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PREFACE

Journal of Technology (JOT) is the official journal of Takoradi Technical University. JOT is a peer-reviewed journal that targets readers who are committed to improving practice and professional development through novel ideas and evidence. All JOT papers are required to have a sound scientific, evidential, theoretical or philosophical base and to be critical, questioning and scholarly in approach.

The primary aim is to promote the exchange of ideas and experience that offers significant contributions to the understanding and improvement of the educational processes. JOT does not only focus on research outcomes from different disciplines and methodological approaches, but also research carried out by inter-disciplinary research teams. In line with this, disciplinary and interdisciplinary research related to Engineering, Natural Environment, Building Technology, Applied Sciences, Pure Arts, Social Sciences and Language studies are welcomed.

The Publications Board of JOT accepts contributions from authors in other institutions. All manuscripts are double-blind reviewed by renowned researchers and experts. Greater attention is given to precision, rigorous peer review process and multidisciplinary audience.

Hopefully, the high-quality empirical and conceptual papers published in this volume will support and advance the discussion of social and technical issues.

Prof. Mrs. Maame Afua Nkrumah

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Abstract

Studies on innovation have focused less on service firms such as the hospitality industry. Thus, the purpose of this study is to investigate how innovation types: technological (product/service & process) and non-technological (marketing & organisational) innovations, and knowledge sharing influence the performance of star-rated hotels in Ghana. A cross-sectional design with a quantitative approach was employed. Data were collected using 5-point Likert-scaled questions from purposively selected 636 star-rated hotel managers. Structural equation modelling-partial least square design (SEM-PLS) was used to measure the relationships between study constructs and to test the established hypotheses. Findings showed that both innovation types and knowledge sharing positively and significantly influenced firm performance. Innovation types exclusively hada high influence on firm performance with product innovation having a stronger tie. The findingsof this study imply that managers of hotel firms should place a greater emphasis on various forms of innovations to achieve high organizational performance. Knowledge management should then be a strategic part of hotel management such that it can be shared to enhance innovation and the innovative capability of individual employees and the hotels at large, to positively influence performance and maintain a continuous existence as well.

Keywords: Firm performance, Hospitality industry, Innovation types, Knowledge sharing, Star- rated hotels

1. Introduction

Innovation is key in any business-oriented organisation as it is a vital component of organisational competitiveness, given the vast nature of technological advancement in recent times. A study by Anning-Dorson (2016) showed that innovation is one of the most relevant strategies used by service firms to improve their competitiveness in the market (Anning-Dorson, 2016). Kiveu et al.(2019) also linked innovation to the competitive advantage and growth of small and medium-scale enterprises (SMEs). Innovation is often part of an organisation's strategic plans, embedded in its structures, processes, products and services and supported by a culture that ensures optimum performance and sustainability (Anning-Dorson, 2016).

Several studies have also linked technological innovation and other forms of firm innovation to the competitiveness of firms in different markets (Bonin, 1991; Carayannis & Roy, 2000). Innovation can also be characterized by the capability of firms to take steps to adapt to changes in the market by employing various dynamic approaches to solving problems that effectively respond to the needs of its clients as well as its missions and vision (Kindström et al., 2013; Schoemaker et al., 2018).

In this light, research has found that the ability of firms to innovate is dependent on their innovative capacity in terms of human resources (Turulja & Bajgorić, 2020), technology (Ince et al., 2016; Zhou & Wu, 2010), finance, research and development (Kocoglu et al., 2012), among others. This means that innovation comes with several changes that may be linked to structural changes, human capital development, capital investment, and many other aspects of organisational management, including strategic flexibility (Cingöz & Akdoğan, 2013) and innovative competence (Cingöz & Akdoğan, 2013; Durand, 1997). The principal objective of organisational innovation is to make changes to remain relevant, improve performance (Kemp et al., 2003; Klomp & Van Leeuwen, 2001) and compete profitably in the market (Audretsch, 1995; Roberts, 2001). Therefore, innovation has become crucial for all firms, regardless of size,due to the dynamic nature of products and services as a result of shifting consumer preferences, advancing technologies, and increased competition (Gupta, 2021).

Most studies on innovation focused on firms in the manufacturing industry with less attention on firms in the service sector such as the hospitality industry. Hospitality research has not addressed which types of innovation stimulate knowledge sharing (Acosta-Prado et al., 2020; Schoemaker et al., 2018; Taouab & Issor, 2019; Xin et al., 2018). Some studies have explored innovation and knowledge sharing in

manufacturing firms but have not addressed its impact either on performance and innovation of the service industry to which hospitality belongs. This, as a result, gives no insight into sound policy for the hospitality business, specifically, ones with smaller star ratings as indicated in figure 2.

Again, several studies looked at innovation or knowledge sharing separately. In addition, most studies so far have focused on the European Union and Asia, with little or no literature covering the African and Ghanaian context on the subject. Therefore, this study seeks to fill these knowledge gaps by focusing on the relationship between knowledge sharing, innovation and firm performance among star-rated hotels in Ghana. This makes room for an assessment of the subject across different geographical contexts and enriches literature in that regard.

This study addresses two questions. First, does knowledge sharing drive hotel innovation and performance? Second, if so, what is the structural relationship among knowledge sharing, innovation and firm performance in star-rated hotels in Ghana? Thus, in this study, the effect of innovation and knowledge sharing on firm performance is investigated concurrently in the contextof star-rated hotels in Ghana. Our findings contribute to the theory of hotel innovation types and how hotels function in terms of knowledge sharing and innovation, with practical implications for facilitating the formation of knowledge sharing culture in the hospitality industry.

1.1 Literature Review and Theoretical Foundation

1.1.1 Innovation Types

Innovation is important, especially in the hospitality industry, given the perishability and heterogeneity of services and the dependence on the aesthetic appreciation of hotel landscapes, websites, accommodation, diets, structures and the environment (Crescenzi et al., 2015; Parida et al., 2015). In Ghana and other global jurisdictions, hotels need to constantly devise means of attracting potential clients. Green innovative initiatives and the adoption of information and communication technology (ICT) have been used, respectively, in India and Thailand to attract customers (Sahadev & Islam, 2005; Singhal et al., 2018). These are typical examples of how innovation can lead to improved firm competitiveness.

In developing countries such as Ghana, the proliferation of new and modern hotels and recreational firms has become competitively unfavourable for already existing ones. This is worse for old hotels with obsolete structures, which need deliberate, continual innovation to remain conspicuous and attractive.

Innovation in the hospitality industry can take many different forms, such as *technological innovation (product/service & process innovations) and non-technological innovation (organisational & marketing innovations)* (Geldes et al., 2017; Hu et al., 2020; Martín-Rios & Ciobanu, 2019; Martínez-Ros, 2019).

Product innovation is characterized by the creation and subsequent introduction of goods or services that are either new or improved versions of already existing ones, with paramount goals of satisfying consumer needs and remaining competitive and profitable (Cooper, 2005; Cooper&Kleinschmidt, 1987; Danneels, 2002). The term product innovation has many dimensions. First, from the perspective of the customer, the product is new to the customer. Second, from the perspective of the firm, the product is new to the firm. Third, product modification means bringing product variation to the existing product of the firm (Liu & Atuahene-Gima, 2018).

Process innovation is the use of new or significantly upgraded systems of production or delivery,which includes significant changes in techniques, equipment and/or software (Davenport, 1993;Dost et al., 2020). Any improvement to current manufacturing, delivery, packaging, marketing, and project management can be considered a process innovation. Process innovation means improving the production and logistic methods significantly or bringing significant improvements in supporting activities such as purchasing, accounting, maintenance, and computing (Bartelsmanet al., 2019).

Marketing innovation includes the execution of new marketing methods that involve appreciable changes in product design, packaging, distribution, communication, or pricing. Its aim is to give value to the customers and to improve competitive advantage (Chen, 2006; Naidoo, 2010). Agarwal et al. (2019) assert that innovations in product design can also includethe introduction of serious changes within the form, appearance, or taste of food or beverage products, like the introduction of the latest flavours for a foodstuff, to focus on a replacement customer segment.

Organisational innovation is described as the implementation of new or improved organisational methods in a firm in all of its administration (Damanpour & Evan, 1984). It involves the adoption of the latest techniques for organizing routines and procedures for labour conduct (Rizan et al., 2019). These include, for instance, the implementation of the latest practices to enhance learning and knowledge sharing within the firm. An example is the first implementation of practices for codifying

knowledge, e.g., establishing databases of best practices, lessons, and other knowledge, so that they are more easily accessible to others. Another example is the first implementation of practices for employee development and improving worker retention, like education and training systems.

1.1.2 Knowledge Sharing

Innovation is based on the use of information to do things differently in ways that will improve existing systems (Vaccaro et al., 2010). Information, education and knowledge are inextricably linked, such that the lack of one hinders the other (Hartono & Sheng, 2016). Knowledge sharing is key to education, development and innovation in all sectors and businesses (Kamaşak & Bulutlar,2010; Saenz et al., 2009; Wang & Wang, 2012; Yeşil et al., 2013). Studies have shown that knowledge sharing positively influences innovation (Camelo-Ordaz et al., 2011; Kamaşak & Bulutlar, 2010), firm performance (Mahmoud et al., 2018; Saenz et al., 2009; Thornhill, 2006; Turulja & Bajgorić, 2020; Wang & Wang, 2012; Yeşil et al., 2013) and organisational competitiveness (Bloodgood, 2019). In partnership activities with innovation, knowledge exchange frequently attracts resource understanding and many iterations (Wang et al., 2018).

Firms must engage in a supportive manner on a regular basis to benefit from higher levels of knowledge exchange and performance. Knowledge sharing could also act as a link between different sorts of innovation and marketing performance (Oanh, 2019; Ogunmokun et al., 2020;Yiu et al., 2020)]. Few previous research (Acosta-Prado et al., 2020; Ogunmokun et al., 2020),in particular, advocate that knowledge sharing be used as a tool to better understand the information benefits of cooperative innovation activities for innovation performance. As previously stated, researchers have shown that sharing knowledge effectively and quickly improves the performance of innovation (Wang et al., 2018; Yeşil & Hırlak, 2019).

1.1.3 Firm Performance

Performance could also be described as the results achieved in meeting the internal and external goals of a firm (Wolff & Pett, 2006). It comprises a set of financial and non-financial indicators that describe the level of achievement for each factor of a given operation (Ittner et al., 1997). Firm performance can also be measured by using different indicators such as production, finance or marketing (Sohn et al., 2007). These indicators may be classified as operational whereas organisational growth and profit may be referred to as consequential (Pett et al., 2019; Wolff & Pett, 2006).

Depending on the source and availability of data and type, the performance of a firm can be measured objectively or subjectively (Agyemang & Ansong, 2017; Harris & De Chernatony, 2001). In this study, subjective indicators (profitability, market value, innovativeness and customer service) were used to measure performance as a perceived concept, which according to Venkatraman (1989) as cited in Asiaei and Bontis (2019), could be used in the absence of objective financial data and lack of public data on studied firms.

Existing studies (Dahiyat, 2015; Hung & Chiang, 2010; Hung & Chou, 2013) have been able to find the relationship between firm performance, innovation and knowledge management and sharing. Specifically, it has been established that firms with the capability to manage knowledge will use available resources more efficiently to be more innovative and perform better in a more sustainable and competitive manner (Darroch, 2005).

Gunday et al. (2011) discuss this relationship as well, describing innovation as an essential component of competitiveness that is part of the firm's organisational structures, processes, productsand services, and which positively influences firm performance. Several others have also established a positive correlation between knowledge sharing and firm performance (Bloodgood,2019; Hu et al., 2009; Koskab, 2013; Saenz et al., 2009; Thornhill, 2006; Wang & Wang, 2012).

1.2 Theoretical Foundation

This study was informed by two theories, namely the resource-based view (RBV) and the knowledge-based view (KBV) of the firm. The RBV is a framework used by firm managers to determine resources available to a firm for strategic use to gain a sustainable competitive advantage over others.This theory is based on the principle that a firm can have heterogeneous resources with specific characteristics that can be strategically assigned for different purposes to achieve a competitive advantage. Although Penrose (1959) proposed the RBV, others felt the need to expand the scope to include the KBV. They held the view that resources alone are insufficient (Penrose, 1959; Penrose & Penrose, 2009; Wernerfelt, 1984).

The KBV theory considers knowledge to be the most relevant resource of a firm and that heterogeneous knowledge bases and firm capabilities are the main determinants of a firm's competitive advantage and high performance. The KBV theory is also believed to be the main factor that influences organisational culture and policies and other organizational operations classified

under strategic management, policies, documents, systems and employees (Foss, 1996;Foss & Jensen, 2019).

Information technologies have been considered as having the ability to influence the knowledge-based view of firms due to their use in the synthesis, enhancement and expedition of large-scale knowledge management within and between firms (Alavi & Leidner, 2001). In this current study, all resources that are available to a firm and which the firm can use to increase its capabilities to achieve competitive advantage and to perform can be classified under the RBV whereas the sharing of knowledge and its use intra- and inter-firm to enhance firm performance can also be classified under KBV; and both interact in such a way to create an efficient mix that is peculiar to the needs of a firm, depending on strategic management.

1.3 Conceptual Framework and Hypotheses Development

In the Ghanaian context, how do Innovation and Knowledge Sharing influence Firm Performance? To answer this question, a conceptual framework guiding the study has been shown (Figure 1).

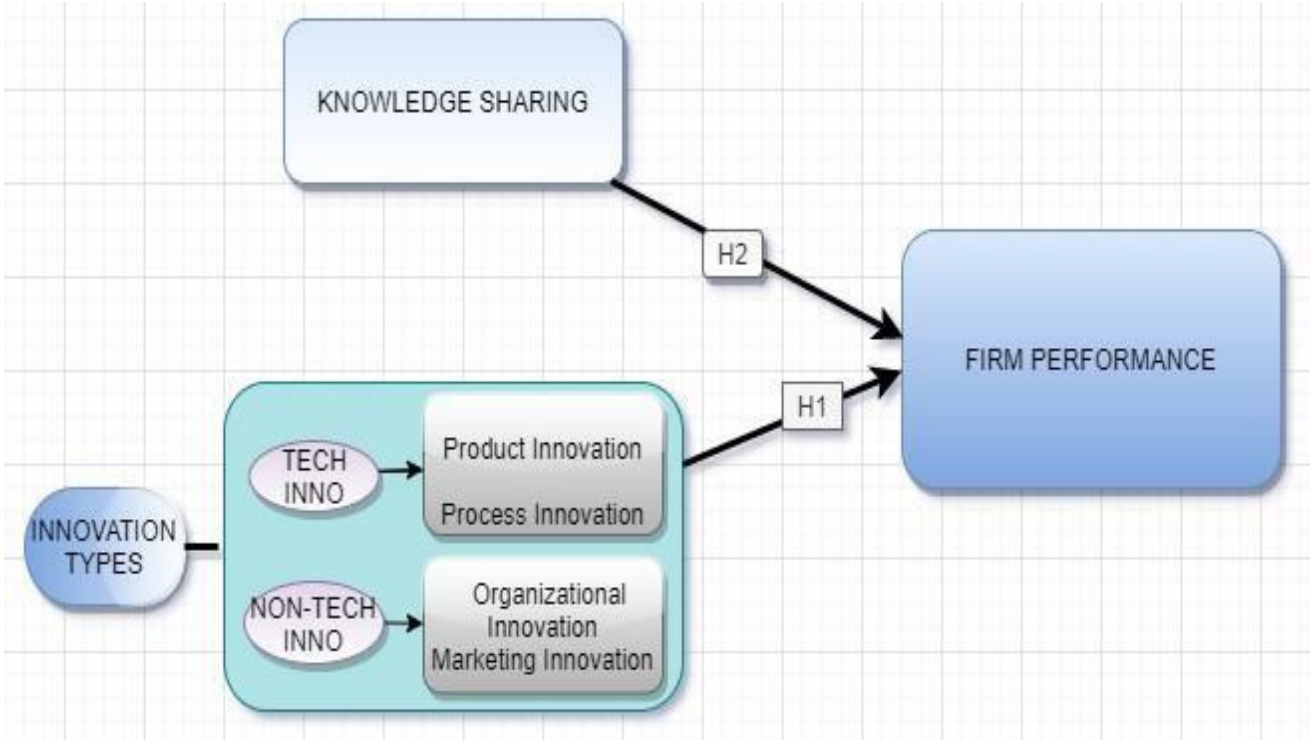


Figure 1: Conceptual framework

1.3.1 Relationship between Innovation and Firm Performance

Literature (Bhat & Sharma, 2022; Chege et al., 2020; Feng et al., 2021; Latifi et al., 2021), has suggested a positive relationship between innovation and firm performance. External technology acquisition and external technology exploitation, as measures of innovation, were positively related to firm performance when high internal research and development investment and a turbulent market environment were put into context (Hung & Chou, 2013).

Many other studies (Hung & Chou, 2013; Kemp et al., 2003; Kiveu et al., 2019; Klomp & Van Leeuwen, 2001; Pei et al., 2013; Roberts, 2001) support a positive relationship between innovation and performance at the firm level. This has roused the researchers' interest to assess similar relationships within the context of Ghanaian star-rated hotels to ascertain if the outcome is same or otherwise. For instance, some researchers (Cabrilo & Dahms, 2018; Shahzad et al., 2020) have conducted studies on the role of innovation in the performance of firms. The findings showed that firms that are more innovative by virtue of good knowledge management will use resources better and perform better. Besides, most of the empirical studies conducted showed that when firms invest in other capacity-building projects or research, their innovation increases, increasing their performance (Barge-Gil, 2013; Bayraktar et al., 2017; Dahiyat, 2015; Kafouros et al., 2008).

Furthermore, Bayraktar et al. (2017) found that when firms adopt competitive strategies, it boosts their ability to become more innovative, which translates into better performance. The findings of their study implied that to remain competitive, managers implementing cost-leadership and differentiation strategies for their firms should place more relevance on innovation due to its significant role as a link between these strategies and performance. This gives innovation a mediating capability on the relationship between firms' competitive strategies and performance.

Another study conducted in Spain by Barreca et al. (2017) used PLS-SEM to assess the relationship between organisational innovation and firm performance among small and medium-scale manufacturing enterprises. It was found that organisational innovation contributed positively to the performances of the 175 firms (Soto-Acosta et al., 2016). Xu et al. (2019) also showed by PLS-SEM that technological innovation in firms has the potential to increase firm performance. We, thus, hypothesize that within a Ghanaian context:

H1: Innovation positively influences firm performance.

1.3.2 Relationship between Knowledge Sharing and Firm Performance

Knowledge sharing has also been linked to firms' ability to innovate for their competitive advantage (Saenz et al., 2012). The knowledge "dependent nature of innovation makes it indispensable when the former is considered in the context of firm performance" (Koskab, 2013).Many studies have shown that firms that have access to good information and education are more capable to innovate than those which do not, and hence improve performance (Kamaşak & Bulutlar, 2010; Thornhill, 2006; Turulja & Bajgorić, 2020; Wang & Wang, 2012; Yeşil et al., 2013). A study conducted among some Spanish firms using PLS-SEM showed that knowledge sharing is a crucial element needed to develop the innovation capability and performance of firms(Saenz et al., 2012). The sharing of knowledge in-group enhanced both exploitative innovation and ambidexterity in firms (Kamaşak & Bulutlar, 2010)

A different dimension of knowledge sharing was studied by another scholar, who considered what individuals learn from social media instead of the aggressive collection of information as done in the "classroom" setting. It was found that through knowledge sharing, enhanced meta knowledge canbe developed which can lead to more innovative firm products and services resulting in positive firm performance. It was also mentioned that less duplication of knowledge will occur in firms provided that employees work using new approaches from the knowledge shared elsewhere (Leonardi, 2014). Companies continue to operate in a knowledge-based world, where knowledge is increasingly becoming a strategic resource (Wang et al., 2018) with some even considering it to be the key capacity and performance driver of organizations (Wang et al., 2018).

One other key factor and relationship between knowledge sharing and innovative performance at the firm level is that both of them work well together and enhance each other. For example, firms that innovate more are also able to better share their experiences intra- and inter-firm. The more innovative a firm is, the more it uses information technology, digital platforms and many other methods to make learning and capacity development easy. Thus, it becomes easier for other affiliates such as sister firms or branches, to learn from them. The advent of the new COVID-19 pandemic has made this clearer; in that, many firms now resort to the use of social media in the dissemination of information leading to enhanced performance. From the above discussions, the following hypothesis was developed:

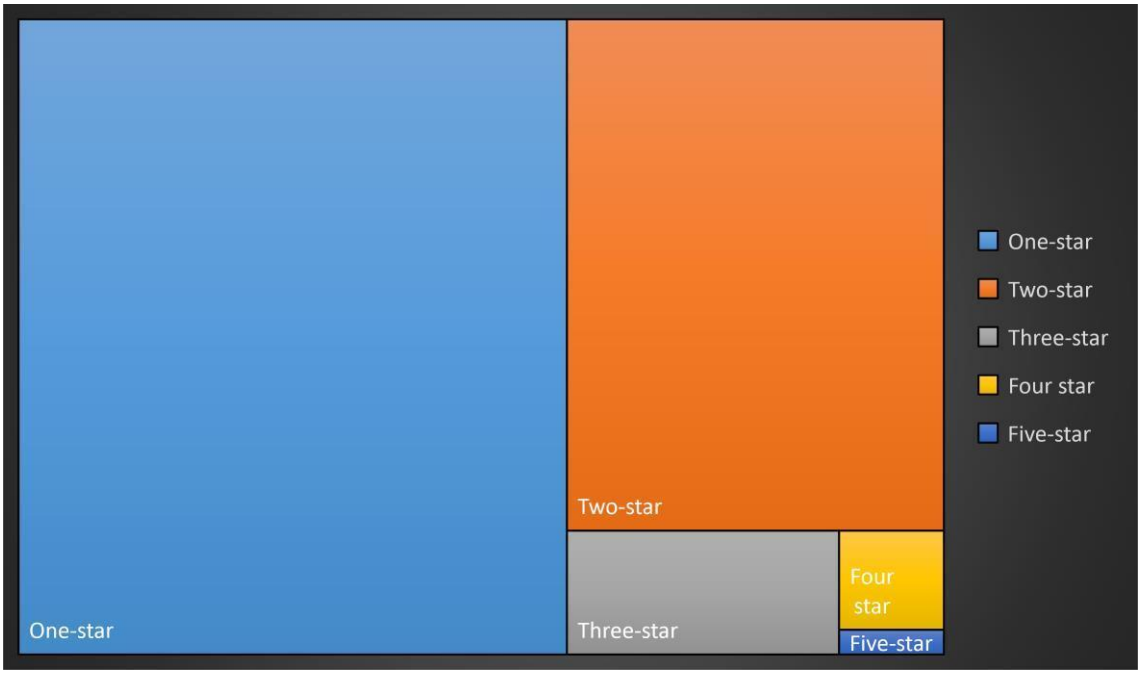
H2: Knowledge sharing positively influences firm performance.

2. Methods

2.1 Data Gathering Process

The population of this study included star-rated hotels which met specific criteria for investigation

(Alvi, 2016). In the 2019 report from the Ghana Tourism Authority (GTA), 3 hotels were designated as five-star, 12 hotels as four-star, 39 hotels as three-star, 223 hotels as two-star, and 403 hotels as one-star. This, therefore, indicates that the majority of the star-rated hotels in the country are either one or two stars with very few having five-star. Figure 2 outlines the distributional chat of the star-rated hotels within each stratum per the report from GTA.



Source: *Authors construction from Ghana Tourism Authority (GTA) report, 2019*

Figure 2: A tree map depicting the frequency of the star-rated hotels in each stratum.

Figure 2 unveils that most of the hotels in Ghana are one-star hotels; followed by two-star and three-star hotels, whereas hotels which are rated four and five stars are very rare in the country. These four- and five-star hotels are mainly foreign-based hotel chains. It is worth mentioning that the hotels in the majority (1-3 star) are owned by Ghanaian entrepreneurs.

By the census technique, all the 680 star-rated hotels (GTA Report, 2019) formed the target population for the data collection and were suitable statistically (Kotrlik & Higgins, 2001). Hotels that had no star rating by the GTA were excluded from this study. By purposively selecting a manager from the top-level management in each hotel per the respective star-rating strata, a sampleof 680 respondents was obtained. These managers saw to the hotel's decision-making and strategic planning and thus, possessed requisite knowledge pertaining to the study topic. Cross-sectional data were gathered from 680 managers.

Out of the 680 responses, 44 were incomplete. Incomplete responses were rejected, leaving a total of 636 (93.5%) valid responses for further investigation. The survey process lasted between March2021 and June 2021.

2.2 Measurements of Items

The study employed a structured questionnaire containing open and closed-ended demographic information questions. The questionnaire also included a 5-point Likert scale on the study variables. The questionnaire was made up of four parts: Part A was on the demographics of the hotel; Part B was on technological and non-Technological Innovations; Part C was on firm performance, and PartD was on knowledge sharing. All measurement items were drawn from previous studies. (See Table1). Innovation types (INNO), used as manifest variables of the latent, were product innovation (PRODINNO), process innovation (PROCINNO), marketing innovation (MKTINNO), and Organisational innovation (ORGINNO). Five questions were asked for each type of innovation. Firm performance (FPERF) was measured based on profitability performance (PROFIT), market performance (MKTPERF), customer service performance (CSPERF), and innovative performance (INNOPERF). Knowledge sharing (KNOWSHARIN) was measured based on explicit knowledge sharing, procedural knowledge sharing, implicit knowledge sharing and tacit knowledge sharing.

Innovation types were measured as an aggregate score, summing up the mean scores for each innovation type, based on a Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. Firm performance was also measured as an aggregate with the mean sum of all the performance types. Finally, a combined measure for knowledge sharing was created covering five (5) items with a 5-point interval scale which ranges from least practiced =1 to highly practised =5. This helped to determine the innovation, knowledge sharing and firm performance correlation in this current study.

Table 1: Measurement Items

Construct	Elements	Items	Scale	Sources
Innovation	Technological(Product/service& Process)	10	Ordinal	(Danneels & Kleinschmidt, 2001; Hertog & Bilderbeek, 1998; Hu et al., 2017; Wikhamn, 2019)
	Non-technological (Organisational & Marketing)	10	Ordinal	
Firm Performance	Profitability	5	Ordinal	(Hertog & Bilderbeek,

	Market	5	Ordinal	1998;O'Cass & Sok, 2013;Ramadani et al., 2019)
	Customer service	5	Ordinal	
	Innovative	5	Ordinal	
Knowledge Sharing	Explicit	1	Ordinal	(Afriyie et al., 2020; Foss &Jensen, 2019; Khari & Sinha,2018)
	Procedural	2	Ordinal	
	Implicit	1	Ordinal	
	Tacit	1	Ordinal	

Source: *Authors' adaptation from the above references (2021)*

2.3 Data Analysis

This study employed the partial least square Structural Equation Model (PLS-SEM) which is a type of SEM approach. Notably, PLS-SEM is the preferred method when the study object does not have a well-developed theoretical base, particularly when there is little prior knowledge of causal relationships (Fan et al., 2016). The algorithm of PLS-SEM is different from the common SEM, which is based on maximum likelihood. When the sample size and data distribution of research can be hardly used by a common SEM, PLS-SEM has a more functional advantage. The collated responses were cleaned, coded, and analyzed using the SmartPLS 3.0 software. Tables and figures were used to present the results from the analysis.

3. Result

3.1 Evaluation of Measurement Model

The data of the study were analyzed to ascertain the internal constituency, reliability and discriminant validity of the model. Based on Hair Jr et al. (2016), Cronbach's alpha, composite reliability, KMO and Bartlett's and, Herman single factor tests were conducted. Table 2 displays the results of the tests.

The outer loadings of all the indicators were above the threshold of 0.7 (Henseler et al., 2016). Again, Cronbach alpha and composite reliability (CR) for all constructs were higher than the threshold of 0.70, suggested by Hair Jr et al. (2016), indicating that the measurement models were reliable. Convergent and discriminant validity were used to determine the measurement model's validity. Both the composite reliability (CR) and the average variance extracted (AVE) recommended values were used to assess convergent validity. Since all of the constructs of the measurement model's value for both CR and AVE were above the accepted values of 0.70 and 0.50 in that order, the current study's measurement model exhibited appropriate convergent validity (see Table 2).

Table 2: Construct Reliability and Validity

Factors	Loadings	Cronbach's Alpha α	Composite Reliability	Average Variance Extracted (AVE)	KMO-test	B-S test
Factor 1: Innovation Types						
PRODINNO	0.913	0.921	0.944	0.809	0.858	2914.113***
PROCINNO	0.890					
MKTINNO	0.884					
ORGINNO	0.910					
Factor 2: Knowledge Sharing						
KNOWSHARIN 1	0.780	0.750	0.842	0.572	0.830	1156.277***
KNOWSHARIN 2	0.763					
KNOWSHARIN 3	0.728					
KNOWSHARIN 4	0.753					
Factor 3: Firm Performance						
PROFIT	0.918	0.927	0.948	0.821	0.863	2603.736***
MKTPERF	0.916					
CSPERF	0.892					
INNOPERF	0.898					

***Note:** MKTINNO (Marketing innovation); ORGINNO (Organizational innovation); PROCINNO (Process innovation); PRODINNO (Product innovation); CSPERF (Customer Service Performance); INNOPERF (Innovative Performance); MKTPERF (Market Performance); PROFIT (Profitability); KNSHARIN (Knowledge Sharing). KMO represents Keiser Mayer Oklin whereas B-S stands for Bartlett's Sphericity. *** represents a 1% level of significance.*

The different constructs used in this research should be statistically identifiable from one another. Therefore, we employed the Fornell-Larcker criterion to investigate the presence or absence of this phenomenon. The appropriate value for the Fornell-Larcker criterion, according to Henseler et al. (2016), should be 0.85. As a result, the measurement constructs used in the study are distinct from one another, as indicated in table 3 (KNSHARIN and INNO=0.827, INNO and FPERF=0.922, and FPERF and KNSHARIN=0.831).

Table 3: Fornell-Larcker Criterion for Discriminant Validity

	FPERF	INNO	KNOWSHARIN
Firm Performance	0.906		
Innovation Types	0.922	0.899	
Knowledge sharing	0.831	0.827	0.756

The diagonal values (bolded), represent the square root of the AVE whereas the off-diagonals are correlations.

3.2 Evaluation of Structural Model

The results of the test of the hypotheses are presented in Figure 3 below.

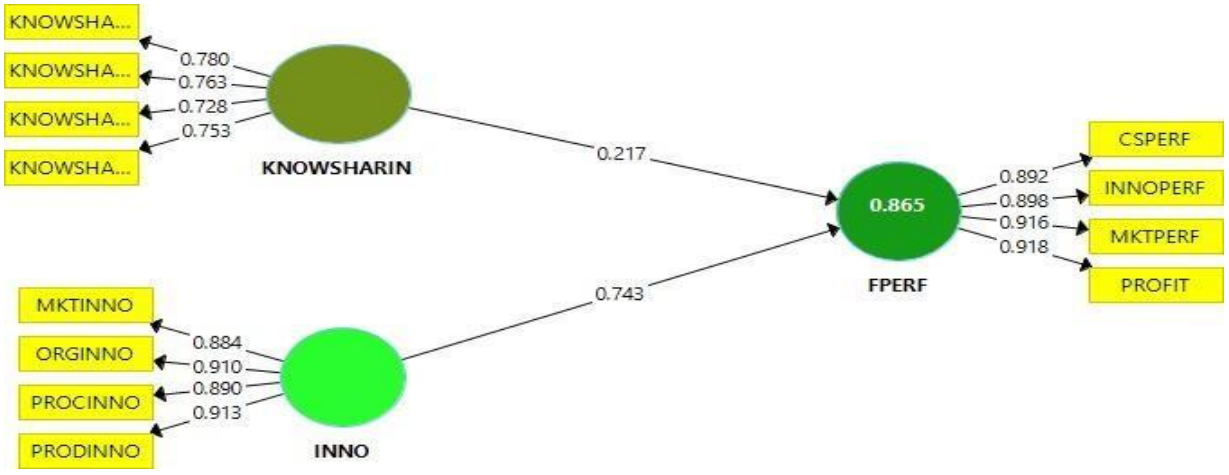


Figure 3: Structural Model

***Note:** MKTINNO (Marketing innovation); ORGINNO (Organizational innovation); PROCINNO (Process innovation); PRODINNO (Product innovation); CSPERF (Customer Service Performance); INNOPERF (Innovative Performance); MKTPERF (Market Performance); PROFIT (Profitability); KNOWNSHA (Knowledge Sharing).*

Path analysis was performed to assess the relationships between innovation types and firm performance, as well as knowledge sharing and firm performance. As suggested by Hair et al. (2017), the SmartPLS was used to evaluate the structural model whereby approval or rejection was based on the path estimate. The path coefficients for the relationship between innovation types and firm performance as well as knowledge sharing and firm performance were β=0.743 and β=0.217 respectively, (See Figure 3). These are positive outcomes and thus provides support for the hypotheses.

4. Discussion

This study empirically investigated the link innovation types: technological (product/service & process) and non-technological (marketing & organizational) innovations alongside knowledge sharing have with firm performance. The PLS-SEM estimates are shown in Figure 3. The study hypotheses were all accepted, in that innovation types positively influenced hotel firm performance. Knowledge sharing also had a statistically significant impact on the performance of star-rated hotels. Product innovation which falls under technological innovation has a stronger link with performance of the hotels although between technological and non-technological innovation the difference is minimal (Figure 3). For instance, the use of automated doors to the reception areas, automated key cards to

guest rooms, online reservation systems, self-service facilities and electronic payment systems in some of these hotels attest to this result.

Danso et al 2020, in their study of technological innovation in star-rated hotels in Ghana, found that most of the smaller hotels eventually foldup due to a decline in innovative ideas that enhance patronage and sustainability. Innovation in the hotel was found to increase customer patronage, hotel performance and sustainability (Danso et al., 2020). In this study, Ghanaian star-rated hotels could increase their performance up to about 74.3% with a unit increase in their innovativeness (Figure 3).

A similar study was conducted among hotels in Slovenia and the results confirmed a strong positive relationship between hotel innovation and performance (Artič, 2016). Therefore, it is relevant for hotel owners and managers to understand the importance of being innovative to enhance customer patronage, sustainability and total hotel performance, regardless of geographical orientation, years of existence and size of the hotel. This is because innovation ensures that the best products, services, processes and many other approaches are used in such a way that customers are satisfied and remain loyal (Diaw & Asare, 2018; Mahmoud et al., 2018; Omofowa et al., 2021).Agyapong et al. (2018) found that the hotel industry in Ghana depends on knowledge and information obtained through social networking and other media. It was found that the sharing of knowledge and information enhances their innovative capabilities and performance. Hongyun et al. (2021) also found that knowledge sharing is one of the variables that lead to innovation among other factors such as decentralization and delegation in hotels.

Unfortunately, not much can be found on the effect of knowledge sharing on the performance of hotels in Ghana. This may be because most studies in Ghana conducted in the hotel industry do not focus on the subject enough. However, in other jurisdictions, knowledge sharing has been shown to increase the performance of hotels (Hu et al., 2018; Ogunmokun et al., 2020; Sayangbatti& Riyadi, 2021). This study also showed that star-rated hotels in Ghana performed higher due to the sharing of knowledge, which eventually aided their innovative capabilities. This depicts how expedient knowledge sharing is as far as the performance of firms is concerned.

4.1 Conclusion

The relationship between innovation types: technological (product/service & process) and non-technological (marketing & organizational) and firm performance was assessed among star-rated hotels in Ghana. Knowledge, being closely linked with information and innovation, and the effect of its sharing on firm performance was also measured. The hotels studied showed that innovation type

can influence about 74.3% of their performance. So, the continued existence and progress of the hotels hinge on their consistent innovative abilities to meet market demands. For instance, the advent and proliferation of social media have afforded hotels a wider coverage.

However, the sharing of knowledge affects performance by up to about 21.7%. This revealed that knowledge sharing in the hotels is beneficial for increased performance as well as innovation. This positive outcome could mean that knowledge sharing may complement in improving the effect of innovation type on firm performance. Thus, management and employees must work together to disseminate innovation.

4.2 Implication and Limitations for Future studies

The implications for Ghanaian hotels, as well as others in the developing parts of the world, are enormous. Thus, knowledge management must be a strategic part of hotel management such that it can be shared to enhance open innovation and the innovative capability of individual employees and the hotels at large, to positively influence performance, to remain relevant in the market and to ensure continuous existence.

This current study looked at a pertinent issue that would aid in enhancing the operation of the hospitality industry in Ghana. Yet, the study's scope considered only star-rated hotels. Again, the hospitality industry comprises other businesses apart from hotels. As a result, more research including other hotels is required to corroborate this finding so generalization can be supported. Other businesses in the hospitality industry could as well be explored. Future studies will focus onthe effects of the star rating of hotels on their innovative capabilities and the factors influencing their willingness to be innovative. In addition, the dynamics of knowledge sharing among and within competitive hotels and employees may present interesting insights.

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Examining English Language Learning Anxiety and Student Achievement at Takoradi Technical University in Ghana

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Abstract

Literature shows that English language learning anxiety (ELLA) has a debilitating effect on English language achievement (ELA) and that knowledge of ELLA is essential for successful language acquisition. Yet, most of these studies focus on English as a foreign language, leaving studies on English as a second language on the fringes of current literature, though the two are distinct. Thus, this paper examined the link between ELLA and ELA among Takoradi Technical University students.It also determined the individual relationships of ELLA components with the students' ELA. Using Horwitz et al.'s (1986) Foreign Language Classroom Anxiety Scale and students' Examination scores, this paper tested students' ELLA and ELA respectively with a sample of 351 students. A negative correlation was found between ELLA and ELA. Though the components of ELLA: Communication apprehension (CA), Test anxiety (TA) and Fear of negative evaluation (FNE), were negatively correlated with the students' ELA, CA was most strongly correlated with ELA. Apparently, even in the context of English as a second language, the students were anxious when it comes to classroom communication. It is recommended that teachers supportand encourage an interest in learning English and use classroom activities that are less likely toinduce fear.

Keywords: Communication Apprehension, English Anxiety, Language Achievement, Takoradi Technical University, Negative Evaluation

1. Introduction

The Technical Universities sector of Ghana consists of at least 10 formerly government-run Polytechnics that have lately been converted into Technical Universities. As suggested by its name, Takoradi Technical University is one of Ghana's Technical Universities. It is located in Ghana's

Western Region. Takoradi Technical University prepares students for the workforce. Consequently, first-year students at this university learn generic English Communication Skills for one year. However, their achievement in learning the language is somewhat challenging (Aboagye et al., 2017).

Prior studies (Mishan, 2019; Turchyn et al., 2022) have made known that language learning is unquestionably seen as a difficult and multifaceted process. Over the past several decades, there has been widespread agreement among language scholars that they should investigate the factors that make English language learning more difficult, even though English is widely regarded as one of the most flexible and expressive languages in the world (Alege, 2018). English is notable for its variety and propensity to be changed. This has led to a wide range of forms of English in differentcontexts. One of such forms is English as a second language[1]. The related literature on affective aspects in English as a second language (ESL) learning indicates that anxiety is one of the most extensively researched emotional concepts in psychological and educational research (Behforouzet al., 2022; Khattak et al., 2011). In fact, the literature on affective aspects in ESL acquisition indicates that language anxiety is one of the most commonly recognized difficulties regarding emotive domains in the language acquisition process (MacIntyre, 2002).

To facilitate comprehension of the principle of language anxiety, Hilgard et al. (1971) as referenced in Khattak et al. (2011) explained anxiety to be "a psychological construct, commonly described by psychologists as a state of apprehension, a vague fear that is only indirectly associated with an object." (p.1601). Language anxiety (LA) has been extensively studied and found to be negatively connected with English language learning processes or results (Botes et al., 2020; Horwitz et al., 1986; Zheng & Cheng, 2018). Tantamount to this, prior research postulates that English language learning anxiety is a distinct sort of state anxiety that language learners experience when learning and/or utilizing the English language (Horwitz, 2017), in which the language learner's communication abilities in the English language being learnt are restricted (Horwitz, 2001; Horwitz et al., 1986).

When English language learning anxiety is associated with learning a second or foreign language, it is termed as 'second or foreign language anxiety, respectively. In the context of the present study, English language learning anxiety is regarded as second language anxiety because it is the language learnt in Ghana after the mother tongue or first language. Thus, in the present study, English as a second language anxiety is the sense of apprehension and fear that learners have while learning and

[1] *second language (L2) is any language learned after the mother tongue or first language (L1).*

using the English language as an L2. It is worth noting that English language learning anxiety is a negative aspect of emotion (MacIntyre, 2017) and that it is the most significant obstacle to overcome when learning the English language (Khattak et al., 2011).

As the concept of English language learning anxiety (ELLA) is inextricably linked to classroom learning, the connection between ELLA and English language achievement has been the subject of much research (Botes et al., 2020; Oruç & Demirci, 2020). Generally, academic achievement metrics typically employed in the academic literature include grade point average and test or exam scores (Aida, 1994; Liu, 2022), and second language achievement can be construed as students' English performance, which is also evaluated by the results of the prior examination. Consistently, researchers have shown a correlation between ELLA and English language achievement (Amiri &Ghonsooly, 2015; Teimouri et al., 2019). In fact, ELLA has been generally attributed to a detrimental effect that hinders the language achievement of L2 learners in the English learning process (Aida, 1994; Horwitz, 2017; MacIntyre, 2017; MacIntyre & Gardner, 1994; Young, 1986).

Due to this, several researchers, including Amiri and Ghonsooly (2015), Effiom and Bassey (2018), Teimouri et al. (2019) and Liu (2022), have conducted various studies to assess the connection between ELLA and English language achievement (ELA). Liu (2022), for instance, demonstrated that ELLA was significantly associated with the English test achievement for the students and that low self-confidence in speaking English and anxiety about the English classroom had a link with the students' test achievement differently. In a similar vein, Effiom and Bassey (2018) investigated the link between the two variables among secondary school students in CrossRiver State Nigeria and found that the test anxiety of students significantly correlated with their academic achievement in the English language.

In contrast, Olagbaju's (2021) study on 'Influence of Language Anxiety and Prior Knowledge on ESL Students' Achievement in Expository Essay in Ibadan North LGA, Nigeria showed that there was no significant relationship between language anxiety and the students' achievement in an expository essay. Similarly, using cognitive test anxiety and cumulative GPA to measure ELLA and ELA respectively, Cadet (2021) indicated that was no significant link between the level of cognitive test anxiety and cumulative GPA.

Existing studies revealed that ELLA is essential for supporting successful English language acquisition (Cadet, 2021). The studies on ELLA and ELA are typically from Asian countries like

China (Hu et al., 2021), Indonesia (Hermagustiana et al., 2021), Malaysia (Azar & Tanggaraju, 2020) and South Korea (Jee, 2018); some Middle-eastern countries like Iraq (Celik, 2019) and Pakistan (Shehzadi et al., 2021); and European countries like Turkey (Oruç & Demirci, 2020), where English is a foreign language, leaving studies on English as a second language on the fringes of current literature, though what occurs in the use of English as a foreign language is strikingly distinct from what occurs in the use of English as a second language (Sekhar & Chakravorty, 2017;Shrestha, 1983).

For instance, Christopherson (1960) as cited in (Shrestha, 1983) puts forward that English as a foreign language is used to absorb the culture of another nation, whereas English as a second language is used to express one's own culture. Marckwardt (1963) as referenced in (Shrestha, 1983) also suggested that English is a foreign language if it is taught as a school subject or at an adult level exclusively to provide students with a foreign language competence that they may use in one of several ways: read literary and technical works, listen to the radio, understand dialogue in movies, and use language for communication, possibly with English or Americans. It is a second language when English is used as a lingua franca between speakers of vastly divergent languages, as in Ghana or when it is used as a language of instruction in schools, as in Ghanaian Technical Universities.

In furtherance to this, in spite of the relevance of ELLA and ELA, there is limited study on the link between ELLA and ELA in the context of the use of English as a second language in Ghana on a technical university level and beyond, as most studies within the context second language focus on English language teaching and learning (Bukari, 2021; Fenyi et al., 2021; Tabiri et al., 2022). Against such a backdrop, this paper seeks to contribute to empirical evidence from a hitherto unexplored multilingual and multicultural Ghanaian context where English is regarded asa second language, and thus used as a medium of instruction in technical universities. Specifically,the study aimed

1) to examine the relationship between English language learning anxiety and English language achievement among the students of Takoradi Technical University.
2) to determine the individual relationships of the components of English language learning anxiety with English language achievement among the students of Takoradi Technical University.

1.1 Literature Review

1.1.1 Language Learning Anxiety

Language learning anxiety is a multifaceted phenomenon that influences and is influenced by a variety of perceptions, attitudes, and beliefs held by language learners. Anxiety, which is defined as "a

sensation of tension and dread," can be exacerbated when learning a second language. In fact, it is arguably the characteristic that has been researched the most in second language (L2) research (Alamer & Lee, 2021). Language anxiety can impede all types of learning processes, but when it is specifically related to learning a second language, it is referred to as 'second language anxiety.'Before discussing language anxiety, two key questions should be discussed and attempted to be answered. To begin, what exactly is language anxiety? Second, why is it seen as particularly crucial in learning a new language? There are two approaches to understanding the onset of language anxiety. First, language anxiety is a broad idea of anxiety and a basic human reaction that can be triggered by a variety of situational reasons (MacIntyre, 2017).

As ascertained by Horwitz et al. (1986), a feeling of nervousness experienced by a 'shy' student when delivering a short speech in front of a whole class can be considered language anxiety. It is an inherent kind of anxiety caused by the interaction of language anxiety as well as other anxieties, resulting in an unusual type of internal barrier in language learning. According to the opposing opinion, there is an aspect inherent in the language learning process that causes certain persons to become apprehensive and fearful of language acquisition. When this anxiousness or fear arises in the context of language learning, we refer to it as language anxiety (vHakim, 2019).

The difficulty posed by language anxiety is a challenge for both L2 learners and their instructors. Some students experience anxiety as a result of the increasing contemporary demand to converse "just in English" in language classes, as it exposes their shortcomings in front of their peers. Hence, to effectively assist learners in developing their communication abilities in the English language, it is crucial to take learner anxiety into account in English language learning classroom settings.

There are three ways to investigate anxiety: trait, state, and situational anxiety (Cheng & McCarthy, 2018). Trait anxiety is a permanent disposition of an individual experiencing worry without a time limit (Levitt, 1980), whereas state anxiety is a temporary condition of an individual experiencing anxiety that varies in intensity and fluctuates over time; for example, the apprehension felt by a student prior to taking an exam (Spielberger, 1983). The third method for the study of anxiety is scenario-specific anxiety, which is the probability of feeling anxious in a particular setting, such as while speaking a foreign language (Cheng & McCarthy, 2018).

Language anxiety is related to a learner's self-consciousness and a foundational internal stimulation, such as an individual's self-perceptions about others (peers, teachers, etc.). It could be demonstrated in a variety of contexts requiring communication in the target language and the expression of one's views in the target language (vHakim, 2019). Among other things, the inabilityto utilize the target language effectively and a lack of knowledge may contribute to language anxiety (Horwitz, 2001). Generally, it could be owing to the linguistic challenges that language learners face learning and utilizing the target language.

In a social context, language anxiety may be triggered by external cues, which may include a variety of social and cultural settings, namely those where L2 learning occurs. In other words, the target language is an alternate means of communication, and as with any human connection, there is a tendency for some persons to suffer fear (Horwitz & Young, 1991). The supposed social identity of the L2 speakers, the power relations and hierarchies between/among them, and a variety of other concerns and variables (such as gender discrimination) may play a significant role in the development of language anxiety (vHakim, 2019).

Some scholars (Bailey, 1983; Scovel, 1978) have emphasized the facilitative nature of anxiety. According to them, it is this form of anxiety that encourages a second language student to tackle the challenges of the second language learning process. For example, Wei's (2014) study, which looked into the interrelationships between achievement goal orientation, language learning anxiety, and autonomous learning behaviour, came up with similar findings. The survey drew the participation of 429 university students. The researcher discovered a substantial positive link between English language anxiety and learner autonomy after using AMOS 7.0 to analyze the collected data.

Besides, Wang (2012) looked at the relationship between test anxiety and learner autonomy in secondary school pupils. Data were collected from 145 respondents at two secondary schools in Zibo, China, using a combination of quantitative (questionnaire) and qualitative (interview) research methodologies. Pearson correlation analysis revealed a positive association between learner autonomy and test anxiety.

Nonetheless, several researchers on anxiety declare that language anxiety has a debilitating effect and impairs language acquisition (Aida, 1994; Amengual-Pizarro, 2018; Horwitz et al., 1986; MacIntyre & Gardner, 1991). Most students regard language classes as the most anxiety-inducing of all

disciplines and a threat to learners' self-concept (Amengual-Pizarro, 2018; Noerilah & Puspitaloka, 2022). As Horwitz claimed:

> *not only is it intuitive to many people that anxiety negatively influences language learning, but it is also logical because anxiety has been found to interfere with many types of learning and has been one of the most highly examined variables in all of psychology and education (Horwitz, 2001, p. 113).*

Indeed, anxiety can cause second language learners to lose confidence in their abilities, avoid participating in activities in the classroom and even abandon their efforts to acquire the language (Damayanti & Listyani, 2020). Learners of a second language whose anxiety levels are elevated usually perform at lower levels than those with reduced anxiety (Zhang, 2019).

To measure Language Anxiety, Horwitz et al., 1986 developed the 33-item Foreign Language Classroom Anxiety Scale (FLCAS) answered on a 5-point Likert scale ranging from strongly agree to strongly disagree. Horwitz et al. (1986) categorized FLCAS into three: communication apprehension (CA), test anxiety (TA) and fear of negative evaluation (FNE). CA is the anxiety a person gets when talking in L2, whereas TA, is motivated by a fear of failure. The third component, FNE, is the fear of being negatively evaluated and avoidance of evaluative circumstances. Ever since, the conceptualization of FLCAS, it has been frequently utilized to measure language anxiety in diverse English language situations with excellent reliability in subsequent studies (Jianfeng etal., 2018; Liu, 2022; Turchyn et al., 2022; Zheng & Cheng, 2018). These studies demonstrate that language anxiety is prevalent among English language learners and is negatively associated with English language learning outcomes, including language achievement.

Numerous researchers have employed FLCAS to examine language anxiety in relation to various learner variables like gender (Yih et al., 2018), motivation (Alamer & Almulhim, 2021) learner autonomy (Desta, 2020), language aptitude (Sparks & Alamer, 2022), willingness to communicate (Kalsoom et al., 2020), language learning strategy use (Szyszka, 2017), language achievement (Liu, 2022), and others. Gender, the fundamental characteristic of human participants, has received considerable attention in English language research (Bensalem, 2021; Piniel & Zólyomi, 2022; Ra& Rhee, 2018). However, employing FLCAS in conjunction with other scales yields contradicting results relating to FLCA and gender.

As an instance, Yih et al. (2018) examined the role of gender in second language acquisition among 56 male and 93 female first-year Diploma Malaysian university students who had enrolled on English language classes. Using SPSS 22, the items of the Foreign Language Classroom Anxiety Scale (FLCAS) were analyzed for data. The results revealed that males were somewhat more anxious than females in English language learning. Contrary to this, Gerencheal (2016) investigated the possible differences in English language anxiety between 50 male and 28 female students of English major third-year students at Mizan-Tepi University in Ethiopia. Using the items of the Foreign Language Classroom Anxiety Scale (FLCAS), the study indicated that females had a higher anxiety level than their male counterparts in their English sessions.

Further, research on language anxiety and motivation revealed that learners with elevated anxiety levels may lack the motivation to indulge in the target language and avoid using it altogether. For instance, using FLCAS, Liu and Huang (2011) conducted a study to explore the connection between language anxiety and English learning motivation among 980 students. The findings demonstrated that the majority of respondents did not experience English-related anxiety and were moderately motivated to learn the language and that English language anxiety and English learning motivation were significantly and inversely associated.

English Language anxiety has also been assessed in relation to learner autonomy. Kabiri et al. (2018) examined the relationship between English Language anxiety and learner autonomy. Using FLCAS, these researchers collected quantitative data from conveniently sampled 158 undergraduate students who were majoring in English Translation and English Literature. The findings revealed there was a significant and negative correlation between anxiety and autonomy, and high levels of anxiety were associated with low levels of autonomy. Consequently, the higher the level of autonomy, the lower the learners' English language anxiety and vice versa.

Additionally, Kalsoom et al. (2020) conducted a study on language anxiety and willingness to communicate (WTC) in English. Using Horwitz et al.'s (1986) FLCAS, these researchers collected data from 200 students. The findings revealed that anxiety was negatively and significantly related to WTC in English. The study attributed this to fear of negative evaluation which was the major contributing factor behind the decreased level of learners' WTC in the English language.

Moreso, Martirossian and Hartoonian (2015) explored the relationship between English language anxiety and self-regulated learning strategies (SRLSs). FLCAS (Horwitz et al., 1986) was used to collect data from 100 university students. The results from correlation analysis revealed that there is a negative relationship between FLCA (communication apprehension, test anxiety, and fear of negative evaluation) and SRLSs (cognitive strategy use and self-regulation).

1.1.2 English Language Learning Anxiety and Achievement

Cross-comparisons of research on anxiety and its influence in the second language classroom were almost impossible prior to the release of the Foreign Language Classroom Anxiety Scale (FLCAS) in 1986, a period that MacIntyre (2017) referred to as the "Confounded Approach". The publication of the FLCAS marked the beginning of the "Specialized Approach," in which the use of the same instrument permitted comparisons between research. Horwitz (2001) discovered consistent correlations between language anxiety and academic achievement. In recent years, researchers have also observed some correlations between these two variables (Li et al., 2020). Inspite of the fact that Horwitz et al.'s, (1986) creation of the Foreign Language Classroom Anxiety Scale (FLCAS) has allowed for a degree of standardization, contemporary findings continue to yield contradictory results, reflecting the complexity of anxiety. There have been three arguments on the relationship between English Language Learning Anxiety (ELLA) and English Language Achievement (ELA).

The first argument is that ELLA has a negative link with ELA, as numerous researchers have demonstrated a negative association between ELLA and ELA (Aida, 1994; Gerencheal, 2016; Gökcan & Çobanoğlu Aktan, 2018; Horwitz, 2001), though, in L2 literature, the negative connection between language anxiety and language achievement is fairly well-established (Hwa & Peck, 2017). Bukhari et al. (2022) assessed the association between English learning anxiety and achievement among purposively selected 380 students from universities in the capital of Pakistan. Horwitz et al.'s, (1986) FLCAS was used to measure English language anxiety while the students' final exams were used to measure language achievement. The study concluded that with an increase in the students' anxiety level, their achievement decreased.

Likewise, Hu et al. (2021) studied the relationship between language anxiety and achievement among primary school students learning the English language in China. A questionnaire developed from Horwitz et al.'s (1986) FLCAS to measure anxiety and regular assessments with low stakes and formal tests with high stakes to measure achievement were used to gather data from 631 (324male and 307

female) primary school students aged 9–11 years. The results revealed a statistically significant inverse relationship between English language anxiety and achievement. While language anxiety predicted 43% of the variance in students' language achievement, this figure increased considerably from Year 4 to Year 6.

Subekti (2018) employed Horwitz et al.'s, (1986) FLCAS and learners' exam grades to examine English language anxiety and learners' speaking achievement, respectively, in an effort to assess the connection between English language anxiety and achievement among 119 non-English major university students in Indonesia. The study indicated that there is a negative correlation between English language anxiety and achievement. The negative associations were found between achievement and the following categories of English language anxiety: communication apprehension, test anxiety, and fear of negative evaluation anxiety.

In a similar vein, Tandang and Arif (2019) provided extensive insights and a greater comprehension of the topic of English as a second language anxiety in Malaysia. The focus of the study was to examine the connection between English as a second language anxiety and English as a second language achievement. To achieve the objective, a quantitative approach was carried out with 334 respondents from a polytechnic in Malaysia. This study used the modified version of Horwitz et al.'s, (1986) FLCAS and the students' semester test to measure second language anxiety and second language achievement, respectively. From the study, it was found that English as a second language anxiety was negatively correlated with language achievement, which explains the low performance when anxiety levels are high.

In the second argument, some researchers have put forward the facilitative nature of language anxiety, regarding it as positive energy (Bailey, 1983; Macayan et al., 2018; Scovel, 1978). Contrary to the findings of earlier studies, Macayan et al. (2018) investigated the influence of language learning anxiety on the writing achievement of 162 Filipino learners of English as a second language at a University in Manila, the Philippines. A questionnaire developed from Horwitz et al.'s, (1986) FLCAS and writing scores from an institutional English language test were used to measure language learning anxiety and writing achievement, respectively, in the study. The results revealed that language learning anxiety has a facilitative impact on English as a second language writing.

In contrast to the two previous arguments, other empirical studies (Mekie, 2021) revealed that language anxiety has no significant association with language achievement. Mekie (2021) investigated the relationship between English language learning classroom anxiety and students' English language achievement. A questionnaire developed from Horwitz et al.'s, (1986) FLCAS and learners' first-semester English midterm exam results were used to evaluate English language learning classroom anxiety and English language achievement, respectively. The data were collected from 210 randomly selected students from Jimma Preparatory School. The results revealed that there was no significant correlation between English language learning classroom anxiety and English language achievement.

In summary, despite the theoretical debates concerning the relationship between English language learning anxiety and English language achievement, most researchers congregate to support the notion that English language learning anxiety is negatively linked with English language achievement (Scovel, 1978; Teimouri et al., 2019) and can be very deleterious to the learning process (MacIntyre, 2017). Even beyond the learning of English, negative relationships between language anxiety and achievement have been reported for multiple target languages, such as Japanese, Spanish, German and French (MacIntyre, 1995; Teimouri et al., 2019). In addition, MacIntyre's (2017) recent assessment of language anxiety research provides evidence that language anxiety (i) is best theorized as debilitating, (ii) is both a cause and a result of achievement, and (iii) has both internal and societal dimensions.

2. Materials and Methods

2.1 Sample, Ethical Issues and Instrumentation

In assessing the relationship between English language learning anxiety and English language achievement, the researchers employed a cross-sectional survey approach. The general population was the entire student membership of Takoradi Technical University. Based on a large number of the student body, the researchers set eligibility criteria to define the limits of the population to form the target population. The target population included students who are currently registered for a generic English Communication Skills course. Thus, the target population was first-year undergraduates. Using the target population of 4024, the researchers applied Yamane's formula for random sample size (Yamane, 1967) to obtain a sample size of 364. After sample size determination, participants were briefed on the study's goal and ensured of the data's anonymity and confidentiality. Completing and returning the questionnaire was considered informed consent for the study.

An online survey was used to collect the data. The questionnaire was made up of three parts. The first part was on the sociodemographic characteristics (Gender and Age) of the respondents, the second part was on language anxiety, and the third was on achievement. Foreign Language Classroom Anxiety Scale (Horwitz et al., 1986), a 33-item self-report 5-point Likert scale, ranging from 1= Strongly agree to 5 = Strongly disagree, was used to assess English language learning anxiety among undergraduates. The scale was modified to measure English-language learning anxiety. The FLCAS was used for this study because it has been shown to have appropriate reliability (Aida, 1994; Botes et al., 2022; Horwitz, 2001; Sham & Azmi, 2018) and is useful for measuring general foreign language anxiety. The language achievement scores were derived from school-administered examinations of learners' English knowledge. Specifically, the scores of the first semester examination 2021/2022 results were used. This was used because, at the time of the study, the learners had written only the first semester examinations.

2.2 Data Analysis

Data analysis for this study was performed using SPSS v. 23 (IBM Corp, 2016). Pearson Product Moment Correlation was used to test research objectives. Pearson Product Moment (developed by Karl Pearson) is used to associate two or more variables depending on their correlation coefficient value (Xue & Lu, 2021). Correlation involves measuring the association or relationship between two variables to determine whether they are positively, negatively, or not at all related (Obilor &Amadi, 2018). If one variable's value increases or decreases, and the other variable's value similarly increases or decreases, then the correlation between the variables is positive.

In contrast, the correlation between two variables is negative if the increasing value of one variable causes the decreasing value of the other variable or vice versa. Coefficients of correlation might be high or low (magnitude) and positive or negative (direction). Correlation coefficients range from -1 to +1, with -1 and +1 indicating perfect negative and positive association coefficients, respectively, and 0 indicating no correlation (zero relationship). In addition, a correlation coefficient below 0.40 (either negative or positive) is considered low, a correlation coefficient between 0.40 and 0.60 is considered moderate, and a correlation coefficient above 0.60 is considered strong (Obilor & Amadi, 2018).

3. Results

The profile of the respondents describes the attributes of the sample population as shown in Table 1. These were used to characterize the sample. Thus, they were not incorporated into the results. Three

hundred and sixty-four students were approached to fill out the questionnaires for the study; however, 360 (98.9%) students participated in the study. Nine questionnaires were excluded due to incomplete responses. Therefore, after the data cleaning process, 351 questionnaires were used for the data analyses.

Table 1: Sociodemographic characteristics

	N	Mean	Std. Dev.	Freq.	Percentiles
Gender					
Male	351	1	0	244	69.52
Female	351	2	0	107	30.48
Age					
18-22	351	1.021	0.756	167	47.62
23-26	351	1.912	0.675	142	40.48
27 and above	351	2.872	0.564	42	11.9

Analysis of the data on the sociodemographic characteristics, as indicated in Table 1, revealed that more than half of the participants were males; about less than a quarter of the participants were between the ages of 27 and above.

This research employed correlation analysis to examine the relationship between English language learning anxiety (ELLA) and English language achievement (ELA). Table 2 presents the results of the correlation analysis. The first objective was to examine the relationship between ELLA and ELA. As recommended by research, a correlation coefficient below 0.40 (negative or positive) is low, between 0.40 and 0.60 is moderate, and above 0.60 is strong (Obilor & Amadi, 2018). Thus, as shown in Table 2, there is a significantly negative correlation between ELLA and ELA ($r = -0.102$, $p < 0.5$), albeit a weak one. In other words, a percentage change in ELLA leads to a reduction of 0.102 in ELA. The second objective was to determine individual relationships of ELLA sub-variables with ELA among the students of Takoradi Technical University. As shown in Table 2, there are significant negative correlations between CA and ELA ($r = -0.639$, $p < 0.05$),TA and ELA ($r = -0.547$, $p < 0.01$) as well as FNE and ELA ($r = -0.453$, $p < 0.01$). CA and ELA, on the other hand, have a strong correlation, TA and ELA have a moderate correlation, and FNE and ELA have a low correlation.

Table 2: Correlation Matrix of the set of variables used in the analysis

	ELA	ELLA	CA	TA	FNE
ELA	1				
ELLA	-0.102*	1			
CA	-0.639*	0.083**	1		
TA	-0.547**	0.121*	0.621**	1	
FNE	-0.453**	0.097*	0.749**	0.342**	1

Correlation is significant at 0.05; ** Correlation is significant at 0.01. **ELA = English Language Achievement; **ELLA** = English Language Learning Anxiety; **CA** = Communication Apprehension; **TA** = Text Anxiety; **FNE** = Fear of Negative Evaluation.*

4. Discussion

This present study examined the relationship between English language learning anxiety and English language achievement among the students of Takoradi Technical University. In addition,it determined the individual relationships among the components of English language learning anxiety with language achievement. Regarding the first objective, this study demonstrated a statistically significant negative relationship between English language learning anxiety and language achievement. This finding is consistent with those of other research conducted in different settings (Liu, 2022; MacIntyre, 2017; Oruç & Demirci, 2020). The findings support the concept that low anxiety results in high language achievement, and vice versa (Botes et al., 2020; Zheng & Cheng, 2018). The finding contributes significantly to our understanding of the association between language anxiety and achievement among students of Takoradi Technical University.

The second objective investigated the relationship between the components of English language learning anxiety with ELA. Though all three components: CA, TA and FNE were negatively correlated with ELA, this correlation was found to be stronger between CA and ELA. CA refers to the level of a person's fear or anxiety in relation to actual or expected communication with some otherperson or persons (Amiri & Puteh, 2021). Apparently, within the context of the present study, the students were anxious when it comes to communication in the classroom. The students have few opportunities to communicate in English in or out of the classroom due to the dominance of the mother tongue.

Hence, identifying parental background and previous school is important. From the experience of the researcher, it was discovered that the majority of English language teachers in Ghana place a greater emphasis on grammar tasks than the other four macro skills, particularly speaking. Consistent with prior research (Ali & Anwar, 2021; Hu et al., 2021; Mekie, 2021), CA has been revealed to be

negatively associated with educational outcomes, as learners who report high CA exhibit a variety of traits that hinder the progression of learning in the classroom and, eventually, achievement (e.g., low self-confidence or excessive concern with their ability). The result of a negative association between TA and ELA is consistent with earlier studies (Bukhari et al., 2022; Teimouri et al., 2019; Zheng & Cheng, 2018). It has been stated that TA consumes cognitive resources like attentiveness and working memory, impeding learners' exam preparation and mentalfocus during the exam.

Moreover, learners with test anxiety are frequently pessimistic about their capacity to perform wellon examinations and overestimate the amount of work required to succeed (Hu et al., 2021). This may cause learners to give up after encountering failure, resulting in low achievement (Lang & Lang, 2010). Furthermore, the negative relationship of FNE with ELA could be attributed to the fact that learners with a high level of FNE tend to be too concerned with making a good impression on others. Thus, this heightened self-awareness may divert attention away from the activity at hand and limit learners' ability to achieve success (Brook & Willoughby, 2015). Seemingly, within the context of Ghana, fear of negative evaluation is frequently accompanied by possible shame and a feeling of inferiority resulting from falling short of one's standards.

4.1 Conclusion

The focus of the present study was to examine the relationship between English language learning anxiety and English language achievement, and how the components of English language learning anxiety individually relate to the learners' English language achievement. From the findings, it can be concluded that anxiety negatively affects the English Language learning efforts of students at Takoradi Technical University. The study highlights that, even within the context of learning English as a second language, English language learning anxiety has a debilitating effect on students' language achievement, and the strongest contributing factor to this effect is communication apprehension. Therefore, teachers and other language teaching and learning stakeholders should ensure that policies and activities are developed to create more opportunities for students to communicate in and out of the classroom. It is worth noting that whether within the context of English as a second language, or a foreign language more effort is needed to minimize the detrimental effects of English language learning anxiety.

4.2 Pedagogical Implication

This current study shows several significant pedagogical implications. The current investigation revealed a negative correlation between English language learning anxiety and English language achievement. Teachers must be able to identify the presence of English language anxiety and comprehend how classroom activities and assessment conditions influence anxiety.

To date, there is a paucity of research examining evidence-based strategies for reducing language anxiety in tertiary students in Ghana, making this a crucial subject for future study. Supporting and promoting a keen interest in learning the English language and employing classroom activities that are less likely to induce fear may be advantageous. Moreover, moving the emphasis from competitive individual activities (e.g., individual reading tasks) to collaborative group activities, may also boost students' encouragement, support, and motivation. In addition, itis recommended to adjust classroom activities to students' preferences based on their skill level. It is essential that teachers recognize and acknowledge students' strengths and areas for improvement in order to motivate them appropriately. For instance, if a student has bad pronunciation but good grammar, emphasis must be paid to these areas of strength in addition to the areas that require improvement.

In furtherance to this, teachers could advise students clearly about the inherent presence of anxiety in English learning. They could also counsel learners that self-regulation of one's thinking and learning helps alleviate anxiety. Whilst teachers can utilize the above-mentioned strategies to assist students in overcoming their anxiety in English learning classrooms, they should not attempt to help students fully avoid anxiety (Mustapha et al., 2010), as numerous studies demonstrate that a moderate level of anxiety could motivate learners to keep up their efforts in the English language learning classroom (Alamer & Almulhim, 2021; Bárkányi, 2021).

Concerning three components of English language learning anxiety, namely Communication apprehension, Test anxiety, and Fear of negative evaluation, several approaches can be utilized to alleviate their negative connection with English language achievement. To reduce Communication apprehension, it is essential to offer learners appropriate preparation time and untimed work. Learners should be encouraged to participate in group discussions which will push them to communicate more. Teachers might seek to enhance learning environments by fostering an environment where students feel comfortable speaking up or expressing their opinions (Mustaphaet al., 2010).

To reduce Test anxiety, the manner of assessments should also be carefully considered. Currently, in Ghana, learners' achievement in the English language is determined by their performance on yearly paper-based classroom quizzes and examinations. Incorporating a larger range of evaluations (e.g., pair/group work, problem-solving activities, role-play, etc.; (Young, 1991) and stressing students' development as opposed to their achievement may reduce English language exam anxiety. It is typical for teachers to overtly rate their students based on test scores. These habits could generate test anxiety and the dread of receiving a poor grade. Thus, teachers and educational policymakers as a whole should take measures that will eliminate the ranking of students based on test scores.

With regard to Fear of negative evaluation, it is crucial to assist learners to realize that learning a foreign language is a lengthy process and that making mistakes is proof of learning. Creating a non-threatening and supportive teaching environment might be beneficial. Therefore, teachers should refrain from providing negative evaluations and instead provide more positive feedback on learners' conduct.

4.3 Limitations for future research

The present study has a number of limitations. The main limitation of this study is that it used a cross-sectional approach. In spite of this, cross-sectional data provide insight for longitudinal studies. Therefore, a future longitudinal study should be considered to clarify the relationship between language anxiety and achievement in English language learners from a Ghanaian perspective.

Second, this study was conducted at a single technical university, limiting the generalizability of the results. The institution was chosen to ensure that it served a large population and featured students from a variety of suburban and urban social backgrounds. Since this university adhered to the Curriculum for teaching English Communication Skills, it can be assumed that the students' curriculum experiences would be comparable to those of students at other technical universities. In light of this, the anxiety-achievement association discovered in the present study may exist at other technical universities as well. Therefore, further research is required to verify this.

A third limitation is related to the research approach. This study would have benefited from a qualitative technique of data collecting (e.g., student interviews) to comprehend, for instance, students' impressions of the various types of English language classroom anxiety. A fourth limitation is related to the socio-demographic characteristics of the participants. Since the result of the profile of the

participants was used to only characterize the sample; future studies can examine the role of socio-demographic factors in the link between English language learning anxiety and language achievement within the context of English as a second language.

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Trade and Economic Growth: Evidence from Four African Regions

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Abstract

Trade is well known as an important factor in the economic growth process for all economies in the world. Despite this, there has not been a great deal of research on Africa's ongoing trade that takes inflation, exchange rates and industries into consideration in a single study. Thus, this study is a novel attempt to apply the GMM, RE and GLM models to assess the influence of trade on economic growth in connection with inflation, exchange rates, and industries in four African regions: Central, East, North, and West African regions. Within the scope of this investigation, the data spanning from 1980 to 2017 was obtained from the World Bank database. The findings demonstrated that trade negatively influences the economies of the four African regions due to high inflation rates and low export production. Additionally, the findings suggested that the variable exchange rate is one of the primary drivers of the negative impact of trade in these regions. The report, therefore, suggests that the inflation rate be lowered to a level that could stimulate trade balance and growth. Moreover, there should be an appropriate distribution of resources to export- producing industries.

Keywords: Economic Growth, Exchange rate, Industries, Inflation, Trade

1. Introduction

Trade is well known as an important factor in the economic growth process for all economies in the world. It plays the role of advancing skilled labour through the importation and adoption of superior production technology and innovation (Adedoyin et al., 2022; Adeleye et al., 2019). Exporters always use innovation and develop production technology either by acting as subcontractors to foreign enterprises or through the international market's competition (Abdelhadietal., 2019; Aboagye, 2017). This makes producers of import-substitutes face competition from producers abroad or foreign firms.

This competition then pushes the producers to adopt more capital-intensive production facilities to face the hard competition in developing countries, where products are usually capital-intensive (Frankel, 2014; Tahir et al., 2015).

The impact of trade on economic growth can be significantly positive due to the accumulation of physical capital and technology transfer that comes with it in well-developed economies. Normally, trade can lead to an inflow of Foreign Direct Investment (FDI) which can play an important role by increasing and augmenting the supply of funds for domestic investment in the host country (Abdelhadi et al., 2019). Besides, Ricardo's theory of comparative advantage asserts that a nation's economic growth is contingent on its efficiency and productivity, and it is most advantageous if the nation exports goods and records a positive trade balance.

On the contrary, African countries' terms of trade are always unfavourable (trade deficit). In other words, the total value of imports minus the total value of exports for most African countries is negative (Lemi, 2017; Were, 2015). A trade deficit occurs when a country imports more goods and exports fewer. With a trade deficit, a nation is said to be undergoing economic undergrowth in the sense that much of the nation's income is used for paying debts (more importation).

Most African countries have an agricultural-driven economy that depends heavily on commercial and subsistence agriculture, which provides significant employment to the people (Adams et al., 2020). Africa is rich in natural resources, including oil and gas, gold, diamond, copper, bauxite, coal, uranium, platinum, aluminium, iron, and steel, to name a few. It also, among other capital goods, produces cash crops such as cocoa, coffee, cotton, tea, tobacco, oil palm, and rubber, which means that Africa should record positive trade teams and be well developed or benefit from trade.

However, Adedoyin et al. (2022) purport that most African economies are exploited and do not benefit from trade because of the nation's inability to turn most of these natural resources into finished goods. Africa trades many goods and services with the rest of the world (Ahmad, 2020).Most studies on Africa show that trade hurts economic growth (Abendin & Duan, 2021; Lee, 1993;Yanikkaya, 2003). For an instance, Central Africa's trade contribution to economic growth has been negative since 1960, and in recent times, the Central African countries had a trade imbalance from 2010 to 2017 despite their oil reserves (Yapatake Kossele & Shan, 2018). The East African economies always record trade deficits due to high imports and low exports (Busse & Shams, 2005). North Africa accounts for 30% of Africa's

GDP and has 169 million inhabitants. Even though North African countries have many bilateral and regional trade agreements, intra-regional commerce is among the lowest in the world, according to 2015 AFDB data (Dennis, 2006). WestAfrica has ECOWAS. Due to the predominance of fuels from extractive industries, ECOWAS' exports produce are mainly local value goods which in the end add little or nothing to economic growth as a result of a high level of imports.

These African economies are too dependent on imported goods. This, in both the long-run and short-run, kicks out the infant industries which are trying to turn some of these resources into finished goods. It is, therefore, recommended that developing countries should keep out imported goods until their infant industries become competitive (Alvarado et al., 2017) . According to Stokey (1995) and Auboin et al. (2021) African countries should adopt export production policies and import substitution to benefit from trade and growth. In fact, poor or developing countries should adopt an import substitution policy, and developed countries should export primary products.

There have been numerous studies conducted within the context of Africa on the link between trade and economic growth (Abendin & Duan, 2021; Acquah & Ibrahim, 2020; Asamoah et al., 2019; Bunje et al., 2022; Coulibaly, 2023; Nathaniel, 2020; Yameogo & Omojolaibi, 2021). As an instance, Asamoah et al. (2019) employed the structural equation modelling (SEM) technique with data covering the period 1996–2016 to investigate the role of institutions as an interacting factor in the relationship between foreign direct investment (FDI), trade, and economic growth in sub- Saharan Africa (SSA). Findings indicated a declining effect of FDI on growth, which grows steadily over time in the absence of institutions. On the relationship between trade openness and economic growth, there was a positive effect of institutions on trade openness. There was also a positive effect of institutional quality on growth, yet there was no such effect on FDI. In order to increase economic growth and development in SSA, the study concluded that a targeted approach to enhancing institutional quality is required.

In addition, Acquah and Ibrahim (2020) examined the link among foreign direct investment, economic growth and financial sector development in Africa. With data spanning from 1980 to 2016, the study employed the two-system generalized method of moments model (sys-GMM). The findings revealed an unclear relationship between FDI and economic growth though higher FDI is generally linked to higher growth. Thus, whereas FDI significantly increases economic growth, the domestic financial sector mitigates this effect.

More so, Abendin and Duan (2021) employed static and dynamic models to evaluate the role of the digital economy in the impact of international trade on Africa's economic growth for the period of 2000-2018. It employed POLS (pooled ordinary least squares), random effect (RE), fixed effect(FE), and the GMM (generalized method of moment) models as estimation models. The results from the POLS estimations indicated that trade only has a positive impact on economic growth when it interacts with the digital economy. In the RE, FE, and sys-GMM estimations, trade had asignificant positive impact on economic growth, both without and with the interactive term. The study recommends directing concentrated efforts towards the development of the digital economy to maximize international trade's full economic impact in Africa.

Moreover, Bunje et al. (2022) examined the effect of trade openness on economic growth in Africa by using the pooled ordinary least square (POLS), fixed effects (FE), and the system generalized methods of moment (sys-GMM) estimation approaches to analyze panel data from 2000-2018. Per the POLS model estimation, the results showed mixed effects of trade openness on GDP per capita which was used to evaluate economic growth. When Africa was subdivided into sub-regions, trade openness exhibited a nonlinear relationship with GDP, but the result for Northern Africa was sustainable economic growth. Per the estimation of the FE, trade openness had a statistically negative influence on per capita GDP while sys-GMM confirms that trade openness is not robust across a variety of openness indices and robustness regression estimates. The findings indicate that imports impede growth in Africa, whereas exports stimulate growth. In this environment, it is suggested that governments embrace innovative structural economic policies to boost export growth and economic expansion.

Despite the quantum of research on trade and economic growth from different perspectives (Abendin& Duan, 2021; Acquah & Ibrahim, 2020; Asamoah et al., 2019; Bunje et al., 2022; Coulibaly, 2023; Nathaniel, 2020; Yameogo & Omojolaibi, 2021), there has not been a great deal of research on Africa's ongoing trade deficit that takes inflation, exchange rates, and industries into consideration in a single study. In fact, to the best of the authors' knowledge, no single study has been conducted at the time of the study to examine the effect of trade on economic growth in terms of inflation, exchange rate and industries. Generally, inflation, exchange rate and the industries in Africa are just but severing sectors for the bigger economies in the world hence the lower or no performance of the manufacturing sectors. Inflation in most African economies is the galloping level which leads to more imports and a non-performing exchange rate (Škare et al., 2019).

In furtherance to this, the majority of studies assessing the link between trade and economic growth employ the Generalized Method of Moment (GMM) model, the random effect (RE) and /or the fixed effect (FE) models for model estimation. The present study is focused on the fact that studies employing the Generalized Linear Model (GLM) to supplement the GMM model and random or fixed effect models remain on the fringes of current literature. Precisely, the Generalized linear model(GLiM or GLM) is a sophisticated statistical modelling technique that permits the dependent variable to have an error distribution other than the normal distribution. The general linear model implies linearity between the outcome and all continuous predictors (Ng & Cribbie, 2017; Zheng & Agresti,2000). Consequently, a non-linear transformation of the predictors can be included, with the model assuming that the changed predictors have a linear relationship with the outcome variable. Since the GMM and RE indicate a linear relationship, the GLM is used to validate and supplement them.

Given the lack of studies on the application of GLM to estimate the relationship between trade's effect on economic growth in relation to inflation, exchange rate, and industries, the present study is a novel attempt to apply the GMM, RE and GLM models to assess the influence of trade on economic growth in four African regions. The study is based on the idea that trade may hurt economic growth in these four African regions and that high inflation and low productivity may add to the "damage" that trade does to economies.

1.1 Literature Review

Much of the previous empirical research has delved extensively into the impact of trade on economic growth or the relationship between trade and economic growth (Batrancea et al., 2021; Doucouliagos & Ulubaşoğlu, 2008). All of these researches have reached the conclusion that trade boosts economic growth. The impacts of trade on economic growth vary from region to region and country to country over time, and for some nations, trade can even have a negative impact on economic growth (Ahmed et al., 2022; Alam & Murad, 2020; Dauda et al., 2019; Sun et al., 2019).

Even though there are lots of literature on trade and economic growth in many emerging and developing countries, empirical research on the impact of trade on economic growth in these four African regions is scarce. There is a great deal of evidence regarding the relationship between trade and economic growth, and the effects of trade on economic growth have often been analyzed for specific countries, situations, or objectives. The study of the impact of trade on economic growth often employs a variety of econometric methods and samples to solve research problems. Most studies on trade and

economic growth in developing economies or nations are expected to be positive, indicating that the export-led growth theory has some support. The hypothesis is predicated on the notion that export output causes economic growth and the rectification of the balance of payments.

Kong et al. (2021) have studied the relationship between export production and economic growth in some selected developing countries. The results of their study supported a long-term relationship between trade and economic growth in some of the selected countries. It also reported that the promotion of export production will lead to a long-term growth effect on economies as well as attract investors into the economy, resulting in an increase in the FDI position of the economy. Empirical research postulates that export production and its promotion can significantly contribute to economic growth through the introduction of new technologies that foster human capital growth and employment creation (Jahanger et al., 2022; Rahim et al., 2021; Rahman et al., 2023).

The relationship between international trade and economic growth has been the subject of a great deal of statistical research over the past five decades (Batrancea et al., 2021; Doucouliagos & Ulubaşoğlu, 2008; Nurgazina et al., 2021). The majority of research and economists estimate correlation and regression coefficients, test for cointegration, and run a number of other statistical tests to establish or deny the presence of a relationship or impact between trade and economic growth. For example, Yang and Shafiq (2020) suggest that there is no evidence of an adversely correlated or negative relationship between trade and economic growth. Yet, this applies exclusively to highly developed economies.

When a nation does not record a trade surplus, the negative effects on economic growth and stability are mostly higher rates of unemployment in the domestic country (Safarzyńska & van den Bergh, 2019). This is to say that if the import rates are higher than the export rates, local or domestic jobs may be at a loss to workers abroad. In some cases, the unemployment rate can sometimes be high in the presence of trade surpluses. Other studies suggest that if the demand fora nation's export is high, the local currency also becomes high, but if the import is more than the export, the exchange rate will decline, making imports more expensive, which will lead to a trade deficit (Menyah et al., 2014). With a trade surplus, the nation is most likely to have more returns on foreign direct investment; with a trade deficit, the nation is likely to have fewer returns from foreign direct investment, thereby increasing government foreign debt (Akhmetshin et al., 2017).

In most African economies, this may impede economic growth. But all in all, Milton Friedman proposes that the negative trade balance is not harmful in the long run because it leads to technology spillover and the local currency returning into the domestic market through foreign investment. In all, a huge trade deficit simply means that there is high consumer preference and in the long-run does not really matter on the economy as citizen needs are met.

1.1.1 Trade and the Industries

Industries are the backbone of trade because if they are not productive, they cannot export as much (Morris & Fessehaie, 2014). According to Ricardo's theory of comparative advantage, economic progress depends on efficiency and productivity, implying that low productivity may lead to underdevelopment. This suggests that manufacturing inefficiencies would likely result in a trade deficit, which would also inhibit economic growth. So, for an economy to make up for its trade deficit or record a trade surplus, it needs to be productively efficient and use its resources in the right way. (Geda & Seid, 2015; Osakwe et al., 2018). The primary production industries in Africa need to be properly controlled to produce much for export (Mbate, 2016; Njikam, 2017).

Some studies have established a positive relationship between export production and economic growth (Fannoun & Hassouneh, 2019; Sultanuzzaman et al., 2019). It is expected that high export production will lead to a trade surplus, a correction of the trade deficit, and the creation of jobs, which will lead to growth. However, a decline in the export product sector will result in a trade deficit. Modern trade theory demonstrates that the gains from trade depend critically on a reallocation of production from small to large firms (Mold & Mukwaya, 2016; Seck, 2016). This suggests that the loss in exporting industries may be the result of a misallocation of resources or a failure to expand to satisfy demands in the international market. If export-producing industries are deteriorating and inefficient, they may require a substantial amount of investment to become efficient. Thus, protection for these exporting industries in decline would encourage these companies to invest and re-invent themselves. Protectionism could also be a reason to help these businesses that are not very good at what they do so they can make things for the international market.

1.1.2 Trade and Inflation

General price inflation results in changes to the real income level and the level of income distribution within and across nations (Franses & Janssens, 2018). Inflation is a persistent rise in the general level of prices in the economy, as assessed at the retail or wholesale level. In an economy's inflation rate, index

numbers are often used to show how fast prices are going up or down (Ndou & Gumata, 2017).When there is a trade surplus, it indicates that the local market's inflation rate is low enough to encourage output. However, when there is a trade imbalance, it shows that the economy's productivity is low, leading to high prices for goods. When this occurs, and because the consumer is well-off enough to purchase more goods than the nation produces, it allows for an increase in imports and a decrease in exports, resulting in a trade deficit.

A trade imbalance is not always unfavourable, as it frequently corrects itself over time (Young, 1998). As foreign competition grows, an increase in imported goods and services from other countries lowers the price level of consumer goods and services in the country. Lower prices help to reduce the threat of inflation in the local economy. If a country's inflation rate rises faster than its main competitors, it makes that country's exports less competitive and imports more competitive. This will then lead to a deterioration in the country's trade balance (Nguyen et al., 2017; Yanamandra, 2015). However, inflation may also result in a currency depreciation to counterbalance this loss of competitiveness. Additionally, inflation tends to affect exchange rates and the international balance of payments (Buffie et al., 2018; de Mendonça & Tiberto, 2017).

1.1.3 Trade and Exchange Rate

Anticipation of inflation has real effects on the trade and economic growth of a nation through its role as a tax on money and all monetary transactions in an economy (Krugman, 2017). An increase in the rate of monetary growth generally reduces the value of gross domestic output and alters the composition of all domestic production. This monetary growth results in changes in the pattern of international comparative advantage and trade flows (Gilpin, 2016). According to the majority of exchange rate and monetary theories, the first depreciation of the exchange rate due to an increase in the rate of monetary growth is typically accompanied by a trade surplus (Krugman, 2017; Ndou& Gumata, 2017) whereas the subsequent depreciation is predominantly accompanied by a trade imbalance in the economy. Changes in the exchange rate mostly affect imports and exports, and it is thought that a nominal depreciation or appreciation of the exchange rate will change the real exchange rate and have a direct effect on a country's trade balance.

If the currency of a nation becomes overvalued, imports become cheaper, resulting in a higher volume of imports and making exports uncompetitive, which then leads to a fall in the export volume. The trade theory that takes into account the exchange rate, a real depreciation (Song et al., 2022) or the

devaluation of the local currency, would cause imports to be more expensive and exports to be less expensive, resulting in an improvement in the trade balance and economic growth (Young,1998). This will discourage imports and, in both the short- and long-term, make exports cheaper, inevitably resulting in economic growth and a reduction in the trade imbalance (Streeck et al., 2019).

According to Zahonogo (2019) , the price of imports is becoming more expensive as a result of the acceptance of the dollar as the common currency for international trade. It is also expected that the persistent trade deficit will be controlled by the changes in the exchange rate. Thus, the exchange rate is a critical factor in economic activity (Senadza & Diaba, 2017). First, changes in the exchange rate influence the appreciation and depreciation which has an impact on the direction of trade. If a nation's exchange rate experiences depreciation while holding other factors constant, that nation's goods and services will become relatively cheaper than those of its trade partners.

2. Methodology and Model Specification

2.1 Data

The panel data collection covering the years 1980 to 2017 were obtained from the World Bank Database. The data consisted of 15 nations based on the availability of data and level of economic growth. The length of the sample was determined by how quickly the local economy grew and how large those regions' international trade was. At the end of each accounting year, calculations are done on trade by subtracting the total sum of goods and services imported from the total sum of goods and services exported.

After collecting raw data from the World Bank Database, a general test was conducted to determine how the data would function. Before the model could be adopted, additional tests were conducted to determine whether there was any form of cross-sectional dependence in the data; whether there was any form of independence in the data, and whether there was any form of heteroskedasticity in the data, which would not result in any form of bias in the outcome.

Simple ordinary least squares (OLS) results may be highly misleading when evaluating the principal impact of an ongoing issue, particularly in research requiring huge data sets or panel data(Beck, 2001; Burkhart & Lewis-Beck, 1994; Lv & Xu, 2017; Ntshakala, 2015; Ojong et al., 2016;Ullah et al., 2018).

For the empirical study and estimation, the researcher utilized a methodology that accounts for diverse dynamic panels. To overcome these obstacles and address these problems efficiently, economists such as Alonso-Borrego and Arellano (1999); Breusch et al. (1989); Lee and Chang (2008) proposed the use of instrumental variables and more recent panel data techniques such as Arellano and Bond's Generalized Method of Moments (GMM) (Arellano & Bond, 1991, 1998; Doornik, Arellano, & Bond, 2002). When the number of cross-section observations is relatively large, as in this study, the GMM estimator can yield more reliable results.

In addition, the GMM estimator is appropriate for panel data with a relatively modest temporal dimension, as compared to the number of cross-sections (Bond, 2002; Bun & Carree, 2005; Petrović & Lobanov, 2022). In linear GMM models, which are supposed to have a nuisance parameter, the nuisance parameter is removed by multiplying the moment conditions by a projection matrix and the model's covariance matrix. In doing so, the inverse that is generally used to build an efficient GMM estimator will become singular and hence cannot be inverted. But it ispossible to show that the generalized inverse can be used instead to make a good estimator.

Based on earlier research by Farhadi, Ismail, and Fooladi, (2012), employing the Generalized Method of Moments (GMM) to determine the impact of information and communication technology use on economic growth over a nine-year period was a step in the right direction. The result of this investigation indicated a positive relationship between economic growth and residual autocorrelation. Similarly, Adeleye et al. (2017), Nandelenga and Oduor (2020), and Adeleye et al. (2020) all employed the GMM model to determine the impact of various economic growth indicators on growth nexus in selected Sub-Saharan African nations. To estimate the influence of international trade on Africa and in each Region, the researcher applied the inverse GMM in addition to the Arellano-Bondtwo-step system GMM estimator for calculating the primary impact of international trade on Africa's economic growth.

Therefore, to evaluate the primary effect of trade on economic growth in these four African Regions, the Generalized Method of Moment (GMM) estimator was used to analyze the data and solve the model's econometric equation. Since GMM also addresses the issue of residual autocorrelation and accounts for the fact that some explanatory variables are endogenous, the Random Effect Model (RE), and the Generalized Linear Model (GLM) were then employed to supplement the GMM model (Acaravci et al., 2009; Wang & Wen, 2021).

Table 1: Test for independence, cross-sectional dependence Heteroskedasticity in the data

Regions	Breusch-Pagan Lagrange multiplier (LM)th Test		Pasaran CD test for cross-sectional dependence (CD) Test		HeteroskedasticityTest
	FE Chi2	RE Chibar2	Probability	Absolute Value	Prob>Chis
Central Africa	47.784	0.000	0.024	0.366	0.000
East Africa	26.546	0.000	0.366	0.362	0.000
North Africa	159.781	0.000	0.00	0.373	0.000
West Africa	129.753	0.000	0.650	0.577	0.000

Table 1 shows that with the Breusch-Pagan Lagrange multiplier test (LM), there is independence in the data. Also based on the null hypothesis, the LM test shows that the variance across the whole data is not zero which also means that there is a significant difference across the panel. There is no heteroskedasticity in the data for all four regions.

If the probability chi2 is less than or equal to 0.05, choose the fixed effect model to perform the regression, but if the probability chis2 is greater than 0.05, choose the RE model for the estimate (Campbell, 2007; Mantel, 1963; Rao & Scott, 1981). In the present study, the Hausman test of both random effect (RE) and fixed effect (FE) model selection yielded a probability chi2 of greater than 0.05 in all four regions (the Central African region, the East African region, the North African region, and the West African region). As a result, the RE model was the best model to complement the GMM model in evaluating the major effect of trade on economic growth.

2.2 Model Specification

Trade of a nation is defined mathematically as;

$td_{it} = x_{it} - m_{it}$ ..... (1)

Where:

"td" represents trade, "x" represents total export, "m" represents total import, and "i and t" are indices for individual and time.

From the model, it holds that total export of a nation at a time minus total import of the nation at time holding other factors that determine both export and import constant is called total trade or net export. From equation (1), the impact of trade on economic growth follows:

$Y_{it} = \gamma_0 + \beta_1 y_{i(t-1)} + \beta_2 td_{it} + \beta_3 Ifn_{it} + \beta_4 Ind_{it} + \beta_5 Fe_{it} + \mu_{it}$ …….. (2)

Where;

Y_{it} represents the real GDP, $y_{i(t-1)}$ represents the lag value of the GDP, td_{it} represents the trade at a time period "t", Ifn_{it} represents the Inflation rate in an individual country at a time period "t", Ind_{it} represents Total production industries in an individual country at a time period "t" taking into consideration depreciation. Also, Fe_{it} represents the Exchange rate in an individual country at a time period "t", $\gamma_0$represents the constant of the model, "β_1,,,,,,,,,,,,,,,β_5" represents the coefficients of the variables under consideration while "μ_{it}" represents the error term of the model which is always a zero term.

3. Result and Discussion

Table 2: Granger causality test

	Central Africa	East Africa	North Africa	West Africa
w-bar	1.4303	1.9623	2.0574	2.1592
Z-bar	-0.4934	-0.0327	0.0642	0.1592
	(0.6217)	(0.9739)	(0.9488)	(0.8735)
Z-bar tilde	-0.523	-0.0954	-0.0249	0.0715
	(0.6029)	(0.924)	(0.9801)	(0.943)

Source: Authors computation with the World Bank data

From the granger causality test results in Table 2, the study accepts the hypothesis that trade does cause GDP growth and GDP growth does cause trade. This implies that trade does lead to economic growth and economic growth also leads to trade. The result implies that any change in trade can affect economic growth either positively or negatively in both the long-run and the short-run.

Table 3: Descriptive Statistics for the Selected Region

Regions	Mean (%)		Std.(%) Dev.	Variance (%)	Skewness (%)	Kurtosis (%)	Max (%)	Min (%)
Central Africa								
	GDP	3.16	5.559	3.089	1.957	5.858	2.245	-5.665
	GDP-growth	3.36	5.743	33.035	-0.117	5.879	25.007	-15.743
	Trade	-5.069	5.441	29.662	-0.216	3.464	10.083	-21.101
	inflation	245.951	2063.9	4259684	12.343	158.558	26765.86	-5.665
	industry	32.217	15.67554	245.725	1.816	8.102	104.637	0.993
	Exchange Rate	261.567	220.568	48650.41	0.277	1.144	733.038	0.024
East Africa								
	GDP	6.839	1.291	1.662	3.421	15.173	7.499	1.161
	GDP-growth	6.32	8.457	71.528	0.55	5.307	39.487	-24.049
	Trade	-7.098	21.918	480.398	-0.287	2.708	36.362	-61.892
	inflation	8.277	11.647	135.654	1.187	6.658	65.41	-20.809
	industry	28.277	17.898	320.358	0.41	2.189	-6.946	66.527
	Exchange Rate	20.859	24.48	599.317	1.827	5.2135	4.761	103.373
North Africa								
	GDP	4.611	5.731	3.282	2.559	10.65	3.411	3.338
	GDP-growth	9.452	16.041	257.327	2.09	13.987	-62.075	123.139
	Trade	-3.156	19.617	384.861	-0.359	3.9285	3.832	23.956
	inflation	9.787	11.559	133.618	0.8247	3.855	53.788	-29.172
	industry	30.706	12.683	160.876	0.093	2.737	-6.946	59.221
	Exchange Rate	9.158	20.225	409.056	3.178	12.252	0.281	110.973
West Africa								
	GDP	2.76	8.501	7.231	4.607	24.294	5.688	1.211
	GDP-growth	1.517	2.308	5.286	15.139	230.443	3.5	-19.685
	Trade	-14.786	56.393	3180.67	-3.466	16.232	49.76	-344.751
	inflation	15.954	15.104	228.088	2.362	15.134	113.076	-20.83
	industry	29.364	23.798	566.046	0.584	2.707	104.637	-12.304
	Exchange Rate	127.131	176.434	31130.16	1.584	4.615	733.038	0.007

All the variables are measured in percentage of the real GDP. From the descriptive analysis of the data for Central, East, North and West African countries, the trade variable, as indicated in Table 3, shows a negative mean on the real GDP of about -5.069, -7.098, -3.16, -14.786 and a positive standard deviation of 5.44, 21.918, 19.617 and 56.393 respectively. These results demonstrate the dispersion of the data and its suitability for the investigation.

Table 4: Regression result from the four regions

Variables	CENTRAL AFRICA (RE) GDP	(GLM) GDP	(GMM) GDP	EAST AFRICA (RE) GDP	(GLM) GDP	(GMM) GDP	NORTH AFRICA (RE) GDP	(GLM) GDP	(GMM) GDP	WEST AFRICA (RE) GDP	(GLM) GDP	(GMM) GDP
$yi(t-1)$	1.249** (5.637)	1.249** (5.637)	1.249*** (4.191)	1.619** (6.756)	1.619** (6.756)	1.619*** (5.736)	-2.383 (2.100)	-2.383 (1.931)	-2.383 (2.251)	1.519** (7.293)	1.519** (7.293)	-4.630 (5.712)
trade	-2.288*** (6.338)	-2.288*** (6.338)	-2.288*** (4.868)	-5.800*** (3.646)	-5.800*** (3.646)	-5.800*** (2.038)	-4.602** (1.866)	-4.602*** (1.636)	-4.602*** (1.306)	-6.221** (3.839)	-6.221*** (3.839)	-0.045** (0.027)
inflation	-51,601 (156,547)	-51,601 (156,547)	-51,601** (41,365)	-6.710 (4.773)	-6.710 (4.773)	-6.710 (5.289)	-7.403 (3.157)	-7.403 (3.105)	-7.403 (2.220)	-6.232 (4.813)	-6.232 (4.813)	0.260* (0.155)
industry	9.881*** (2.188)	9.881*** (2.188)	9.881*** (1.682)	5.409 (4.250)	5.409 (4.250)	5.409** (2.324)	-2.581 (2.814)	-2.581* (1.434)	-2.581 (2.780)	1.148 (6.150)	1.148 (6.150)	0.308** (0.120)
exchange rate	1.614*** (1.446)	1.614*** (1.446)	1.614*** (1.702)	4.701*** (2.671)	4.701*** (2.671)	4.701*** (5.816)	1.340*** (1.621)	1.340*** (1.614)	1.340*** (1.522)	4.692*** (2.708)	4.692*** (2.708)	-0.0496 (0.032)
Constant	-5.785*** (1.046)	-5.785*** (1.046)	-5.785*** (8.366)	-5.387*** (1.671)	-5.387*** (1.671)	-5.387*** (1.023)	4.263*** (9.816)	4.263 (0)	4.263*** (1.124)	-4.169* (2.133)	-4.169* (2.133)	20.34*** (0.597)
Prob > chi2	0.000		0.000			0.000	0.000		0.000	0.674	0.674	0.000
R-squared			0.469			0.751			0.236	1.188	1.188	0.069
sigma_u	0.000			0.00			0.000			6.556	6.556	
sigma_e	4.077			6.555			4.666			0.031	0.031	
rho	0.000			0.000			0.000			0.000	0.000	
prob>F	0.000			0.000			0.000			0.458	0.458	

corr(u_i, Xb)		0.000		
log. Likelihood	-4095.31	-4176.190	-7555.650	-486.902
Deviance	2.834	7.166	7.253	3.981

From the regression analysis for the selected Regions in Africa, as indicated in Table 4, each Region's trade impacts economic growth negatively.The result is accepted based on *** p<0.01, ** p<0.05, * p<0.1 as a standard of the analysis that the result is significant at 1% to 10%. For Central,East, North and West African countries, it appears that there is a very strong negative impact of trade on the real GDP and it varies significantly at all levels.

This could mean that any increase in trade will have a negative impact on real GDP or economic growth which is in line with the study of Kohli (2004), Ju et al. (2010) and . According to Fischer (1993), inflation, high budget deficits, and distorted foreign exchange markets are all negatively associated with economic development. Also, Lopes da Veiga et al. (2016) concluded in their research that the highest average rates of real and per capita growth are attained when public debt exceeds 60% of the real GDP and the average inflation rate is 8.2%. This was found to be the case. When this ratio falls between 60 and 90%, the average rate of economic growth reduces by up to 1.32 percentage points, and when it exceeds 90%, the rate of economic growth continues to fall by up to 1.64 percentage points. In a nutshell, the low rates of economic growth reflect the high levels of inflation that have been seen.

The findings presented in Table 4 indicate that a negative impact of trade on economic growth can be related to a high rate of inflation in all four of these African regions. The fact that countries in these four regions have substantial inflation rates in the double digits has led to an excessive amount of importing, as the report demonstrates. It is also held that a double-digit inflation rate in an economy results in the undergrowth and an increase in the prices of goods and services, both of which indicate that production in the economy is not enough or that there is inefficiency in production. This is another theory that has been put forward. When there is a higher rate of inflation, there is always a negative influence that has a direct effect on economic growth. In the case of Northern African countries, trade has a negative effect because the industrial sector does not contribute much; hence, inflation is high with rates of 2.851 and 4.602 respectively.

Table 5: The Main Impact on Africa

VARIABLES	(RE) GDP	(GLM) GDP	(GMM) GDP
$yi(t-1)$	-0.094***	-0.094***	-0.094***
	(0.028)	(0.0278)	(0.029)
Trade	-0.014***	-0.014***	-0.014***
	(0.051)	(0.051)	(0.039)
Inflation	-0.040***	-0.040***	-0.040**
	(0.070)	(0.070)	(0.017)
Industry	0.099	0.099	0.099
	(0.099)	(0.099)	(0.016)
Exchange Rate	0.351***	0.351***	0.351***
	(0.051)	(0.051)	(0.066)
Constant	21.18***	21.18***	21.18***
	(0.392)	(0.392)	(0.570)
Observations	992	992	992
R-squared	0.892	0.799	0.852

*Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

Using the three estimation models to figure out how trade impacts the four different regions of Africa, the conclusion is that trade negatively affects economic growth in Africa. This impact is a result of the high rate of inflation in Africa. African countries suffer high inflation rates all the time and as a result, the prices of goods keep increasing. This high rate of inflation can also be linked to the low contribution from the industrial sectors in Africa.

The results also confirm that most African countries in these four regions record trade deficits each year as a result of too much importation. As a result of the high level of imports in these areas, most developed economies regard them as dumping grounds for commodities that, in the long run, destroy small businesses. Due to the amount of dumping, which contributed to the collapse of newborn industries, it has become impossible for them to be efficient in their production sectors to compete with the high level of imports. In these regions, imported items are typically less expensive than the equivalent products produced by local firms. As a result, the price of locally produced goods on the local market becomes prohibitively high, causing consumers to switch to imported goods. This has economic ramifications and also affects strategies.

3.1 Conclusion

In this study, four different areas of Africa's economy are used to investigate the effect that trade has on overall economic growth. In using varieties of data and estimating tools, the study and the majority of economic theories attempt to determine the connection between commerce and economic growth. The analysis discovered a negative influence associated with trade and economic growth, contrary to the findings of the vast majority of research on trade and economic growth.

This study reveals that trade negatively influences economic growth in these four locations due to high inflation rates and poor levels of productivity. It has also been discovered that the majority of African nations record continuous trade deficits, which are damaging both long-term and short-term economic growth. It is occasionally true that a trade deficit does not guarantee economic growth as some economists believe it contributes to technological spillover and human capital growth. The empirical findings strongly support a greater inflation rate, which has a detrimental effect on economic growth. This is because inflation has a negative impact on the prices of goods and services and affects the exchange rate in both the long and the short terms.

The study also implies that the low level of local industry productivity is one of the primary drivers of the negative impact of trade on economic growth in the four African Regions studied. More so, the present study investigated the relationship between the prices of products and services and the exchange rate as an additional factor contributing to the negative impact of trade on economic growth. As changes in the exchange rate affect the prices of goods and services by either increasing the prices of imported goods and services or decreasing the prices of exported goods and services, inflation will increase.

3.2 Recommendation and policy

Since their entry into the global market, most African economies had believed that it will help strengthen the economies; instead, their entry has resulted in a trade deficit and a deterioration of the economies. As a result, they must have a highly successful exporting industry to balance imports and exports. Nonetheless, simply building exporting businesses will not suffice to close the trade deficit, but building enterprises capable of producing the majority of imported goods will aid in reducing excessive imports. African economies should encourage the usage of African-made products to promote and support the expansion of the indigenous industry. More specifically, interregional trade in Africa should be encouraged.

To address these persistent trade deficits, African organisations such as the Economic Community of Central African States (ECCAS), the East African Community (EAC), the Arab Maghreb African Union (UMA), and the Economic Community of West African States (ECOWAS) should develop a comprehensive export production policy. Studies show a beneficial relationship between export output and economic growth, so a comprehensive policy that encourages inter- and intra- regional commerce among all five regions should be implemented.

Taking into account the current state of integration in Africa, which the eight recognized blocks, namely the Arab Maghreb African Union (AMU), Community of Sahel-Saharan States (CEN- SAD), Common Market for Eastern and Southern African (COMESA), East African Community(EAC), Economic Community of Central African States (ECCAS), Economic Community of West African States (ECOWAS), the Intergovernmental Authority on Development (IGAD) and Southern African Development Community (SADC), are expected to serve, the Common Market should be utilized

appropriately to bring all goods produced in these four regions to market. This market could function as a hub for other African countries. The construction of an intra-African trade initiative and a continental free trade zone should also be carefully considered because it is envisaged that trade in Africa will improve as a result. This will also result in the adjustment of Africa's ongoing trade deficit and the development of more jobs.

Abbreviations

GDP: Gross Domestic Product, **GMM:** Generalized Method of Moment, **GLM:** GeneralizedLinear Model, **RE:** Random Effect Model, **FDI:** Foreign direct investment, **LM:** Lagrange multiplied

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