discourage people from driving in places with heavy vehicular movement. The constant e can be adjusted depending on the severity of the vehicle congestion. Compare the work of Andoh, Mensah and Quaye (2020) who developed models that incorporate the space, car density and the damage a vehicle causes to the road in the payment of vehicle registration, renewal, and towing rates.

$P_{F_{ij}}$ can thus be written as

$$P_{F_{ij}} = K_j[n_{l_i}\tilde{A}_l + n_{m_i}\tilde{A}_m + n_{h_i}\tilde{A}_h + n_{o_i}\tilde{A}_o] - 1 \times [T_v + t_f + \omega_i AR_c(1+r)^i]$$
(5)

and set.

Decomposing into the various vehicular classes, we have

$$P_{f_{l_{ij}}} = K_j n_{l_i}\tilde{A}_l - w_l[T_v + t_f + \omega_i AR_c(1+r)^i] \tag{6}$$

$$P_{f_{m_{ij}}} = K_j n_{m_i}\tilde{A}_m - w_m[T_v + t_f + \omega_i AR_c(1+r)^i] \tag{7}$$

$$P_{f_{h_{ij}}} = K_j n_{h_i}\tilde{A}_h - w_h[T_v + t_f + \omega_i AR_c(1+r)^i] \tag{8}$$

$$P_{f_{o_{ij}}} = K_j n_{o_i}\tilde{A}_o - w_o[T_v + t_f + \omega_i AR_c(1+r)^i] \tag{9}$$

where w_l, w_m, w_h and w_o are the damage weight satisfying $w_l + w_m + w_h + w_o = 1$. Notice that $P_{F_{ij}} = P_{f_{l_{ij}}} + P_{f_{m_{ij}}} + P_{f_{h_{ij}}} + P_{f_{o_{ij}}}$.

For light vehicular operations to be viable or sustainable $P_{f_{l_{ij}}} > 0$. Consequently,

$$n_{l_i} > \frac{w_l[T_v + t_f + \omega_i AR_c(1+r)^i]}{K_j \tilde{A}_l} \tag{10}$$

In a similar fashion, for the sustainability of medium, heavy, and 'others' vehicular classes

$$n_{m_i} \in \left(\frac{w_m[T_v + t_f + \omega_i AR_c(1+r)^i]}{K_j \tilde{A}_m}, \infty\right), n_{h_i} \in \left(\frac{w_h[T_v + t_f + \omega_i AR_c(1+r)^i]}{K_j \tilde{A}_h}, \infty\right) \quad \text{and}$$

$$n_{o_i} \in \left(\frac{w_o[T_v + t_f + \omega_i AR_c(1+r)^i]}{K_j \tilde{A}_o}, \infty\right) \tag{11}$$

Every concessionaire will want as much profit as possible. We formulate this desire in the following mathematical programming problem for light vehicles.

$$Max\left(K_j n_{l_i}\tilde{A}_l - w_l[T_v + t_f + \omega_i AR_c(1+r)^i]\right)$$

$$\text{subject to: } K_j n_{l_i}\tilde{A}_l > w_l[T_v + t_f + \omega_i AR_c(1+r)^i]$$

$$0 < n_{l_i} < \alpha_i \tag{12}$$

where α_i is the maximum number of light vehicles that cross the toll gate in month i.

Expected profit and the risk of the concessions are two key items every investor would be concerned about. We begin with the expected optimal profit.

a. Expected Optimal Profit

We follow the approach adopted by Andoh and Quaye (2017). Let $p_{fl_{ij}}^{opt}$ be the optimal profit for month i for light vehicles and observe that this quantity is a random variable as the number of light vehicles that pass through the toll booth in any month i within the concessionary period is random. Given a concessionary period of n months, we solve the optimization problem (12) for each month to obtain the optimal profit, $p_{fl_{1j}}^{opt}, p_{fl_{2j}}^{opt}, \ldots, p_{fl_{nj}}^{opt}$, then the sample optimal profit for light vehicles for a toll booth located at town j for the concession is given by

$$\bar{X}_{lj} = \frac{1}{n} \sum_{i=1}^{n} p_{fl_{ij}}^{opt} \tag{13}$$

Observe that this estimate is just for a path and so the expected optimal profit for light vehicle μ_{lj}^{opt} for a toll booth located at town j is obtained by solving the optimization profit (12) to obtain the optimal profit $p_{fl_{1j}}^{opt(m)}, p_{fl_{2j}}^{opt(m)}, \ldots, p_{fl_{nj}}^{opt(m)}, m = 1, \ldots, M$ for M large. Then

$$\frac{1}{M} \sum_{m=1}^{M} p_{fl_{nj}}^{opt(m)} \to E\left(p_{fl_{nj}}^{opt}\right) = \mu_{lj}^{opt} \tag{14}$$

as $M \to \infty$. This process is replicated for medium, heavy, and 'other' vehicles. The expected optimal profit for the entire operations for toll booth located at town j will be given by

$$\mu_j^{opt} = \mu_{lj}^{opt} + \mu_{mj}^{opt} + \mu_{hj}^{opt} + \mu_{oj}^{opt} \tag{15}$$

b. Estimating the risk exposure of the concessionaire

The sample risk exposure for the optimal profit $p_{fl_{1j}}^{opt}, p_{fl_{2j}}^{opt}, \ldots, p_{fl_{nj}}^{opt}$ for light vehicles is given by

$$S_{lj}^{opt} = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} \left(p_{fl_{ij}}^{opt} - \bar{X}_{lj}\right)^2} \tag{16}$$

The true risk exposure for the concessionaire for light vehicles, σ_{lj}^{opt}, for a toll booth located at town or city j is given by solving the optimization problem (12) for all possible number of light vehicles within the concession period to obtain the optimal profits $p_{fl_{1j}}^{opt(m)}, p_{fl_{2j}}^{opt(m)}, \ldots, p_{fl_{nj}}^{opt(m)}, m = 1, \ldots, M$ for M large. The expected average variance for the optimal profit for light vehicles, $E\left[Var\left(p_{fl_{jn}}^{opt}\right)\right]$ is given by

$$\frac{1}{M} \sum_{m=1}^{M} \left(S_{lj}^{opt(m)}\right)^2 = \frac{1}{M} \sum_{m=1}^{M} Var\left(p_{fl_{jn}}^{opt(m)}\right) \to E\left[Var\left(p_{fl_{jn}}^{opt}\right)\right] \tag{17}$$

as $M \to \infty$. Note that under some regularity conditions (for example Stock and Watson (2007), pg 76), it can be shown that

$$\sigma_{l_{jn}}^{opt} = \sqrt{E\left[Var\left(p_{fl_{jn}}^{opt}\right)\right]} \tag{18}$$

Similar expressions can be derived for medium, heavy and 'others' vehicles. The risk exposure of the entire operations, σ_j^{opt}, for light vehicles for toll booth located at town or city j is given by

$$\sigma_j^{opt} = \sqrt{\left(\sigma_{l_{jn}}^{opt}\right)^2 + \left(\sigma_{m_{jn}}^{opt}\right)^2 + \left(\sigma_{h_{jn}}^{opt}\right)^2 + \left(\sigma_{o_{jn}}^{opt}\right)^2} \tag{19}$$

provided the number of light, medium, heavy and 'others' vehicles that enter the toll booth do not depend on each other.

Observe that

$$(\sigma_j^{opt})^2 = \left[\left(\sigma_{l_{jn}}^{opt} + \sigma_{m_{jn}}^{opt}\right) + \left(\sigma_{h_{jn}}^{opt} + \sigma_{o_{jn}}^{opt}\right)\right]^2 - 2\left(\sigma_{l_{jn}}^{opt} + \sigma_{m_{jn}}^{opt}\right)\left(\sigma_{h_{jn}}^{opt} + \sigma_{o_{jn}}^{opt}\right) - 2\sigma_{l_{jn}}^{opt}\sigma_{m_{jn}}^{opt} - 2\sigma_{h_{jn}}^{opt}\sigma_{o_{jn}}^{opt}$$

and so, we can write

$$\sigma_j^{opt} \leq \sigma_{l_{jn}}^{opt} + \sigma_{m_{jn}}^{opt} + \sigma_{h_{jn}}^{opt} + \sigma_{o_{jn}}^{opt} \tag{20}$$

Thus, the concessionaire risk exposure is worsened by restricting certain vehicular classes from using the road.

On the other hand, if there is a reason to believe that there is a correlation in movement among the vehicular classes in any month, then

$$(\sigma_j^{opt})^2 = \left(\sigma_{l_{jn}}^{opt}\right)^2 + \left(\sigma_{m_{jn}}^{opt}\right)^2 + \left(\sigma_{h_{jn}}^{opt}\right)^2 + \left(\sigma_{o_{jn}}^{opt}\right)^2 + Cov\left(p_{f_{l_{jn}}}^{opt}, p_{f_{m_{jn}}}^{opt}\right) + Cov\left(p_{f_{l_{jn}}}^{opt}, p_{f_{h_{jn}}}^{opt}\right) + Cov\left(p_{f_{l_{jn}}}^{opt}, p_{f_{o_{jn}}}^{opt}\right) + Cov\left(p_{f_{m_{jn}}}^{opt}, p_{f_{h_{jn}}}^{opt}\right) + Cov\left(p_{f_{m_{jn}}}^{opt}, p_{f_{o_{jn}}}^{opt}\right) + Cov\left(p_{f_{h_{jn}}}^{opt}, p_{f_{o_{jn}}}^{opt}\right) \tag{21}$$

Taking the square of the LHS of equation (21) gives the desired risk exposure. This can occur during festivities, electoral campaigns, church programmes where the movement of light, medium and some type of heavy vehicles will necessarily have to move together.

Next, we demonstrate that even when there is correlation in movement at the toll booth between vehicular classes, the risk exposure to the concessionaire is minimum by not restricting certain vehicular classes from patronizing the road. From equation (21) we can write

$$(\sigma_j^{opt})^2 = \left(\sigma_{l_{jn}}^{opt}\right)^2 + \left(\sigma_{m_{jn}}^{opt}\right)^2 + \left(\sigma_{h_{jn}}^{opt}\right)^2 + \left(\sigma_{o_{jn}}^{opt}\right)^2 + \sigma_{l_{jn}}^{opt}\sigma_{m_{jn}}^{opt}\rho\left(p_{f_{l_{jn}}}^{opt}, p_{f_{m_{jn}}}^{opt}\right)$$
$$+ \sigma_{l_{jn}}^{opt}\sigma_{h_{jn}}^{opt}\rho\left(p_{f_{l_{jn}}}^{opt}, p_{f_{h_{jn}}}^{opt}\right) + \sigma_{l_{jn}}^{opt}\sigma_{o_{jn}}^{opt}\rho\left(p_{f_{l_{jn}}}^{opt}, p_{f_{o_{jn}}}^{opt}\right)$$
$$+ \sigma_{m_{jn}}^{opt}\sigma_{h_{jn}}^{opt}\rho\left(p_{f_{m_{jn}}}^{opt}, p_{f_{h_{jn}}}^{opt}\right) + \sigma_{m_{jn}}^{opt}\sigma_{o_{jn}}^{opt}\rho\left(p_{f_{m_{jn}}}^{opt}, p_{f_{o_{jn}}}^{opt}\right)$$
$$+ \sigma_{h_{jn}}^{opt}\sigma_{o_{jn}}^{opt}\rho\left(p_{f_{h_{jn}}}^{opt}, p_{f_{o_{jn}}}^{opt}\right)$$

It follows that

$$(\sigma_j^{opt})^2 = \left[\left(\sigma_{l_{jn}}^{opt} + \sigma_{m_{jn}}^{opt}\right) + \left(\sigma_{h_{jn}}^{opt} + \sigma_{o_{jn}}^{opt}\right)\right]^2 - \sigma_{l_{jn}}^{opt}\sigma_{m_{jn}}^{opt}\left[\rho\left(p_{f_{l_{jn}}}^{opt}, p_{f_{m_{jn}}}^{opt}\right) - 2\right]$$

$$- \sigma_{l_{jn}}^{opt}\sigma_{h_{jn}}^{opt}\left[\rho\left(p_{f_{l_{jn}}}^{opt}, p_{f_{h_{jn}}}^{opt}\right) - 2\right] - \sigma_{l_{jn}}^{opt}\sigma_{o_{jn}}^{opt}\left[\rho\left(p_{f_{l_{jn}}}^{opt}, p_{f_{o_{jn}}}^{opt}\right) - 2\right]$$

$$- \sigma_{m_{jn}}^{opt}\sigma_{h}^{opt}\left[\rho\left(p_{f_{m_{jn}}}^{opt}, p_{f_{h_{jn}}}^{opt}\right) - 2\right] - \sigma_{m_{jn}}^{opt}\sigma_{o_{jn}}^{opt}\left[\rho\left(p_{f_{m_{jn}}}^{opt}, p_{f_{o_{jn}}}^{opt}\right) - 2\right]$$

$$- \sigma_{h_{jn}}^{opt}\sigma_{o_{jn}}^{opt}\left[\rho\left(p_{f_{h_{jn}}}^{opt}, p_{f_{o_{jn}}}^{opt}\right) - 2\right]$$

Each of the expressions in larger brackets involving the correlation is positive so we can write

$$(\sigma_j^{opt})^2 \leq \left[\left(\sigma_{l_{jn}}^{opt} + \sigma_{m_{jn}}^{opt}\right) + \left(\sigma_{h_{jn}}^{opt} + \sigma_{o_{jn}}^{opt}\right)\right]^2$$

Hence

$$\sigma_j^{opt} \leq \sigma_{l_{jn}}^{opt} + \sigma_{m_{jn}}^{opt} + \sigma_{h_{jn}}^{opt} + \sigma_{o_{jn}}^{opt} \tag{22}$$

demonstrating the key concept of subadditivity of a coherent risk measure (Artzner et al. (1997, 1999), Dowd (2005), pp 32-36). Thus, even when there is correlation between vehicular classes, the risk exposure for the concessionaire is worsened by restricting certain vehicular classes from using the road.

An investor may want to know which vehicular class operations are the riskiest. This can be achieved by computing the optimal coefficient of variation for the four categories of vehicles. For example, the optimal coefficient of variation for light vehicles for a toll booth located at town or city j, $CV_{l_j}^{opt}$, can be obtained by

$$CV_{l_j}^{opt} = \frac{\sigma_{l_j}^{opt}}{\mu_{l_j}^{opt}}, \mu_{l_j}^{opt} > 0$$
$$(23)$$

A concessionaire may be interested in determining the riskiest operations across concessions. This can also be achieved by computing the optimal coefficient for the entire operations for a toll booth located at town or city j, CV_j^{opt}, given by

$$CV_j^{opt} = \frac{\sigma_j^{opt}}{\mu_j^{opt}}, \mu_j^{opt} > 0 \tag{24}$$

RESULTS

This section tests the models developed using the data collected from several sources and traffic data from one of the most patronized toll booths in Ghana.

Data Source

Data for the analysis was obtained from Ghana Highway Authority, Driver and Vehicle Licensing Authority (DVLA) in Ghana and Ghana Statistical Service.
From Ghana Highway Authority, we obtained information on the number of toll booths in the country and the regions where these toll booths reside, the cost of toll booth structure and automation, highway cost per kilometer for the different construction types and traffic data for some selected toll booths (see Table 1B of appendix for the name of the toll booth and the region where they lie). For the traffic data, we used

the 2019 data, the newest for which the Authority has records on the Mallam Kasoa toll booth, one of the heavily congested highways.

From DVLA, information on the number of vehicle registration offices and the cities or towns where they reside was obtained. Some dimensions of vehicles that ply on our road were also obtained from there. The population data for regions/cities where DVLA has registration offices were obtained from the Ghana Statistical Service website.

Data Analysis

Table 1 summarizes the regions in Ghana with toll booths. Out of the 38 toll booths scattered throughout the country, the Greater Accra region has 9 followed by the Ashanti region, with 6 and then the Western region with 4. Oti and Upper West regions have no toll booth. The table also shows the towns and the regions with the greatest number of registration offices. Here, the Ashanti region has the greatest with 5 vehicle registration offices, followed by the Greater Accra region with 4.

Table 1: Regional capitals, the number of tooth booths, towns with vehicle registration offices and car densities.

Region	Capital	Number of toll booth stations	Registration offices	Car densities
Ahafo	Goase	1		
Ashanti	Kumasi	6	Kumasi, Obuasi, Bekwai, Mampong, Nkawkaw	1.1710, 1.3366, 1.0153, 1.0080, 1.0172
Bono East	Techiman	2	Techiman	1.1373
Brong Ahafo	Sunyani	1	Sunyani	1.5676
Central	Cape Coast	3	Cape Coast	1.2561
Eastern	Koforidua	3	Koforidua, Sked Somanya	1.5232, 1.0101
Greater Accra	Accra	9	Accra, Tema, Weija, Bivac-Kutunse	1.5553, 2.9229, 1.3162, 1.4786
Northeast	Nalerigu	1		
Northern	Tamale	1	Tamale	1.3433
Oti	Dambai	0		
Savannah	Damango	3		
Upper East	Bolgatanga	1	Bolga	2.1002
Upper West	Wa	0	Wa	1.3769
Volta	Ho	2	Ho, Denu	1.1926, 1.0184
Western North	Sefwi Wiaso	1		
Western	Takoradi	4	Takoradi, Tarkwa	1.1444, 1.0487

The car density, $K_j = e^{\frac{N_j}{P_j}}, j = 1, \ldots, 21$, is depicted in Figure 1. Tema has the greatest concentration of vehicles and consequently has the greatest car density. Thus, toll booths residing in Tema and its enclave will have the highest rates for vehicles that use them. The car density for toll gates in Tema and its enclave is approximately two times that of toll booths in Accra and its enclave. This is followed by Bolga, Accra and Bivac-Kutunse. Column 5 of Table 1 shows the car density assigned to

each toll booth. In the rows where there are multiple assignments, the order must be kept. For example, the numbers 1.1926 and 1.0184 correspond to the car densities assigned to Ho and Denu respectively. Table 1A shows the numbers used to represent each registration office. Accra is represented by '1', Tema with '2', Kumasi with '3', etc.

Figure 1: Car density for 21 registration offices.
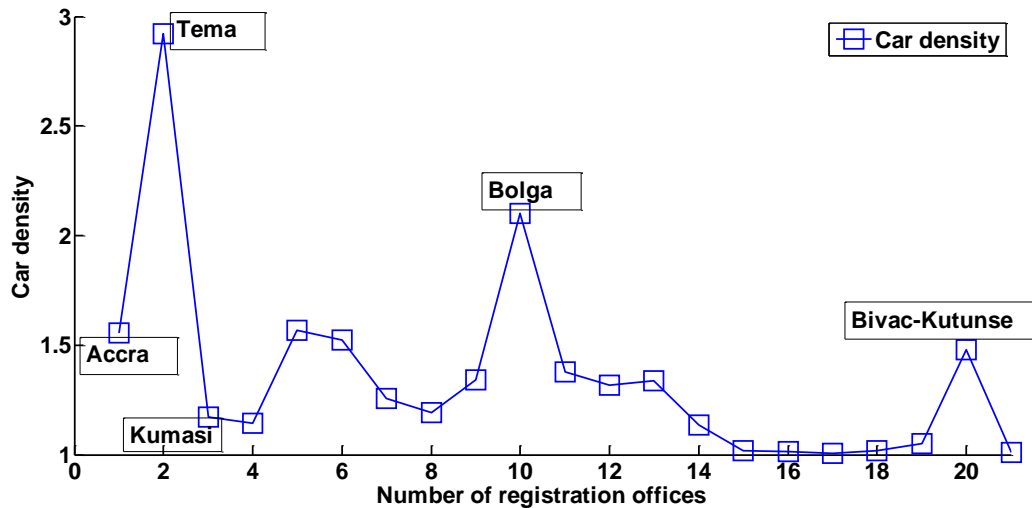
The median surface area of each vehicular class is depicted in Table 2 with 'others' having the greatest median surface area followed by the heavy vehicles.

Table 2: Median surface area of vehicular classes.

Vehicular class	Median surface area (cm^2)	Median surface area (m^2)
Light	85948.915	8.5948915
Medium	207765.25	20.776525
Heavy	275400	27.54
Others	330000	33

Toll Rates for Toll Booths Scattered Across Ghana

Using equations (1), (2), (3) and (4) and the convention that $0.15m^2$ is equivalent to 1GHS we get the rates for all the 38 toll gates scattered across Ghana for the different sized vehicles. These rates are shown in Table 3.

Table 3: Name of toll station, their region, and their respective toll rates (GHS) for the different sized vehicles.

Number	Location	Region	Light	Medium	Heavy	'Others'
			(GHS)	(GHS)	(GHS)	(GHS)
1	Afianya	Greater Accra	2	4.8	6.42	7.7
2	Dodowa	Greater Accra	2	4.8	6.42	7.7
3	Ayi Mensah	Greater Accra	2	4.8	6.42	7.7

4	Kasoa	Greater Accra Englashie	2	4.8	6.42	7.7
5	Pobiman	Greater Accra	2	4.8	6.42	7.7
6	Motorway	Greater Accra End	3.77	9.11	12.07	14.47
7	Ashiaman	Greater Accra	2	4.8	6.42	7.7
8	Tsopoli	Greater Accra	2	4.8	6.42	7.7
9	Motorway	Tema End	2	4.8	6.42	7.7
10	Kubiase	Ashanti	1.51	3.65	4.84	5.8
11	Aboaso	Ashanti	1.51	3.65	4.84	5.8
12	Offinso	Ashanti	1.51	3.65	4.84	5.8
13	Tabere	Ashanti	1.51	3.65	4.84	5.8
14	Kyemfaso	Ashanti	1.51	3.65	4.84	5.8
15	Adiembra	Ashanti	1.51	3.65	4.84	5.8
16	Badukrom	Western	1.48	3.57	4.73	5.66
17	Ankobra	Western	1.48	3.57	4.73	5.66
18	Jomoro	Western	1.48	3.57	4.73	5.66
19	Bonsaso	Western	1.48	3.57	4.73	5.66
20	Assin Praso	Central	1.62	3.91	5.19	6.22
21	Dunkwa.On-Offin	Central	1.62	3.91	5.19	6.22
22	Moree	Central	1.62	3.91	5.19	6.22
23	Adomi	Eastern	1.96	4.75	6.29	7.54
24	Sekyere	Eastern	1.96	4.75	6.29	7.54
25	Kade	Eastern	1.96	4.75	6.29	7.54
26	Bamboi	Savana Region	1.47	3.54	4.7	5.63
27	Buipe	Savana Region	1.47	3.54	4.7	5.63
28	Sawla	Savana Region	1.47	3.54	4.7	5.63
29	Sogakope	Volta	1.31	3.17	4.21	5.04
30	Ativuta	Volta	1.31	3.17	4.21	5.04
31	Babator	Bono East	1.47	3.54	4.7	5.63
32	Tuobodom	Bono East	1.47	3.54	4.7	5.63
33	Fiapre	Brong Ahafo	1.47	3.54	4.7	5.63
34	Bechem	Ahafo	1.47	3.54	4.7	5.63
35	Yapei	Northern	1.54	3.72	4.93	5.9
36	Nasia	Northern East	1.54	3.72	4.93	5.9
37	Pwalugu	Upper East	1.54	3.72	4.93	5.9
38	Awaso	Western. North	1.48	3.57	4.73	5.66

Figure 2 below shows the rates for each registration office. For regions with no registration office, the closest region with a registration office is applied.

Figure 2: Toll rates for registration offices.
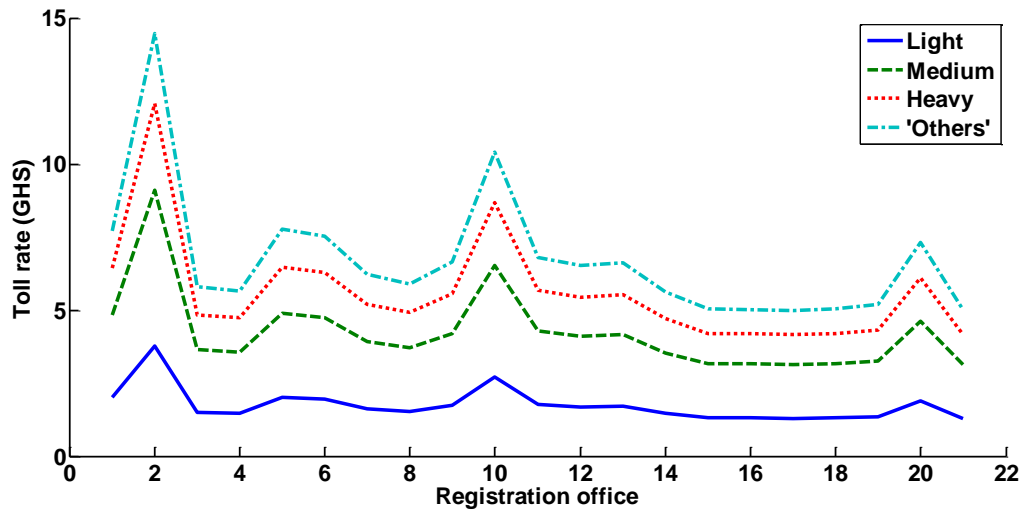
Number of vehicles to ply for viability for Mallam Kasoa route

Using the traffic data obtained (see Table 1C of appendix for traffic data for some selected highways for 2019), we obtain the damage weights in equations (6), (7), (8) and (9) for the Mallam Kasoa route as follows:

$$w_l = 0.825, \ w_m = 0.070, \ w_h = 0.076, \ w_o = 0.029$$

The results are depicted in Table 4 below.

Table 4: Damage weights for different sized vehicles Mallam Kasoa route.

Type of vehicle	Median weight of vehicle (kg)	Median number of monthly vehicular crossing on toll booth	Monthly total weight on Highway (kg)	Damage weight assigned to vehicular class
Light	1779.5	428040	761697180	0.825
Medium	8692.5	7435	64628737.5	0.07
Heavy	23800	2935	69853000	0.076
"Others"	15791.5	1710	27003465	0.029
Totals			923182382.5	1

The cost structure for Mallam Kasoa route showing the fixed, variable and asset replacement costs are also depicted in Table 5. Government regulation regarding road tolls requires that the toll booths must be set 50km apart. 8.4km of the Mallam Kasoa route is an asphaltic concrete (4-lane single carriage) and the remainder, an asphaltic concrete (2-lane single carriage). These have been accounted for in the computation of AR_c. Table 5 incorporates cost in the construction of toll booths and its associated cost. See Table 1D for the average sum of 4 toll booths construction.

Table 5: Cost structure for the Mallam Kasoa road.

Cost type	Components	Amount (GH₵)	Amount (US$)
Variable	Operating expenses	5.75x19008.42	19,008.42
	Total	109,298.42	
Fixed	Staff salaries and allowances	24,000	31,265.39
	Management fee	5.75x6,804.93	6,804.93
	Total	63,128.35	
AR_c	Construction of 4 Isolated toll booths	2x342,85.15	
	Construction of Office Blocks (for both ends)	390,684.03	
	Toll Booth Canopy	635,383.65	
	Ancillary Road Works and External Works	4,398,963.44	
	Painting of Metal Canopy	213,086.75	
	41.6km Asphaltic concrete - 2 lane single carriage +8.4km Asphaltic concrete-4 lane single carriage	88,180,000x5.75	(50-8.4) x1,478,000 + 8.4x3.178,000
	Total	513,358,830.17	

From the inequalities (10) and (11), substituting values from Tables 2, 3, 5 and 6 we get

$$n_{l_{mk}} > \frac{0.825\left[109298.42 + 63128.35 + \omega_i 51335883017\left(1 + \frac{0.215}{12}\right)^i\right]}{0.15 \times 1.5553 + 8.5948915}$$

We have chosen the prevailing interest rate banks charge on loans in Ghana hovering around 21.5% and the $0.15m^2$ equivalence of 1GHS. Simplifying we get

$$n_{l_{mk}} > 7.3093 \times 10^4 + 0.4239 \times \omega_i 51335883017 \times 1.0179^i \tag{25}$$

Similarly, for medium, heavy and 'others' we get

$$n_{m_{mk}} > 2.490 \times 10^3 + 0.0144 \times \omega_i 51335883017 \times 1.0179^i \tag{26}$$

$$n_{h_{mk}} > 2.04 \times 10^3 + 0.0118 \times \omega_i 51335883017 \times 1.0179^i \tag{27}$$

and

$$n_{o_{mk}} > 649.5 + 0.0038 \times \omega_i 51335883017 \times 1.0179^i \tag{28}$$

Figure 3: Number of vehicles for a 15-year concession for light (upper left), medium (upper right), heavy (lower left) and 'other' (lower right) vehicles.
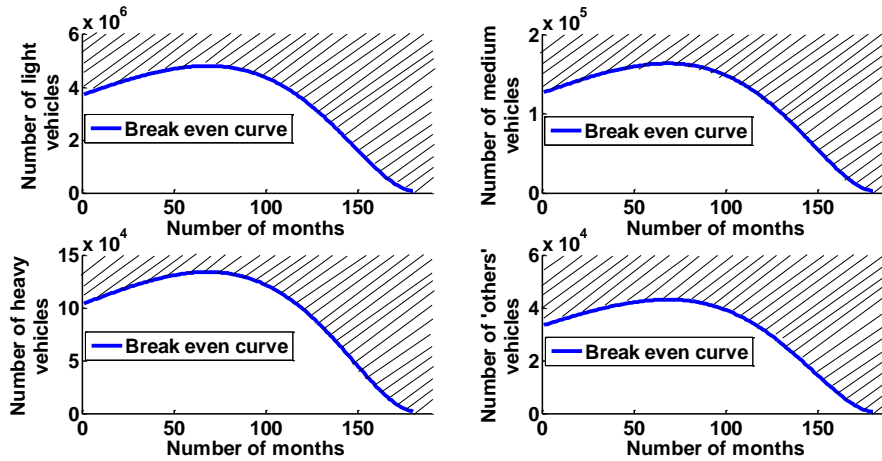
For the light vehicular operations to be profitable for a 15-year concession, the number of light vehicles that pass through the toll booth must lie in the shaded part of Figure 3 (upper left). The number of light vehicles that should pass the toll booth rises from 3734328 in the first month reaching its maximum of 4809861 in month 68 and declines relatively fast to 75799 in the 180 months. For the medium vehicular class operations (Figure 3, upper right), the number of medium vehicles must exceed 126864 in the first month reaching its maximum of 1633994 in the 68th month and declining gradually to 25820 in the 180 months. For heavy vehicles (Figure 3, lower left), the number of vehicles rises from 103957 in month 1 until it reaches its maximum of 133897 in the 68th month. Beyond this month, the number of vehicles declines reaching its minimum of 21154 in the 180 months. Finally, for 'others' vehicular class (Figure 3, lower right), the number required for profitability operations has to exceed 33470 in the first month until it reaches its maximum of 43112 in month 68 and declines gradually to 674 in month 180.

Figure 4: Number of vehicles for a 30-year concession for light (upper left), medium (upper right), heavy (lower left) and 'other' (lower right) vehicles.
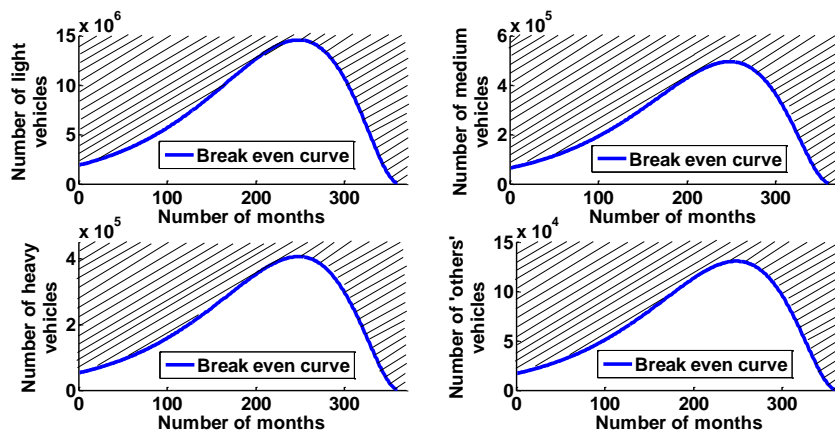
For light vehicular operations to be profitable for a 30-year concession (Figure 4), the number of light vehicles must exceed 1911328 in the first month rising relatively quickly to its maximum value of 14564682 in the 248th month declining relatively fast to 81372 in month 360. For the medium vehicular class operations, the number of medium vehicles has to exceed 64936 in the first month reaching its maximum of 494774 in month 248 and declines gradually to 2772 in month 360. For heavy vehicles, the

number of vehicles rises from 53211 in month 1 until it reaches its maximum of 405439 in the 248th month. Beyond this month, the number of vehicles declines reaching its minimum of 2271 in the 360 months. Finally, for 'others' vehicular class, the number required for profitability operations has to exceed 17129 in the first month until it reaches its maximum of 130558 in month 248 and declines gradually to 724 in month 360.

Figure 5: Number of vehicles for a 45-year concession for light (upper left), medium (upper right), heavy (lower left) and 'other' (lower right) vehicles.
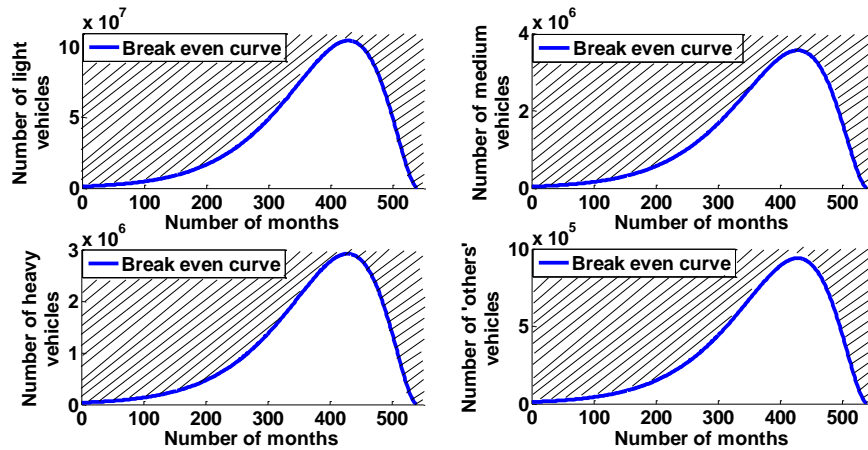
For a 45-year concessionary agreement to be profitable (Figure 5), the number of light vehicles has to exceed 1300283 in the first month to a maximum of 104873947 in the 428-month declining relatively fast to 132960 in month 540. For the medium vehicular class operations, the number of medium vehicles must exceed 44178 in the first month reaching its maximum of 3562604 in month 428 and declines gradually to 4524 in month 540. For heavy vehicles, the number of vehicles rises from 36201 in month 1 until it reaches its maximum of 2919356 in the 428th month. Beyond this month, the number of vehicles declines reaching its minimum of 3707 in the 540 month. Finally, for 'others' vehicular class, the number required for profitability operations has to exceed 11651 in the first month until it reaches its maximum of 940124 in month 428 and declines gradually to 1187 in month 540.

Figure 6: Number of vehicles for a 60-year concession for light (upper left), medium (upper right), heavy (lower left) and 'other' (lower right) vehicles.

For a 60-year concessionary agreement to be profitable (Figure 6), the number of light vehicles must exceed 994123 in the first month to a maximum of 1078449512 in the 608th month declining relatively fast to 689101 in month 720. For the medium vehicular class operations, the number of medium vehicles must exceed 33779 in the first month reaching its maximum of 36635235 in month 608 and declines gradually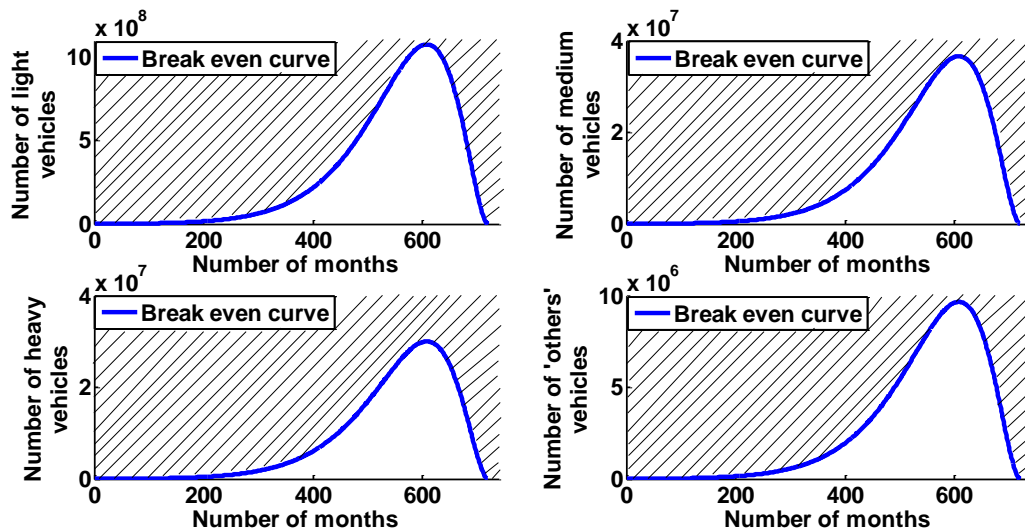 to 23416 in month 720. For heavy vehicles, the number of vehicles rises from 27679 in month 1 until it reaches its maximum of 30020540 in the 608th month. Beyond this month, the number of vehicles declines reaching its minimum of 19188 in the 720 month. Finally, for 'others' vehicular class, the number required for profitability operations has to exceed 8906 in the first month until it reaches its maximum of 9667624 in month 608 and declines to 6172 in month 720.

From (12) and using the information collected, the objective of a concessionaire for the Mallam Kasoa highway for light vehicles is:

$$Max(2n_{l_{mk}} - 142252.08 - 0.825 \times \omega_i 51335883017 \times 1.0179^i)$$

Subject to: $\quad 2n_{l_{mk}} > 142252.08 + 0.825 \times \omega_i 51335883017 \times 1.0179^i$

$$0 \leq n_{l_{mk}} \leq 1720950 \tag{29}$$

Similarly, the optimization problems for medium, heavy, and 'other' vehicles are:

$$Max(4.85n_{m_{mk}} - 12069.86 - 0.07 \times \omega_i 51335883017 \times 1.0179^i)$$

Subject to: $4.85n_{m_{mk}} > 12069.86 - 0.07 \times \omega_i 51335883017 \times 1.0179^i$

$$0 \leq n_{m_{mk}} \leq 178800 \tag{30}$$

$$Max(6.42n_{h_{mk}} - 13104.42 - 0.076 \times \omega_i 51335883017 \times 1.0179^i)$$

Subject to: $6.42n_{h_{mk}} > 13104.42 - 0.076 \times \omega_i 51335883017 \times 1.0179^i$

$$0 \leq n_{h_{mk}} \leq 69210 \tag{31}$$

and

$$Max(7.7n_{o_{mk}} - 5000.36 - 0.029 \times \omega_i 51335883017 \times 1.0179^i)$$

Subject to: $\quad 7.7n_{o_{mk}} > 5000.36 - 0.029 \times \omega_i 51335883017 \times 1.0179^i$

$$0 \leq n_{o_{mk}} \leq 69210 \tag{32}$$

Using *fmincon* of the optimization toolbox in Matlab version 2020a and noting that $maxf(x) \Rightarrow -\min[-f(x)]$ (see Brandimorte (2002), pp 124), the optimal profit for light, medium, heavy and 'others' for 15-year concession are shown in figure 7.

The optimal profit for light vehicular operation is essentially constant with a monthly value 1.7209×10^6. The difference between the minimum and the maximum values is just about 0.0067. The medium, heavy and 'others' vehicular operations also depict similar characteristics with monthly optimal values $1.7879 \times 10^5, 6.9210 \times 10^4$ and 6.9210×10^4 respectively.

Estimating the expected optimal profit for the concessionaire on the Mallam Kasoa route

To get the expected optimal profit for the concessionaire for the light vehicular class, we solve the optimization problem (29) altering the maximum number of vehicles α_i in each case to obtain the optimal profit $p_{fl_{1mk}}^{opt(m)}, p_{fl_{2mk}}^{opt(m)}, \dots, p_{fl_{nmk}}^{opt(m)}, m = 1, \dots, 1000$. The expected optimal profit is

then obtained by employing equation (14). The monthly traffic volume reported in 2019 lies in [915870, 1720950] and we use the interval [50000, 3000000] with interval steps 50000, 100000, …,2950000, 3000000. We assume that with a concessionary period of 15 years, the minimum number of light vehicles that will use the toll booth in a month is 50000 with a maximum of 3000000. It should be noted these end points can be altered if desired (i.e. if there is a reason to believe that within the concessionary period the number of light vehicles can exceed 3000000 or go below 50000 in a month).

For medium vehicles we solve the optimization problem (30) altering the maximum number of medium vehicles that pass through the toll booth in each case. The monthly traffic volume reported in 2019 lies in [8850, 178800] and using the interval steps 500, 1000, …, 999500, 1000000 within the interval [500, 1000000], we obtain the optimal profit $p_{fl_{1mk}}^{opt^{(k)}}, p_{fl_{2mk}}^{opt^{(k)}}, \ldots, p_{fl_{nmk}}^{opt^{(k)}}, k = 1, \ldots, 1000$. The expected optimal profit is then obtained by applying equation (14).

For heavy vehicles optimization model (31) is used and we use the interval steps 50, 1050, . . ., 999000, 1000000 to obtain the optimal profit $p_{fl_{1mk}}^{opt^{(j)}}, p_{fl_{2mk}}^{opt^{(j)}}, \ldots, p_{fl_{nmk}}^{opt^{(j)}}, j = 1, \ldots, 1000$. The expected optimal profit is obtained similarly by applying equation (14).

Finally, for 'others' we used the interval steps 300, 600, . . . , 299700,300000 and obtained the optimal profit $p_{fl_{1mk}}^{opt^{(r)}}, p_{fl_{2mk}}^{opt^{(r)}}, \ldots, p_{fl_{nmk}}^{opt^{(r)}}, r = 1, \ldots, 1000$ using optimization model (32). Equation (14) is then applied to obtain the expected optimal profit. The monthly expected optimal profits for each vehicular class together with the expected optimal profit for the entire operations are depicted in Table 6.

Figure 7: Optimal profit for a 15-year concession for light (upper left), medium (upper right), heavy (lower left) and 'others' (lower right) vehicles.
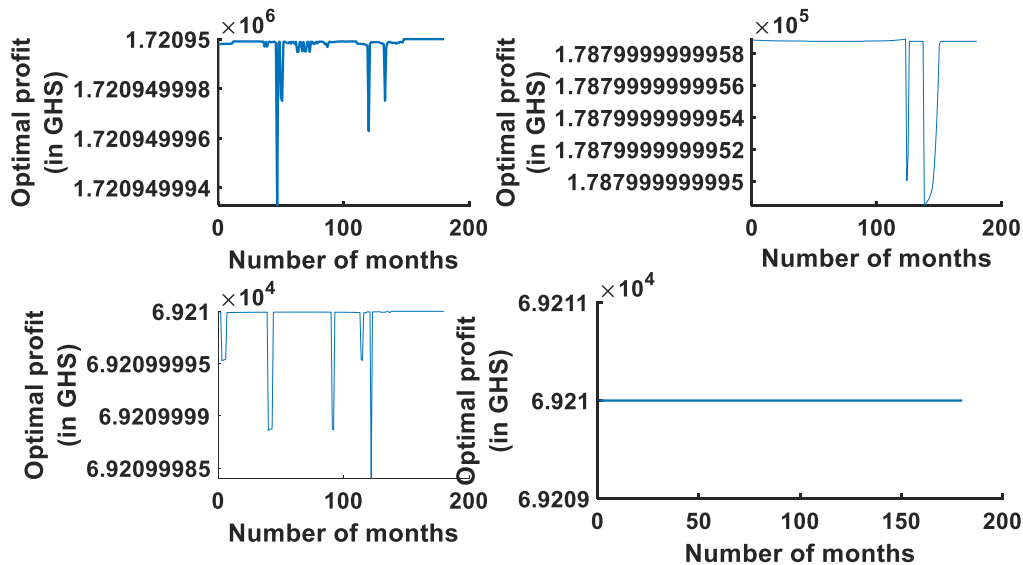
It should be noted that the monthly traffic volume reported for the latter two vehicular classes all lie in [2820, 69210].

It should be clear from Table 6 that the expected optimal profit increases with years of concession for the overall vehicular operations. Also, for each vehicular class, the expected optimal profit increases with years of concession.

Table 6: Expected optimal profit for the different sized vehicles for 180, 360, 540 and 720 months.

Concessionary periods (in months)	Expected Optimal Profit for different sized vehicles (Mallam Kasoa road)				
	$\hat{\mu}_l^{opt}$	$\hat{\mu}_m^{opt}$	$\hat{\mu}_h^{opt}$	$\hat{\mu}_o^{opt}$	$\hat{\mu}_{mk}^{opt}$
180	719,999.99	179,838.00	8,999.99	53,999.99	962,837.97
360	1,437,926.40	359,676.00	17,999.99	107,999.99	1,923,602.38
540	2,155,771.09	539,514.00	26,999.99	161,999.99	2,884,285.07
720	2,873,684.52	719,352.00	35,999.99	215,999.99	3,845,036.50

Risk Exposure for the concessionaire on the Mallam Kasoa route

The risk of the optimal profit can be obtained straightforwardly once the optimal profit is obtained for all the 1000 paths by applying equations (16), (17) and (18). The results are depicted in Table 7. The overall risk exposure for the entire operations was obtained by applying equation (19).

Table 7: Risk for the optimal profit for the different sized vehicles for 180, 360, 540 and 720 months.

Concessionary periods (in months)	Risk of optimal profit for different sized vehicles (Mallam Kasoa road)				
	$\hat{\sigma}_l^{opt}$	$\hat{\sigma}_m^{opt}$	$\hat{\sigma}_h^{opt}$	$\hat{\sigma}_o^{opt}$	$\hat{\sigma}_{mk}^{opt}$
180	1536754.09	383842.75	19209.43	115256.55	1588269.96
360	1918355.78	479568.66	24000.00	144000.20	1982772.57
540	1991927.19	497949.33	24919.89	149519.37	2058811.43
720	1795757.99	448595.10	22449.96	134699.75	1855972.08

From Table 8, the shorter the concession the riskier the arrangement. It should also be noted that risk exposure within a concession period is relatively the same across all vehicular classes.

Table 8: Coefficient of variation for the optimal profit for the different sized vehicles for 180, 360, 540 and 720 months.

Concessionary periods (in months)	Optimal Coefficient for different sized vehicles (Mallam Kasoa road)				
	$\widehat{CV}_l^{opt}$	$\widehat{CV}_m^{opt}$	$\widehat{CV}_h^{opt}$	$\widehat{CV}_o^{opt}$	$\widehat{CV}_{mk}^{opt}$
180	2.1344	2.1344	2.1344	2.1344	1.6495
360	1.3341	1.3333	1.3333	1.3333	1.0308
540	0.9240	0.9230	0.9230	0.9230	0.7138
720	0.6249	0.6236	0.6236	0.6236	0.4827

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Decades of underinvestment of the highway infrastructure in Ghana have left the country with a significant infrastructure deficit which is holding back the development and economic growth of the country. Investments from sources beyond public financing are needed to close this infrastructure deficit. The paper develops the conditions under which a PPP arrangement can work for different sized vehicles which incorporates the car density and the space a vehicular class occupies on the road. The toll rates are developed taking cognizance of the surface area of each vehicular class and the proportion of people that

possess vehicles in the town or city the toll booth is situated. The desire of a concessionaire is expressed as a mathematical programming problem for the expected optimal profit and risk exposure of the concession are also developed. We also provide methods for estimating the expected optimal profit and risk exposure for a given number of years of concession. Models for deciding the number of years of concession for an investor based on the risk tolerance are provided.

The models are good decision tools for any businessman or organization interested in partnering with the government in road construction. The models can be adopted with slight modification to fit any country where there is greater traffic volume and road congestion abound. It also allows the parties to the concession agreement to make prudent decisions. This mode of toll setting can have the potential of reducing congestion in major cities. Because the pricing incorporates the car density of the region or city where the toll booth resides, users may be motivated to use public transport or other means of getting to major cities to avoid paying high charges at the toll booth thus reducing congestion. It could potentially motivate businesses to move to less congested regions of a country in other to benefit from low toll charges in those areas. The concessionaire should also benefit from this mode of pricing as users will pay an amount commensurate with city congestion, damage, and frequency of road usage.

The toll rates assignment hinges on the surface area of the vehicular class. Because the median surface area is used for each vehicular class, vehicles whose surface area is below the median surface area of that class are overcharged and those whose surface area is above the median surface area are undercharged. We call the government to dismantle the vehicle classification so that models that assign rate based on the surface area of each vehicle is developed and deployed. The results presented are only for construction type asphaltic concrete-single carriageway. Other road construction types such as motorway, reconstruction, rehabilitation, and new construction need to be studied as well.

REFERENCES

Andoh, C., Mensah, L. & Quaye, D. (2020). Road Pricing: A Solution to Ghana's Traffic Congestion. *African Journal of Management Research,* vol. 27, Issue 1, pp. 129-150.

Andoh, C. & Quaye, D. (2017). Toll Rates and Highway Construction in Ghana: The Concessionary Projects. In K. A. Osei., J. Y. Abor., R.E., Hinson., R. Boateng., J.M. Onumah., K. Dartey-Baah & A. Ahenkan (eds), *Contemporary Issues in Management Development in Africa* (pp. 415-454). London, UK: Adonis & Abbey Publishing Ltd.

Andoh, C., Mills, E.A., & Quaye. D. (2012). Public Private Partnership as an Alternative Source of Financing Highways in Ghana. *Annals of Management Science,* Vol. 1, number 1, pps 61-82.

Artzner, P., Delbaen, F., Eber, J., & Heath, D. (1997). Thinking coherently. *Risk* 10, 11, 68–71.

Artzner, P., Delbaen, F., Eber, J., & Heath, D. (1999). Coherent measures of risk. *Mathematical Finance* 9, 203–228.

Awortwi, N. (2012). Contracting Out Local Government Services to Private Agents: An Analysis of Contract Design and Service Delivery Performance in Ghana. *International Journal of Public Administration*, 886–900.

Brandimorte, P (2002). *Numerical Methods in Finance. A Matlab-Based Introduction*. Wiley series in Probability and Statistics (Chapter 2, pp 124).

Brent, D. A., & Gross, A. (2017). Dynamic Road Pricing and the Value of Time and Reliability. *Journal of Regional Science*, 58(2), 330-349.

Brocklebank, P. (2014). *Private Sector Involvement in Road Financing.* Washington DC: Sub-Saharan African Transport Policy Programme (SSATP) and World Bank.

Brown, J. W., Pieplow, R., Driskell, R., Gaj, S., Garvin, M. J., Holcombe, D., . . . Smith, A. (2009). *Public-Private Partnerships for Highway Infrastructure:Capitalizing on International Experience.* International Technology Scan.

Davis, J. H., Donaldson, L., & Schoorman, F. (1997). Toward a Stewardship Theory of Management. *Academy of Management Review, 22*, 20-47.

Dowd, K. (2005). *Measuring Market Risk (2nd edition).* England: John Wiley and Sons.

Eliasson, J., & Mattsson, L. G. (2006). Equity effects of congestion pricing: quantitative methodology and a case study for Stockholm. *Transportation Research Part A: Policy and Practice*, 40(7), 602-620.

Grossman, S. J., & Hart, O. D. (1983). An Analysis of the Principal-Agent Problem. *Econometrica, 51(1)*, 7-45.

Heggie, I. G. (1995). Management and Financing of Roads An Agenda for Reform. *World Bank Technical Paper Number 275*, 1-149.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics, 3(4)*, 305-360.

Kirk, R. S., & Mallett, W. J. (2013, September 12). *Funding and Financing Highways and Public Transportation.* Congressional Research Servive. Retrieved from Preventionweb: http://www.preventionweb.net/countries/gha/data

Litman, T. (1999). Distance-based charges; a practical strategy for more optimal vehicle pricing. *Victoria Transport Policy Institute.*

Mirrlees, J. A. (1976). The optimal structure of incentives and authority within an organization. *The Bell Journal of Economics*, 105-131.

MOFEP. (2020, July 11). *Ministry of Finance and Economic Planning.* Retrieved from ppp.mofep.gov.gh: http://www.ppp.mofep.gov.gh

Perkins, S. (2013). Better Regulation of Public-Private Partnerships for Transport Infrastructure:Summary and Conclusions. *International Transport Forum* (pp. 1-56). Paris: OECD/ITF Transport Research Centre.

Ross, S. A. (1973). The Economic Theory of Agency: The Principal's Problem. *American Economic Review*, 134-139.

Rouhani, O. M. (2016). Next Generations of Road Pricing: Social Welfare Enhancing. *Sustainability*, 8(3), 265.

Stiglitz, J. (1975). Incentives, Risk, and Information: Notes Toward a Theory of Hierarchy. *The Bell Journal of Economics*, 522-579.

Stock, J. H., & Watson, M. W. (2007). *Introduction to econometrics (2nd ed.).* Boston, MA: Pearson International edition.

UNECE. (2017). *Innovative ways for Financing Transport Infrastructure.* Geneva: United Nations Economic Commission for Europe (UNECE).

World Bank Group. (2014). *Public-Private Partnerships Reference Guide.* Washington DC: World Bank Group.

Zhang, K., Zhou, Z., Qi, Y., & Wang, Y. (2019). Dynamic pricing strategy for high occupancy toll lanes based on random forest and nested model. *IET Intelligent Transport Systems*, 13(4), 636-643.

Zhu, S., Du, L., & Zhang, L. (2013). Rationing and pricing strategies for congestion mitigation: behavioral theory, econometric model, and application in Beijing. *Procedia-Social and Behavioral Sciences*, 80, 455-472.

APPENDIXES

Table 1A: Registration offices and the numerical designation

Registration office	Number	Registration office	Number	Registration office	Number
Accra	1	Ho	8	Denu	15
Tema	2	Tamale	9	Bekwai	16
Kumasi	3	Bolga	10	Mampong	17
Takoradi	4	Wa	11	Nkawkaw	18
Sunyani	5	Weija	12	Tarkwa	19
Koforidua	6	Obuasi	13	Bivac-Kutunse	20
Cape Coast	7	Techiman	14	Sked Somanya	21

Table 1B: Name of Toll Stations and their respective Region

Number	Location	Region	Number	Location	Region
1	Afianya	Greater Accra	20	Assin Praso	Central
2	Dodowa	Greater Accra	21	Dunkwa.On-Offin	Central
3	Ayi Mensah	Greater Accra	22	Moree	Central
4	Kasoa	Greater Accra Englashie	23	Adomi	Eastern
5	Pobiman	Greater Accra	24	Sekyere	Eastern
6	Motorway	Greater Accra End	25	Kade	Eastern
7	Ashiaman	Greater Accra	26	Bamboi	Savana Region
8	Tsopoli	Greater Accra	27	Buipe	Savana Region
9	Motorway	Tema End	28	Sawla	Savana Region
10	Kubiase	Ashanti	29	Sogakope	Volta
11	Aboaso	Ashanti	30	Ativuta	Volta
12	Offinso	Ashanti	31	Babator	Bono East
13	Tabere	Ashanti	32	Tuobodom	Bono East
14	Kyemfaso	Ashanti	33	Fiapre	Brong Ahafo
15	Adiembra	Ashanti	34	Bechem	Ahafo
16	Badukrom	Western	35	Yapei	Northern
17	Ankobra	Western	36	Nasia	Northern East
18	Jomoro	Western	37	Pwalugu	Upper East
19	Bonsaso	Western	38	Awaso	Western. North

Table 1C: Median and average traffic volume for some selected tollbooths for 2019.

Tema Motorway 2019

	Light	Medium	Heavy	Other
Average (7days)	37261	3246	1587	1246
Median (7 days)	89482	2662.5	2519	1383

Mallam Kasoa 2019

	Light	Medium	Heavy	Other
Average (3 days)	43566	2581	996	160
Median (3 days)	42804	743.5	293.5	171

Yamoransa- Cape Coast 2019

	Light	Medium	Heavy	Other
Average (7 days)	5923	613	211	295
Median (7 days)	16878	885	266	302

Axim Junction-Esiama 2019

	Light	Medium	Heavy	Other
Average (3 days)	3802	249	217	85
Median (3 days)	1839	163	97	84

Motorway Dawhenya 2019

	Light	Medium	Heavy	Other
Average (3 days)	12832	847	956	125
Median (3 days)	13280	523	465	114

Mpataba-Elubo 2019

	Light	Medium	Heavy	Other
Average (3 days)	1171	164	75	55
Median (3 days)	613	140.5	50.5	65

Sogakope Kase 2019

	Light	Medium	Heavy	Other
Average (3 days)	4192	380	184	241
Median (3 days)	4128	225	120	244

Table 1D: Average sum of 4 toll booths construction

Description	Amount (GH₵)
Construction of 4 Isolated toll booths	342,856.15
Construction of Office Block	390.684.03
Toll Booth Canopy	635,383.65
Ancillary Road Works and External Works	4,398,963.44
Painting of Metal Canopy	213,086.75

SELF-GOVERNING STRATEGIES OF FEMALE TIED MIGRANTS IN THE SOUTH AFRICAN LABOR MARKET

Farirai Zinatsa and Musawenkosi D. Saurombe

ABSTRACT

Despite being one of the major integration means for migrants, labor market integration (LMI) remains understudied in the Global South. The extant literature on the LMI of female accompanying spouses is lacking. Skilled accompanying spouses can be considered economic migrants who may seek to exercise their agency in search of empowerment and economic self-sufficiency through LMI. The main objective of this research was to determine the meso governing technologies influencing the LMI of accompanying spouses in the Free State Province, South Africa, using Michel Foucault's theory of governmentality. Since South Africa remains a key regional hub for migration in the Global South, it is imperative that its migration governance framework considers accompanying spouses. A qualitative, interpretivist approach using 13 one-on-one interviews, which each lasted two hours on average, was adopted in this study. Thematic analysis was used to generate the findings. The study found that the meso-level governing technologies affecting the tied migrants' pursuit of LMI included family ties and traditional gender roles, diaspora expectations, visa processing challenges, the non-recognition of qualifications, and employer-related exclusion—mainly linked to what were perceived to be discriminatory and exclusionary practices. This study's findings can, to some extent, highlight issues that could inform South African immigration policy.

Keywords: Tied migrant, self-governing strategies, female, labor market, South Africa

INTRODUCTION

Labor migration has been a distinctive feature of the South African economy for many decades. Relative economic stability, relative political stability, and broad respect for human rights are among the notable pull factors contributing to the rise of post-apartheid South Africa as a key regional hub for

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migration and preferred destination for many labor migrants. However, the South African migration governance framework is characterized by conflicts and contradictions, evidenced in policies that are simultaneously inclusive and restrictive (Amit & Kriger, 2014; Hiralal, 2017; van Lennep, 2019).

While national development has gained traction as a discursive hegemony in relation to skilled migration, the government of South Africa has maintained an exclusive and restrictive discourse emanating from the apartheid era. Anti-immigrant sentiment remains widely prevalent among the general populace at the national government and political party levels. Despite evidence highlighting the positive contribution of migrants to the South African economy (Hiralal, 2017; Organisation for Economic Co-operation and Development-International Labor Organization (OECD-ILO), 2018), common misconceptions are that migrants "steal the jobs" of South Africans, burden public services, and engage in criminal activities (Abebe, 2019; Amit & Kriger, 2014; Kanayo et al., 2019).

While South Africa has used its migration policies to address labor shortages and manage the supply of labor over the years, its policies encompassing economic development are often criticized for disregarding the intricacies concerning family migration. Women migrating in the family context as accompanying spouses typically incur the highest migration penalties (Ballarino & Panichella, 2018). Accompanying spouses seeking to be employed must therefore navigate a complex assemblage of policies, laws, practices, and discourses of labor migration, through which their situation is framed and constructed discursively, and their behaviors are controlled and shaped concerning the labor market in South Africa. Moreover, accompanying spouses remain primarily invisible in migration research. This study sought to critique the meso governing technologies that shape the conduct and experiences of female accompanying spouses in the Free State Province where labor market integration (LMI) in South Africa is concerned. Michel Foucault's theory of governmentality was adopted in this research.

RESEARCH PURPOSE

The aim of this research is to explore the meso governing technologies that influence the LMI of accompanying spouses/tied migrants in the Free State Province, South Africa.

LITERATURE REVIEW

The theory of governmentality

In *Security, Territory and Population*, Foucault (2009) defines government as the conduct of conduct. Governing entails the utilization of an assemblage of techniques, discourses, practices, or strategies that guide and modify the behavior of individuals toward ends. These government technologies are determined by mentalities or thoughts (governmentalities) such that the shaping of conduct is deliberate and not random or arbitrary. According to Bhattacharjee (2017), governmentality suggests that some ways of being are preferable to others. Governmentality therefore operates by shaping the subjectivities of the ones governed. Specific individual subjectivities arise from specific knowledge to determine possibilities (Ho, 2017). For example, in the South African context, the legal ascription of "dependant" given to accompanying spouses determines whether they can legally work or not. Therefore, governmental technologies and rationalities can be expanded into society and individual lives (Bhattacharjee, 2017).

However, conduct does not just pertain to governing others but also extends to governing oneself (Teo, 2019). The governance of self-determines whether one concurs with or resists how one is subjectified. From the Foucauldian perspective, power is reconceived as power *from a distance*, which involves the configuration of habits, aspirations, and beliefs and the education of preferences. In this regard, the effectual exercise of power is seen through the governed's voluntary acts (Del Percio, 2018).

Power is expansive and therefore not solely embodied in the state and administration (Davids et al., 2011; Lemke, 2002; Rose et al., 2006). It emanates from multiple actors and seeks to govern numerous behaviors or actions (Teo, 2019). The assemblages of power, including policies, laws, rules, training programs, codes of conduct, and diverse discourses, are tailored to guide professional, ethical, and civic behavior. Power is not totalizing, however (Teo, 2019). The individual remains a locus of freedom through which they can regulate themselves. However, as Lemke (2002: 341) expounds, to govern means to place limitations on the possible field of action. Foucauldian theory in practice can be used to deconstruct the practices and knowledge behind specific forms of identities and subjectivities (Teo, 2019), hence the authors' adoption of the theory in this study.

Factors that may influence governing technologies of female tied migrants

Gender role theory presupposes that female migrants are socialized to prioritize the needs of the family over their own personal goals (Bailey & Mulder, 2017; Ncube & Mkwananzi, 2020). Traditional gender roles are believed to be more salient among non-Western families (Banerjee & Phan, 2015). Banerjee and Phan (2015) note that these roles may not be explicit but can manifest subtly through gender disparities in occupations, education levels, work experience, and even language ability. Ncube and Mkwananzi (2020) suggest that socialization according to traditional gender roles can determine migrants' aspirations regarding work and/or education. The sacrifice of professional aspirations to focus on domestic responsibilities can lead to cultural isolation (Banerjee & Phan, 2015). Social capital can relieve the burden of childcare responsibilities, especially those in relation to young children, but its absence can be particularly detrimental for a woman's career prospects (Bailey & Mulder, 2017; Föbker, 2019).

The poor LMI of highly skilled migrants into labor markets (Confurius et al., 2018; Zinatsa & Saurombe, 2022) strongly challenges the assumptions made in human capital theory, which presuppose that training and education improve LMI outcomes. The human capital of female migrants may be devalued by employers due to institutional rules and professional requirements and the devaluation of foreign-acquired skills and experience (Vermaak & Muller, 2019). Entry into labor markets by skilled migrants is also predicated upon the legal rules governing the labor market (Föbker, 2019). Labor market conditions vary among countries and can broadly be classified into two categories: flexible and inflexible.

The South African labor market can be described as inflexible (Chinyakata et al., 2019) as strict employment legislation governs it. Regarding the employment of immigrants, the Immigration Act's (13 of 2002) Section 38(1) provides that "no person shall employ (b) a foreigner whose status does not authorise him or her to be employed by such person, nor (c) a foreigner on terms, conditions or in a capacity different from those contemplated in such foreigner's status" (Department of Home Affairs (DHA), 2002). Deterrents for employers against employing immigrants without permits include the imposition of fines or threats of imprisonment.

The DHA (2017) noted several shortcomings and criticisms of South African migration policy, and migration in the context of family was one of the points raised. No country that seeks to attract top-tier international immigrant skills can evade the reality that, in many cases, the targeted candidates come with a spouse or nuclear family. The current migration policies, as developed and implemented by agencies such as the DHA, disregard tied migrants in terms of LMI. In efforts to elude stringent and inhibiting policies and legislation, tied migrants often resort to more tedious, though preferably scrupulous, trajectories toward LMI. The process of determining which migrants are skilled, unskilled, or semi-skilled, and the assignation of value in terms of the labor structure are key parts of governmentality (Allan & McElhinny, 2017; Del Percio, 2018). Tied migrants whose native country qualifications are downgraded by the South Africa Qualifications Authority often resort to deskilling and downplaying their skills.

RESEARCH METHODOLOGY

Research approach and philosophy

A narrative, qualitative approach was used to garner rich interpretations of reality and an understanding of the world through the lens of the respondents. The emic approach used was regarded as suitable for understanding lived experiences from an intersectional perspective (Atewolugun, 2019). In addition, unlike the quantitative approach, the narrative approach is lauded for its ability to make the invisible visible (Meares, 2010).

The researchers ontologically observed the subjective meanings obtained from the interviews conducted with participants (Saunders et al., 2016). They explored and explained the participants' interpretations of the nature of reality as the latter made sense of their everyday lives (Ngulube, 2020). The researchers further epistemologically acknowledged the role that narratives and personal interpretations played in the phenomenon of coping with life as a tied migrant in this study (Ngulube, 2020). Through the interpretivist paradigm, the researchers scrutinized the lived experiences of others and interpreted them within a particular historical and social context (Saunders et al., 2016).

Sampling

In total, 13 interviews were carried out for this study, which conformed with the qualitative sample size recommendations by Braun and Clarke (2021b). This research also considered the study by Guest et al. (2006), which found that 94% of the most prominent or frequent codes emerge in the first 6 interviews and 97% of them in the first 12 interviews, thus implying the sufficiency of the sample size in terms of ensuring valid findings and, arguably, alluding to data saturation.

The specific inclusion criteria for this study were defined as migrant women between the ages of 18 and 65, migrant women who were born outside and not citizens of South Africa, spouses (female tied migrants) who either accompanied or followed their spouses to South Africa for the purposes of family reunification, migrant women who were legally resident in South Africa, migrant women who came to South Africa with some form of tertiary education or work experience, and migrant women who were either employed or previously employed in South Africa.

Purposive sampling was initially used to select respondents meeting the inclusion criteria to participate in the study based on the researchers' network. A snowball approach was utilized to complement the initial purposive sampling, whereby participants were asked to refer other participants who met the inclusion criteria to the researchers. All participants were based in the Free State at the time of data collection.

Interview guide development

A semi-structured interview guide was constructed to explore themes of LMI arising from the extant literature. Initially, the interviewees were asked an open-ended question to elicit their own narratives regarding their transition from the country of origin to the host country in the context of family migration, without the researchers imposing their own preconceived ideas. After the initial narratives, the researchers used the semi-structured guide to explore various issues arising from the search for greater understanding. The guide was structured to examine in depth the matters pertaining to meso-level governing technologies.

Data collection

In total, 13 one-on-one interviews, which each lasted two hours on average, were conducted in English with female migrants based in the Free State Province who had emigrated to South Africa from various countries within sub-Saharan Africa. The interviews were conducted between August 2020 and February 2021, online via Zoom, and in adherence to Covid-19 social distancing protocols. The

interviews were recorded on an external device. The researchers also made (field) notes throughout each interview. The initial participants comprised the researchers' migrant network, and then further candidates were identified by these initial participants.

Upon referral, the interviewees received a call from the researchers explaining the nature of the research project and key ethical issues regarding consent and voluntary participation. After verbally consenting to be interviewed, each interviewee was given a sub-Saharan consent letter to sign, which was to be returned prior to the date of the interview. The interviews were held at the convenience of the interviewees, who were asked to choose a date and time when they would be available. This concession was made considering the relatively long length of time required for narrative interviews.

Data analysis

The audio-recorded interviews were transcribed by the researchers. During the interviews, the researchers engaged with the text and developed initial ideas about coding (Braun & Clarke, 2021a). During the transcription, the researchers noted ideas for codes emerging from the text. The full transcriptions were uploaded to ATLAS.ti for analysis, and comparisons were made across cases. The interviews were read twice before themes were developed in accordance with the deductive topics arising from the theory.

Strategies employed to ensure data quality and integrity

The researchers employed the following strategies to ensure the quality and rigor of the data in this research (Hadi & Closs, 2015):

- Triangulation: the researchers discussed the codes and themes generated with the supervisors to ensure credibility and conformability.
- Self-reflection: the researchers clearly stipulated their role in terms of the study and were careful to consider any biases that could have emanated from personal or subjective viewpoints.
- Peer debriefing: the researchers consulted with two other researchers, who were not directly involved in the study, to promote reliability and validity.
- Extensive descriptions: the researchers provided extensive descriptions of the research setting and sample traits, including the data gathering and analysis techniques used in this study.
- Lengthened engagement: the researchers gained the trust of the participants by being involved with them for a substantially long period of time.

FINDINGS

The study found a complex assemblage of governing technologies operating at the meso level by means of practices and policies, as depicted in TABLE 1 below. These governing technologies were instrumental in directly and indirectly shaping the conduct of accompanying spouses in the Free State province, with respect to the labor market in South Africa. Overall, these technologies appeared to have a predominantly negative impact on the labor market trajectories of tied migrants in the Free State, South Africa.

Table 1. Meso-Level Governing Technologies

Level of analysis	Actor	Governing technology
Meso Level	Family and friends	Family ties and (traditional) gender roles
		Diaspora conditions and expectations
	Employer(s)	Exclusionary practices – ethnic-based discrimination, overqualification, deskilling, and language requirements

	State/State-appointed agency	Visa processing and administrative challenges
		Non-recognition of qualifications

Main Theme 1: Meso-level governing technologies

Sub-theme 1: Family and friends

Sub-theme 1.1: Family ties and traditional gender roles

Strong family ties appeared to motivate the decisions of accompanying spouses to migrate, even in the case where South Africa did not appear to be the first choice of where to settle, as exemplified by the following participant response:

When I came to South Africa, honestly, to start with, it's not really my favorite destination. It was not really a place I dreamt I would stay, raise a family, and stuff like that ... Lo and behold somebody that resides temporarily in South Africa came to ask for my hand in marriage [in tied migrant's country of origin] ... So, at the back of my mind, I was just like, okay, let me just stay with him five years then we can look for somewhere else to go. (Iris, PhD in Animal Science, lecturer, took 3 years to LMI)

He was assigned to SA. If your company moves you, your baggage [i.e., family] moves along. (Priscilla, PhD in Leadership, pastor/businesswoman, took 9 years to LMI)

Employment opportunities were deemed more accessible in certain provinces/cities, but the accompanying spouse's location was, again, largely determined by where the lead spouse was able to find employment and settle:

It's a small town where there's no media anyway. I could not even apply for any job. And at that time, in terms of the journalism profession in that town, I couldn't find anything. (Charlotte, Diploma in Journalism, administrator, took 7 years to LMI)

He also got a job whilst we were still in Louis Trichardt and then moved to Joburg. So he moved first to Johannesburg and then I stayed on in Louis Trichardt for a month. Then he came and fetched me ... You know how it is in small towns. (Andrea, Master's in Development Studies, programme manager, took 5 years to LMI)

Hubby moved to Bloem because of work ... In Joburg it's a fast town. I grabbed a job, I left, I got another one, I left [In reference to being able to move from one job to another]. I didn't have any issues of getting a job [referring to the ease of getting a job in Johannesburg]. (Iris, PhD in Animal Science, lecturer, took 3 years to LMI)

Strong family ties also influenced intentions regarding onward migration concerning employment opportunities outside South Africa:

Yes, my husband is the one who steers the ship, so if he gets a better job obviously, we'll move to France [for example], or move to any other country. (Theresa-May, B Accounting, quality analyst, took 8 years to LMI)

No remember, it's my husband's decision because my husband is the one who's an engineer. So, going to Australia, it's his plans. I'm also going again in the way of accompanying spouse. If there is something like accompanying [in terms of Australian legislation], I'm also going to do the accompanying thing. (Unarine, Bachelor's in HRM, real estate agent, took 4 years to LMI)

Due to family ties, accompanying spouses found it very difficult to leave their families and migrate on their own to other cities/provinces, even when moving meant securing employment or an opportunity for upward career mobility:

I had got something at Rhodes, but family ties also came in, unfortunately. I got something at Rhodes... My husband believes it's difficult for us to stay apart late like this. It's like, my husband feels we should always be together everywhere. I also feel the same but here I was tempted because I was looking at the salary and I was also looking at the upward mobility and the opportunity that had just been presented but he said money is not everything. (Monica, PhD in Education Management, educationist, took 2 years to LMI)

We had to be together, and I mean you don't want to stay [alone] in foreign land or foreign country. You don't want to separate with your spouse. (Charlotte, Diploma in Journalism, administrator, took 7 years to LMI)

In South Africa, when you think about moving to places like Johannesburg, Cape Town, Durban, if you're a married person when you're considering all those decisions, we also consider kids. Is anyone going to give your kids the love that you're giving them, the support that you're giving them right now? Is it worth it? (Lucille, B(Honours) Accounting, lecturer, took 4 years to LMI)

Sub-theme 1.2: Diaspora conditions and expectations

Friends appeared to play a huge role when imagining life in South Africa. They appeared to make significant contributions, such as finding opportunities for employment for the lead spouse in the host country.

We hadn't planned on moving to South Africa but this job offer came and then you weigh your options to say okay, perhaps, let me try this because the economy in Zimbabwe at that time wasn't doing well. It's not like it was a major decision in the sense that something came up this side. He got a call from his friend to say if you want this job, please come tomorrow. (Andrea, Master's in Development Studies, programme manager, took 5 years to LMI)

Due to excessive pressure and expectations from friends and family back home, there appeared to be strong perceptions that being employed in South Africa equated to having succeeded in the host country:

First of all, I'm not doing what I want to do. I just got a job and I started working, I think it was for my family, to work. It's not what I went to school for. (Theresa-May, B Accounting, quality analyst, took 8 years to LMI)

But I said I can't go back to Nigeria alone. My husband has a job in South Africa. So, what would my parents say if I comeback just because I couldn't find a job. So, I just stayed put. (Iris, PhD in Animal Science, lecturer, took 3 years to LMI)

It's not easy, 'cause you know one of the pressures that we have as Zimbabweans is that the moment that you say that you're in South Africa, people have these high expectations, and it's difficult for our families back home to understand how difficult life is in South Africa. It only takes someone who has stayed here to understand the challenges that we go through. (Andrea, Master's in Development Studies, programme manager, took 5 years to LMI)

In most cases, financial necessity compelled the accompanying spouse to find employment as a means of expanding the couple's financial means and ability to take care of the extended family back home:

But if he's a breadwinner then there's a huge black tax ... Remember if it's his salary it goes to my mom, it goes to his mom, it goes to the brother, the sister, the grand [mother/father], the aunty. You find that at the end of the day they can say women don't have to work but honestly, it's

straining them. It's really straining them [the lead spouses] because now there's so much that needs to be done and you can't do it without the financing. (Unarine, Bachelor's in HRM, real estate agent, took 4 years to LMI)

I was hoping at least if I work, I'll send money home. It wasn't necessary because my husband had gotten quite a good job at that time. So, for us in South Africa, we were fine. But the money that I really needed was to send home to my family. (Andrea, Master's in Development Studies, programme manager, took 5 years to LMI)

Sub-theme 2: Employer-related exclusionary practices

Sub-theme 2.1: Ethnic-based discrimination

Practices of discrimination based on nationality were regarded as resulting in less qualified South Africans being hired in the place of the more qualified non-South Africans, termination of employment, and a lack of promotion opportunities or equal pay:

Here, the culture is different in terms of the acceptance rate of non-South Africans. They'd rather accept the Europeans, the Americans, even if they are black skinned ... Because when the chips are down, you are still a foreigner. Even if you have a permanent job here in South Africa which gives you more financial security, if somebody doesn't like your face tomorrow, they can just terminate your appointment like that. (Iris, PhD in Animal Science, lecturer, took 3 years to LMI)

There's a trend I have seen here, they give you the job as a non-South African and they turn against you. You see, there is a difference between if you are not productive and they are against you ... If you are not being productive, it's understandable, than for them to suddenly want to put you out [unexplainedly]. (Palesa, Master's in Urban Planning, town planner, took 3 years to LMI)

You've got so many battles to fight. It's not only whites against black. There's Indians against black, and I'm not saying this because it's only the company, it's just in general. I feel strongly that there is racism and because I'm a woman. I'm always saying in South Africa, you fight so many [battles], [you're] black, you're a foreigner and you're a woman. There are three things that you are constantly fighting, and I feel that even at the current place I work. (Charlotte, Diploma in Journalism, administrator, took 7 years to LMI)

But the challenge came when as a woman in IT, the promotion wasn't coming. So that's when I started getting frustrated to say you know what, "I've proved to these people that I'm hardworking, I've even done courses that are in line with what I do. But still, there's just no promotion coming ... For me I didn't get those opportunities which was like very frustrating. I had my ID by then so I was like you know what I should change my career. (Andrea, Master's in Development Studies, programme manager, took 5 years to LMI)

Some accompanying spouses believed that, due to their status as a foreigner, most employers would not give them permanent contracts. Feelings of being underemployed and underpaid were also linked to a system of exploitation by some employers:

They have refused to make me permanent. Yeah, I understand. I am not South African ... So well, yeah, they are very glad to give me the part time stuff. I'm not really costing that much money ... The part time job was just for grocery money because the payment was so little. (Iris, PhD in Animal Science, lecturer, took 3 years to LMI)

Overall, there was a perceived reluctance among South African business entities to hire foreign nationals. Having permanent residence, which signified the right to work in South Africa, did not appear to make a significant difference for many accompanying spouses, and many held the view that employers

preferred naturalized citizens, who therefore had greater employment prospects. This also appeared to be more dominant in particular sectors:

Then she [HR practitioner] said, as long as you don't have a special skill and you have a permanent residence, they won't take you. Yes, they will never take you if you have got a PR. If you are qualified, they will never take you, unless you've got citizenship. [Company X] won't employ you … they are not going to take you because they are forced to take South Africans or someone whose got citizenship, or even an asylum person, I think they can take, but not someone who has got a PR. (Theresa-May, B Accounting, quality analyst, took 8 years to LMI)

I couldn't be employed in [Company X] because the policy is, they start by employing South Africans. (Monica, PhD in Education Management, educationist, took 2 years to LMI)

Remember some of the jobs state that they want a South African citizen not a permanent resident. Some of the job adverts, you know for sure to say, we want a citizen not a permanent resident. (Lucille, B(Honours) Accounting, lecturer, took 4 years to LMI)

Sub-theme 2.2: Overqualification

As a result of being categorized as overqualified, it was difficult to access the labor market; however, this was also linked to a form of othering:

The journey got worse actually even with a Master's, it got worse … So, I submitted and after, not even up to two days, I got a call that "Oh, sorry, we don't need people like you. You are overqualified for the job." And I started pleading with the guy that called. I was like Just forget about the qualifications. Forget. Just forget. He said "No, we just realized that you're not a South African". That is how he put it. (Tshepiso, PhD in Environmental Management, environmental manager, took 7 years to LMI)

If I'm doing an admin job, they'll just say even a grade 12 can do an admin job without even being trained whatsoever, it won't make sense for them. (Grace, Master's in Financial Management, real estate agent, took 6 years to LMI)

… also, there was nothing amazing for me in having a master's because they said the basic qualification for one to teach in their primary schools is a first degree. So, for me to have a master's was just a bonus for myself, it did not move them to give me a post even though I was second highest qualified … (Monica, PhD in Education Management, educationist, took 2 years to LMI)

Sub-theme 2.3: Deskilling

Despite many years of experience, some had to restart their careers with entry-level positions after deskilling themselves to employers in terms of experience and qualifications, leading to significant underemployment:

I came in as an entry despite the 15 years of experience plus [the] five years I had acquired in South Africa. You start afresh, yes … When I went there, I had to start on level one, according to the new system of the department. They regarded me as a new entry, so the salary level was for an entry level person … (Monica, PhD in Education Management, educationist, took 2 years to LMI)

Sub-theme 2.4: Language requirements

Many accompanying spouses found that their knowledge of local languages was deficient, and this became a significant challenge to LMI:

The only difficult place that I found it very difficult to break through it was here Bloemfontein. It was very difficult because of the language. They can't employ you if you can't say, what is it, morning in Afrikaans. (Unarine, Bachelor's in HRM, real estate agent, took 4 years to LMI)

It's a limitation. I have seen adverts where they want an Afrikaans speaking person, to teach something in English because they will have Afrikaans speaking pupils. The belief is, at least the students must be able to express themselves, so [not knowing Afrikaans] it's a big limitation. (Monica, PhD in Education Management, educationist, took 2 years to LMI)

Not knowing the local language or speaking in a foreign accent was in some cases a signifier of one's nationality and led to discrimination:

Another issue was communication barrier. I couldn't even interview someone, it was just difficult because they couldn't speak so much of English and they pick it up that you are a foreigner, it was something else. (Unarine, Bachelor's in HRM, real estate agent, took 4 years to LMI)

So, this white lecturer was like, this was an older lady by the way, she said something which if it was from a younger person I would understand. But this older lady came and said that students may not understand us, you know, we non-South Africans. She said we always have this kind of accent that students don't understand. Wow! It was so derogatory. And she was screaming, she wasn't silent, people could hear. [She said], students don't understand you and that's how students fail. (Iris, PhD in Animal Science, lecturer, took 3 years to LMI)

Sub-theme 3: State/State-appointed agency

Sub-theme 3.1: Visa processing and administrative challenges

For accompanying spouses, the ability to apply for, renew, and change their visa categories was regarded as important in terms of assuring the right to live, study, or work in South Arica. Almost all the accompanying spouses experienced significant challenges in one form or another with regard to visa processing. These challenges created barriers to LMI in indirect and direct ways.

For instance, having a permanent residence permit was associated with the right to work in South Africa; however, unreasonably long delays with visa processing were cited as problematic. Consider the following response:

… believe me, now it's four years, I'm still waiting for my ID, nothing is happening. So, getting a job is difficult. (Unarine, Bachelor's in HRM, real estate agent, took 4 years to LMI)

Other challenges related to unclear visa application requirements, unreasonable demands, and a lack of clarity regarding the reasons for rejections are reflected in these responses:

I realized that the requirements for certain visas were not explicit. We used to joke about it with my family, that what South Africans write on paper is not what they need. It may be different. If they say, you may submit this. You may, means if you have it, submit, if you don't have it, don't submit. If you have it, you must submit it. I found it difficult trying to comprehend their kind of English and what they mean … (Iris, PhD in Animal Science, lecturer, took 3 years to LMI)

You have been in South Africa, then you will be required to submit a yellow fever certificate. You know, why would you? In fact, the very last application I made was last year ... I have not left the country for ten years, so of what use will a yellow fever certificate be? And since I have not left the country for the past ten years why would you ask me to submit a Nigerian police clearance certificate. When would I have committed the crime in Nigeria? Where? (Iris, PhD in Animal Science, lecturer, took 3 years to LMI)

Last year alone, I personally spent more than R24,000 minimum in permits. My critical skills visa was rejected seven good times. Seven times. Dr [name supplied] will testify to that. For no justifiable reason. Seven times. (Iris, PhD in Animal Science, lecturer, took 3 years to LMI)

Short validity windows before visas were set to expire and the need to apply for multiple visas due *to changes in conditionality posed another challenge:*

You're there [at the visa processing center] at five and then the guard already dismisses you to say, we already have the number of people that we're going to serve for the day. They would give out numbers [at Home Affairs] and you'd have to go three or four times before you gained access, so that was the greatest frustration there. (Andrea, Master's in Development Studies, programme manager, took 5 years to LMI

Sub-theme 3.2: Non-recognition of qualifications

Accompanying spouses expressed the drawbacks that coming to South Africa with foreign qualifications sometimes entailed:

Funny enough 'cause I thought I was going to go to master's straight away but they told me no, you know these SAQA [South African Qualifications Authority] qualifications, I don't know how the rating goes but sometimes the rating is not so relevant to what we have done. Sometimes they rate the South African system higher than other education systems. So, in my case I thought I was ready to start with master's. I even wrote a proposal, but they said I must start with an honors. (Monica, PhD in Education Management, educationist, took 2 years to LMI)

The perceived benefits of obtaining local (South African) qualifications to avert the SAQA evaluation of foreign qualifications, possibly resulting in the non-recognition of these qualifications, also emerged:

It gave me hope that soon I am going to get a job because I was now studying under the South African system then I wouldn't need to go through SAQA evaluation. (Monica, PhD in Education Management, educationist, took 2 years to LMI)

Another narrative indicated the perceived increased benefits of supporting one's qualifications with professional body recognition:

You must be registered with a professional body. It's a must otherwise you will not be able to apply for any of the work permits. You can't. (Lucille, B(Honours) Accounting, lecturer, took 4 years to LMI)

DISCUSSION

The aim of this study was to explore the meso-level governing technologies influencing the conduct of accompanying spouses in the Free State province with respect to LMI in South Africa. This study utilized a narrative approach to garner the perspectives of accompanying spouses in the Free State who had moved to South Africa within the context of family migration.

For most families, the decision to migrate was mainly based on what were perceived to be better economic prospects and job opportunities than those obtained in the country of origin, as supported by Kanayo et al. (2019). With a few exceptions, the decision to migrate was significantly influenced by the lead spouse's skill set, ability to secure the right to work, and potential for career progression in South Africa. The initial decision to migrate to South Africa rarely involved the input of the accompanying spouse. The lead spouse's social network appeared to play an important role in the ultimate decision to migrate and, in some cases, included securing a job for the lead spouse prior to migration. For the most part, there was no prior investigation into the labor market prospects for the accompanying spouse. Strong family ties motivated the decision of accompanying spouses to migrate, even in the case where South Africa did not appear to be their first choice of where to settle. This aligns with what was found in the study by Föbker (2019).

Arising from strong family ties, a similar pattern of moving together within the host country also ensued post-migration. Patterns of internal migration to take up employment opportunities were commonplace among most migrant families, as also found by Ncube and Mkwananzi (2020). However, such moves were mainly made to advance the lead migrant's career. It was the view of most participants that location was highly instrumental in determining the prospects of not only securing a job but a professional, well-paying one that matched the accompanying spouse's skills. Due to family ties, accompanying spouses found it very difficult to leave their families and migrate on their own to other cities/provinces, even when moving meant securing employment or an opportunity for upward career mobility. Several studies, such as Mbiyozo (2018), Chinyakata et al. (2019), and Ncube et al. (2019), support these findings.

For most migrant families, a pattern of internal migration within the borders of South Africa then ensued to expand the lead spouse's career opportunities. Subsequent decisions concerning which provinces, cities, or towns in South Africa the families were to settle in were also influenced mainly by the lead spouse and made with the lead spouse's job or career prospects in mind. Again, there appeared to be no consideration of the LMI prospects of the accompanying spouse. This study further found that tied migrants employ several strategies to counter the complex assemblage of meso governing technologies that they experience in the labor market space, as seen in the studies by Røysum (2018) and Ncube et al. (2019).

Friends appeared to play a huge role when imagining life in South Africa. They appeared to make significant contributions, such as finding opportunities for employment for the lead spouse in the host country. Expectations of family and friends at home appeared to strongly influence the behavior of accompanying spouses in relation to efforts to integrate themselves into the labor market and pressured them to accept any form of employment available, as corroborated by Ala-mantila and Fleischmann (2018). This was at times to the detriment of the accompanying spouse.

For most families, moving to South Africa was prompted by economic conditions in their respective countries of origin, as supported by Kanayo et al. (2019). The decision to migrate was largely seen as an opportunity to improve one's livelihood. Expanding one's means to take better care of one's nuclear family while increasing one's capabilities in terms of caring for one's extended family in the country of origin was a significant push factor for most (Kanayo et al., 2019).

Employers were regarded as most likely to discriminate against accompanying spouses based on their nationality, and this was strongly linked to a prevailing sense of othering at the country level, as supported by Vermaak and Muller's (2019) study. Discrimination was also grossly prevalent regarding gender and race, as similarly noted in Korteweg's (2017) study, and was experienced throughout the employment cycle. Discrimination based on gender appeared to be more dominant in traditionally male-dominated fields, such as town planning and information technology. Discrimination broadly appeared to foster feelings of vulnerability, insecurity, and temporality on the part of many accompanying spouses, which similarly emerged in Kesler and Safi's (2018) and Grigoleit-Richter's (2017) studies.

Overall, there was a perceived reluctance among South African business entities to hire foreign nationals, as also suggested by Vermaak and Muller (2019). Having permanent residence, which signified the right to work in South Africa, did not appear to make a significant difference for many accompanying spouses, and they held the view that employers preferred naturalized citizens, who therefore had greater employment prospects.

In some circumstances, employers deemed accompanying spouses overqualified, as per the SAQA (2017) standards, for specific jobs. Having advanced (postgraduate) qualifications, even those attained at South African institutions of learning, therefore did not enhance the prospects of securing employment, as similarly found by Confurius et al. (2018). Downward occupational mobility was demonstrated to be a significant factor contributing to underemployment, as seen in the study by Ncube et

al. (2019). Despite significant work experience, in some sectors, these skills and qualifications were not regarded as important.

In various sectors/provinces, local language proficiency was critical to the hiring process, which was supported by Föbker and Imani (2017) and Del Percio (2018). Critically, knowledge of the language was also an identifier of nationality, which was a challenge experienced in some employment sectors (Föbker & Imani, 2017).

For accompanying spouses, the ability to apply for, renew, and change their visa categories was regarded as important in terms of assuring the right to live, study, or work in South Arica. Almost all the accompanying spouses experienced significant challenges in one form or another regarding visa processing, as alluded to by van Lennep (2019). These challenges created barriers to LMI in indirect and direct ways, as supported by Abebe (2019). There were also instances where applications of family members submitted at the same time experienced different processing times. For instance, even where applications were made for all family members at the same time, there was a propensity for accompanying spouse permits to be processed last and with significant delays. The high cost of visa applications due to the fees charged by Visa Facilitation Services (VFS) Global, the official visa processing arm for the DHA, was regarded as a significant challenge for many accompanying spouses in this study (van Lennep, 2019).

PRACTICAL IMPLICATIONS

This article contributes to the scant extant empirical knowledge on the meso-level governing technologies of tied migrants pursuing LMI in the Free State, South Africa, from a hitherto understudied South-to-South perspective and by exploring the experiences of skilled women migrants in the context of family migration. This research also considers how the DHA in South Africa is making known its intention to initiate programs designed explicitly for the integration of legal migrants (DHA, 2017). The results of this study could therefore be beneficial in this regard. Further, it utilizes a neglected aspect of Michel Foucault's theory of governmentality—counter conducts—to investigate the integration needs of accompanying spouses. Such research can, to some extent, highlight issues that could inform policy.

LIMITATIONS AND RECOMMENDATIONS

Due to time and financial constraints, the sample size in this study was relatively small. It enabled the researchers to capture and analyze in-depth narratives from the participants. As is generally applicable to studies of a qualitative nature, the findings of this study are context specific and therefore cannot be generalized to other settings. A strong reliance was placed on snowballing as a data collection strategy, and accordingly, a wide range of participants was not included in terms of nationality and race. However, every effort was made to ensure scientific rigor.

Suggestions for further research include the following: a large-scale quantitative survey or mixed-methods research incorporating a larger number of participants of both genders; a study focusing on particular industries, for example, a male-dominated industry, and garnering the perspectives of women's labor market experiences in these industries; a more pertinent examination of women who failed to integrate themselves into the labor market; and a comparative research approach to identify reciprocal LMI prospects.

CONCLUSION

Significant barriers exist for tied migrants who wish to achieve LMI. This study showed how various strategies were instrumental in the process of trying to subvert governing technologies. However, while the strategies utilized were influential when it came to attempts to undermine the governing technologies impeding LMI in the host country, they were not necessarily successful. Structural factors limited agency. For example, self-deskilling for fear of appearing overqualified for already limited jobs and outqualifying locals was a strategy used to ensure access to and security in the workplace, while the downgrading or non-recognition of [otherwise superior] foreign qualifications by the host country's qualifications authority made LMI more challenging. Tied migrants with a strong sense of family responsibility inadvertently conformed to traditional gender roles, which further limited LMI. Similarly, the lack of sufficient networks in South Africa constricted LMI opportunities for tied migrants in the Free State, as LMI conducive conditions seemed to mostly favor those who were well connected. Unnecessary red tape and delays surrounding visa applications and processing also made LMI in South Africa more daunting for tied migrants in the Free State.

Overall, this study confirms the notion that the context of reception is a critical factor in determining labor migration outcomes. South Africa is implementing increasingly restrictive migration and employment legislation and a pervasive anti-immigrant sentiment. Consequently, accompanying spouses are subjectified as unpaid caregivers, housewives, and appendages to their spouses, as well as the "other," therefore compromising their ability to integrate fully into the labor market. Accompanying spouses remain driven by their personal aspirations to attain success in the labor market context, as evidenced in this study. It would therefore benefit the DHA-SA to carefully consider migration policy that specifically affects female tied migrants, especially in instances where they could make a noteworthy contribution to the country's labor force and economy.

REFERENCES

Abebe, T. T. (2019). Securitisation of Migration in Africa: The Case of Agadez in Niger. *Institute for Security Studies Africa Report*, 2019 (20): 1–15.

Ala-mantila, M., & Fleischmann, F. (2018). Gender Differences in Labour Market Integration Trajectories of Recently Arrived Migrants in the Netherlands. *Journal of Ethnic and Migration Studies*, 44 (11): 1818–1840.

Allan, K., & McElhinny, B. (2017). Neoliberalism, Language and Migration. In Canagarajah, S. (Ed.), *The Routledge Handbook on Language and Migration*, New York: Routledge, pp. 35-50.

Amit, R., & Kriga, N. (2014). Making Migrants "Illegible": The Policies and Practices of Documentation in Post-Apartheid South Africa. *Kronos*, 40 (1): 269–290.

Bailey, A., & Mulder, C. H. (2017) Highly Skilled Migration Between the Global North and South: Gender, Life Courses and Institutions. *Journal of Ethnic and Migration Studies*, 43 (16): 2689–2703. https://doi.org/10.1080/1369183X.2017.1314594

Ballarino, G., & Panichella, N. (2018). The Occupational Integration of Migrant Women in Western European Labour Markets, *Acta Sociologica*, 61 (2): 126–142.

Bhattacharjee, S. S. (2017). Gendered Technologies of Power: Experiencing and Unmaking Borderscapes in South Asia. *Berkeley Planning Journal*, 29 (1): 45–77.

Braun, V., & Clarke, V. (2021a). Conceptual and Design Thinking for Thematic Analysis. *Qualitative Psychology*. Advance online publication. https://doi.org/10.1037/qup0000196

Braun, V., & Clarke, V. (2021b). To Saturate or not to Saturate? Questioning Data Saturation as a Useful Concept for Thematic Analysis and Sample-Size Rationales. *Qualitative Research in Sport, Exercise and Health*, 13 (2): 201–216.

Chinyakata, R., Raselekoane, N. R., & Mudau T. J. (2019). Intersectional Factors Contributing to the Vulnerability of Young Zimbabwean Female Immigrants in Johannesburg. *African Renaissance*, 16 (2): 143–163.

Confurius, D., Gowricharn, R., & Dagevos, J. (2018). Labour Market Participation of Sub-Saharan Africans in the Netherlands: The Limits of the Human Capital Approach. *Journal of Ethnic and Migration Studies*, 45 (13): 1–20.

Del Percio, A. (2018). Engineering Commodifiable Workers: Language, Migration and the Governmentality of the Self. *Language Policy*, 17 (2): 239–259.

Department of Home Affairs. (2017). White Paper on International Migration for South Africa – Final Version. Retrieved May 14, 2020, from http://www.dha.gov.za/WhitePaperonInternationalMigration-20170602.pdf

Föbker, S. (2019). "This is not a Career Move" – Accompanying Partners' Labour Market Participation after Migration. *Comparative Migration Studies*, 6 (7): 1–18.

Föbker, S., & Imani, D. (2017). The Role of Language Skills in the Settling-In Process – Experiences of Highly Skilled Migrants' Accompanying Partners in Germany and the UK. *Journal of Ethnic and Migration Studies*, 43 (16): 2720–2737.

Foucault, M. (2009) Security, Territory, Population: Lectures at the Collège de France 1977–1978, In Senellart, M. & Burchell, G. (Eds.), Basingstoke: Palgrave Macmillan.

Grigoleit-Richter, G. (2017). Highly Skilled and Highly Mobile? Examining Gendered and Ethnicised Labour Market Conditions for Migrant Women in STEM-Professions in Germany. *Journal of Ethnic and Migration Studies*, 43 (16): 2738–2755.

Guest, G., Bunce, A., & Johnson, L. (2006). How Many Interviews Are Enough? An Experiment with Data Saturation and Variability. *Field Methods*, 18 (1): 59–82. https://doi.org/10.1177/1525822X05279903.

Hiralal, K. (2017). Women and Migration-Challenges and Constraints – A South African Perspective. *Nordic Journal of African Studies*, 26 (2): 158–175.

Ho, E. (2017). Smart Subjects for a Smart Nation? Governing (Smart) Mentalities in Singapore. *Urban Studies*, 54 (13): 3101–3118.

Kanayo. O., Anjofui, P., & Steigler. N. (2019). Push and Pull Factors of International Migration: Evidence from Migrants in South Africa. *Journal of African Union Studies*, 8 (2): 219–250.

Kesler, A. C. K., & Safi, M. (2018). Immigrants in the Labour Markets of France and the United Kingdom: Integration Models, Institutional Variations, and Ethnic Inequalities. *Migration Studies*, 6 (2): 225–250.

Korteweg, A. C. (2017). The Failures of 'Immigrant Integration': The Gendered Racialized Production of Non-Belonging. *Migration Studies*, 5 (3): 428–444.

Lemke, T. (2002). Foucault, Governmentality, and Critique. *Rethinking Marxism*, 14 (3): 49–64.

Mbiyozo, A. (2018). Gender and Migration in South Africa: Talking to Women Migrants. Retrieved May 17, 2020, from https://issafrica.org/research/southern-africa-report/gender-and-migration-in-south-africa-talking-to-women-migrants

Ncube, A., Bahta, Y. T., & Jordaan, A. J. (2019). Job Market Perceptions of African Migrant Women in South Africa as an Initial and Long-Term Coping and Adaptation Mechanism. *Journal of International Migration and Integration*, 21: 1165–1185.

Ncube, A., & Mkwananzi, F. (2020). Gendered Labour Migration in South Africa: A Capability Approach Lens. In Seiger, F., Timmerman, C., Salazar N. B., & Wets, J. (Eds.), *Migration at Work: Aspirations, Imaginaries and Structures of Mobility*. Leuven University Press: Belgium, pp. 65-90.

Ngulube, P. (2020). *Handbook of Research on Connecting Research Methods for Information Science Research*. IGI Global.

OECD-ILO. (2018). How Immigrants Contribute to South Africa's Economy. Retrieved September 9, 2020, from https://read.oecd-ilibrary.org/development/how-immigrants-contribute-to-south-africa-s-economy_9789264085398-en#page1

Røysum, A. (2018). The Job-Seeking Experiences of Resourceful Female Immigrants and the Impact on Their Self-Efficacy Beliefs. *European Journal of Social Work*, 23 (1): 1–12.

Saunders, M., Lewis, P., & Thornhill, A. (2016). *Research Methods for Business Students, 7th Edition.* Harlow; Munich: Pearson.

South Africa Qualifications Authority. (2017). Policy and Criteria for Evaluating Foreign Qualifications within the South African NQF, as amended March 2017. Retrieved March 23, 2021, from https://www.saqa.org.za/docs/guide/2017/Policy%20%20and%20Criteria%20on%20Evaluating%20Foreign%20Qualifications%20within%20the%20South%20African%20NQF%20as%20amended1.pdf

Teo, T. A. (2019). Conduct and Counter-Conduct in the "Non-Liberal" State: Singapore's Headscarf Affairs. *Global Society*, 33 (2): 201–223.

van Lennep, T. (2019). Migration II. The South African Migration Policy Landscape. *Helen Suzmanne Foundation.* Retrieved August 30, 2021, from https://hsf.org.za/publications/hsf-briefs/the-south-african-migration-policylandscape

Vermaak, C., & Muller, C. (2019). Do Immigrants Have Better Labour Market Outcomes than South Africans? *Development Southern Africa*, 36 (5): 678–698.

Zinatsa, F., & Saurombe, M. D. (2022). Tied Migrant Labor Market Integration: Deconstructing Labor Market Subjectivities in South Africa. *Frontiers in Psychology-Gender, Sex and Sexualities*, 13. doi: https://doi.org/10.3389/fpsyg.2022.806436

SURVIVAL OF THE FITTEST. HOW SMALL AND MEDIUM ENTERPRISES (SMES) IN THE BULAWAYO METROPOLITAN PROVINCE, ZIMBABWE, EXPERIENCED THE COVID-19 PANDEMIC

Gwendoline Vusumuzi Nani and Izithembisozenkosi Ndlovu

ABSTRACT

The Corona Virus Disease (COVID-19) led to the closure of most Small and Medium Enterprises (SMEs). The argument presented in this paper is that SMEs that are still operational have done so due to the employment of survival strategies. The study premised in the interpretivist paradigm, utilising a qualitative approach and a case study design, sought to establish the challenges faced by SME owners in the COVID-19 era and the survival strategies that they used, for the benefit of those still overwhelmed by the pandemic. Data was collected from 30 purposively selected SME owners, using semi structured questionnaires with open ended questions. Thematically analysed data revealed that SME owners predominantly faced the following challenges: a massive reduction in revenue, increased running costs, longer lead times in procurement of raw materials, as well as delivering orders to the customers, importing challenges due to the closure of national borders and travel restrictions as well as loss of lives. Conclusions drawn were that businesses can survive even during pandemics as long as appropriate survival strategies are applied. The study recommended that SME owners be equipped with digital literacy, innovative and environmental analysis skills as strategies to enable them to hedge against unexpected risks.

Keywords: COVID-19 pandemic, challenges, digital, skills, survival strategies

INTRODUCTION

The COVID-19 pandemic has had negative effects on the economies of countries across the globe ever since its outbreak in late 2019 (Adam & Alarifi ,2021). Gong, Hassink, Tan, and Huang (2020), concur that the novel corona virus brought a lot of suffering at personal level and significant potential of various effects on businesses, especially SMEs. Ratnasingam, Khoo, Jegathesan, Wei, AbdLatib,

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Thanasegaran, Liat, Yi, Othman and Amir (2020) assert that the COVID-19 pandemic exerted pressure on the management of SMEs as they are considered to be restricted in their capability to implement any changes in a short period to its workforce and were rendered ineffective in their capability to provide any goods and services.

After the declaration by the World Health Organisation (WHO) on February 11, 2020, of COVID-19 as a global pandemic, the Government of Zimbabwe responded by placing a series of extra ordinary measures and Statutory instrument to combat the pandemic (Chirisa, Mavhima, Nyevera, Chigudu, Makochekanwa, Matai, Machingura, Moyo, Chirisa, Mhloyi, Murwira, Mhandara, Katsande, Muchena, Manjeya, Nyika & Mundau, 2021). Among them was a 21- day lockdown to try to stop the spread of the coronavirus (Mavhunga, 2021). Chirisa et al (2021), further state that production has been on a standstill in most, if not all countries around the world. Both the suppliers and buyers in the informal sector have been affected by the lockdown measures. According to Habakkuk Trust (2020), the COVID-19 requires individuals to isolate themselves and this sometimes reduces activity needed by those informal businesses.

BACKGROUND

The COVID-19 pandemic descended upon Zimbabwe in the least opportune of times as the country was already reeling under economic distress (Makombe, 2021). SMEs naturally operate under unique challenges in a normal environment by virtue of their size and limited resources. Therefore, the advent of the COVID-19 pandemic magnified these pre-existing challenges for most SMEs (Chirume & Kaseke, 2020). SMEs make up approximately 90% of all businesses world-wide (Singh & Thakar, 2018). They are pivotal for the economic growth of every country. In Zimbabwe, SMEs are the drivers of the economy through employment creation (Chivume & Kaseke, 2020). Nyanga & Zirima, (2020), reveal that the pandemic adversely affected the financial performance of SMEs in Masvingo, Zimbabwe, as business came to a standstill and workers got laid off due to the lockdown. As the virus keeps mutating, it is difficult to determine how long this crisis is likely to last. Survival and sustainability become very critical for every business. A study by Omar, Ishak, & Jusoh (2020) revealed that some SMEs have adopted financial and marketing strategies for survival in mitigating the adverse effects of the COVID-19 crisis.

STATEMENT OF THE PROBLEM

Prior to the COVID-19 pandemic, SMEs needed certain entrepreneurial talent and skills to survive and thrive. Such skills included among many others, leadership and management qualities, ability to obtain funding, as well as placing a good product or service in the market place. Despite all these necessary requirements, sustaining SMEs before the pandemic was a lot simpler than it is now (Gordana, 2021). The decline in revenue due to the lockdown restrictions and environmental uncertainty led to the closure and collapse of many SMEs (Effendi, Sugandini & Istanto, 2020). In order to survive post the COVID-19 era, SMEs and businesses in general will have to adapt and adopt new survival strategies and techniques that align with the new normal. Very few studies have focused on the practices adopted by SMEs for survival ever since the outbreak of the COVID-19 virus (Omar et al.,2020), hence necessitating further study in this area. It is therefore crucial that jobs are preserved by ensuring the sustainability of enterprises during this turbulent COVID-19 era (Chirume & Kaseke, 2020). Hence, this study sought to investigate the challenges experienced during the COVID- 19 pandemic and survival techniques adopted by SMEs in the Bulawayo Metropolitan Province in Zimbabwe, to remain sustainable in this 'new normal.'

Aim of the study

The aim of this study was to examine the challenges and the survival strategies that were and continue to be employed by SMEs in the Bulawayo Metropolitan Province at the peak of the COVID-19

pandemic, so as to assist businesses that are reeling under the impact of the pandemic or have had to close their businesses, to access survival strategies used by businesses that have remained afloat. It is envisaged that such exposure would help rejuvenate those SMEs that are still experiencing challenges and to enhance the sustainability of those that are still operational, to beyond COVID-19.

The study was guided by the following objectives.

Objectives

- To find out the challenges experienced by SMEs in the Bulawayo Metropolitan Province in the COVID-19 era.
- To find out the survival strategies employed by SMEs in the Bulawayo Metropolitan Province in the COVID-19 era.

LITERATURE REVIEW

The COVID-19 virus came and left most businesses regardless of size on their knees across various continents globally. SMEs have always had a high failure rate even prior to the advent of the COVID-19 pandemic, with only 10% surviving the first five years of start-up (Murithi, 2021). In an effort to comply with the World Health Organisation stipulations, the day to day operations of most SMEs were disrupted due to reduced demand as businesses were either forced to operate below capacity or completely suspend their operations depending on whether they belong in the essential or non-essential goods and services sector (Buheji & Ahmed, 2020).

SMEs by virtue of their size and limited capital were the most vulnerable to the devastating impact of the virus (Dhochak & Sharma, 2015). The pandemic turned from being a health crisis into an economic catastrophe disrupting the supply and demand of products and services. SMEs are the pillars of economic development in most African countries (Murithi, 2021). The impact of the pandemic brought many of these enterprises to their knees. It is therefore, critical to ensure the survival of SMEs during the COVID-19 era while also looking towards their growth post COVID-19 (Chirume & Kaseke, 2020).

Challenges faced by SMEs in the COVID-19 era

Due to the COVID-19 pandemic, by 2021, the world economy had already suffered a negative impact resulting in US12 trillion through the International Monetary Fund (Murithi, 2021). SMEs have been faced with a myriad of challenges (Ratnasingham et al., 2020; Adam & Alarifi, 2020), ranging from increased business running costs associated with complying to COVID-19 regulations for the safety of employees and customers within business premises, loss of manpower due to COVID-19 related deaths, reduced working hours due to lockdown restrictions and curfews, disrupted supply chains caused by travel restrictions and shutting down of borders. This disruption in supply chains, (Fornaro & Wolf, 2020; Gong et al, 2020), had a ripple effect leading to failure to restock or purchase raw materials (Guo et al., 2020), and naturally failure to deliver orders and consignments timeously.

Social distancing regulations in the work place made working remotely from home a necessity thus posing a major challenge to some cash strapped SMEs (Guo et al.,2020) who were not prepared for the costs involved in equipping staff members with the technological gadgets, internet and training involved to successfully work on line (Harel, 2021).All these challenges put together resulted in SMEs facing drastic financial constraints (Omar et al., 2020) and the inability to pay employees' salaries and other fixed costs and for many, this led to business failure (Ratnasingham et al., 2020). The lack of financial support from government and other financial institutions during this COVID-19 era contributed heavily to risk on the survival of SMEs (Adam & Alarifi, 2021).

In Nigeria, a study by Aifuwa, Saidu & Aifuwa (2020) reveals that the COVID-19 pandemic negatively impacted business performance both financially as well as non-financially in the private sector.

A study by Shafi, Liu & Ren, (2020) which sought to unearth the effects of COVID-19 induced lock down on the small and medium enterprises in Pakistan uncovered that the bulk of the entrepreneurs that participated in the study were ill prepared for the containment measures to curb the virus such as the lock down and hence they had no coping mechanisms in place. The challenges faced by participants in the study entailed financial constraints due to decline in demand, therefore, sales and profits, disruption in supply chains as well as well high transportation costs.

A similar study by Nasar, Akram, Safdar & Akbar, (2021), in Pakistan highlights the interconnectedness of various impacts from the pandemic on SMEs and their clientele. The lockdowns intended to curb the spread of the virus, not only incapacitated many enterprises, but also led to the demise of many of them. As lockdowns forced people to stay at home, businesses in turn experienced a massive decrease in the turn-around of customers, hence SMEs were unable to manage their operational costs. This ripple effect further resulted in the job losses for many employees in the affected enterprises.

Rukasha, Nyagadza, Pashapa & Muposhi (2021) conducted a study on the impact of the COVID-19 disease on the agriculture supply chains which revealed that Zimbabwe like the rest of the globe has not been spared the negative impacts of the pandemic in the form of disrupted supply chains and a food economy that has been thrown into disarray due to closed borders, reduced capacity utilisation, production stoppages and export restrictions. Mazikana (2020), also emphasises the negative impact of the pandemic on SMEs in Harare, Zimbabwe through the disruption in supply chains. Nyanga & Zirima (2020) also carried out a similar study on the reactions of SMEs to the Corona virus in Masvingo, Zimbabwe. Their findings reveal a myriad of challenges. However, drastic financial constraints were cited as being the challenge that stood out for most of the enterprises under study. Makombe (2021) in a study on the socio-economic impacts of the Corona virus on high density areas in Harare, Zimbabwe, reiterates that the shutting of borders not only eliminated incomes but also access to cheaper commodities for SMEs.

Survival strategies adopted by SMEs in the COVID-19 era

In the COVID-19 era, worldwide, a paradigm shift as well as the adoption of innovative business models and strategies is necessary for business survival, growth and sustainability. Muriithi (2021) recommends such strategies as proactive planning, financial, non-financial support and government incentives. In the period post COVID-19, Muriithi (2021) recommends new ways of thinking such as developing new business models, keeping an eye on business opportunities, accessing sources of funding as well redefining customer bases. In Saudi Arabia, Adam & Alarifi, (2020) reveal the positive impact of innovation practices of SMEs on the performance and survival of SMEs during the pandemic.

The COVID-19 era has been an era of the survival of the fittest, strategic thinking and the adoption of creative ideas to enable SMEs to weather the storm. Studies reveal that digital platforms from websites to social media have been massively adopted by most businesses as a survival strategy (Guo et al., 2020). The pandemic forced SMEs to embrace technology at a much faster pace than before. SMEs have had to either adapt or find themselves out of business (Manyati & Mutsau, 2021).

Literature reveals that product diversification is another strategy that has been effective for survival since the advent of the pandemic. Chirume & Kaseke (2020) in a case study on SMEs in Chinhoyi, Zimbabwe, recommend that SMEs should alter their product offers in line with consumer demand in the COVID-19 era. Gaps have arisen in the market for certain types of products. Consumer demand for masks, sanitisers, temperature checking equipment and other COVID-19 related products has opened supply gaps for innovative SMEs.

National lockdowns worldwide forced people to stay at home, work from home and conduct home schooling for their children. Proactive businesses had to take their products and services to the customer through mobile services and house deliveries. Such strategies are supported by Manyati &

Mutsau (2021) who highlight the need for restructuring if SMEs are to survive the pandemic. Cost cutting measures became imminent for the survival of SMEs.

Manyati & Matsau (2021) reveal that SMEs in Harare, Zimbabwe had to adopt digital networking platforms such as WhatsApp as a strategy for communication with suppliers in order to mitigate the challenges associated with travel restrictions. Their study shows that Zimbabwean SMEs adopted sustainable skills to navigate through the volatile business environment in the face of the pandemic through establishing distant markets as well as gathering market intelligence.

Makombe, (2021) highlights other survival strategies such as forced leave being imposed on employees, termination of short-term contracts as well as salary cuts. All this was caused by the loss of business and reduced demand as customers were also forced to be prudent in their expenditures (Gurria, 2020; Chirume & Kaseke, 2020). Shafi et al., (2020) discovered similar survival strategies adopted by Pakistanian entrepreneurs who preferred to cut down on staff and where possible also cut down on employee salaries. In some cases, temporary closure of business was opted for in fear of customers or staff getting infected by the virus in the business premises.

The study situated in the interpretive paradigm, utilised a qualitative approach and a case study design to establish the challenges experienced by SME owners in the Bulawayo Metropolitan Province, in the COVID-19 era and the survival techniques that they used for the benefit of those still reeling under the pressures of the pandemic and to enhance the performance of those that are still operational. According to Bryman, Bell, Hirschsohn, Dos Santos, Du Toit, Masenge, Van Aardt and Wagner (2017), a case study involves the detailed and intensive analysis of one or more cases which the researcher aims to study in-depth. Yin (1993) defines a case study as an empirical inquiry that investigates a contemporary phenomenon within its real life context. The COVID-19 pandemic is a contemporary phenomenon, hence the preference for this design where rich in-depth data could be obtained.

The qualitative approach was selected in order to obtain rich data from the participants in their natural settings. The purpose of qualitative research is based on "researcher immersion in the phenomenon to be studied, gathering data which provide a detailed description of events, situations, and interaction between people and things, thus providing depth and detail" (Saunders, Lewis and Thornhill, 2016). Semi structured questionnaires with open ended questions were used as data collecting instruments which enabled researchers to collect descriptive qualitative data from information rich participants. The open ended questions enabled researchers to document related experiences and to record verbatim what participants said and to derive meaning of participants' experiences.

The researchers used purposive and snowball sampling techniques. According to Cooper and Schindler (2008:174-5), ''in purposive sampling, researchers choose participants arbitrarily for their unique characteristics, experiences, attitudes or perceptions, whereas in snowball sampling, participants are referred by the purposively selected participants.'' The two non-probability sampling methods are what the researchers used in this study and the sample comprised 30 SME owners belonging to different types of businesses as shown in Table 1, on page 12.

Before the actual data collection, the questionnaires were pilot tested with five randomly selected SME owners to check for ambiguity and to increase credibility. When the instruments were deemed credible and unambiguous, actual data collection commenced. Regarding ethical considerations, full disclosure of the purpose of data collection, non-coercion of participants and non-disclosure of respondents' identities were observed. To conceal their identities, participants were given codes such as SME 1, SME 2 up to 30. The data collected was supported with verbatim quotations.

DATA ANALYSIS AND DISCUSSION OF FINDINGS

This section focuses on data analysis, presentation and discussion of findings based on research objectives. Data analysis enabled researchers to systematically organise, synthesize and transform the

collected data into understandable meaning of the phenomena under study. From the transformed data, researchers were able to generate categories, patterns and themes relating to the topic under study (Maree, 2007). The responses from the participants were subjected to intense reading and scrutiny in order to identify the emerging themes.

Table 1 represents participant's types of businesses. It is important to note that for this particular study, the owners of the businesses who experienced the COVID-19 pandemic were the targeted participants thus disregarding the sizes of the businesses. The rationale was that whether small, medium or big, SME entrepreneurs experienced the pandemic and had experiences to narrate on the impact of their businesses.

Table 1 Participant's types of businesses

No	SME and Type of Business
1	Business consultancy
2	Retail
3	Retail
4	Nail salon
5	Retail-Gas
6	Transport
7	Car Sales
8	Mental Health Psychology
9	Retail industry
10	Farming
11	Transport
12	Marketing Consultancy
13	Transport
14	Marketing Agency
15	Personal Body Care Service
16	Media
17	Logistics
18	Transport
19	Retail
20	Retail
21	Farming
22	Retail
23	Retail
24	Farming
25	Retail
26	Retail
27	Agriculture
28	Retail
29	Retail
30	Transport

According to Table 1, most of the participants were in the retail sector, suggesting that this could have been the most viable type of business to operate during the pandemic.

Research Objective 1 - To find out the challenges faced by SMEs in the Bulawayo Metropolitan Province in the COVID-19 era.

The data collected from the study cut across SMEs in different sectors ranging from retail, farming, business consultancies, car sales, personal care services, transport and logistics amongst many others. The challenges encountered by SMEs in the study were categorised into 5 keys themes which are reduced revenue due to low demand and sales, longer lead times in procuring supplies and raw materials as well as delivering customer orders due inability to replenish stocks, importing challenges necessitated by the closing of borders, travel restrictions and government stipulations, loss of lives due to the nature of the pandemic as well as increased business running costs.

The majority of the SMEs interviewed indicated that their businesses were drastically affected by the COVID-19 pandemic financially (SME 3, 4, 5, 7, 8, 14, 15,16, 18, 19, 20, 24, 26). These findings are in line with the findings of Chirume and Kaseke (2020). The financial challenges experienced included loss of businesses through massive decrease in sales and demand leading to reduced revenue. In some instances, revenue was cut off completely particularly for those SMEs whose products and services were categorised as 'non essentials' by the Government for example (SME 4 & 15).

SME 15: *'Due to the shut-down of the local tourism industry, the national lockdown of non-essential services operations as well as the decline in profits, we failed to breakeven and as a result we had to shut down.'*

SME 4 in the personal body care sector (nail salon) experienced a total shut down as all types of salons were barred from operating being considered non- essential services. SMEs in the media sector (SME 16) had their revenue streams completely cut off as weddings and functions were banned and cancelled as part of the lockdown restrictions.

The majority of businesses despite falling under 'essential services' which were allowed to operate during the lockdown (farming, food retail, medical service providers) were also affected financially as the number of customers decreased due to the restriction of customer movement. The customers' income streams were also equally affected, leading to reduction in demand and sales as customers resorted to minimal spending. The following participants were quoted verbatim:

SME 26 (retail sector): *'We experienced massive loss of business due to the lockdown, curfew, resulting in low demand for products as schools were closed and most customers were at home. Man hours were also lost due to the disease.'*

SME 25 (farming sector): '*Reduced trading hours had an impact on our revenue as well as shutting down of some departments due to COVID-19 infections.*'

SME 22 (retail sector): '*Short business hours and reduced number of customers resulted in reduced revenue. Our customers also couldn't afford our commodities*.'

SME 12 (marketing consultancy): '*Most of our clients shelved consulting as they grappled survival.'*

Another key challenge that was experienced by most of the SMEs that were interviewed, was that of 'longer lead times' both in acquiring stock and raw materials. This finding is consistent with the finding by Makombe (2021). Failure to acquire stock timeously, also had a ripple effect on the delivery of products to the end user/customer. Companies could no longer deliver consignments on time. Some orders had to be cancelled in some instances as supplies became a challenge to acquire during the lockdown period. The following responses are quoted:

SME 18: '*Our business was affected by immobility challenges resulting in stock outs and failure to replenish.*'

SME 13: '*We were affected by the failure to deliver goods to other cities and towns due to intercity travel ban as well as failure to procure products from outside Zimbabwe due to travel restrictions.*'

SME 10 remarked as follows: '*A major challenge for us was the failure to deliver orders to customers due to limited movement.*'

SME 25 weighed in and said: '*We encountered problems like slowdown in sales, longer lead times, movement restrictions as well as orders being defaulted due to deliveries arriving late.*'

SME 23 said: '*It became harder for us to acquire stock.*'

Another challenge encountered by SMEs in the Bulawayo Metropolitan Province was the inability to procure products outside the country due to the fact that importing goods became harder to get as importing costs spiralled upwards. Some players had to resort to informal importing channels. Gurria (2020) highlights the disruption of supply chains as a major challenge resulting from the pandemic.

SME 18 responded as follows: '*We experienced lower business as we rely mainly on importers for the bulk of our business.*'

SME 15: '*Some of the products we sold in our salons were imported and borders were shut hence breaking our supply chain*'.

SME 13 said:' *We experienced higher procurement costs through informal importing channels.*'

SME 18 had this to add: '*We experienced lower business as we rely mainly on importers for the bulk of our business. Restrictions in travel severely affected our businesses.*'

Businesses were also negatively affected by the high death rates that were associated with the pandemic either directly (internal to their organisations) or indirectly (in their clients' organisations). Some SMEs in the study sadly lost team members as well as employees. Marketing consultancies in the study were also affected by the loss of key decision makers in their clientele's organisations. Their responses are presented as follows:

SME 12: '*In some cases, we lost key decision makers to the pandemic.*'

SME 23: '*We were affected by the death of two of our employees.*'

SME 15: '*We lost a member of our team to the pandemic.*'

SME 24: '*We also experienced reduced revenue because of increased funeral expenses.*'

SME 8: '*The loss of loved ones and breadwinners affected the financial status of most of our clients.*'

Amidst the loss of revenue, decline in sales, increased lead times, immobility challenges as well as the loss of lives, businesses were also affected by excessive increase in running costs which included amongst others, rentals which still had to be paid despite some businesses not being operational, transport and delivery costs also went up as well as high maintenance costs as they struggled to break even. Other comments that came from the participants were as follows.

SME 2: '*Running costs spiralled due to high importation and maintenance costs*'

SME 5: '*All other running costs like transport went up and it was hard to break even.*'

SME 9: *'We experienced higher procurement costs through informal importing channels and increased delivery costs emanating from the intercity travel ban.'*

SME 19: *'Delivery meant reduced income.'*

SME 15: *'Breaking even became harder with the coming months as property owners were adamant on reviewing rentals. All this led to the ultimate constant losses monthly and hence a decision to shut down.'*

SME 8*: 'We experienced difficulties in covering our business standing expenses.'*

Some of the challenges stated were unique to certain types of businesses. For example, the businesses that adopted working on line from home experienced the following challenges:

SME 1 (business consultancy): *Our employees were failing to meet deadlines when working from home. There was a lot of miscommunication between employees and our clients as they were now used to face to face meetings.'*

SME 12 (marketing consultancy): *'Clients had no proper technology and systems to remain in business. Poor internet connectivity was a challenge. Pricing of services became hard as clients didn't appreciate a virtual working model.'*

SME 8 in the mental health and psychology sector has this to say*: 'We expected a boom, in terms of having more people seeking our services due to the trauma associated with the pandemic but the economic depression was harsher.'*

The research findings prove that the COVID-19 pandemic negatively affected SMEs across all business sectors. These findings tally with a number of previous studies (Makombe 2021; Omar et al., 2020; Chirume & Kaseke, 2020; Gurrai, 2020; Guo et al., 2020, Gong et al., 2020) amongst many others. SMEs under the 'non-essential services category' were evidently more affected than those that were categorised by the government as 'essential service providers'.

Research Objective 2 - To find out the survival strategies employed by SMEs in the Bulawayo Metropolitan Province in the COVID-19 era.

Establishing the survival strategies adopted by SMEs in response to the COVID- 19 disease was another key objective in this study. Previous studies suggest that SMEs have adopted strategies to ensure their survival in the face of the COVID-19 devastation (Guo et al, 2020; Manyati & Mutsau, 2021). The key themes that arose in the analysis of the data were as follows:

1. Door to door deliveries
2. Online marketing strategies
3. Cost cutting measures
4. Running promotions
5. Product/service diversification
6. Customised services

The aforesaid survival strategies are elaborated on below.

1. Door to door deliveries

In response to the strategies, they adopted to mitigate the challenges imposed by the pandemic and lockdown restrictions, the majority of respondents revealed that they adopted door to door deliveries and mobile services. As customer movement was restricted as part of the lockdown regulations, businesses had to improvise and take their products to the customer to avoid excessive losses. This is a strategy that was adopted by most SMEs across their various business sectors. The SMEs that adopted this strategy are quoted as follows:

SME 19 (retail sector): *'I started delivery services which increased my market share.'*

SME 10 (farming sector): *'We sold our produce mostly to neighbours.'*

SME 15 (personal body care sector)*: 'We offered mobile services.'*

SME 25 (retail sector): *'We did customer visits, home deliveries and opened new markets outside the CBD.'*

2. Online marketing strategies

Another survival strategy that was popular amongst the SMEs that participated in the study was the adoption of online marketing in its various forms. Some respondents created WhatsApp groups to maintain constant communication with their clientele. Other respondents either created social media accounts from scratch whilst those that already had social media presence intensified their social media marketing efforts (Adam & Alirifi, 2021). This is evidenced by the following responses quoted verbatim:

SME 2 (retail sector): *'We increased the vigour of our online campaigns.'*

SME 5 (retail gas): *'We adopted excessive marketing mostly online using WhatsApp and Facebook.'*

SME 9 (retail sector)*: We implemented Geo-targeted online marketing which enabled us to restrict our online advertisements to places we were able to deliver products easily without much resistance.'*

SME 12 (consultancy): *'We adopted network marketing and adopted social media marketing.'*

SME 14 (marketing agency)*: 'We kept our social media pages active with content at least 3 to 4 times a week to maintain visibility.'*

These findings are corroborated by Manyati & Mutsau (2021), whose study revealed that informal manufacturers adopted digital marketing platforms for various purposes as a survival strategy. The digital platforms were adopted in order to communicate with alliances to source supplies, place orders, receive payments, gather market intelligence and much more. Digital platforms however seemed to be adopted by younger and more formally trained manufacturers compared to older manufacturers.

3. Cost cutting measures

Cost cutting is another key survival strategy that was adopted by the majority of respondents in the study in order to try and match the excessive reduction in sales. Some SMEs resorted to cutting salaries and even laying off non- essential staff members in an effort to stay afloat as alluded to by Makombe (2021). The cost cutting strategy was adopted in different forms unique to each business as evidenced by the comments quoted from the responses verbatim.

SME 6 (transport sector): *'We adopted cost cutting measures through reduction of salaries.'*

SME 8 (mental health & psychology): '*We had to tighten our budgets and operating costs.'*

SME 15: (personal care sector)*: We operated on a loss model for a while and negotiated to reduce fixed costs.*

SME 9 (retail sector)*: 'We laid off temporary staff.'*

SME 24 (farming sector): 'Reduced the number of chickens reared.'

4. Running promotions

Some SMEs also resorted to running specials and promotions as a survival strategy to keep their businesses afloat.

SME 8 (mental health & psychology): '*We held mental awareness campaigns, reduced our assessment and consultation fees and sometimes gave free sessions as courtesy.*'

SME 15 (personal care services): '*We introduced specials to try and keep the customers coming.*'

SME 9 (retail sector): '*We ran promotions and increased the affordability of our products.*'

5. Product/service diversification

Some SMEs adopted diversification as a survival strategy. Some added products that were not originally part of the product mix or services offered. This strategy was adopted in an attempt to increase the streams of income and keep the business afloat. Chirume & Kaseke (2020) highlight the need for SMEs to be creative with the products they offer in line with the changes brought about by the pandemic. This strategy was adopted as follows.

SME 23 (retail sector): '*We diversified our products and services offered.*'

SME 19 (retail sector): '*We changed the type of goods being sold.*'

SME 18 (logistics sector): *We looked into other business streams and opportunities such as transportation.*'

SME 4 (nail salon): '*I added products for resale e.g. hand sanitisers and hand washes.*'

6. Customised survival strategies

Other survival strategies were unique across different players. Some players offered customised services. SME 3 (retail) and SME 4 (a nail salon) worked on appointments to reduce traffic and create a safe environment. SME 9 (retail sector) adopted bulk ordering to mitigate stock replenishing issues. SME 12 (consultancy), and SME 16 (media), formed alliances with other players to expand their markets and reach while SME 3 offered bundled services. SME 12 (marketing consultancy) adopted working online from home as a strategy to mitigate the challenges imposed by lockdown restrictions.

SME 7 in the car sales sector did not adopt any survival strategy except to wait for the lifting of lockdowns so they could resume operations. This probably could have been due to the fact that their products are costly and were hard to push in a period where the market had very little disposable income. SME 13 in the transport sector, also did not state any strategies adopted for survival.

The majority of findings for this particular objective are in line with previous studies (Adam & Alarifi, 2021; Makombe, 2021; Manyati & Mutsau, 2021; Chirume & Kaseke, 2020; Guo et al., 2020) whose focus was on the challenges and impact of the COVID-19 pandemic on the performance of SMEs as well as the survival strategies and techniques adopted by the SMEs who were a fragile group of businesses even prior to the pandemic.

LIMITATION OF THE STUDY

Distribution and collection of questionnaires was cumbersome due to COVID-19 requirements. Getting participants to return the questionnaires meant numerous calls as reminders. With perseverance, we managed to collect all the questionnaires that had been distributed.

SPECIFIC RECOMMENDATIONS AND IMPLICATIONS

a. For SME owners

This paper is of importance to SME owners and policy makers since it provides ways to handle the challenges brought about by the pandemic. It is evident from the findings of the study that SME owners need specific entrepreneurial talent and skills to survive and thrive in situations such as those of pandemics. They need to be equipped with environmental analysis, innovation and digitalisation skills among many. With people spending more time online than ever before, digital marketing channels are no longer an option but a necessity for small businesses to survive in the coronavirus era.

To mitigate against the loss of revenue, SME owners need to come up with creative ways that do not violate the COVID-19 regulations. These include adoption of door to door deliveries, online marketing strategies, offer customised services, run promotions and diversify products and services. Such measures would help them increase market share and generate the much needed revenue to cover unanticipated costs like deliveries where there were none previously, sanitisation of both customers and employees, temperature checking equipment as well as COVID-19 testing for employees amongst many others.

Another way of cutting down on costs is reducing the number of working days per week, adopting working from home online, negotiating for lower fixed costs /rentals with landlords, laying off of staff members or engaging them on a contract basis amongst many others. Cost cutting measures are crucial to match the reduced income streams and revenue coming into the companies.

A survival strategy that was mentioned by nearly every participant was the adoption of digital marketing strategies and the growth of online presence through social media platforms. Those SME owners who were not into digital marketing strategies need to adopt such. WhatsApp groups are a useful technique to stay in touch with clientele during the various lockdown levels.

In some instances, some businesses reveal that some employees and team members sadly succumbed to the disease. In such cases, mandatory vaccination or encouraging employees to vaccinate would reduce the number of people dying from the disease. Another way is upscaling outreach awareness programmes on how the impact of this pandemic can be reduced, such as observing social distancing, wearing of masks, sanitising, and avoiding crowded places like parties and funerals.

b. For Policy makers

The study has several practical implications for the government through the Ministry of Small to Medium Enterprises as well as SME owners for the survival and sustainability of SMEs during and in the post COVID-19 era.

Longer lead times became the order of the day, both in the attainment of raw materials and stock as well as delivering customer orders. Businesses relying on imports were also affected as importing became a challenge for most SMEs. To help SMEs in this regard, the government should offer support by relaxing import regulations for small businesses. There is no way SME can bring in the imported raw materials without the government creating a supportive environment.

The government can also come up with COVID-19 relief financial programmes, to ensure that businesses do not close, and employees do not lose jobs. The government should also offer information, advice, training, and technical support. Some SME owners lack relevant information and training because of their educational background.

FURTHER RESEARCH

The study was limited to SMEs in the Bulawayo Metropolitan Province only, hence further studies could expand the scope and conduct research on a national level. By virtue of the qualitative research methodology adopted, our study findings could not be generalised across the whole of Zimbabwe. Therefore, further studies could adopt a mixed method approach which is more generalizable by virtue of adopting larger sample sizes as well as the use of probability sampling techniques. The majority of the participants in this study indicated that they adopted some form of digital transformation in one way or another. This shows that there were some lessons learnt from the experience of operating businesses in a disrupted environment, hence further studies could investigate the lessons learnt by SMEs from the experiences and encounters which the COVID-19 pandemic imposed on them without warning.

REFERENCES

Adam, N.A.& Alarifi, G. (2020). Innovation practices for survival of small and medium enterprises (SMEs) in the COVID-19 times: the role of external support. *J Innov Entrep* 10, 15 (2021). https://doi.org/10.1186/s13731-021-00156.

Aifuwa, H. O., Saidu, M., & Aifuwa, S. A. (2020). Coronavirus pandemic outbreak and firms' performance in Nigeria. Accessed from https://www.researchgate.net/publication/341152 on 20 May 2020.

Bryman, A., Bell, E., Hirschon, P., Dos Santos, A., Dutoit J., Masenge, A, Van Aardt., I & Wagner, C. (2017). Research methodology. Business and Canagement contexts. 7th impression. Cape Town: Oxford University Press Southern Africa.

Buheji, M. & Ahmed, D. (2020). Foresight of coronavirus (COVID-19) opportunities for a better world. American Journal of Economics, 10(2), 97–108.

Chirisa, I., Mavhima, B., Nyevera, T., Chigudu, A., Makochekanwa, A., Matai, J., Machingura, F. Moyo, S., Chirisa, H., Mhloyi, M., Murwira, A., Mhandara, L., Katsande, R., Muchena, K., Manjeya. E., Nyika, T. & Mundau, L. (2021) The impact   and implications of COVID-19: Reflections on the Zimbabwean society. *Social   Sciences & Humanities Open, Volume 4, (1) 101*

Chirume. E & Kaseke. N, (2020). Impact of COVID-19 on small and medium-sized   enterprises (SMEs) in Chinhoyi, Zimbabwe, *International Journal of Business, Economics and Law*, Vol. 23, Issue 1. ISSN 2289-1552 2020

Cooper, D. R. & Schindler, P. (2008). Business Research Methods. Singapore: McGraw-Hill. Irwin.

Dhochak, M., & Sharma, A. K. (2015). Impact of global financial crisis on Indian venture capital firms: An empirical evaluation. *Journal for International Business and Entrepreneurship Development*, 8(4), 330–345.   https://doi.org/10.1504/JIBED.2015.072931.

Effendi, M,I., Sugandini, D. & Istanto, Y. (2020). Social media adoption in SMEs impacted by COVID-19. The TOE Model. *The Journal of Asian Finance, Economics, and Business.* 7(11), 915-925.

Fornaro, L. & Wolf, M. (2020). Covid-19 corona virus and macroeconomic policy (CEPR   Discussion Paper No. DP14529). https://ssrn.com/abstract=3560337

Gong, H., Hassink, R., Tan, J., & Huang, D. (2020). Regional Resilience in Times of a Pandemic Crisis: The Case of COVID-19 in China. *Tijdschrift Voor Economische en Sociale Geografie, I*II (3), 497-512. https://doi.org/10.IIII/tesg.1244

Gordana, D., P. (2021), Sustaining SME Management and Innovations in the Post-COVID Era *Handbook of Research on Strategies and Interventions to Mitigate COVID-19 Impact on SMEs*

Guo, H., Yang, Z., Huang, R., & Guo, A. (2020). The digitalization and public crisis responses of small and medium enterprises: Implications from a COVID-19 survey. *Frontiers of Business Research in China*, *14*(1), 1–25.

Gurría, A. (2020). Tackling coronavirus (COVID-19) contributing to a global effort. Organisation for Economic Co-operation and Development (OECD) viewed.

Habakkuk Trust (2020). Government managing COVID-19 Information.https://www.newsday.co.zw/2020/o3/govt-managing-covid-19-information-csos

Harel, R. (2021), The impact of COVID -19 on Small Businesses ' Perfomance and Innovation. Global Business Review, *SAGE journals*

Makombe. E.K., (2021), "Between a Rock and a Hard Place": The Coronavirus, Livelihoods, and Socioeconomic Upheaval in Harare's High-Density Areas of Zimbabwe. https://doi.org/10.1177/0169796X211030062

Manyati, T.K. & Mutsau, M. (2021), "Leveraging green skills in response to the COVID-19 crisis: a case study of small and medium enterprises in Harare, Zimbabwe*", Journal of Entrepreneurship in Emerging Economies, Vol. 13 No. 4, pp. 673-697.* https://doi.org/10.1108/JEEE-07-2020-0236

Maree, K. (Ed.) (2007). First Steps in Research. Pretoria. Van Schaik Publishers. (pp.75-92). Pretoria. Van Schaik.

Mavhunga, C (2020) Zimbabwe Begins Lockdown to Fight COVID-19. [Internet :https://www.voanews.com. science-health coronavirus. Accessed on 15 October 2021]

Mazikana, A. T. (2020). The impact of COVID-19 on SMEs performance in Harare, Zimbabwe. https://papers.ssrn.com

Muriithi, Samuel. (2021). THE IMPACT OF COVID-19 ON AFRICAN SMES, POSSIBLE REMEDIES AND SOURCE OF FUNDING. *European Journal of Research and Reflection in Management Sciences, 9(1)5-12.* https://www.researchgate,net

Nasar. A, Akram. M, Safdar. M. R & Akbar. M. S, (2021), A qualitative assessment of entrepreneurship amidst COVID-19 pandemic in Pakistan.

Nyanga, T. & Zirima, H., (2020), Reactions of Small to Medium Enterprises in Masvingo, Zimbabwe to Covid 19: Implications on Productivity. *Bus. Excell. Manag*. 2020, 10, 22–32.

Omar, A. R. C., Ishak, S., & Jusoh, M. A. (2020). The impact of Covid-19 movement control order on SMEs' businesses and survival strategies. *Geografia-Malaysian Journal of Society and Space, 16(2), 90–103.*

Ratnasingam, J. Khoo, A. Jegathesan, N., Wei, L.C., AbdLatib, K., & Amir, M.A. (2020). How are small and medium enterprises in Malaysia's furniture industry coping with COVID-19 pandemic? Early evidence from a survey and recommendations for policy makers. *Bio resource. 15(3), 5951-5964*

Rukasha. T, Nyagadza. B, Pashapa. R & Muposhi. neurship amidst COVID-19 pandemic in Pakistan, Asia Pacific Management Review.

A, (2021) Covid-19 impact on Zimbabwean agricultural supply chains and markets: A sustainable livelihoods perspective, Cogent Social Sciences, 7:1, 1928980, DOI:10.1080/23311886.2021.1928980

Saunders, M., Lewis P & Thornhill, A. (2016). Research methods for business students. 7th ed. Pearson Education Ltd.

Shafi, M., Liu, J & Ren, W. (2020). Research in globalisation-[Amsterdam] *Elsevier Ltd.* ISSN2590-051X,ZDB-ID 3051244-X- Vol. 2, p 1-14.

Singh, M. D., & Thakar, G. D. (2018). Green manufacturing practices in SMEs' of India -a literature review. *Industrial Engineering Journal*, 11(3). https://doi.org/10.26488/iej.11.3.1052 [Crossref], [Google Scholar]

World Health Organisation (2009) World Health Organisation. Cities and public health crises: Report of the international consultation 29-30 October 2008 lyon. *(Google Scholar)*

Yin, K. R. (1993) Application of Case Study Research. Sage. https://www.scirp.org

Appendix- Questionnaire used for data collection

Survival of the fittest. How SMEs in the Bulawayo Metropolitan Province, Zimbabwe, experienced the COVID-19 pandemic.
Section A: Demographic data

Please tick the appropriate box
A1. Indicate your age group.

Below 30 years	1
30-40 years	2
41-50 years	3
Above 50 years	4

A2. Indicate your highest level of education.

Degree	1
Diploma	2
Advanced level	3
Ordinary level	4
No formal education	5

A.3 Indicate your type of business

Retail	1
Manufacturing	2
Farming	3
Hospitality	4
Catering	5
Other (specify	Business consultancy

A4. Indicate the number of years in business

Below 5 years	1
5-15 years	2
16 - 25 years	3
26 -30 years	4
Above 30 years	5

Read the following questions and fill in the required details

Section B: COVID-19 Challenges on the business
5. What challenges did your business experience as a result of the pandemic? Give as much detail as possible.

Section C: Strategies used
6. What strategies did you use to keep your business operational?
7. What strategies did you use to improve your revenue?

STRUCTURING AUDIT COMMITTEES TO ENHANCE VOLUNTARY ETHICS DISCLOSURES IN INDONESIA: A THEORY-OF-COMFORT PERSPECTIVE

Alvianis Yusnita Bayu and Desi Adhariani

ABSTRACT

This study aims to determine the association between audit committee characteristics and ethics disclosure using the theory of comfort as theoretical lens. The audit committee characteristics investigated are audit committee expertise, frequency of meetings, audit committee size, audit committee tenure, and multiple directorships of audit committee members. Ethics disclosure is measured using a disclosure checklist developed by Persons (2009). This research takes an emerging market, Indonesia, as the context to enable a comparison of the findings with previous literature in developed countries. The sample consists of 85 large-market-capitalization companies (595 observations) listed on the Indonesia Stock Exchange (IDX) in 2014–2020. Panel data regression was used to test the hypothesis. The findings indicate that the level of ethics disclosure on average is 58.16%. The results show that there are three characteristics of audit committees that significantly influence ethics disclosure: audit committee expertise, audit committee size, and frequency of meetings. These factors play a significant role in producing comfort and confidence in the eyes of stakeholders of companies that exercise ethical business practices. This research has important implications regarding how several attributes of audit committees can encourage ethical conduct in business and hence increase ethics disclosure. This study uses a different lens—the theory of comfort—as a theoretical perspective to study audit committee characteristics, which has been scantily applied in accounting and auditing research.

Keywords: Ethics, voluntary disclosure, audit committee, audit committee characteristics, theory of comfort

INTRODUCTION

A sustainable company is defined as being able to keep the business going by paying attention to the needs of various stakeholders (Colbert & Kurucz, 2007). The nature of sustainability in an organizational context is to enhance social, environmental, and economic systems in which the business operates (Chartered Institute of Personnel and Development, 2012). This is in accordance with Colbert

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and Kurucz (2007), who stated that sustainability "implies a simultaneous focus on economic, social, and environmental performance." They also reported that many companies make reports about sustainability based on the notion of the "triple bottom line," which includes economic, social, and environmental performance.

Ethics is a critical component in building a sustainable company. Business ethics refers to good or bad and right or wrong behavior in doing business (Tota & Shehu, 2012). Ethics is a key aspect in conducting business which must be in accordance with regulations and acknowledged codes (Othman et al., 2014). Nowadays, ethical behavior is crucial in business conduct to avoid lawsuits (Salehi et al., 2012). Previous examples from big companies such as Enron, WorldCom, and Parmalat show how unethical behavior bears extreme consequences for the company in conducting business.

The occurrence of unethical behavior is mostly a result of poor corporate governance. Corporate governance mechanisms are in place to make sure that companies are implementing ethical practices and ethical leadership (Fatoki, 2020). This can be supported by assigning audit committees to improve business ethical practices and ethics disclosure and thus help oversee management more effectively (Othman et al., 2014). Therefore, a committee is required to maintain an adequate internal control system and monitor the performance of external auditors to realize good corporate governance. The existence of an audit committee in Indonesia's public companies is stipulated by POJK 55/POJK.04/2015, which explains the establishment and guidance of audit committees. To achieve good corporate governance, public companies listed in the Indonesia Stock Exchange (IDX) must have an audit committee and independent commissioners.

The Guidance on Audit Committee by the Financial Reporting Council in 2016 states that the audit committee should review and report to the board on significant financial reporting issues and judgments made in connection with the preparation of the company's financial statement, interim reports, preliminary announcements, and related formal statements. The audit committee should also review related information presented with financial statements, including business reviews, and corporate governance statements relating to audit and risk management. Audit committee responsibilities are to review these reports; however, the challenge arises when selecting the members of audit committees.

Previous research regarding audit committee and disclosure found that education and experience have a positive impact on disclosure (Reeb & Zhao, 2009). Other studies by Felo and Solieri (2009) as well as Al Lawati, Hussainey, and Sagitova (2021) found that the increase in expertise and the number of independent members of audit committees have a positive effect on company disclosure. This study focuses on audit committees since most companies have assigned the duty of overseeing ethics to this committee. Marnburg (2000) suggested that the corporate code of ethics is used to help boost individuals' ethical behavior to sustain an ethical environment. This indicates that the company's ethical behavior is heavily determined by the example of top-tier positions set by the board of directors. Studies about this specific topic have not been conducted yet. A study by Persons (2009) about audit committee characteristics and ethics disclosure in fraudulent and nonfraudulent companies showed that those that made earlier voluntary ethics disclosure plausibly have larger and more independent audit committees in which they held meetings more often and were unlikely to be involved in financial reporting fraud. Another study by Othman et al. (2014) found that there are only two characteristics of the audit committee that are associated with ethics disclosure: tenure and multiple directorships; meanwhile, independence, expertise, meeting frequency, and size were inconsistent.

Voluntary ethics disclosure can be classified as a form of comfort produced by a company to gain trust from shareholders, investors as market participants, and other stakeholders. Considering comfort theory (Kolcaba and Kolcaba, 1991) as the sociological strand of corporate governance research, we argue that certain characteristics of an audit committee should be structured to transform inherently untrustworthy corporate activities into comfortable forms through ethics disclosure. By using this theory, we mobilize the importance of the audit committee as part of the corporate governance organ by viewing it as more

than just a guard or control provider against unethical conduct traditionally portrayed in agency theory. Hence, the research gap we intend to fill is on the theoretical aspect by offering an alternative theory with which to view the importance of audit committee characteristics. By taking this side, our study aims to provide a theoretical contribution to the literature on corporate governance and ethics. The Indonesia context that we use in this study represents an emerging market to enable comparison with previous studies taking developed countries as the context. Apart from the generalization of the findings, we also aim to provide practical contributions for corporations in designing their audit committee characteristics.

LITERATURE REVIEW

Theory of Comfort as a Theoretical Perspective

The concept of comfort can be traced back to nursing practice (Carrington & Catasús, 2007), which provides comfort to patients and their families through certain interventions to actual or potential health problems. The idea has been applied by auditing research to represent the notion of relief from discomfort in terms of a company's financial statement by conducting an audit to reach a level of confidence ("a reasonable assurance") in which auditors are comfortable with the numbers provided by clients to issue an unqualified opinion.

Several previous studies have investigated the concept of comfort in the auditing context using other theories related to comfort as theoretical lenses. For example, using the theory of interaction ritual chains, Pentland (1993) investigated comfort production in the actual auditing process by conducting field observations of two audit engagements. Rowe (2019) challenged prior research assumptions about auditors being more comfortable with management estimates supported adequately by evidence, as it can reduce the chances of misstatements. Using experimental research based on information processing theory, he found that the assumption is true only to a certain extent: better-supported estimates promote auditor comfort to the extent of producing confidence in auditor's beliefs. Once auditors are confident, more support leads to a less comfortable state, as it poses a potential challenge to their beliefs. Sarens et al. (2014) analyzed the role of the internal auditor as an expert at providing comfort to the audit committee. Based on four Belgian case studies, the research found that audit committees seek comfort in the control environment and internal control aspects, which are two areas in which they have considerable discomfort. The source of comfort is internal auditors' unique knowledge about risk management and internal control because of their internal position, familiarity with the company, and position close to people across the company, combined with appropriate interpersonal and behavioral skills. Furthermore, it was found that the overall level of comfort to the audit committee can be enhanced via a joint audit approach, that is, the collaboration between internal and external auditors.

This study does not focus on the "process" or "practice" of audit in a company but rather on the actors, in this case, the audit committee members, who provide comfort for the companies' stakeholders in terms of voluntary ethics disclosure to enhance ethical business practices.

Corporate Governance

According to Schleifer and Vishny (1997), corporate governance (CG) is a set of mechanisms that can protect the minority (outside investors/minority shareholders) from expropriation by managers and insider shareholders with emphasis on the right aspect. CG mechanisms are believed to strengthen control within the company and reduce opportunistic behavior and information asymmetry to have a positive impact on the quality of information disclosed (Li & Qi, 2008). Mustapha and Ahmad (2011) said that after the collapse of large companies, the effects of these crises pushed efforts to increase CG, which has been done by countries around the world through the establishment of CG guidelines.

To achieve long-term success, CG implementation needs to be based on high integrity; therefore, business ethics is an integral part of CG (KNKG, 2011). The company code of ethics is a code of conduct that becomes a reference for corporate organs and employees in applying corporate values. Company values are applied continuously in corporate culture (OJK, 2014). CG mechanisms can be either internal or external mechanisms (Li & Qi, 2008). Internal mechanisms are the internal structures installed in a company, such as independent commissioners and audit committees, while external mechanisms can be in the form of policy instruments that protect shareholders and other stakeholders. The audit committee is often reflected as a success of CG because of its crucial role in corporate management and its function that can improve the control of the company (Forker, 1992).

Ethics Disclosure

Business ethics in a company is implemented through a code of ethics, where, to create the code, the organization must determine the most important values, formulate standards of conduct to describe the application of values to the roles and responsibilities of affected people, direct how the values and which standards are generally applied, and establish systems and processes to ensure that the code is implemented and running effectively (Navran & Pittman, 2003).

The code of ethics is a company statement incorporating principles, rules of conduct, and practices or philosophies of corporate responsibility to stakeholders, the environment, or the external community (Langlois & Schlegelmilch, 1990). Navran and Pittman (2003) state that the code of ethics is a set of basic principles that can be used both as a basis for operational needs (things to do) and operational restrictions (things that should not be done).

According to Persons (2009), no code of ethics can change employee behavior, but the disclosure of this code can help councils and management create a culture of honesty and accountability, improve internal controls, and reduce the likelihood of fraud in financial statements. In addition, although the code of ethics is not a corporate environmental guarantee free from fraud, it can help management focus on ethical risks, maintain an honest culture and accountability, improve internal controls, and reduce the likelihood of fraud in financial statements.

Audit Committee

An audit committee is a committee established by the board of commissioners of the company, whose members are also appointed and dismissed by the board of commissioners, whose duty is to assist in conducting the necessary inspections or research on the implementation of directors' functions in managing the company. According to Arens and Loebbecke (2017), the audit committee is a person that is elected as a member of the board of directors whose responsibilities include helping auditors remain independent of management. The audit committee is ultimately responsible for ensuring the principles of corporate governance, especially transparency and disclosure, are consistently and adequately addressed by executives (Tjager et al., 2003). The audit committee is the most important subcommittee because of its specific role of protecting the interests of shareholders in terms of financial control and supervision (Mallin, 2007).

This research focuses on audit committees as part of internal corporate governance instead of other corporate governance mechanisms (such as the board of commissioners, the board of directors, and external audit). This is because audit committees play an important role in internal and day-to-day monitoring mechanisms and in improving the quality of information between managers (agents) and corporate owners (principal) through voluntary disclosure. With an audit committee, the company will further improve the quality of its financial reporting so that all of its activities will be disclosed clearly in its annual report (Ho & Wong, 2001). Based on the description above, the audit committee becomes one of the steps to initiate voluntary adoption and disclosure of ethical code.

HYPOTHESIS DEVELOPMENT

The expertise of the audit committee

Persons (2009) found that audit committee members with accounting/financial expertise had no significant effect on previous voluntary ethics disclosure. Felo et al. (2003) found that the percentage of audit committee members with expertise in accounting and financial management positively influences the quality of financial reporting, which also supports corporate disclosure. Carcelo et al. (2006) and Huang and Thiruvadi (2010) mentioned that accounting and financial experts in the audit committee support the transparency and fairness of financial statements, thus increasing disclosure. Based on the above description, the following hypothesis can be developed:

H1: *There is a positive relationship between the expertise of audit committee members and voluntary ethics disclosure.*

The frequency of meetings of the audit committee

Li et al. (2008) found that the frequency of meetings of the audit committee had a positive effect on disclosure. Persons (2009) found that the number of audit committee meetings had a positive effect on previous voluntary ethics disclosure. Suhardjanto and Permatasari (2010) found that audit committee meetings do not affect disclosure. According to Kent and Stewart (2008), audit committees that often hold meetings will result in greater disclosure levels. More specifically, Raimo, Vitolla, Marrone, and Rubino (2021) demonstrated that meeting frequency has a positive effect on integrated reporting quality, which comprises financial as well as nonfinancial disclosures. Therefore, meetings become essential in carrying out an audit committee's functions, duties, and responsibilities. Based on the above description, the following hypothesis is developed:

H2: *There is a positive relationship between the frequency of meetings of the audit committee and voluntary ethics disclosure.*

Audit Committee Size

Felo et al. (2003) found that the size of the audit committee had a positive effect on the quality of financial reporting. Meanwhile, Persons (2009) mentioned that there are those who argue that a larger audit committee is best suited to encourage ethical disclosure because the higher the number of members of the audit committee, the greater the incentive or recommendation for committee members or directors to undertake disclosure. Ettredge et al. (2010) found that the greater the number of audit committee members, the higher the level of disclosure. Persons (2009) found that the size of the audit committee had a positive effect on previous voluntary ethics disclosure.

Nasir and Abdullah (2004) stated that the existence of the audit committee helps ensure the disclosure goes well, so it is expected that a larger audit committee size will lead to better supervision and broader disclosure of information, especially voluntary disclosure.

H3: *There is a positive relationship between audit committee size and voluntary ethics disclosure.*

Audit Committee Tenure

The longer the working period of an audit committee, the better the performance, effectiveness, monitoring, knowledge, and experience in handling the company (Bedard et al., 2004). Persons (2009) stated that the lack of seniority would influence their ability to affect top management. Thus, the more senior the audit committee member, the more it is expected of them to pressure top management to make an ethics disclosure (Persons, 2009). Therefore, another hypothesis for this study is developed:

H4: *There is a positive relationship between audit committee tenure and voluntary ethics disclosure.*

Multiple Directorship of the Audit Committee

Effective control requires a commitment to time and effort. When a member of the audit committee holds a position in another company, this will reduce the availability of their work time and responsibilities (Morck et al., 1988). Core et al. (1999) stated that the effectiveness of the audit committee decreases when members have many important positions and serve in many companies.

Persons (2009) found that members of audit committees with additional directorship did not affect previous voluntary ethics disclosure. Barua et al. (2010) found that the dual positions held by the audit committee also had no effect on the company's internal audit on the effectiveness of supervision and assisted the audit committee in ensuring the quality of financial reporting. Adeyemi et al. (2012), found that the experience of members of the audit committee was obtained through the positions of directors in other companies. But according to Sharma and Iselin (2006), too many audit committee members have an important outside position. Thus, the hypothesis can be developed as follows:

H5: *There is a negative relationship between multiple directorships of the audit committee and voluntary ethics disclosure.*

RESEARCH METHOD

This research aims to analyze the influence of audit committee characteristics on ethics disclosure. It uses five independent variables consisting of expertise of the audit committee, frequency of audit committee meetings, audit committee size, audit committee tenure, and multiple directorships of an audit committee member and control variables consisting of return on asset, return on equity, and financial leverage.

The relationship between voluntary ethics disclosure and audit committee characteristics is analyzed using regression analysis. The following research model is used to test the hypotheses:

$$EDSC_{it} = \beta_0 + \beta_1 AUDACC_{it} + \beta_2 AUDMET_{it} + \beta_3 AUDSIZE_{it} + \beta_4 AUDTEN_{it} + \beta_5 DIRSHIP_{it} + \beta_6 ROA_{it} + \beta_7 ROE_{it} + \beta_8 LEV_{it} + \varepsilon$$

Research variables are explained as follows.

a. Dependent variable

The dependent variable is ethics disclosures measured using the following checklist developed by Persons (2009):

1) Did a firm have a written code of business conduct and ethics?

2) Did it have a specific committee of the Board of Directors (BODs) that had an oversight responsibility related to ethics?

3) Did it have a corporate ethics or compliance officer?

4) Did it consider ethics in hiring a director or an executive?

5) Did it link executive compensation to the ethical conduct of the firm?

6) Did it provide ethics training to employees or require employees to sign a letter acknowledging that the employees had read and would abide by its code of ethics?

7) How many of the following 12 areas did its code of ethics apply?

   a) Maintenance of accurate company records.

   b) Communication with the public.

   c) Conflict of interest between personal and professional relationships.

   d) Treatment of confidential information.

   e) Use of company assets.

   f) Anti-nepotism.

g) Reporting of accounting complaints and illegal/unethical behavior.
h) Compliance with applicable laws and regulations including discrimination, harassment, environment, and human rights.
i) Commercial bribery.
j) Competition and fair dealing.
k) Insider trading of the firm's stock.
l) Disciplinary action for violating the code.

The ETHICS variable is represented by ethics-disclosure points. A firm with no ethics disclosure will be given 0 points. For a firm with ethics disclosure, the more details it provided, the higher its ethics-disclosure points. A firm may receive up to 18 points: one point for each "Yes" answer to the following 18 aspects of ethics disclosure.

ETHICS = (number of indicators disclosed)/18

b. Independent variables

The independent variables are audit committee characteristics, which are classified into five as utilized in Persons (2009), excluding audit committee independence. Each category is measured in accordance with their field, as follows:

Table 1. Measurement of independent variables

Audit Committee Characteristics	Definition	Measurement
AUDACC	Expertise of audit committee members	Percentage of independent audit committee members with accounting or financial expertise
AUDMET	Frequency audit committee meetings	Number of audit committee meetings in a year
AUDSIZE	Audit committee size	Number of audit committee members
AUDTEN	Audit committee tenure	Average tenure of independent audit committee members
DIRSHIP	Multiple directorships of audit committee members	Average number of multiple directorships of independent audit committee members

c. Control Variables

To better verify the correlation between audit committee characteristics and ethics disclosure, return on net assets (ROA), return on equity (ROE), and financial leverage (LEV) are added as control variables in the multivariate linear regression equation to control the impact on corporate value.

$$ROA = \frac{net\ profit}{total\ assets}$$

$$ROE = \frac{net\ profit}{equity}$$

$$LEV = \frac{total\ debt}{total\ equity}$$

This study provides an overview of the influence of audit committee characteristics on the voluntary ethics disclosure of listed companies in Indonesia. The population used in this research are companies listed on the Indonesia Stock Exchange excluding the financial sector. The sample is taken to best represent the population of overall listed companies in Indonesia. The following criteria are used in the sample: (1) The companies have been listed in the Indonesia Stock Exchange in the 2014–2020 period. (2) The companies have complete annual reports for the research period. (3) The companies' 2020 total assets are above 8 billion rupiahs, which represents the average of the total assets of seven sectors. The companies are chosen based on their size because they represent the largest listed companies and therefore are more likely to report voluntary disclosure than smaller companies. Persons (2011) argued that larger companies are more likely to adopt a code of ethics than smaller companies because they are more likely to be an investor's choice because of their well-known brand name and greater information on disclosures. The approach of sampling the largest companies is also adopted based on prominent empirical literature on social disclosure (Guthrie & Parker 1989; Gray et al. 1995; Clarke & Gibson-Sweet 1999) as well as latest research (Brammer & Pavelin, 2006; da Silva Monteiro & Aibar-Guzmán, 2010; Sadou et al., 2017). Adopting the same approach will enable comparability between this study and previous work. Firms that produce voluntary disclosures tend to be large, and some of the disclosure drivers may apply only to larger companies. Adler and Milne (1997) found that there is a size threshold effect in the association between firm exposure and social disclosure. In addition, large firms tend to exhibit sufficient diversity of practice to generate ideal resources for the study of motivations for voluntary disclosure (Gray et al. 1995).

RESEARCH FINDINGS

The sample for this study consists of 85 companies from various sectors as depicted in the following table.

Table 2. Sample Details

Sector	Number of companies
Agriculture	10
Mining	13
Basic Industries and Chemical	11
Consumer Goods	8
Infrastructure	9
Property and Real Estate	16
Trade, Security, and Investment	18
Final Sample for the research period 2014-2020	85 x 7 years
Total Observation	595

Descriptive Statistics Analysis

The descriptive statistics of the observations are shown in Table 3.

Table 3. Descriptive Statistics

Variables	Observations	Mean	Std. Dev	Min	Max
EDSC	595	0.5816	0.3233	0	0.9887
AUDACC	595	0.327	0.4663	0	2
AUDMET	595	14.3333	15.7644	5	70

Variables	Observations	Mean	Std. Dev	Min	Max
AUDSIZE	595	3.6287	0.8769	3	6
AUDTEN	595	3.7158	2.6548	0.33	14.33
DIRSHIP	595	0.0922	0.2045	0	1
ROA	595	0.0779	0.0901	0.0004	0.5973
ROE	595	0.2283	0.7589	0.0010	10.9897
LEV	595	0.791	0.4527	0.2702	2.8857
EDSC = Ethics disclosure. AUDACC = Expertise of audit committee. AUDMET = Frequency of meeting of audit committee. AUDSIZE = audit committee Size. AUDTEN = Audit committee Tenure. DIRSHIP = Multiple directorship of audit committee members. ROA = Return on Assets. ROE = Return on Equity. LEV = Financial leverage.					

Each sector has various levels of ethics disclosure. The table below shows the average level of ethics disclosure made by companies in each sector ranked from highest to lowest from 2014 to 2020.

Table 4. Average Ethics Disclosure per Sector

SECTOR	MEAN OF ETHICS DISCLOSURE
Infrastructure	0.6277
Property & Real Estate	0.5946
Mining	0.5795
Trade Security & Investment	0.5986
Agriculture	0.5792
Basic Industry & Chemical	0.5597
Consumer Goods	0.4539

Hypothesis Testing

The result from the regression in the table shows that there are three variables that positively influence ethics disclosure: audit committee expertise (AUDACC), audit committee size (AUDSIZE), and frequency of audit committee meetings (AUDMET). The other variables are found to be insignificant.

Table 5. Regression Results

	Coefficient	P>|t|
Cons	0.5256226	
AUDACC	0.0421633	**0.042****
AUDMET	0.0021965	**0.013****
AUDSIZE	0.0263597	**0.099** *
AUDTEN	0.0074512	0.308
DIRSHIP	-0.0195472	0.877

ROA	-0.0418257	0.684
ROE	-0.0023169	0.851
LEV	0.0012613	0.832
R Squared	0.3913	
Prob > F	.0000	
Notes:		
AUDACC = Expertise of audit committee. AUDMET = Frequency of meeting of the audit committee. AUDSIZE = Audit committee Size. AUDTEN = Audit committee Tenure. DIRSHIP = Multiple directorships of audit committee members. ROA = Return on Assets. ROE = Return on Equity. LEV = Financial leverage. * significant at a level of 10% ** significant at a level of 5%		

DISCUSSION

The results of this study reveal that there is a positive association between the expertise of audit committee members and voluntary ethics disclosure. Accounting and finance expertise can help audit committee members spot unethical business practices such as bribery, misappropriation of assets, and violations of environmental and human rights acts. This might be attributed to the calculative nature of accounting and finance, which enables an audit committee member to consider the positive and negative impacts of business practices on society and the environment.

The frequency of audit committee meetings is also found to have a significant effect on the disclosure of business ethics. The audit committee is required to meet periodically at least once in three months or three to four times a year to perform its obligations and responsibilities (FCGI, 2002). The existence of a positive impact of the number of audit committee meetings indicates that companies held meetings not only to fulfill their agenda of annual or regulatory programs but also to pay attention to the role of the audit committee to oversee and advise the board of commissioners in the case of the creation of a supervisory mechanism. These results are consistent with the study of Barros et al. (2013).

Audit committee size also has a positive association with voluntary ethics disclosure. The Indonesian regulation concerning the establishment of the audit committee states that the total number of audit committee members shall be at least three members, including the chair of the audit committee. The positive influence of the size of the audit committee indicates that the establishment of the committee is based not only on the need to meet requirements but also on the need for effective oversight functions. This positive influence also indicates that the audit committee has carried out its responsibilities as described by Forum for Corporate Governance in Indonesia (FCGI, 2003) to ensure that the company has been following applicable laws and regulations, ethically conducting business, and avoiding conflicts of interest and fraud committed by company employees. This result is in accordance with Persons (2009).

Audit committee tenure is not found to have a positive relationship with voluntary ethics disclosure. This is consistent with the findings of Persons (2009). Although longer tenure can increase competence, it can also impair independence. Nili (2016) highlighted the potential effect of tenure on director independence. He provided arguments on the importance of tenure as a factor that may affect director independence and sought to direct regulators to focus their attention on tenure by providing empirical data that showed an increase in director tenure over the last decade. Nili (2016) maintained that this new long-serving director became the "new insider," someone who meets the regulatory requirements

of independence but has much of the "inside" knowledge of the former executives in the boardroom as a result of their lengthened tenure.

Lastly, the absence of influence of audit committee members with multiple directorships might be because of the low time commitment by the audit committee, which causes insufficient performance. Audit committee members with too many important positions outside the company can overcommit because they are too busy (Sharma & Iselin, 2006).

The results of this study confirm comfort theory; that is, certain audit committee characteristics can produce comfort for audit committee members in determining the adequacy of voluntary ethics disclosures. The characteristics found to be significant are audit committee expertise and the size and frequency of meetings. These three factors implied the dynamics of audit committees as comfort producers of ethical business conduct represented in the disclosures. Although this study does not investigate what process in audit committee meetings significantly contributes to comfort production, the findings of this study can still be beneficial for companies in structuring their audit committee characteristics to enable the maximum benefit of corporate reputation in the eyes of stakeholders.

Companies can use the results of this study to design appropriate audit committee structures as managerial strategic decisions. These structures should not only comply with applicable regulations as a tick-mark exercise, but a company should also consider the most appropriate audit structure to oversee business practices and ensure that business ethics are implemented and communicated to stakeholders through ethics disclosure. Following the results, a company is recommended to provide opportunities for audit committee members to enhance their expertise and capabilities through internal and external training. A company should also pay attention to audit committee size to ensure various perspectives are accommodated to oversee business practices. The frequency of meetings should also be treated as a sign of the effectiveness and quality of an audit committee to ensure that important matters are discussed adequately in meetings among members.

CONCLUSION

This study examines the relationship between audit committee characteristics, namely, audit committee expertise, frequency of audit committee meetings, audit committee size, audit committee tenure, and multiple directorships of audit committee members on listed companies in Indonesia for the period 2014–2020. Three variables are found to positively influence ethics disclosure: audit committee expertise, audit committee size, and frequency of meetings.

The overall level of disclosure of listed companies in Indonesia is 58.16%, which is considered high, as it is still a voluntary disclosure without any obligations from the regulation. The sector with the most ethics disclosure is the infrastructure industry with a mean of 62.77%.

This study has theoretical as well as practical contributions. First, we offered a multidisciplinary theoretical lens, the theory of comfort, which has not been much explored in accounting and auditing research. This theoretical perspective enables the investigation of actors and processes involved to produce comfort in terms of trustworthy corporate ethics disclosures which hopefully represent the ethical conducts of the companies. The finding that only three characteristics are found to be significant represents a practical contribution to enhance the role of audit committees in corporate disclosures. For example, the absence of a significant role played by the tenure of audit committee members might indicate a call for providing adequate tenure for audit committee members to develop their capabilities including identifying unethical business practices and provide recommendations to improve company business conduct.

This study has several limitations. The scoring method to assess the ethics disclosure of companies might not be adequate to measure all ethical business practices conducted by a company. Future studies can perform a more thorough analysis using a more appropriate scoring method that can

provide an analysis of the quantity and quality of ethics information disclosed in a company's report. Future studies can also investigate the process or practices in audit committee dynamics to determine what factor contributes more to comfort in terms of high-quality voluntary ethics disclosures as suggested by the theory of comfort.

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REFERENCES

Al Lawati, H., Hussainey, K., & Sagitova, R. (2021). Disclosure quality vis-à-vis disclosure quantity: Does audit committee matter in Omani financial institutions? *Review of Quantitative Finance and Accounting*, *57*, 557–594.

Arens, A., & Loebbecke, J. (2017). *Auditing: An integrated approach.* Prentice-Hall.

Bedard, J., Chtourou, S. M., and Courteau, L. (2004). The effect of audit committee expertise, independence, and activity on aggressive earnings management. *Auditing: A Journal of Practice and Theory, 23*(1), 13–35.

Barros, C. P., Boubaker, S., & Hamrouni, A. (2013). Corporate governance and voluntary disclosure in France. *Journal of Applied Business Research, 29*(2), 561–578.

Barua, A., Rama, D. V., & Sharma, V. (2010). Audit committee characteristics and investment in internal auditing. *Journal of Accounting and Public Policy, 29*(5), 503–513.

Carrington, T., & Catasús, B. (2007). Auditing stories about discomfort: Becoming comfortable with comfort theory. *European Accounting Review*, *16*(1), 35–58.

Chartered Institute of Personnel and Development. (2012). Responsible and sustainable business: HR leading the way – A collection of "thought pieces." London: CIPD.

Colbert, B. A., & Kurucz, E. C. (2007). Three conceptions of triple bottom line business sustainability and the role for HRM. *People and Strategy*, *30*(1), 21–27.

Core, J., Holthausen, R., and Larcker, D. (1999). Corporate governance, chief executive officer compensation, and firm performance. *Journal of Financial Economics, 51*(1), 371–406.

Ettredge, M., Heintz, J., Li, C., & Scholz, S. (2011). Auditor realignments accompanying implementation of SOX 404 ICFR reporting requirements. *Accounting Horizons, 25*(1), 17–39.

Fatoki, O. (2020). Ethical leadership and sustainable performance of small and medium enterprises in South Africa. *Journal of Global Business and Technology*, *16*(1), 62–79.

Forum for Corporate Governance in Indonesia (FCGI). 2003. Corporate governance: Tantangan dan Kesempatan bagi Komunitas Bisnis Indonesia. Jakarta.

Felo, A., & Soleri, Steven A. (2009). Are all audit committee financial experts created equal? *International Journal of Disclosure and Governance, 6*(2), 150–166.

Forker, J. J. (1992). Corporate governance and disclosure quality. *Accounting and Business Research, 22*(86), 111–124.

Ho, S. S., & Wong, K. S. (2001). A study of the relationship between corporate governance structures and the extent of voluntary disclosure. *Journal of International Accounting, Auditing and Taxation, 10*(2), 139–156.

Huang, H. W., & Thiruvadi, S. (2010). Audit committee characteristics and corporate fraud. *International Journal of Public Information Systems, 6*(1), 71–81.

Kent, P., & Stewart, J. (2008). Corporate governance and disclosures on the transition to international financial reporting standards. *Accounting & Finance, 48*(4), 649–671.

Kolcaba, K. Y., & Kolcaba, R. J. (1991). An analysis of the concept of comfort. *Journal of Advanced Nursing*, *16*(11), 1301–1310.

Komite Nasional Kebijakan Governance (KNKG). 2011. Pedoman Umum Good Governance Business Syariah. Jakarta. Indonesia.

Langlois, C. C., & Schlegelmilch, B. B. (1990). Do corporate codes of ethics reflect national character? Evidence from Europe and the United States. *Journal of International Business Studies, 21*(4), 519–539.

Li, H., & Qi, A. (2008). Impact of corporate governance on voluntary disclosure in Chinese listed companies. *Corporate Ownership and Control, 5*(2), 360–366.

Marnburg, E. (2000) The behavioral effects of corporate ethical codes: Empirical finding and discussion. *Business Ethics: A European Review, 9*(3), 200–210.

Nili, Y. (2016). The new insiders: Rethinking independent directors' tenure. *Hastings LJ*, 68, 97.

OJK (Otoritas Jasa Keuangan). (2014). Roadmap Tata Kelola Perusahaan Indonesia Menuju Tata Kelola Emiten dan Perusahaan Publik yang Lebih Baik. Jakarta: OJK.

Mallin, C. A. (2007). *Corporate governance* (2nd ed.). Oxford University Press.

Morck, R., Schleifer, A., & Vishny, R. W. (1988). Management ownership and market valuation: An empirical analysis. *Journal of Financial Economics, 20*(1), 293–315.

Mustapha, M., & Che Ahmad, A. (2011). Agency theory and managerial ownership: Evidence from Malaysia. *Managerial Auditing Journal, 26*(5), 419–436.

Navran, F., & Pittman, E. L. (2003). Corporate ethics and Sarbanes-Oxley. *Wall Street Lawyer*, *7*(2).

Othman, R., Ishak, I. F., Arif, S. M. M., & Aris, N. A. (2014). Influence of audit committee characteristics on voluntary ethics disclosure. *Procedia-Social and Behavioral Sciences*, *145*, 330–342.

Pentland, B. T. (1993). Getting comfortable with the numbers: Auditing and the micro-production of macro-order. *Accounting, Organizations and Society*, *18*(7), 605–620.

Persons, O. S. (2009). Audit committee characteristics and earlier voluntary ethics disclosure among fraud and no-fraud firms. *International Journal of Disclosure and Governance, 6*(4), 284–297.

Raimo, N., Vitolla, F., Marrone, A., & Rubino, M. (2021). Do audit committee attributes influence integrated reporting quality? An agency theory viewpoint. *Business Strategy and the Environment*, *30*(1), 522–534.

Reeb, D. M., & Zhao, W. (2013). Director capital and corporate disclosure quality. *Journal of Accounting and Public Policy*, *32*(4), 191–212.

Rowe, S. P. (2019). Auditors' comfort with uncertain estimates: More evidence is not always better. *Accounting, Organizations and Society*, *76*, 1–11.

Salehi, M., Saedinia, M., & Aghaei, M. (2012). Business ethics. *International Journal of Scientific and Research Publications, 2*(1), 1–10.

Sarens, G., De Beelde, I., & Everaert, P. (2009). Internal audit: A comfort provider to the audit committee. *The British Accounting Review*, *41*(2), 90–106.

Schleifer, A., & Vishny, R. W. (1997). A survey of corporate governance. *The Journal of Finance, 52*(2), 737–783.

Sharma, V. D., & Iselin, E. R. (2006). Reputation, tenure and compensation of independent audit committee members and financial restatements. *Washington DC: The American Accounting Association Conference*.

Suhardjanto, D., & Permatasari, N. D. (2010). Pengaruh corporate governance, etnis, dan latar belakang pendidikan terhadap environmental disclosure: Studi empiris pada perusahaan listing di Bursa Efek Indonesia. *Kinerja, 14*(2), 151–164.

Tjager, I. N., Alijoyo, F. A., Djemat, H. R., & Sembodo, B. (2003). *Corporate governance: Tantangan dan Kesempatan bagi Komunitas Bisnis Indonesia.* Pearson Education-Prentice Hall.

Tota, I., & Shehu, H. (2012). The dilemma of business ethics. *Procedia Economics and Finance*, *3*, 555–559.

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   Submission of a manuscript implies that it contains original unpublished work and is not being submitted for publication elsewhere. Upon acceptance of a manuscript, authors will be asked to

transfer copyright of the manuscript to the publisher. This transfer will ensure the widest possible dissemination of information.

2. A cover letter must accompany each submission indicating the name, address, telephone number, fax number and e-mail of the corresponding author. The cover letter must indicate that the manuscript is not currently being considered at another publication.

STYLE GUIDELINES

1. Manuscripts must be double-spaced with normal margins (Top: 1 inch, Bottom 1 inch, Left: 1 inch, Right: 1 inch) and Letter size (8.5 inches x 11 inches). All pages should be numbered sequentially.

2. Manuscripts should have a cover page with the following information of each author: name, affiliation, and area of concentration (e.g., accounting, marketing, etc.). No other pages should contain information about the authors. The cover letter must indicate that the manuscript is not currently being considered at another publication.

3. An abstract of at least 200 words, including 5 key words, must appear on the 2nd page of the manuscript. The abstract must state an adequate summary of article`s content (i.e., objective(s), rationale, methodological rigor, and major contributions & implications).

4. The paper itself should begin on the 3rd page. Manuscripts should not exceed 25 double-spaced pages including tables, figures, and references. Manuscripts that exceed these limits are routinely returned to the authors for shortening before consideration.

5. Tabular material and figure legends should be in box form and incorporated in the proper part of the text. They should also be contained in the Microsoft Word and cannot be hand drawn. Tables should be numbered in Arabic numbers (i.e., Table 1). Columns should be set using tab stops, not spaces, so they align. Figures are numbered similarly to tables (i.e., Figure 1).

6. References should be made by the in-text form of citation. The Reference List should include information for all sources cited in the manuscript. The author should make sure that there is a strict one-to-one correspondence between the references in the text and those on the list. It should be double spaced and listed in alphabetical order according to APA style by author's last name, but including first name initial, on a separate sheet at the end of the manuscript.

The following are examples of proper form:

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Hurmelinna-Laukkanen, P., Ritala, P., & Sainio, L. (2013). Protection of Radical Innovations-Differences in Domestic and International Markets. *Journal of Global Business and Technology*, 9 (1): 1-16.

Authored Book

Delener, N. (1999). *Strategic Planning and Multinational Trading Blocs.* Connecticut, USA: Quorum Books.

Edited Book

Delener, N. (Ed.) (2012). *Service Science Research, Strategy, and Innovation: Dynamic Knowledge Management Methods*, U.S.A. IGI Global.

Chapters in Edited Book

Delener, N. & Lees, F. (2001). Global Planning of Business Activity. In Milner, M. & Lees, F. (Eds.), *Management of the Modern Company*, Moscow, Russia: 366 – 378.

Paper Presented at ...

Sturma, P. (2009). Global Challeneges and International Law. Paper presented at Global Business and Technology Association's Eleventh Annual Conference, Prague, Czech Republic, July.

Published Proceedings

Florinda, M., Rodrigues, S., Lopes, A., & Matos, N. (2011). Intellectual Capital Tool. In Delener, N., Fuxman, L., Lu, V. & Rivera-Solis, L.E. (Eds). Fulfilling the Worldwide Sustainability Challenge: Strategies, Innovaitons, and Perspectives for Forward Momentum in Turbulent Times (pp. 615-621). USA: GBATA Press.

Instance of Publication in press

Afriyie, K., Torres-Baumgarten, G. & Yucetepe, V. (in press). Internationalization and Value-Creation Perfromance of Latin American Multinationals: The Case of Outbound Foreign Direct Investment. *Journal of Global Business and Technology.*

Article in an Internet-Only Journal

Fredrickson, B. L. (2000, March 7). Cultivating positive emotions to optimize health and well-being. *Prevention & Treatment, 3*, Article 0001a. Retrieved November 20, 2000, from http://journals.apa.org/prevention/volume3/pre0030001a.html

7. Include and cite references from the previously published JGBAT issues if relevant.

8. Strongly observe the language, grammar, and punctuation. All spelling, grammar, and punctuation are the responsibility of the author(s). No corrections will be made by the JGBAT Editors. **Therefore, all articles must be edited professionally prior to submission.**

9. Acknowledge the anonymous reviewers. Acknowledgements and information on grants received must be stated before the References.

10. Sections of the paper such as the INTRODUCTION should be justified with one extra line space between section heading and text. Headings should be centered in all capital letters. Subheadings should be aligned left in upper and lower-case letters, with one extra line spacing above and no extra line spacing below the subheading. For subheadings below the first level subheading, indent one tab for next subheading.

11.   The text should appeal to a wide audience by avoiding the use of methodological/technical jargon wherever possible. It may be more appropriate to include technical details in an appendix rather than in the body of the article.

12.   Every effort should be made to avoid the use of specific national names of organizations and/or individuals which might be unfamiliar to the international audience of JGBAT. Authors may need to provide brief explanations in a footnote or an appendix.

13.   Explanatory footnotes should be kept to a minimum and be numbered sequentially throughout the text with superscript Arabic numerals. They should be double-spaced and not include displayed formulas or tables.

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Each manuscript is blind reviewed by at least 2 subject specialists selected for their expert knowledge as well as the Editor-in-Chief. The authors of each manuscript are provided with each reviewer's completed Review Form which includes qualitative comments and suggestions.

Revised manuscripts are reviewed by the original referees. Revised manuscripts include a detailed set of notes to each reviewer.

The refereeing process takes about 6-8 weeks from date of receipt of the article to communication of initial decision to the author.

The Editor-in-Chief reserves the right to refuse any manuscripts, whether an invitation or otherwise, and to make suggestions and/or modifications before publication.

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