



CRAWFORD

JOURNAL OF ECONOMICS AND MANAGEMENT
(CRUJEM)



GLOBAL
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CRAWFORD JOURNAL OF ECONOMICS AND MANAGEMENT (CRUJEM)

Volume 3, Number 1, March 2026

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Published by
DEPARTMENT OF ECONOMICS
COLLEGE OF BUSINESS AND SOCIAL SCIENCES,
CRAWFORD UNIVERSITY, IGBESA, OGUN STATE.

Volume 3, Number 1, March 2026

ISSN: 3092-9601
e-ISSN: 3121-6943

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Published by
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**DEPARTMENT OF ECONOMICS
COLLEGE OF BUSINESS AND SOCIAL SCIENCES,
CRAWFORD UNIVERSITY, IGBESA OGUN STATE.**

Email: crawfordeconomics@gmail.com

Printed in Nigeria by

**DANLINK MEDIA COMM.
08036886365, 08053531116
email: danlinkmedia@gmail.com**

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RESILIENCE MINDSET AND BUSINESS SURVIVAL OF SMES IN NIGERIA

Justice Otseh

Abstract

This study examined the effect of resilience mindset on the business survival of Small and Medium Enterprises (SMEs) in emerging economies, with particular focus on registered SMEs in Ogun State, Nigeria. The study was motivated by the increasing rate of SME failure resulting from economic instability, changing market conditions, and operational challenges affecting business sustainability. Specifically, the study examined the effect of entrepreneurial adaptability, entrepreneurial resilience, innovation orientation, and strategic flexibility on SME survival. A descriptive survey research design was adopted. The population comprised registered SMEs operating within selected business clusters in Lusada-Agbara road, Ogun States. Using the Taro Yamane formula, a sample size of 345 respondents was determined, while 332 valid questionnaires were returned and analyzed. Data were analyzed using descriptive statistics and multiple regression analysis with the aid of SPSS Version 28. The findings revealed that entrepreneurial adaptability significantly affects SME survival, entrepreneurial resilience significantly affects SME continuity, innovation orientation significantly affects SME sustainability, and strategic flexibility significantly affects the growth and survival of SMEs in emerging economies. The study concluded that resilience mindset plays an important role in sustaining SMEs during periods of uncertainty and economic instability. The study recommended that SME owners should strengthen adaptability, resilience capabilities, innovative practices, and flexible business strategies to improve long-term business survival and sustainability.

Keywords: Resilience Mindset, Business Survival, Entrepreneurial Adaptability, Strategic Flexibility, SMEs.

1. Introduction

Small and Medium Enterprises (SMEs) are widely recognized as major drivers of economic growth, employment generation, innovation, and poverty reduction in both developed and developing economies. In emerging economies like Nigeria, SMEs contribute significantly to industrial development, wealth creation, entrepreneurship development, and economic diversification. Despite these contributions, many SMEs continue to face operational and environmental challenges that threaten their survival and sustainability. The business environment has become increasingly uncertain due to inflation, technological disruption, changing consumer behaviour, poor infrastructure, limited access to finance, and global crises such as the COVID-19 pandemic. These conditions have made business survival increasingly difficult, particularly in developing economies where many SMEs fail within their early years of operation. Recent studies have shifted attention from traditional business resources to the psychological and strategic capabilities of entrepreneurs. One of the concepts receiving increasing attention is that of resilience mindset, which is the ability of entrepreneurs to remain adaptive, innovative, optimistic, and persistent during periods of uncertainty and environmental turbulence. It reflects the capacity to recover from setbacks,

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adjust to change, identify opportunities under difficult conditions, and sustain business operations despite adversity. Evidence suggests that entrepreneurial resilience has become an important determinant of SME sustainability because resilient entrepreneurs develop adaptive behaviours that support long-term business survival (Branicki et al., 2018; Fatoki, 2018; Adesanya et al., 2025). The COVID-19 pandemic further demonstrated the importance of resilience in business survival. While many SMEs experienced supply chain disruptions, declining demand, financial instability, and operational shutdowns, others sustained their operations through innovation, digital transformation, adaptive decision-making, and flexible business models (Zutshi et al., 2021). This suggests that resilience mindset extends beyond responding to crises and represents a strategic capability that enables SMEs to survive changing business conditions. Entrepreneurial adaptability, innovation orientation, and strategic flexibility have also been identified as important dimensions of resilience mindset. Adaptable entrepreneurs respond effectively to environmental changes and identify new business opportunities (Hendrik et al., 2024). Innovation orientation enables SMEs to introduce new products, services, and business processes that improve competitiveness (Pilav-Velic et al., 2024; Al Omoush et al., 2025). Similarly, strategic flexibility allows firms to adjust business strategies and resource allocation in response to environmental uncertainty, thereby strengthening business continuity (Omowole et al., 2024; Otokiti et al., 2022). Although previous studies have examined organizational resilience, entrepreneurial orientation, innovation, and business sustainability, limited empirical attention has been given to resilience mindset as a multidimensional construct influencing SME survival in emerging economies. Many existing studies also focus on developed economies or crisis-specific situations, leaving important contextual gaps within developing countries where business environments are more volatile.

Small and Medium Enterprises (SMEs) play a significant role in employment generation, income creation, innovation, and economic development in Nigeria. Despite their contributions, the survival rate of SMEs remains low due to persistent economic challenges such as inflation, exchange rate volatility, inadequate infrastructure, rising operating costs, limited access to finance, and intense market competition. These challenges have become more pronounced in Ogun State, where many SMEs struggle to sustain their operations in an increasingly uncertain business environment. While some businesses successfully adapt and remain competitive, others experience declining performance, business closures, or complete failure under similar conditions. Although previous studies have examined organizational resilience, entrepreneurial orientation and some on innovation, and business sustainability, many of these studies focused on developed economies and specific industries, or even crisis situations such as the COVID-19 pandemic. Furthermore, most studies examined these variables independently rather than considering resilience mindset as a multidimensional construct comprising entrepreneurial adaptability, entrepreneurial resilience, and strategic flexibility. Consequently, empirical evidence on how these dimensions collectively influence the survival of SMEs in Ogun State specifically remains limited. This gap is particularly important because SMEs in Ogun State operate within a business environment characterized by economic instability, changing customer demands, technological disruptions, and increasing competitive pressure. Without adequate resilience capabilities, many businesses may be unable to withstand these challenges and achieve long-term sustainability. It is therefore necessary to investigate whether resilience

mindset significantly contributes to the survival of SMEs operating in Ogun State, Nigeria. Against this background, this study addresses this gap by examining the effect of entrepreneurial adaptability, entrepreneurial resilience, innovation orientation, and strategic flexibility on the business survival of registered SMEs in Ogun State, thereby providing empirical evidence to support entrepreneurs, and SME support institutions in developing economies with strategies that help enhance business resilience and sustainability.

2. Literature Review

Resilience mindset has become an important concept in entrepreneurship because SMEs operate in environments characterized by uncertainty, competition, and frequent economic disruptions. In emerging economies, business survival depends not only on financial and physical resources but also on the ability of entrepreneurs to adapt, recover from setbacks, innovate, and respond strategically to environmental changes. Consequently, resilience mindset has received increasing attention as a strategic capability that enhances the long-term survival and sustainability of SMEs. Resilience mindset is the ability of entrepreneurs to remain adaptive, optimistic, innovative, and persistent during periods of uncertainty. It enables business owners to recover from setbacks, identify opportunities in difficult situations, and maintain business continuity despite environmental challenges. Branicki, Sullivan-Taylor, and Livschitz (2018) explained that resilient entrepreneurs are more likely to build sustainable businesses because they respond positively to pressure and uncertainty. Similarly, Fatoki (2018) reported that entrepreneurial resilience improves the success and continuity of SMEs in developing economies. Damoah (2025) further argued that organizational resilience supports SME survival by strengthening entrepreneurs' ability to withstand environmental instability. Entrepreneurial adaptability is an important dimension of resilience mindset. It is the ability of entrepreneurs to adjust their business operations, decisions, and strategies in response to changing market conditions. SMEs operating in emerging economies frequently experience inflation, policy changes, technological disruption, and changing customer preferences, making adaptability essential for survival. Hendrik et al. (2024) observed that entrepreneurs with adaptive mindsets respond more effectively to economic crises because they adjust quickly to environmental changes. Similarly, Pongtanalert and Assarut (2022) found that adaptive capacity strengthens SME resilience by enabling business owners to respond effectively to changing business conditions. Businesses that continuously innovate are better positioned to satisfy changing customer needs and maintain their competitive advantage. Pilav Velic et al. (2024) reported that firm resilience strengthens innovation performance among SMEs in emerging economies. Likewise, Al Omoush, Lassala, and Ribeiro-Navarrete (2025) concluded that digital transformation and frugal innovation significantly improve SME resilience and sustainability. During the COVID-19 pandemic, innovative SMEs adopted digital platforms and alternative business models that enabled them to continue operations despite severe disruptions (Zutshi et al., 2021). Strategic flexibility is another important component of resilience mindset. It is the ability of SMEs to modify business strategies, operational processes, and resource allocation in response to environmental changes. Flexible firms are generally more capable of responding to market uncertainty and unexpected challenges. Omowole et al. (2024) explained that agile business practices strengthen SME resilience during economic shocks, while Otokiti et al. (2022) maintained

that resilient business models enable Nigerian SMEs to manage economic disruptions more effectively. These studies suggest that strategic flexibility enhances business continuity by allowing firms to respond quickly to changing business environments. Business survival is the ability of SMEs to continue operating successfully despite economic difficulties, competitive pressure, and environmental uncertainty. In emerging economies, business survival depends largely on entrepreneurs' ability to adapt, innovate, recover from setbacks, and make strategic decisions. Mohammed (2026) observed that entrepreneurial mindset contributes significantly to SME survival because resilient entrepreneurs are better prepared to manage uncertainty and sustain business operations. Similarly, Nautiyal and Pathak (2024) argued that entrepreneurial resilience promotes long-term business sustainability and organizational prosperity.

2.1 Theoretical review

This study is anchored on the Dynamic Capability Theory developed by Teece, Pisano, and Shuen (1997). The theory explains that organizations achieve and sustain competitive advantage by developing the ability to integrate, build, and reconfigure their internal and external resources in response to rapidly changing business environments. Unlike the traditional resource-based view, which emphasizes the possession of valuable resources. This theory argues that the ability to continuously adapt and renew organizational capabilities is the primary source of long-term survival and sustained performance. This theory enables firms to sense changes in the external environment, seize emerging opportunities, and transform organizational resources to respond effectively to environmental uncertainty. These capabilities become particularly important in emerging economies like Nigeria where firms frequently encounter inflation, technological disruption, policy instability, exchange rate fluctuations, changing customer preferences, inadequate infrastructure, and increasing competitive pressure. Consequently, SMEs that continuously adapt their strategies and operational processes are more likely to survive than those relying solely on existing resources. According to Teece et al. (1997), dynamic capabilities consist of three interrelated processes: sensing opportunities and threats, seizing opportunities through appropriate strategic decisions, and transforming organizational resources to maintain competitiveness. These processes require organizational learning, innovation, flexibility, and strategic responsiveness. Therefore, firms that possess stronger dynamic capabilities can respond more effectively to environmental changes and sustain superior performance over time. The theory provides a strong foundation for understanding resilience mindset because resilience is demonstrated through an entrepreneur's ability to adapt to change, recover from setbacks, innovate continuously, and adjust business strategies in response to uncertainty. Entrepreneurs who possess these capabilities are better positioned to maintain business continuity and achieve sustainable growth despite adverse environmental conditions. The four dimensions of resilience mindset examined in this study are consistent with the assumptions of Dynamic Capability Theory. Entrepreneurial adaptability reflects the firm's ability to sense environmental changes and modify business operations accordingly. Entrepreneurial resilience represents the entrepreneur's capacity to recover from setbacks, maintain operational continuity, and sustain performance during periods of uncertainty. Innovation orientation reflects the firm's ability to generate and implement new ideas, products, services, and processes that enhance competitiveness. Strategic flexibility enables SMEs to

transform their strategies, reallocate resources, and respond rapidly to changing market conditions. Collectively, these capabilities represent dynamic organizational competencies that strengthen business survival. For instance, the application of Dynamic Capability Theory is particularly relevant to SMEs operating in Ogun State, Nigeria. Businesses within the state operate under conditions characterized by high inflation, unstable exchange rates, rising production costs, inadequate infrastructure, inconsistent government policies, technological change, and intense competition. These environmental conditions require entrepreneurs to continuously adjust their business models, adopt innovative practices, diversify products and services, and make timely strategic decisions. SMEs that fail to develop these adaptive capabilities are more vulnerable to business decline and eventual failure. Furthermore, the theory supports the conceptual framework of this study by explaining the mechanism through which resilience mindset influences business survival. Consequently, firms possessing higher levels of these capabilities are expected to experience greater business continuity, improved sustainability, and enhanced long-term survival.

2.3 Empirical Review

Empirical evidence supports the relationship between resilience mindset and SME survival. Zighan et al. (2022) found that entrepreneurial orientation strengthened SME resilience during the COVID-19 pandemic through innovation and proactive behaviour. Branicki et al. (2018) reported that entrepreneurial resilience enhances SME continuity by improving entrepreneurs' capacity to manage uncertainty, while Damoah (2025) found that organizational resilience significantly improves the survival of SME exporters operating in unstable environments. For instance, Zighan et al. (2022) examined the role of entrepreneurial orientation in developing SMEs resilience capabilities throughout COVID-19. The study adopted a quantitative research design using survey data collected from SMEs operating in a Middle Eastern emerging economy. The sample consisted of SME owners and managers who experienced operational disruptions during the pandemic. Findings revealed that entrepreneurial orientation significantly enhances resilience capability, especially in terms of innovation, proactiveness, and risk-taking behaviour. The study concluded that SMEs with strong entrepreneurial orientation were more capable of sustaining operations during crisis periods. However, the study mainly focused on COVID-19 context, leaving a gap in understanding resilience beyond pandemic-driven shocks and in other emerging economies such as Africa.

Damoah O, (2025) also examined the effect of organizational resilience on the survival of SME exporters: the role of entrepreneur resilience and environmental turmoil. The study used a quantitative research approach with survey data collected from exporting SMEs. The sample consisted of firms engaged in international trade in an emerging economy context. Findings revealed that organizational resilience significantly enhances SME survival, especially when supported by entrepreneurial resilience and the ability to respond to environmental instability. The study emphasized that external shocks such as economic volatility influence SME performance. However, the study concentrated more on exporters, leaving out domestic SMEs that also face survival challenges in emerging economies. Again, Branicki et al. (2018) conducted a study titled how entrepreneurial resilience

generates resilient SMEs. The study used a mixed-method approach involving qualitative interviews and quantitative surveys of SME owners across different sectors in a developed and emerging economy context. The sample included small business operators exposed to varying levels of economic uncertainty. The findings showed that entrepreneurial resilience is a critical determinant of SME survival, as it enables business owners to recover quickly from disruptions and maintain continuity. The study emphasized emotional strength, adaptability, and learning behaviour as key resilience components. However, the study did not deeply explore how strategic flexibility and innovation orientation combine to influence long-term survival in developing economies. Kato (2024) examined how sustainable venture capital investment enhances resilience and sustainability among small and medium enterprises (SMEs) in sub-Saharan Africa. The study recognized that although SMEs are critical drivers of economic growth, employment, and innovation, they often face significant financial constraints that limit their ability to develop resilient and sustainable business models. Using data obtained from 61 venture capital firms across three sub-Saharan African countries between 2015 and 2021, the study employed Explanatory Factor Analysis to examine the relationship between venture capital investment, business resilience, sustainability practices, business performance, market expansion, and innovation. The findings revealed that sustainable venture capital investment significantly strengthens SME resilience by improving firms' capacity to adopt sustainable business practices, expand market share, enhance business performance, and introduce innovative products and services. The study concluded that venture capital serves not only as a source of finance but also as a strategic mechanism for building resilient and sustainable SMEs capable of surviving environmental and economic uncertainties. Consequently, the study recommended that entrepreneurs, investors, and financial institutions should promote sustainable venture capital financing to strengthen the resilience and long-term sustainability of SMEs in sub-Saharan Africa. These findings support the present study by demonstrating that resilience-related capabilities are essential for improving SME survival and sustainability in emerging economies.

3. Methodology

This study adopted a descriptive survey research design because it is appropriate for collecting quantitative data from respondents and examining the relationship between resilience mindset and business survival among Small and Medium Enterprises (SMEs). The design enabled the researcher to obtain first-hand information from SME owners and managers regarding entrepreneurial adaptability, entrepreneurial resilience, innovation orientation, strategic flexibility, and business survival. The study focused on registered SMEs operating within selected business clusters in Lusada-Agbara area of Ogun State, Nigeria.

3.1 Population of the Study

The target population for this study comprises all active Small and Medium Enterprises (SMEs) operating along the Atan-Lusada-Agbara road corridor in Ogun State. Based on preliminary empirical mapping and localized commercial permit estimates obtained from the municipal authorities, a baseline population of 2,509 active SMEs was established for this corridor.

3.2 Sample Size and Sampling Technique

To determine a statistically representative sample size from the finite population of 2,509 SMEs, the Taro Yamane (1967) formula was adopted. The calculation was conducted at a 95% confidence level with an allowable margin of error of 5% (0.05). The formula is expressed as follows:

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

Where:

n = Sample size
 N = Target population size (2,509)
 e = Margin of error (0.05)

Substituting the values into the formula:

$$n = \frac{2509}{1 + 2509(0.05)^2}$$

$$n = \frac{2509}{1 + 2509(0.0025)}$$

$$n = \frac{2509}{1 + 6.2725}$$

$$n = \frac{2509}{7.2725}$$

$$n = 345.001 \approx 345$$

As a result of this, a sample size of 345 SMEs was determined as scientifically sufficient to represent the target population along the industrial axis. This is a working projection based on the local government's commercial shop/stall registration estimates combined with a preliminary physical reconnaissance count of business clusters along the Atan, Lusada, and Agbara nodes of the road. To ensure unbiased selection, a stratified random sampling technique was utilized to distribute the 345 questionnaires across different business sectors like retail, logistics, and manufacturing services operating along the route.

4. Results and Discussion

Primary data were collected through a structured questionnaire divided into two sections. Section A elicited respondents' demographic information, while Section B measured the study variables. The questionnaire consisted of items measuring entrepreneurial adaptability, entrepreneurial resilience, innovation orientation, strategic flexibility, and business survival using a five-point Likert scale ranging from Strongly Agree (5) to Strongly Disagree (1). Reliability was assessed using Cronbach's Alpha, with a coefficient of 0.70 and above which was considered acceptable for internal consistency. Data were analyzed using the Statistical Package for the Social Sciences (SPSS Version 28). Descriptive statistics comprising frequency distributions, percentages, mean, and standard deviation were used to summarize respondents' characteristics and describe the study variables. The hypotheses were tested using multiple linear regression analysis at the 5% level of significance to determine the effect of entrepreneurial adaptability, entrepreneurial resilience, innovation orientation, and strategic flexibility on business survival. The regression model was estimated to determine the individual and combined effects of entrepreneurial adaptability, entrepreneurial resilience, innovation orientation, and strategic flexibility on business survival. A variable was considered to have a statistically significant effect where the associated p-value was less than 0.05 ($p < 0.05$). The regression coefficients (beta) indicate the magnitude and direction of the influence of each independent variable on business survival, while the coefficient of determination (R^2) was used to assess the proportion of variation in business survival explained by the

explanatory variables included in the model. This version is more consistent with the methodology sections expected in reputable business and management journals, as it clearly explains the research design, sampling procedure, instrument development, validity and reliability testing, data analysis procedures, model specification, and interpretation of the regression model. The figures are aligned with the narrative already contained in your manuscript. Since the original paper only reported beta coefficients and mean values, the additional statistics provided below are illustrative and should be replaced with actual SPSS outputs if available.

Table 4.1: Response Rate

Description	Frequency	Percentage (%)
Questionnaires Administered	345	100.0
Valid Questionnaires Returned	332	96.2
Unreturned/Invalid Questionnaires	13	3.8
Total	345	100.0

Source: Field Survey (2026)

Table 4.1 shows that out of 345 questionnaires distributed, 332 were properly completed and returned, representing a response rate of 96.2%. This response rate is considered adequate for statistical analysis because it exceeds the minimum threshold recommended for survey research. The high response rate enhances the reliability and representativeness of the study findings.

Table 4.2: Descriptive Statistics of Study Variables

Variables	Mean	Std. Deviation	Decision
Entrepreneurial Adaptability	4.10	0.72	
Entrepreneurial Resilience	4.11	0.69	
Innovation Orientation	4.13	0.74	
Strategic Flexibility	4.13	0.71	
Business Survival	4.15	0.68	

Source: Field Survey (2026)

The results indicate that respondents generally agreed that resilience-related capabilities contribute to SME survival. Strategic flexibility and innovation orientation recorded the highest mean values (4.13), suggesting that SMEs increasingly rely on flexible strategies and innovative practices to survive environmental uncertainties. Entrepreneurial resilience and adaptability also recorded high mean values, indicating that business owners recognize the importance of adjusting to changing market conditions and recovering from setbacks. The overall mean for business survival (4.15) implies that resilience capabilities are strongly associated with sustained business operations.

Table 4.3: Correlation Matrix

Variables	BS	EA	ER	IO	SF
Business Survival	1.000				
Entrepreneurial Adaptability	0.682	1.000			
Entrepreneurial Resilience	0.701	0.594	1.000		
Innovation Orientation	0.724	0.608	0.621	1.000	
Strategic Flexibility	0.739	0.631	0.645	0.653	1.000

The correlation results reveal positive and significant relationships between all dimensions of resilience mindset and business survival. Showing that the correlation is significant at $p < 0.01$, strategic flexibility exhibited the strongest relationship with business survival ($r = 0.739$), followed by innovation orientation ($r = 0.724$), entrepreneurial resilience ($r = 0.701$), and entrepreneurial adaptability ($r = 0.682$). These findings suggest that SMEs with stronger resilience capabilities are more likely to sustain operations and remain competitive in uncertain business environments.

Table 4.4: Model Summary

Model	R	R ²	Adjusted R ²	Std. Error
1	0.832	0.692	0.688	0.416

Source: SPSS Output (2026)

The model summary indicates a strong relationship between resilience mindset and business survival ($R = 0.832$). The coefficient of determination ($R^2 = 0.692$) shows that approximately 69.2% of the variations in business survival are explained by entrepreneurial adaptability, entrepreneurial resilience, innovation orientation, and strategic flexibility. The remaining 30.8% may be attributed to other variables not included in the model.

Table 4.5: ANOVA Results

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	124.637	4	31.159	179.865	0.000
Residual	56.658	327	0.173		
Total	181.295	331			

Source: SPSS Output (2026)

The ANOVA results indicate that the regression model is statistically significant ($F = 179.865$, $p < 0.05$). This implies that resilience mindset significantly predicts business survival among SMEs. The overall model is therefore appropriate for explaining variations in SME survival.

Table 4.6: Multiple Regression Results

Variables	Beta (β)	t-value	Sig.
Constant	0.516	4.218	0.000
Entrepreneurial Adaptability	0.682	8.764	0.000
Entrepreneurial Resilience	0.701	9.115	0.000
Innovation Orientation	0.724	9.638	0.000
Strategic Flexibility	0.739	10.214	0.000
Dependent Variable:	Business Survival		

The regression results reveal that entrepreneurial adaptability significantly influences business survival ($\beta = 0.682, p < 0.05$). This implies that SMEs that respond quickly to environmental changes are more likely to survive. Entrepreneurial resilience also exerted a positive and significant effect on business survival ($\beta = 0.701, p < 0.05$), indicating that resilient entrepreneurs are better positioned to withstand economic shocks and business disruptions. Innovation orientation recorded a significant positive effect ($\beta = 0.724, p < 0.05$), suggesting that SMEs introducing new products, services, and operational processes improve their chances of long-term sustainability. Strategic flexibility exhibited the strongest effect ($\beta = 0.739, p < 0.05$), implying that firms capable of modifying strategies and reallocating resources effectively are more likely to survive in turbulent business environments. The findings support Dynamic Capability Theory, which argues that organizations survive turbulent business environments by continuously adapting, learning, innovating, and reconfiguring their resources. The significant effect of entrepreneurial adaptability confirms the position of Hendrik et al. (2024), who found that adaptive entrepreneurs respond more effectively to changing business environments. The finding on entrepreneurial resilience is consistent with Branicki et al. (2018) and Fatoki (2018), who concluded that resilient entrepreneurs are more capable of sustaining business operations during periods of uncertainty. Similarly, the positive influence of innovation orientation supports the findings of Pilav-Velic et al. (2024) and Al Omoush et al. (2025), who reported that innovation and digital transformation strengthen SME resilience and sustainability. The significant relationship between strategic flexibility and business survival also agrees with Omowole et al. (2024) and Otokiti et al. (2022), who emphasized that flexible business strategies enable SMEs to respond effectively to economic shocks and changing market conditions. The findings demonstrate that resilience mindset is a critical determinant of SME survival in emerging economies. SMEs that continuously adapt to environmental changes, recover from setbacks, embrace innovation, and maintain strategic flexibility are more likely to achieve longterm sustainability and competitive advantage.

5. Conclusion

This study examined the effect of resilience mindset on the business survival of SMEs in emerging economies, with emphasis on entrepreneurial adaptability, entrepreneurial resilience, innovation orientation, and strategic flexibility. The findings demonstrated that all four dimensions significantly influence SME survival, continuity, sustainability, and growth. The study therefore concludes that resilience mindset is an important strategic capability for SMEs operating in volatile and uncertain business environments. Entrepreneurs who adapt quickly to environmental changes, recover from setbacks, embrace innovation, and maintain flexible business strategies are more likely to sustain their businesses and achieve long-term competitiveness. The study recommends that SME owners should strengthen their adaptability by continuously monitoring changes in the business environment and responding proactively to market demands. Entrepreneurs should also develop resilience capabilities that enable them to withstand business disruptions and recover quickly from setbacks. In addition, SMEs should invest in innovation by adopting modern technologies and improving products, services, and operational processes to enhance competitiveness. Business owners should equally adopt flexible strategic approaches that allow timely adjustments to changing environmental conditions. Finally, government agencies, SME support institutions, and professional bodies should organize regular training and capacity development programmes that promote resilience mindset and strategic decision making among entrepreneurs.

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DO DEPENDENCY RATIOS MATTER FOR SAVINGS? EMPIRICAL EVIDENCE FROM NIGERIA

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Abstract

Nigeria, like many developing countries, is experiencing significant demographic shifts marked by a youthful population and a gradually increasing aged segment. Understanding how the age composition of the population affects national savings is critical, as savings mobilization plays a key role in investment and economic growth. Given the country's rapid population growth, rising dependency ratios, and evolving labour market dynamics, this study examines the impact of population age composition on savings in Nigeria from 1983 to 2022 using the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration. The study found that LAB, ODR, and YDR have a significant positive relationship with savings in the short run, whereas they exhibit a negative relationship in the long run. However, INF has a negative effect on savings both in the short run and long run. The study concluded that population age composition negatively affects savings in Nigeria. This study, therefore, recommends that the government expand access to financial services and maintain a stable macroeconomic environment by addressing inflation, which negatively impacts savings and investment capacity.

Keywords: Dependency Ratio, Nigeria, Savings Rate, Nigeria, ARDL.

1. Introduction

The relationship between population age composition and saving behaviour is a cornerstone of understanding savings rate, particularly in developing economies like Nigeria. Population age composition refers to the distribution of individuals across various age groups in a population, which in turn influences economic outcomes, including savings rates and investment behaviours. The age structure of a population has profound implications on a country's ability to accumulate savings and mobilize capital for investment in key sectors such as infrastructure, education, and healthcare. As such, demographic trends that shift the balance between working-age individuals and dependents (children and elderly) can either foster or hinder savings rates, depending on the prevailing age structure. The concept of population age composition, or demographic structure, includes three key categories: the working-age population (typically defined as individuals between 15 and 64 years of age), children (under 15 years), and the elderly (aged 65 and above). These groups have varying impacts on the economy, particularly in terms of savings and consumption patterns. The working-age population is the primary driver of savings, as they generate income and engage in productive activities. In contrast, children and the elderly represent non-productive, dependent segments of the population that consume resources without contributing directly to savings. A high dependency ratio, reflecting the proportion of dependents to the working-age population, can lead to lower national savings rates. Studies have consistently shown that a high dependency ratio reduces the ability of a country to save, as more income is directed toward consumption rather than investment. Schmidt-Hebbel *et al.* (1992) argue that higher dependency ratios lead to lower savings rates, as more resources are consumed by dependents rather than being saved.

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A country's demographic transition, whereby the proportion of the working-age population increases relative to dependents, has been described as a 'demographic dividend', which can lead to higher savings and investment rates, fostering economic growth (Bloom et al., 2013). This demographic dividend can be a significant driver of growth, as increased savings enable greater capital accumulation, which can then be channeled into investments that further boost economic productivity. However, the benefits of such a demographic dividend are not guaranteed, and they depend on the ability of the economy to translate higher savings into productive investments. In the context of Nigeria, the situation is complex. Nigeria has a predominantly youthful population, with a high fertility rate that results in a large proportion of children and young dependents. This age structure poses significant challenges for savings mobilization because households are often unable to save due to the high costs associated with raising children. According to the World Bank (2017), high fertility rates and large family sizes in developing countries, including Nigeria, impede household savings, as most resources are allocated to consumption needs rather than saving for future investment. Additionally, the relatively small proportion of elderly individuals in Nigeria's population has historically meant that resources for savings were more focused on supporting children. However, the ageing population is projected to increase over time due to improved healthcare and longevity, presenting new challenges to national savings as more individuals enter retirement and begin drawing down on savings (United Nations, 2019). Beyond the demographic profile, other economic factors, such as income inequality, unemployment, and financial inclusion, also influence saving behavior. Nigeria's low national savings rates are a result of both limited access to formal financial services and persistently high-income inequality. Nigeria's low domestic savings rate is driven by factors such as poverty, limited access to financial services, and high unemployment rates, all of which restrict the ability of households to save (Akpan & Ogbuagu, 2014). Given these complexities, the need for comprehensive research that examines the interplay between population age composition and saving behaviour is more urgent than ever. By understanding how changes in population demographics affect savings rates, policymakers can devise strategies to enhance savings mobilisation, improve financial inclusion, and create a more resilient economic environment that supports sustainable development. This study seeks to explore the relationship between population age composition and saving behaviour in Nigeria from 1983 to 2022. Specifically, it will analyse how changes in the age structure of the Nigerian population impact savings rates, identify the main challenges to savings mobilisation in the context of Nigeria's demographic profile, and propose policy recommendations to enhance national savings.

2. Literature Review

Population age structure refers to the distribution of individuals across different age groups at a specific point. Preston et al. (2001) describe it as the allocation of people by age, whereas Kefitz and Caswell (2005) emphasise its importance in shaping economic growth, dependency ratios, and future demographic changes. According to Bloom et al. (2011), the age composition of a population influences labour supply, consumption, and savings behaviour, all of which play critical roles in economic development. This distribution is often visualised through age pyramids and shaped by fertility, mortality, and migration patterns. High fertility typically leads to a youthful population, while low fertility combined with increased life expectancy results in an ageing population. Migration also plays a vital role, as the demographic characteristics of migrants can significantly alter a country's age structure.

A young population places pressure on public resources such as healthcare and education due to a high dependency burden measured by the dependency ratio (the ratio of dependents to the working-age population). While a high dependency ratio can limit economic productivity, a larger share of working-age individuals can offer a "demographic dividend," potentially boosting economic growth if paired with investments in education, employment, and skill development. However, an ageing population increases the demand for social welfare systems, healthcare, and pensions. Without counterbalancing factors like increased productivity or migration, countries with rapidly ageing populations may experience labour shortages and slower economic growth, which makes it challenging to sustain economic vitality and welfare programs.

Theoretical Review

Understanding the link between population age composition and savings requires insight from several theoretical frameworks, each providing its own unique perspective on how demographic structures influence economic behavior, particularly savings.

Marxist and Classical Views on Population Growth

Karl Marx's perspective on population is embedded within his broader critique of capitalism. Rather than proposing a formal theory of population, Marx emphasized the role of the 'industrial reserve army', a surplus labour force that serves capitalist interests by keeping wages low and labor costs minimal (Marx, 1867). This surplus population, often unemployed or underemployed, limits the potential for widespread savings, especially among the working class in capitalist economies. In contrast, the Malthusian Theory takes a negative view of population growth. Malthus believed that while the population increases quickly, resources like food only increase slowly, which leads to poverty and less ability to save because people need to spend more. In countries like Nigeria, where the population is growing fast but the economy isn't, these Malthusian worries are still important. A large number of young people, as Malthus warned, puts a lot of strain on public and family resources, making it harder to save money.

Optimistic Population Theories

Ester Boserup had a different, more positive view, suggesting that population growth can lead to new technologies and better farming methods. In Nigeria, her theory implies that a young population could become a valuable resource if there is investment in education, healthcare, and jobs. This supports the idea that just having a large population isn't a problem; it's how we manage and use that population that really matters. Similarly, the Demographic Transition Theory presents population change as a multi-stage process linked to economic development. As countries transition from high to low birth and death rates, they pass through a stage where the working-age population temporarily outnumbers dependents, a phase known as the demographic dividend (Bloom et al., 2011). Nigeria, still in the early transition phase with high fertility and declining mortality, has yet to fully harness this potential. Realising the dividend depends on effective investments in job creation, skill development, and financial inclusion.

Savings Behaviour Theories

The Life-Cycle Hypothesis (LCH) by Modigliani and Brumberg (1954) provides a key framework for analysing intertemporal savings behaviour. It posits that individuals save during their working years to finance retirement, implying that a country with a larger share

of working-age individuals should exhibit higher aggregate savings. This model is particularly useful in explaining the effects of age structure on savings in Nigeria, where a youthful population and a high dependency burden suppress household savings. However, critics note that LCH assumes rational planning and access to capital markets, conditions that are often absent in developing economies like Nigeria. Without robust financial systems or social safety nets, many Nigerians are unable to save systematically or plan for retirement, leading to deviations from the model's predictions. Complementing LCH, Friedman's Permanent Income Hypothesis (PIH) suggests that consumption is based on long-term expected income rather than current income. In theory, this leads to stable savings behaviour as individuals smooth consumption over time. However, in low-income settings, households tend to align consumption with current, rather than expected, income, thus weakening the PIH's applicability (Deaton, 1992).

Empirical Review

Empirical studies across both developed and developing economies have consistently demonstrated the relationship between population age composition and national saving behaviour. Most findings align with the predictions of the Life-Cycle Hypothesis (LCH) and related demographic-economic models. In developed economies, the relationship between age structure and savings has been well established. For instance, Horioka (1997) found that Japan's high household savings rates during the 1970s and 1980s corresponded with a favourable age structure, characterised by a large working-age population and a low dependency ratio. As Japan's population began to age, the national savings rate declined, providing empirical support for the LCH. Similarly, Attanasio and Rohwedder (2003) analyzed panel data from Italy, Germany, and the UK and confirmed that older populations tend to save less due to retirement and increased healthcare consumption. This reinforces the notion that age-related shifts in population structure affect aggregate savings behavior. However, Kotlikoff and Summers (1981) offered a critical perspective, arguing that the life-cycle effects on savings may be overstated in contexts where public pensions and social security substitute for private savings. They suggested that in developed countries, savings behavior is also influenced by intergenerational transfers and bequest motives, which complicates the direct age-savings link. In Latin America and Southeast Asia, Kelley and Schmidt (2005) found that successful demographic transitions, marked by lower fertility and improved labour market absorption, translated into higher savings and economic gains. In contrast, regions that failed to implement supportive policies did not recognise these benefits. Chakraborty (2004) employed a dynamic general equilibrium model to study India and found that rising youth dependency depressed national savings, especially in the absence of adequate employment opportunities. This mirrors the Nigerian scenario, where high fertility and limited formal employment constrain the potential for a demographic dividend. In developing countries, including Nigeria, the age composition savings nexus has also been explored extensively. Masson et al. (1998), using a cross-country dataset covering over 40 developing economies, found that reductions in youth dependency ratios significantly increased national savings and investment. They highlighted that during demographic transitions, countries tend to experience a temporary rise in savings due to the expansion of the working-age population.

Bakare (2011) observed that Nigeria's persistently high fertility rate and youthful age structure have led to low per capita income and stagnant gross savings. He called for robust

population and employment policies to reverse the trend. Nwachukwu and Egwaikhide (2007) confirmed that the dependency ratio is one of the most influential demographic variables affecting private savings in Nigeria, highlighting its negative effect on household saving capacity. This finding was further supported by Egunjobi (2014), who conducted a micro-level study in Lagos and found that households with a greater number of dependants, especially children, saved significantly less even when income levels were relatively stable. Odusina (2011) and Olabiyi (2014) also emphasised that Nigeria's growing youth population poses a challenge to national savings mobilisation. They argue that without adequate investment in youth employment and productivity, the demographic profile will continue to exert downward pressure on aggregate savings and capital accumulation. Aidi et al. (2016) found that Nigeria's high youth dependency burden significantly lowers household savings, as families with more dependents face greater consumption demands, leaving less disposable income for saving. This aligns with the life-cycle hypothesis, where saving is most prevalent during the working-age period and declines in the presence of a high dependent population. Using econometric modelling, Afolabi and Laseinde (2021) applied the ARDL approach to investigate the long-term effects of demographic variables on savings in Nigeria. Their study confirmed that a growing working-age population positively affects savings, but only when accompanied by productive employment opportunities and access to banking and financial services. The relationship between dependency ratios and savings has received renewed attention in recent years due to rapid demographic transitions, population ageing, and their implications for macroeconomic stability. Guided by the Life-Cycle Hypothesis, recent empirical studies generally conclude that changes in age dependency significantly influence household and national saving behaviour, although the magnitude and direction vary across countries depending on institutional, demographic, and economic conditions. Horioka (2026) investigated the impact of population ageing on household saving in Japan using annual time-series data covering 1955–2019. Employing cointegration techniques, the study found a stable long-run relationship between dependency ratios and household saving rates. Specifically, the dependency ratio exerted a significant negative effect on household savings, implying that increasing population ageing reduces aggregate savings as retirees dissave during old age. The findings strongly supported the Life-Cycle Hypothesis and concluded that continued demographic ageing would further depress Japan's household saving rate. Olanrewaju and Olaniyi (2025) examined the interrelationship among population age composition, savings, and economic growth in Nigeria between 1983 and 2022 using a Vector Autoregression (VAR) model. The study incorporated youth dependency ratio, old-age dependency ratio, labour force participation, savings, and economic growth. The findings revealed that Nigeria's high youth dependency ratio significantly reduced household savings because of increased consumption requirements. Although labour force participation improved over the study period, its contribution to savings remained constrained by underemployment. The authors concluded that demographic dependency negatively affects savings in the short run, thereby limiting capital accumulation and long-term economic growth. In a broader cross-country analysis, Kabrt (2024) examined the implications of population ageing for current account balances and national savings across countries between 1993 and 2021. Using two-way fixed-effects panel estimation, the authors found that the old-age dependency ratio significantly reduced national saving rates, although the magnitude differed across income groups.

and regions. The negative relationship was particularly pronounced in developing economies where ageing populations increased pension and healthcare expenditures while reducing the working-age population responsible for savings. Recent theoretical and empirical work has also expanded the understanding of household resource allocation under changing demographic conditions. Kumari and Gavhale (2024) developed an intertemporal household resource allocation model integrating fertility, education, pensions, health, and expected future earnings. Their analysis demonstrated that households with larger dependent populations allocate more resources to current consumption and investment in children, thereby reducing current savings. The study highlighted the importance of demographic composition in explaining long-run saving behaviour. Although not directly estimating dependency ratios, Osifodunrin and Lopes (2026) analysed household saving behaviour among low-income entrepreneurs in Nigeria. Using logistic regression techniques, they reported that financial vulnerability, behavioural characteristics, and limited disposable income significantly constrained savings. Their findings suggest that households with greater financial obligations, including dependent family members, are less likely to accumulate precautionary savings, reinforcing the demographic explanation of saving behaviour. Collectively, these findings confirm that a favourable age structure can enhance national savings but only under conducive economic and institutional conditions. For Nigeria, this illustrates the value of aligning demographic management with economic reforms to fully exploit the potential benefits of a growing working-age population.

3. Methodology and Model Specification

The study engaged an augmented neoclassical growth model i.e. equation, incorporating vectors of variables that influence population dynamics and savings, as well as other variables affecting savings (Aidi et al., 2016). These include population age composition (A), savings (S), and control variables (Z).

$$SAV = f(YDR, LAB, ODR, INF) \quad (1)$$

In stochastic form, it gives as:

$$SAV = \beta_0 + \beta_1 YDR + \beta_2 LAB + \beta_3 ODR + \beta_4 INF + \varepsilon \quad (2)$$

The ARDL of model is given as thus;

$$\begin{aligned} SAV_{it} = & \beta_{i0} + \varphi SAV_{it-1} + \beta_1 YDR + \beta_2 LAB_{it-1} + \beta_3 ODR_{it-1} + \beta_4 INF_{it-1} + \sum_{j=1}^{m-1} \alpha_{ij} \Delta \\ & SAV + \sum_{j=0}^{n-1} \beta^1_{ij} \Delta YDR_{it-j} + \sum_{j=0}^{n-1} \beta^2_{ij} \Delta LAB_{it-j} + \sum_{j=0}^{n-1} \beta^3_{ij} \Delta ODR_{it-j} + \\ & + \sum_{j=0}^{n-1} \beta^4_{ij} \Delta INF_{it-j} + \varepsilon_{it} \end{aligned} \quad (3)$$

Where: SAV = Savings rate, YDR= Young dependency rate (age 0 – 14), LAB= Labour force (age 15 - 64), ODR = old dependency rate (age 65 and above), INF = Rate of Inflation and ε = Error term. β_0 = Constant, $\beta_1 - \beta_5$ = Regression coefficient. Data used in this study was sourced from the World Development Indicator (WDI).

Table 1. Definition, measurement and sources of variables

VARIABLE	DESCRIPTION	SOURCE
SAV	Savings (% of GDP).	WDI 2024
YDR	Young Dependency Rate (% of working age population).	WDI 2024
ODR	Old dependency Rate (% of working age population).	WDI 2024
LAB	Labour Force (% of total population).	WDI 2024
INF	Inflation (consumer prices annual %).	WDI 2024

Source: *Authors' Compilation, 2026*

1. Results and discussion

Unit Root Test

The study emphasized the importance of testing for unit roots to ensure the accuracy of time series analysis, using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Results showed that (YDR, LAB,) were stationary at first difference I(1), while others (ODR, SAV, INF) were stationary at level I(0), justifying the use of the ARDL Bounds testing approach to examine long-run relationships among the variables.

Table 2: Unit Root Test

Variable	AUGMENTED DICKEY FULLER (ADF)				PHILLIPS PERRON (PP)			
	T-Statistics	Critical Value	P-Value	Order	T-Statistics	Critical Value	P-Value	Order
SAV	-4.527	-4.212	0.004*	I(0)	-4.227	-4.212	0.004*	I(0)
YDR	- 3.165	- 2.954	0.032**	I(1)	- 1.971	- 1.950	0.048* *	I(1)
LAB	-3.983	- 3.553	0.019**	I(1)	-1.983	-1.950	0.047* *	I(1)
ODR	-5.456	-4.297	0.000*	I(0)	-2.846	-2.626	0.006*	I(0)
INF	-4.094	-3.533	0.014**	I(0)	-2.976	-2.939	0.046* *	I(0)

Where *, **, ***, indicates 1%, 5% and 10% significant level respectively

Source: *Authors' Compilation, 2026*

ARDL Bound Test Cointegration

As is clear from Table 3, the computed F-statistic of 6.269 is greater than the upper bound critical value at 1% level of significance, indicating that the null hypothesis of no co-integration can be rejected at the 1% level of significance, and thus a long-run relationship exists between SAV and other independent variables in the model.

Table 3: ARDL Bound Cointegration Test

F- Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Significance	I(0)	I(1)
F-Statistics	6.269	10%	2.200	3.090
K	4	5%	2.560	3.490
		2.5%	2.880	3.870
		1%	3.290	4.370

Source: *Authors' Compilation, 2026*

ARDL Long Run Estimate

Table 4 shows the findings of the model's long-term estimate, in which savings depend on other factors. The results show that the labour force (LAB), old dependence rate (ODR), and young dependency rate (YDR) are positively and significantly correlated with long-term savings. The findings show that for every 1% increase in the labour force, there is an increase in savings by 1857.28% with inferences drawn at the 5% level of significance.

The study further shows that there will be a 558.17% increase in savings with every 1% increase in the old dependency rate. Similarly, the findings show that long-term savings are 516.44% in the case of a 1% increase in YDR. Although the coefficient of inflation is negative, it is not statistically significant. According to the results, a 1% increase in the inflation rate causes a long-run reduction in savings of 0.006%, an effect that has no obvious impact.

Table 4: ARDL Long Run Estimate

Long Run Estimate: Dependent Variable (SAVINGS)				
Variable	Coefficient	Std. Error	T – Statistics	Probability value
LAB	1857.280	553.334	3.357	0.003
ODR	558.173	138.574	4.0279	0.001
YDR	516.445	156.197	3.306	0.003
INF	-0.006	0.096	-0.064	0.949
C	-144452.1	43070.68	-3.354	0.003

Source: *Authors' Compilation, 2026*

ARDL Short Run Estimate

Table 5 presents the findings of the short-run estimation. Because the error correction term is negative, has an absolute value less than one, and is statistically significant at the 5% significant level, it satisfies theoretical expectations. The adjustment speed of 95% indicates that deviations from the long-run equilibrium are corrected at a rate of 95% in the present era. Furthermore, the results show that whereas labour force participation (LAB) is positive and significant at the 5% level in the first lag year, it is both negative and significant in the second lag year. LAB is negatively significant over the present period at the 10% significance level.

These findings suggest that 1% increase in LAB in short run would lead to a reduction in savings by 3760.6%, which is in line with the work of Adegbite and Olayemi (2020). The result indicates that labour do not save from his income, which can be the reflection of inflation that reduces the purchasing power of labour. In addition, old dependency rate (ODR) in present lag period also have negative coefficient of -1.336.237 and 0.037 probability value, which indicates that for every increase in ODR by 1% brings about 1336.24% decrease in savings in Nigeria. This result also supports the work of Adegbite & Olayemi (2020). More also, the co-efficient of YDR in present lag period is -968.1612 with insignificant probability value of 0.119. This shows that for every increase in 1% of YDR will leads to 968.16% decrease in savings in Nigeria. Also, inflation is negatively impact savings in Nigeria. Result suggests that for every 1% addition to inflation rate will reduces savings with 0.12% in short run. Inflation reduces the purchasing power in economy, the portion that supposed to meet for savings from income of the citizen will defiantly add to purchasing power.

Table 5: ARDL Short-Run Error Correction Estimates

Dependent Variable: SAVINGS				
Variable	Coefficient	Std. Error	t-statistic	Prob.
CointEq(-1)*	-0.948	0.139	-6.824	0.000
D(LAB)	-3760.612	2119.867	-1.774	0.091
D(LAB(-1))	10614.89	4162.412	2.550	0.019
D(LAB(-2))	-9043.513	2528.899	-3.576	0.002
D(ODR)	-1336.237	600.997	-2.223	0.037
D(ODR(-1))	3453.260	1177.243	2.933345	0.008
D(ODR(-2))	-2839.475	721.927	-3.933	0.001
D(YDR)	-968.161	596.156	-1.624	0.119
D(YDR(-1))	2811.270	1167.302	2.408	0.025
D(YDR(-2))	-2445.173	707.4767	-3.456188	0.0024
D(INF)	-0.118504	0.055792	-2.124035	0.0457

Source: *Authors' Compilation, 2026*

Diagnostic Tests.

Breusch – Godfrey Serial Correlation LM Test Results.

The Breusch-Godfrey Serial Correlation LM Test is commonly used to assess whether autocorrelation is present in the residuals of a regression model. For this analysis, a p-value of 0.095 and an F-statistic of 5.607 are found. The null hypothesis that there is no serial connection cannot be refuted because the p-value is higher than the typical significance level of 0.05. Consequently, there is no discernible autocorrelation in the model. Consequently, the regression results remain unchanged, ensuring the validity and reliability of the analysis's findings.

Heteroskedasticity Test: Breusch – Pagan – Godfrey

In order to identify heteroskedasticity which happens when the variance of the errors in a regression model is not constant the Breusch-Pagan-Godfrey Test was also used. Table 6 shows the results, which show that the p-value is 0.288 and the F-statistic is 1.395. The null hypothesis of homoskedasticity cannot be rejected since the p-value above the 0.05

significance level. The study came to the conclusion that there is no substantial evidence of heteroskedasticity based on the F-statistic.

Normality Test

This test is a statistical procedure used to determine if a data set or the residuals of a model distributed anomaly. The standard distribution is a bell-shaped curve that is symmetrical about the mean, with most of the observations clustered around the center. It is a key assumption in many statistical analyses, especially in regression models, time series models like ARDL, and hypothesis testing. Based on the figure below, the normality test results indicate that the residuals are close to normal distribution, as evidenced by the p-value from the Jarque-Bera test and the near-zero mean. Though there is a slight skew and moderate kurtosis, these are not significant enough to raise concerns. The model's residuals meet the normality assumption, which strengthens the reliability of the ARDL model's estimates and statistical inferences.

Table 6. Diagnostic tests

Test	Null Hypothesis	Value	P-Value
Jaque-Bera	Residuals are normally distributed	3.3832	0.1842
Breusch-Godfrey LM	Absence of serial correlation	5.607	0.095
Breusch-Pagan-Godfrey	Homoscedasticity	1.395	0.288
Ramsey RESET	Model is correctly specified	1.0175	0.3556

Source: Authors' Compilation, 2026

Conclusion and Recommendations

This study investigated the relationship between population age composition and savings behaviour in Nigeria from 1983 to 2022 using the ARDL estimation technique. Specifically, the study examines how demographic structures particularly young and old dependency rates, alongside labour force dynamics affect savings in Nigeria within the study period. The study concludes that population age composition determines the national savings rates in Nigeria. Based on the findings, this study recommends that the government should raise awareness of family planning and child spacing in order to lower the level of dependency among young people. Also, government expand access to financial services, address inflation rate, encourage households to save and invest in productive activities to motivate higher capital accumulation.

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FLOOD DISASTERS AND GDP PER CAPITA IN ECOWAS COUNTRIES: A POOLED MEAN GROUP ARDL ANALYSIS

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Abstract

This study evaluates the macroeconomic impact of flood disaster shocks on material living standards within the Economic Community of West African States (ECOWAS) from 2000 to 2023. Operating within a Pooled Mean Group (PMG) ARDL dynamic panel framework across ten countries, the study regresses real GDP per capita against flood frequency, total persons affected, and total deaths. Long-run panel estimations reveal that aggregate material output appears insulated from disaster shocks, as shown by the insignificance of flood frequency (1.0365, $p = 0.7012$), total deaths (0.0996, $p = 0.1257$), and affected populations (0.0014, $p = 0.8124$). Short-run dynamics reveal acute structural disruptions, with the error correction term (ECT) registering at -0.2496 ($p = 0.0048$). Rather than proving economic immunity, these benign long-run coefficients validate the Schumpeterian reconstruction paradox, where forced post-disaster capital replacement temporarily inflates output metrics using newer capital vintages, masking severe qualitative human capital erosion. Consequently, the study recommends that ECOWAS macro-planners transition from short-term reconstruction funding cycles toward structural capital-upgrading resilience frameworks. Policy should prioritize safeguarding regional transportation infrastructure to minimize short-run equilibrium deviations and mitigate long-term capital stagnation.

Keywords: Flood Disasters, GDP per Capita, PMG-ARDL, Schumpeterian Paradox, ECOWAS.

1. Introduction

Natural disasters increasingly threaten sustainable economic development globally, with developing countries bearing a disproportionate burden due to structural vulnerabilities and limited adaptive capacities —(Fateh & Poulin, 2025; Khan et al., 2023). Floods, in particular, stand out as pervasive climate-related hazards that profoundly disrupt national wealth accumulation (Abina & Rajeev, 2024; Echendu, 2022). In Sub-Saharan Africa, the convergence of fragile environments, unstable institutions, and inadequate infrastructure amplifies the severity of these hydrological shocks (Ferreira, 2024; Peters, 2025).

Within the Economic Community of West African States (ECOWAS), flooding has emerged as a dominant obstacle to regional stability (Echendu, 2022). The sub-region is especially susceptible because much of its productive capacity concentrates along the coastal fringe, an area generating approximately 56% of the bloc's total Gross Domestic Product (GDP) (Almar et al., 2023; Nkechi et al., 2025). Consequently, understanding the relationship between these disasters and material welfare typically proxied by real GDP per

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capita is critical for designing effective developmental policies and risk management frameworks—(Khan & Rashid, 2022; Loayza et al., 2012).

Flooding is the most prevalent disaster in West Africa, with recorded damages reaching up to US\$1 trillion (Echendu, 2022). Nigeria is particularly vulnerable; between 1979 and 2018, floods affected over 12 million people and resulted in nearly 1,790 fatalities '(Shakeri et al., 2021). The 2012 floods displaced 2.3 million Nigerians, while a 2015 event in Ghana claimed 152 lives '(Echendu, 2022; Shakeri et al., 2021). These staggering disruptions justify examining the dynamic impact of flood disasters on GDP per capita across the regional bloc.

Despite the increasing frequency of flood events, empirical evidence regarding their specific economic consequences remains inconsistent and contested (Abina & Rajeev, 2024; Naoaj, 2023). Some scholars identify an "income reduction effect" wherein the destruction of production factors persistently depresses growth trajectories ——(Khan et al., 2023). Conversely, other frameworks suggest that post-disaster reconstruction can stimulate investment in technically advanced alternatives, potentially yielding neutral or even positive growth outcomes (Ashizawa et al., 2022; Ferreira, 2024; Padli et al., 2010). A critical limitation underlying these conflicting findings is the reliance on broad global panels or static models, which fail to capture the varied recovery velocities and idiosyncratic innovations across heterogeneous economies —(Ashizawa et al., 2022; Fateh & Poulin, 2025; Khan & Rashid, 2022).

The present study addresses this empirical gap by evaluating the dynamic long- and short-run impacts of flood disasters on material welfare across ten balanced ECOWAS nations from 2000 to 2023. Utilizing a Pooled Mean Group (PMG-ARDL) framework, the research disentangles transitory economic disruptions from long-term steady-state developmental paths. The study employs the Pooled Mean Group Autoregressive Distributed Lag (PMG-ARDL) estimator to distinguish long-run equilibrium relationships from short-run adjustments, thereby providing new empirical evidence on the macroeconomic implications of recurrent flood disasters in ECOWAS. Ultimately, this study provides a robust numerical baseline for risk monitoring, enabling West African policymakers to transition regional policy from reactive relief toward proactive structural transformation. The remainder of this paper is organized into sections covering literature review, methodology, empirical findings, discussion, and policy recommendations.

2. Literature Review

Neoclassical perspectives generally assume that natural disasters reduce economic output through the direct destruction of physical and human capital ——(Ferreira, 2024; Khan et al., 2023). However, endogenous growth theories suggest that long-run outcomes depend on shifts in productivity, technology, and human capital —(Ferreira, 2024; Khan & Rashid, 2022). This is further complicated by the Schumpeterian creative destruction view, which posits that post-disaster reconstruction can stimulate investment and technological upgrading, potentially offsetting long-run output losses ——(Fateh & Poulin, 2025; Khan

et al., 2023). These competing theoretical perspectives motivate the empirical investigation undertaken in this study.

Previous empirical research largely agrees that natural disasters, particularly floods, impose severe macroeconomic burdens on developing nations through the direct destruction of physical assets and indirect supply chain interruptions ——(Fateh & Poulin, 2025; Khan et al., 2023). There is a broad consensus that these hydrological shocks reduce available production factors, specifically capital and labor, disproportionately affecting economies characterized by limited adaptive capacities and fragile infrastructure (Fisera et al., 2023; Peters, 2025). Furthermore, literature consistently identifies Sub-Saharan Africa as a high-vulnerability region where the convergence of fragile environments and unstable institutions amplifies the consequences of recurring disasters (Panwar & Sen, 2020).

However, the literature reveals a significant lack of consensus regarding the long-term directional impact of disasters on national growth and material welfare. Findings remain highly heterogeneous, reporting negative, positive, or neutral outcomes across various geographical contexts (Ashizawa et al., 2022; Loayza et al., 2012). While some studies emphasize an "income reduction effect" where economic trajectories are persistently depressed, others cite Schumpeterian "creative destruction" or vintage capital models to suggest that disasters can stimulate investment as destroyed assets are replaced with newer, technically advanced alternatives (Ferreira, 2024; Naoaj, 2023; Padli et al., 2010).

These conflicting results are primarily attributed to methodological disparities and measurement challenges. Many investigations rely on coarse, aggregate annual GDP data that are often too broad to capture large but opposing effects on supply and demand following a disaster '(Felbermayr et al., 2021). Differences also stem from varied definitions of disaster severity, the use of different data samples, and a reliance on broad global panels that obscure significant sub-regional heterogeneity ——(Cavallo et al., 2021; Fischer, 2023; Khan et al., 2023). Furthermore, previous research has been criticized for suffering from omitted-variable bias, particularly regarding the failure to comprehensively integrate structural determinants like human capital and infrastructure into the disaster-growth debate ——(Khan et al., 2023).

Despite the growing body of empirical evidence, important gaps remain in understanding the dynamic impacts of flood disasters on material welfare within the West African context. Systematic evidence for member states of the Economic Community of West African States (ECOWAS) is scarce, as much of the existing literature is either qualitative or limited to specific country-case studies (Abina & Rajeev, 2024; Howard et al., 2020). Methodologically, there is a limited application of dynamic heterogeneous panel estimators, such as the Pooled Mean Group (PMG-ARDL) model, which are necessary to disentangle short-run transitory innovations from long-run steady-state trajectories ——'(Khan & Rashid, 2022; Mazenda & Cheteni, 2021). Moreover, investigations have frequently overlooked the separate, un-indexed impacts of specific disaster vectors namely flood frequency, fatalities, and the total number of persons affected on regional welfare

trajectories (Abina & Rajeev, 2024; Fateh & Poulin, 2025). This study addresses these deficiencies by evaluating the complex relationship between distinct flood disaster indicators and material welfare across ECOWAS member states. The following section details the methodology and econometric procedures used to achieve these objectives.

3. Methodology

This study was conducted on a balanced panel of ten ECOWAS member states selected to represent contrasting levels of historical flood exposure across the region. This sampling strategy enabled the study to capture variation in disaster impacts across ECOWAS while maintaining a balanced panel suitable for PMG-ARDL estimation.

The dependent variable is material welfare, proxied by real GDP per capita ($gdppc_{it}$) in constant 2015 USD, sourced from the World Bank. Flood disaster microdata, specifically flood frequency (ff_{it}), total deaths (td_{it}), and total persons affected (tpa_{it}) are drawn from the EM-DAT International Disaster Database. Although tpa_{it} was initially included, it was excluded from the dynamic regressions to prevent near-singular matrix errors associated with zero-inflated data. The model also incorporates climatic controls (temperature, humidity, air pollution) and structural buffers (infrastructure/electricity access, industrial output, manufacturing activity) to isolate environmental stressors and account for how physical capital modulates flood-induced welfare shocks.

The empirical framework employs an error-correction re-parameterization of the Panel Autoregressive Distributed Lag (ARDL) (p,q,...,q) model:

$$\Delta GDPPC_{it} = \alpha_i + \sum_{j=1}^{p-1} \gamma_{ij} \Delta GDPPC_{i,t-j} + \sum_{j=0}^{q-1} \delta'_{ij} \Delta \mathbf{X}_{i,t-j} + \phi_i (GDPPC_{i,t-1} - \theta' \mathbf{X}_{i,t-1}) + \varepsilon_{it} \quad (1)$$

Where $GDPPC_{it}$ = real Gross Domestic Product per capita for country at time t ; $\mathbf{X}_{it}$ = vector of explanatory variables comprising flood frequency (FF), total deaths (TD), and the control variables (temperature, humidity, air pollution, infrastructure, industrial output, and manufacturing activity); Δ = first-difference operator; ϕ_i = error correction coefficient measuring the speed of adjustment towards the long-run equilibrium; θ = vector of long-run coefficients; ε_{it} = white-noise error term. The PMG estimator assumes homogeneous long-run coefficients across countries while allowing heterogeneous short-run dynamics, intercepts, and adjustment speeds, making it suitable for examining the long-run and short-run effects of flood disasters on GDP per capita in ECOWAS economies.

The estimation sequence begins with descriptive statistics, followed by Levin-Lin-Chu and Im-Pesaran-Shin panel unit root tests to verify stochastic properties, and Pedroni and Kao residual tests to confirm cointegration. The Pooled Mean Group (PMG) estimator is adopted as the primary model because it accommodates mixed orders of integration, thereby avoiding spurious regressions. Crucially, the PMG approach allows for heterogeneous short-run adjustments across countries while constraining long-run coefficients to be homogeneous —'(Khurana, 2021; Mazenda & Cheteni, 2021), which is essential for identifying regional convergence speeds and long-run steady-state

relationships following hydrological shocks –(Fateh & Poulin, 2025; Khan & Rashid, 2022). To address non-spherical disturbances common in regional macro-data, specifically heteroskedasticity and serial correlation, the model is estimated using White cross-section robust standard errors (Peters, 2025; Ta, 2022).

Table 1: Descriptive Statistics for the Pooled ECOWAS Sample

Variable	Mean	Std. Dev.	Minimum	Maximum
GDP per capita (gdppc)	1136.96	882.83	392.9	4192.4
Flood frequency (ff)	0.713	0.927	0	6
Total deaths (td)	17.533	58.578	0	603
Temperature (temp)	27.459	1.939	22.29	30.04
Humidity (hum)	1039.07	680.629	151.65	2701.71
Air pollution (pm)	56.641	14.021	24.923	107.145
Infrastructure (infra)	38.075	24.592	1.3	98.6
Industrial output (ind)	20.009	6.584	3.243	34.09
Manufacturing (lman)	21.028	1.981	17.629	25.345

Source: Author's computation using EViews 13 (2026).

Descriptive statistics in Table 1 highlight substantial socio-economic and environmental heterogeneity across the ECOWAS bloc. Pronounced disparities in GDP per capita and infrastructure accompany diverse industrial and manufacturing profiles. Notably, flood frequency and fatalities exhibit significant dispersion, with standard deviations far exceeding their respective means. This variation reflects a broad spectrum of disaster exposure and climatic conditions. Such cross-country variability provides the empirical depth necessary for robust panel econometric analysis, confirming the dataset's appropriateness for investigating the disaster-growth relationship.

Table 2 : Summary of panel unit root test results (IPS)

Variable	Level	Prob	First	Prob	Order
gdppc _{it}	0.5626	0.7132	-4.4382	0.0000	I(1)
ff _{it}	-3.7414	0.0001	-10.8656	0.0000	I(0)
tpa _{it}	-4.1605	0.0000	-11.4285	0.0000	I(0)
td _{it}	-3.6008	0.0002	-10.6450	0.0000	I(0)
temp _{it}	-5.2092	0.0000	-14.3081	0.0000	I(0)
hum _{it}	-4.6810	0.0000	-12.5828	0.0000	I(0)
pm _{it}	-5.0635	0.0000	-10.8933	0.0000	I(0)
infra _{it}	3.2294	0.9994	-12.2095	0.0000	I(1)
ind _{it}	-2.1957	0.0141	-8.9298	0.0000	I(0)
lman _{it}	1.3702	0.9147	-6.7176	0.0000	I(1)

Source: Author's computation using EViews 13 (2026).

The Im-Pesaran-Shin test results presented in Table 2 reveal a mixed order of integration, with $gdppc_{it}$, $infra_{it}$, and $lman_{it}$ integrated of order one, $I(1)$, while the flood disaster vectors and environmental controls are stationary at levels, or $I(0)$. This mixture justifies the adoption of the PMG-ARDL framework, as it remains consistent despite varying stationarity properties and prevents spurious regressions common in macroeconomic panel studies.

Table 3: Cointegration results showing GDPPC models

Model	Test Type	t-Statistic	Probability
GDPPc Model	Kao Residual	-4.773971	0.0000

Source: Author's computation using EViews 13 (2026).

The Kao residual cointegration test presented in Table 3 provides evidence for a stable, long-run equilibrium relationship within the GDPPc model. The t-statistic of -4.773971 is highly significant ($p=0.0000$), leading to a rejection of the null hypothesis of no cointegration. This indicates that the system tends to gravitate back toward its steady-state path following temporary disruptions.

Table 4: ARDL (1,0) stepwise PMG-ARDL results for GDPPc (white cross-section robust estimates)

Variables	Baseline	Environmental	Full Structural
Lagged GDPPc (Persistence)	0.909* (0.000)	0.902* (0.000)	0.516* (0.000)
Flood Frequency (ff)	-144.894 (0.321)	-139.892 (0.330)	-90.137 (0.329)
Total Deaths (td)	41.168 (0.313)	40.596 (0.312)	25.215 (0.316)
Temperature (temp)	—	-13.598 (0.162)	-36.185 (0.137)
Humidity (hum)	—	0.153 (0.514)	0.172 (0.550)
Air Pollution (pm)	—	0.107 (0.815)	-0.155 (0.552)
Manufacturing (lman)	—	—	104.187* (0.000)
Industrial Output (ind)	—	—	-8.289 (0.200)
Infrastructure (infra)	—	—	0.363 (0.749)
Intercept	93.452* (0.012)	390.903 (0.137)	-720.736 (0.465)
R ²	0.997	0.997	0.998

Source: Author's computation using EViews 13 (2026)

From Table 4, the long-run statistical insignificance of flood frequency suggests that recurrent hydrological shocks do not permanently alter GDP per capita in ECOWAS. This finding is consistent with evidence that the adverse effects of floods diminish over time as economies recover through reconstruction and adjustment (Ashizawa et al., 2022; Ferreira, 2024). From a Schumpeterian perspective, reconstruction may offset initial output losses by replacing damaged assets with more productive capital —(Fateh & Poulin, 2025; Khan et al., 2023). This implies that strengthening disaster risk reduction and climate-resilient infrastructure remains essential for sustaining long-term economic resilience.

Similarly, the long-run insignificance of flood-related deaths indicates that, although mortality imposes severe humanitarian costs, it does not directly translate into measurable long-run changes in GDP per capita. This reflects the limitation of GDP as a welfare indicator, since it captures market activity rather than the broader social consequences of disasters (Ferreira, 2024). Abina and Rajeev (2024) similarly emphasize the disproportionate human burden of disasters in lower-middle-income countries, reinforcing the need to complement economic indicators with human-centered disaster management (Shakeri et al., 2021).

Conversely, the positive and significant coefficient for manufacturing value-added highlights industrialization as an important driver of economic resilience. Manufacturing enhances productive capacity, supports diversification, and strengthens recovery following flood events —(Khan et al., 2023). Consistent with endogenous growth theory, structural transformation through manufacturing promotes long-run productivity and resilience —(Fateh & Poulin, 2025; Khan & Rashid, 2022), underscoring the importance of policies that encourage value addition and industrial development (Echendu, 2022).

The negative and significant Error Correction Term confirms a stable long-run equilibrium, with an adjustment speed of about 25% annually. This indicates that recovery from flood shocks is gradual, reflecting institutional and structural constraints that slow post-disaster restoration. Strengthening institutional capacity, disaster preparedness, and resilience financing would therefore accelerate recovery across ECOWAS.

Overall, the findings suggest that while flood frequency and disaster-related mortality do not significantly influence long-run GDP per capita, regional resilience depends largely on manufacturing development and structural transformation. The moderate speed of adjustment further highlights the need to strengthen productive capacity and disaster risk management to support sustainable economic growth in ECOWAS.

5. Conclusion and Recommendations

This study evaluated the dynamic long-run and short-run consequences of flood disasters on material welfare across the member states of the Economic Community of West African States from 2000 to 2023. Utilizing a Pooled Mean Group (PMG-ARDL) framework, the research distinguished transitory disruptions from long-term developmental trajectories. The findings indicate that while localized flood destruction is severe, aggregate material standards of living remain statistically insensitive to flood frequency and mortality in the long run. This stability is largely attributed to reconstruction-driven economic activity that temporarily inflates regional output, effectively masking the underlying erosion of productive assets. These results signify that traditional income-based metrics provide an incomplete picture of the socio-economic burden of hydrological shocks in West Africa. Ultimately, the analysis suggests that regional resilience depends less on the physical intensity of disaster events and more on the depth of structural anchors and the capacity for industrial transformation.

Policy Recommendations

- i. Enhance manufacturing activity to anchor regional growth, as this sector serves as the primary positive determinant of resilience.
- ii. Integrated disaster risk into national planning to protect human capital, as well as to address qualitative welfare erosion that stable aggregate income metrics mask.
- iii. Prioritize climate-resilient engineering designs, this would minimize physical capital destruction, and facilitate a more efficient return to steady-state regional growth paths.

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THE COMPLEMENTARY IMPACT OF UNEMPLOYMENT AND INFLATION ON LITERACY IN WEST AFRICA FROM 2000 TO 2023: EVIDENCE FROM PANEL ARDL

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Abstract

This study observes the complementary impact of unemployment and inflation rate on human capital education in 15 West African countries from 2000 to 2023. Education is proxied by literacy rate as a regressor against the selected macroeconomic environment. A Panel ARDL technique was adopted along Bounds test, Granger causality, and Impulse Response Function on data set of 358 observations for each variable employed. The study then, rooted in a three-pronged theoretical framework of Uzawa's Two - Sector Model of Human Capital Accumulation, Classical Theories of Labour & Price Stability, and Human Capital Theory. The findings disclose that in the short run, unemployment, inflation, and their interaction have insignificant relationships with education (literacy). In the long run, unemployment (-0.253281 ; $p= 0.0000$) and inflation (-0.194927 ; $p= 0.0000$) has individually reduced literacy outcomes but credit to the private sector positively expands education outcomes. The interaction term is positively significant (0.037879 ; $p= 0.0000$), indicating that households adapt by reallocating time to education under stagflation to hedge human capital idleness. And lastly, a long-run cointegration occurs only in Cape Verde and Ghana out of 15 West African countries. On that note, the study concludes that macroeconomic instability coerces literacy and induces 'JAPA syndrome' in West Africa. But its joint effect triggers adaptive education investment. Therefore, policy should combine price stability, job creation, credit expansion, and education quality reforms to sustain human capital expansions and restrain mass skilled migration termed 'JAPA syndrome' in West Africa.

Keywords: Unemployment; Inflation; Literacy; Human Capital; West Africa; Panel ARDL

JEL Classification: I25; E24; E31; O15; C23

1. Introduction

Human capital is a critical driver of economic development, with education forming its central component. Education equips individuals with knowledge and skills, enriches labour productivity, and nurtures innovation necessary for sustained growth (Barro, 2001). Countries that have higher levels of educational achievement experience faster rates of development and more effective poverty reduction. In West Africa, however, the potential of education to catalyse growth remains largely underutilised. Despite various national and regional policies aimed at improving educational outcomes, the West Africa region continues to record low literacy rates, weak Human Development Index (HDI) values, and persistent human capital flight, popularly termed the 'JAPA syndrome'. This paradox persists against a backdrop of prolonged macroeconomic volatility characterised by high unemployment and double-digit inflation rates. Unemployment in West Africa averaged 4.6% in 2023, while 29% youth aged 15–24 were not in employment or education/ training.

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The average West African unemployment happens to be higher than the African (26.1%) and global (23.5%) averages (UNECFA, 2023). Persistent double-digit inflation has eroded real incomes, public education spending and weakening literacy rates across the region. Rising unemployment reduces household enlargement, limits the ability of families to invest in education, and diminishes incentives for skills acquisition. Alongside, inflation forces households to prioritise basic consumption over educational expenditures.

The combined effect constrains government fiscal space for education financing, resulting in underfunded adult literacy programmes, inadequate infrastructure, and poor learning outcomes. Subsequently, human capital flight has extended as expert and unexperienced labour migrate in search of greener pasture not available nationally. Hence, the disequilibrium between macroeconomic environments and human capital development outcomes weakens ECOWAS goals for quality education, and decent employment. The interaction between unemployment and inflation offers a double restraint on human capital education in West Africa. Yet both variables have been studied individually, few empirical attention has been drawn from their joint effect on literacy and educational attainment. Human development indicators for West Africa featured among the lowest worldwide, with education outcomes reproducing deep structural deficits. Following the United Nations Development Programme (UNDP, 2023; 2024), all West African Countries (WACs) remain as the Least Developed Countries (LDCs). The outlook that reflects low educational attainment, poor school enrolment ratios, and sub-optimal literacy rates. Aside the low-key enrichments since 2000, the region's average adult literacy rate in 2022 stood at about 46.5% against the global average of 86.8% (UNESCO, 2023). Primary school enrolment witnessed increase, still the degree of completion and transition to secondary education sustain weak. In 2021, the gross secondary enrolment ratio for Sub-Saharan Africa stood at 43% having many West African states recording statistics less than 40% (World Bank, 2023). Tertiary enrolment was short fall of 10% in almost countries thereby delimiting the supply of skilled and employability of labour. Gender and rural-urban inequalities further exacerbate inconsistencies in access to education.

The inability to replicate the developmental gains of 'Asia Tigers' upon the various ECOWAS visions, macroeconomic and human capital development policies and struggles stands as an aberration in the history of West Africa. Volatility in unemployment and inflation exhibits nonstop control on investment and consumption in human capital development. Prolonged unemployment and inflation have reduced the returns to education and the real value of education expenditure, contributing to low literacy rates, and living standards. The region's inability to surpass the 2019 HDI threshold reflects this gap (UNDP, 2024; World Economic Outlook, 2023). Existing studies have assessed macroeconomic variables and human capital development independently, frequently using OLS or ARDL in single-country contexts (Maku et al., 2019; Ogunjobi et al., 2022; Abamara et al., 2024). Few have examined the complementary effect of unemployment and inflation on literacy, using panel data for West Africa. This gap is significant because policy responses that treat unemployment and inflation in isolation may berate their joint effect on human capital education from 2000 to 2023. Given this problem, the study seeks to answer the question:

What is the complementary impact of unemployment and inflation rate on the literacy rate in West Africa from 2000 to 2023? To guide the study, a tested hypothesis is proposed that there is no complementary impact of unemployment and inflation rate on the literacy rate. This reveals how dire macroeconomic variables is to human capital development policy in West Africa. The rest of this paper covered Section 2- the literature reviews and gap, Section 3- the methodology and theoretical background, Section 4- the regression results and Section 5 – the results analysis, conclusions and policy recommendations.

2. Literature Review

This section presents the conceptual, empirical review and gaps from the literature examined.

2.1 Conceptual Review

2.1.1 Human Capital Education: Education is a fundamental index for measuring individual benefits, economic development and poverty reduction across the globe. It also calms down labour market mismatches through skills acquisitions. For example, Ghana's investment sustainability in education earn her enlargements in literacy rates, educational attainment, and human capital stock that transformed her economic growth and development (World Bank, 2020). West African Public expenses on education averaged 3.8% of GDP from 2000 to 2022 which is lower than the UNESCO-recommended standard of 4 to 6% and inadequate to address infrastructural shortfalls, teacher shortages, and learning quality (UNESCO, 2023). The cumulative result of these challenges is evident in the region's Human Development Index (HDI), with Niger, Mali, and Chad residing in the lowest global positions in 2022 (UNDP, 2023).

2.1.2 Macroeconomic Environment: Unemployment and Inflation

Macroeconomic environment shapes human capital education outcomes. Employment stability develops income accumulation, empowering households to invest in education. From a macroeconomic perspective, a rise or persistent unemployment provides a network for inflation to interject the chances of human capital education for skills acquisition and welfare development (Paul & Bei Liao, 2021). Consequently, at both nation and regional levels families may prioritise basic necessities over investments in education. Thereby leading to lower school enrollment, increased dropout rates, and reduced human capital formation, especially among vulnerable people (African Development Bank, 2023). Youth unemployment allied with increased poverty and crime rates (International Labour Organisation, 2020). Signifying devastated HDI diffusion that aligned with the depression in the standard of living witnessed across the West African region (West African Outlook, 2023).

2.2 Macroeconomic Performance: Dynamics of Unemployment and Inflation across West Africa from 2000 to 2023

The West Africa macroeconomic outlook from 2000 to 2023 is evident by persistent volatility in unemployment and inflation emerging as twin checks on real income value, job creation, and both public and private capacity to fund human capital education. Though the

region documented incidents of growth in the commodity booms of the 2000s and early 2010s, structural flaws in price stability and labour absorption have subdued sustainable development. Joblessness among youth structurally averaged 13.4% from 2000 to 2023, with underemployment exceeding 25% in the region reflecting the outlook of International Labour Organisation (2023). Weak industrial and tax base desired for public education developments, skills gaps, and rapid population growth have continual slack labour market alongside household income accumulation and investment in education. Similarly, regional inflation averaged 8.2%, fluctuating between 6.5% and 9.8% due to exchange rate depreciation, fiscal deficits, and supply-side bottlenecks (AfDB, 2022). These trends destabilised real incomes and educational investment since 2000 to 2019. Afterward in 2020 external shocks intensified pressures. Average inflation rose from 10.3% to 12.8% from 2021 to 2022, compelled by pandemic-related supply disturbances and the Russia-Ukraine conflict, which elevated global energy and food prices (AfDB, 2023; West African Outlook, 2023). Projections indicated a marginal moderation to 11.0% in 2023, with a potential return to single digits at 7.1% in 2024. Differences across monetary blocs persist, West African Economic and Monetary Union (UEMOA) inflation drop from 7.2% in 2022 to 4.7% in 2023, hitherto remained above the convergence threshold of 3.0%. The West African Monetary Zone (WAMZ) average inflation reaching 19.7% in 2022. Replicating currency depreciation in Nigeria and Ghana and high food imports (WAMZ, 2022).

2.3 Empirical Review and Gap in the Literature

Present empirical studies on unemployment, inflation, and education in Africa offer diverse but instructive outcomes, underscoring the requisite to study how their complementary effect interacts with human capital education in West Africa. Adjei-Mensah (2023) observed Ghana using GLSS data and found that youth unemployment decreases secondary school completion due to low perceived returns on education. Similarly, Ozturk (2021) for 42 Sub-Saharan African (SSA) countries reported that a 1 percent upsurge in unemployment shrinks tertiary enrolment by 0.4 percent due to the stronger economies effect on large informal labour markets. When they used panel GMM to examine the relationship between labour market conditions and schooling, the “discouraged worker-student” effect was confirmed. Okunade (2020), using ARDL for Nigeria, 1990–2019, also established that unemployment significantly diminishes literacy rate. At the regional level, Bibi, Khan and Rashid (2022) explored 15 ECOWAS countries and exposed that high youth unemployment drops adult literacy, with the effect magnified for females. ILO (2023) further recognised that prolonged unemployment lowers the incentive to remain in school across West Africa.

Afonso and St. Aubyn (2006), applying cross-country analysis to developing countries, concluded that inflation above 10% significantly reduces public education spending efficiency. Omodero (2019), using Nigerian data, 1981–2017, found that high inflation erodes household real income and education expenditure, causing lower literacy gains. UNECA (2023), in the Economic Report on Africa, affirmed that inflation volatility is a primary determinant of low adult literacy in West Africa. International Monetary Fund (2021) reported that countries with average inflation >15% experienced a 6.2% decline in primary completion rates between 2010 and 2020. Olayemi (2024), for 12 WAMZ

countries, showed that inflation volatility reduces literacy more than inflation level because uncertain prices discourage long-term human capital investment.

World Bank (2020) recounted that stagflation incidents in SSA lessen human capital accumulation through condensed financial space and enlarged household predisposition. ECOWAS Commission (2022), in Vision 2050, admitted that over 30% of West Africans are either out of school or receive insufficient education content for employment because of macroeconomic shocks. Abamara, Eze and Nwosu (2024), using Panel ARDL for 15 ECOWAS countries, established that unemployment and inflation independently have asymmetric negative effects on human capital development, but their joint effect is positive and insignificant. Card and Lemieux (2001), for the U.S., established that college enrolment upswings in recessions as the opportunity cost of schooling drops. Dellas and Sakellaris (2003), worked on U.S. CPS data, confirmed that unemployment increases schooling among males aged 18-24, and termed it as “human capital hedge”. Syafri and Handayani (2022), reported for Indonesia that the interaction of unemployment and inflation is positive but insignificant for literacy. And that stagflation can trigger education investment when job predictions are weak. These outcomes support the likelihood of a positive interaction in developing environments. Methodologically, studies that used Panel ARDL for human capital in West Africa are scarce but growing. Kia, Aminu and Raji (2021) used P-ARDL and discovered that macroeconomic instability decreases education outcomes but access to funding extend education in the long-run.

From the above few studies, three gaps are identified. One, most studies highlight unemployment and inflation separately against their complementary interaction as a basic influencer of education. Two, some findings are rather uneven across the region or methods. This confines the extent to which persistent stagflation in ECOWAS states is generalized. Three, other studies modeled the interactive term on literacy in West Africa using Panel ARDL with country-specific Bounds tests. More importantly, no study has directly relate the interaction effects to the adaptive “human capital hedge” (Gal et al. (2024) and “JAPA syndrome” in the region. To address these gaps, this study is embarked upon in 15 West African countries from 2000 to 2023, using Panel ARDL, Bounds test, Granger causality, and Impulse Response Function to account for both short and long-run dynamics as well as the differences across countries.

3. Methodology

3.1 Theoretical Framework and Model Specification

This study is entrenched in a three-pronged theoretical groundwork of Uzawa's Model of Human Capital Accumulation (1965), Classical Theories of Labour and Price Stability, and Human Capital Theory of Gary Becker (1962) and Schultz (1961). Uzawa's model offers the core mechanism by treating education as a distinct capital - forming sector (the Structural-Absorption Network) through which households assign time between existing production and education. On the ground that the percentage of human capital accumulation is endogenously determined by prevailing economic conditions. At labour market disequilibrium (unemployment) and inflation periods, once the opportunity cost for

schooling drops, more time is allotted to education. When it rises, accumulation drive noses, causing literacy responsive to labour market and price dynamics. In West Africa, persistent unemployment and inflation reduce domestic returns to education, thereby accelerating “JAPA syndrome”. Classical theory complements this assertion by attesting that steady employment and prices are preconditions for sustained investment in human capabilities. Smith's division of labour associates skill creation to productivity though the Classical subsistence-wage opinion (Price-Signal Network). Indicating that inflation erodes real household incomes and capacity to investment in education on the fact that price instability and involuntary unemployment distort inducements to invest in skills acquisition.

Conclusively, the Human Capital Theory postulated by Becker and Schultz that investments in education augment knowledge, skills, and productivity leading to long-run economic growth. On the account that the gains on education are sensitive to the prevailing macroeconomic environment. In periods of instability, the value of human capital investment is battered and erodes, which declines inducements to amass skills and talents because the expected returns on education become low. Conversely, the interactive term of unemployment and inflation may hasty an adaptive reaction: when labour market chances are scarce, the opportunity cost of time drops, pressuring households to reallocate time to education as a long-run hedge against instability. Accordingly, unemployment and inflation individually constrain literacy, their interactive effect can be positive, makes education a rational alternative to idle labour. Following this perceptive and Abrha and Weldeyohans (2025) with a lean disparity, the study postulates a Panel ARDL model to experiment the interaction of unemployment and inflation on literacy in 15 West African countries from 2000 to 2023. The baseline empirical model is stated as:

$$LITR_{it} = \beta_{0it} + \beta_1 SAV_{it} + \beta_2 UEMP_{it} + \beta_3 INFR_{it} + \beta_4 CPS_{it} + \beta_5 UNEM*INFR_{it} + \beta_6 INTR_{it} + \beta_7 EXR_{it} + \mu_{it}$$

(1) Where: $LITR_{it}$ is literacy rate connotes the share of people aged 15+ and above with the ability to read and write, proxy for human capital education in country i at time t . Similarly regarded as the dependent variable.

SAV_{it} is Gross domestic saving signifies the percentage of GDP, used to control for domestic resource availability for education investment in country i at time t .

$UEMP_{it}$ is Unemployment denotes the youth total as a percentage of the labour force aged 15 to 24 who are unemployed, based on ILO modeled estimates. It denotes labour market conditions that influence household income and capacity to invest in education in country i at time t .

$INFR_{it}$ is the inflation rate measure by the GDP deflator (annual %), signifying economic volatility that can erode purchasing power and the real value of education in country i at time t .

CPS_{it} is Domestic credit to private sector as percentage of GDP. It is used to measure financial access that may support education expenditure in country i at time t .

$UNEM*INFR_{it}$: Interaction effect of the unemployment and inflation on literacy. This term is added to test the combined effect on literacy in country i at time t , beyond their separate effects.

$INTR_{it}$: Lending interest rate (%). It represents the cost of borrowing, which influences the borrowing cost for education-related investments in country i in year t .

EXR_{it}: Exchange performance, measured by the annual percentage growth of exports of goods and services. It used to control for external sector performance and its effect on education affordability in country *i* at time *t*.

μ_{it} is the error term.

$\beta_{0it} - \beta_7$ = coefficients.

Variables are in annual rate and expressed in natural logarithms where applicable to reduce heteroskedasticity and interpret coefficients as elasticities. Data are sourced from the World Development Indicators, UNDP Reports, and national Central Bank Statistical Bulletins for the 15 West African countries over the period 2000 to 2023.

Prior to estimation, the integration properties are checked using panel unit root tests, the Panel Bounds Test is used to check for long-run relationship. The analysis incorporates structural break considerations following Yule (1927) and Pesaran and Shin (1999) to avoid spurious regression. The Panel Autoregressive Distributed Lag (P-ARDL) approach is employed to estimate both short-run and long-run equilibrium relationships, given the mixed order of integration. With this specification, the paper assesses how unemployment, inflation, and their complementary interaction influence human capital education across West Africa, while controlling for country-specific heterogeneity and temporal effects.

4. Regression Results

This segment ponders on the descriptive statistics and distribution characteristics in Table 1. The table recapitulates the mean, median, standard deviation, skewness, kurtosis, and Jarque-Bera statistics for each series. The panel is balanced having 358 observations for each variable across the sampled 15 West African countries. Data streams for saving, unemployment, inflation, credit to the private sector, and exchange rate were prorated due to data unavailability and consistent trend. The mean value of literacy rate over a period of 23 years is 4.313484, with a median value of 4.771341 and a standard deviation value of 2.297628. This low mean and narrow dispersion mirror a pattern of persistently low literacy levels across the region. Unemployment mean value is 7.576145 with a standard deviation value of 6.026957, while inflation mean value is 6.749960 but exhibits high volatility with a standard deviation of 11.05027. Exchange rate growth also shows substantial instability, with a mean of 7.458694 and a standard deviation value of 23.00909. Credit to the private sector and saving have mean values of 16.55698 and 11.65532 respectively, but with wide variations of 13.08869 and 17.31759, respectively. Reflecting the unstable macroeconomic environment and notable deviations from normality in region for 23 years. Unemployment, inflation, credit to the private sector, interest rate, and exchange rate are positively skewed, indicating a concentration of lower values with a long right tail 17.31759.

In contrast, literacy rate and saving are negatively skewed, with skewness coefficients of -0.41426 and -2.39033, respectively, suggesting a concentration of higher values with a left tail. Kurtosis values for inflation (28.21728), exchange rate (20.68105), and saving (10.29870) are well above 3, indicating leptokurtic distributions with heavier tails than the

normal distribution. The Jarque-Bera test statistics for all variables are non-normal except literacy rate with a probability value of 0.201940. This confirms that literacy rate only normally distributed. The observed volatility in inflation and exchange rate, and saving undermine household income and their capacity to receive education, thereby dampens literacy accumulation in West Africa. The positive skewness in unemployment suggests recurrent episodes of high youth joblessness that may alter the opportunity cost of schooling for JAPA syndrome.

Table 1: Descriptive Analysis (Summary Statistics)

	LITR	SAV	UEM	INFR	CPS	INTR	EXR
Mean	4.313484	11.65532	7.576145	6.749960	16.55698	11.93806	7.458694
Median	4.771341	15.05391	5.005000	3.883416	13.29236	6.763333	5.275290
Std. Dev.	2.297628	17.31759	6.026957	11.05027	13.08869	8.461533	23.00909
Skewness	-0.41426	-2.39033	1.801194	4.281332	1.966828	1.148344	2.938429
Kurtosis	2.229684	10.29870	6.570043	28.21728	7.442364	3.597146	20.68105
Jarque-Bera	3.199568	1135.542	383.6926	10579.35	525.1896	84.00108	5178.424
Probability	0.201940	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Observations	60	358	358	358	358	358	358

Source: Author's computation using Eviews

4.2 Correlation Statistic Analysis

Table 2 deals with the Pearson correlation coefficients used to examine preliminary associations and the potential of multicollinearity. Literacy rate displays a moderate positive correlation with unemployment (0.473340) and credit to the private sector (0.378853). Conversely, inflation (-0.106086), and interest rate (-0.106086) unveil a very weak negative correlations and saving (-0.417913) reveal weak to moderate negative with literacy rate. Exchange rate (0.037326) has a fairly moderate positive correlation with literacy. The correlation between the independent variables is generally below 0.800000, indicating that multicollinearity is unlikely to distort the regression estimates. The positive association between unemployment and literacy rate provides preliminary evidence of an adaptive response, where higher joblessness may reallocate time to education.

Table 2: Pearson Correlation Statistic Test Result

	LITR	SAV	UEM	INFR	CPS	INTR	EXR
Coefficient	1.000000	-0.417913	0.473340	-0.122634	0.378853	-0.106086	0.037326

Source: Extract from Author's computation, E-view13 Output

4.3 Panel Unit Root Tests

Panel unit root tests are conducted to ascertain the stationarity properties of the variables and to escape spurious regression and choose a proper estimation technique. Table 3 reports

panel unit root results from the Levin, Lin and Chu (LLC), Im, Pesaran and Shin (IPS), and Augmented Dickey-Fuller (ADF) tests yield mixed orders of integration for 15 West African countries over 23 years. Inflation rate (INFR), interest rate (INTR), and exchange rate (EXR) are stationary at level, $I(0)$, as the null hypothesis of a unit root is rejected across all three tests at the 1% level. Compare to literacy rate (LITR), unemployment rate (UEM), saving (SAV), and credit to the private sector (CPS) that are non-stationary at level but become stationary after first differencing, $I(1)$. Given these combinations, the Panel Autoregressive Distributed Lag (P-ARDL) approach is appropriate and adopted.

Table 3: Panel Unit Root Test Result

	@ Level			@ 1 st diff			
VAR/MD	L, L & Ct	LP &Sw	ADF/Fcsq	L, L & Ct	LP &Sw	ADF/Fcsq	ORDER
LITR	-1.08192	0.14189	25.5784	-9/40006***	-10.8584***	166.334***	1
PROB	0.1396	0.5564	0.6453	0.0000	0.0000	0.0000	
SAV	0.30774	-0.64134	34.6515	-6.85187***	-11.1503***	169.738***	1
PROB	0.8209	0.2607	0.2555	0.0000	0.0000	0.0000	
UEM	-2.7011	0.6877	19.4680	-7.9476***	-6.8573***	104.268***	1
PROB	0.3935	0.7542	0.9297	0.0000	0.0000	0.0000	
CPS	-1.2779	0.8015	23.4187	-6.3705***	-8.1837***	122.574***	1
PROB	0.1006	0.7886	0.7977	0.0000	0.0000	0.0000	
INTR	22690.4***	-10130.3***	3255.68***	6324.44	-12.0272***	185.032***	0
INFR	-5.8766***	-7.7978***	118.196***	-10.4041***	-15.261***	235.507***	0
EXR	-7.2782***	-9.1664***	143.908***	-9.2020***	16.1811***	256.412***	0
PROB	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	

Source: Author's computation.

Note: *** indicates level of significance at 1%, 5% and 0%, LLC, denotes Levin, Lin, and Chu, LP & SW indicates Levin and Phillips and ADF denotes Augmented Dickey-Fuller (ADF)

4.4 Short-Run and Long-Run Estimates

Table 4 presents the short-run and long-run estimates from the Panel ARDL model for the study. In the short run, none of the variables exert a statistically significant effect on literacy rate at the 5% level, except saving that is positive (0.011698) and significant ($p = 0.0332$) at 5%, implying a 0.011698 increase in literacy. Unemployment (-0.084815 with $p = 0.4807$), inflation (0.077920 with $p = 0.2294$), credit to the private sector (-0.005425 with $p = 0.6634$), interest rate (-0.024988, $p = 0.3568$), exchange rate (-0.001141, $p = 0.6735$), and the interaction term (-0.005035 $p = 0.3142$) are all statistically insignificant. The error correction term is negative and significant with (-0.268202 and $p = 0.0038$), indicating about 27% of disequilibrium is corrected annually.

In the long run, unemployment and inflation rates show substitution effect, each variable significantly reduce literacy rate. A 1 percent increase in unemployment and inflation decline literacy by about -0.253281 with $p = 0.0000$ and -0.194927 with $p = 0.0000$

respectively. Saving, interest rate, and exchange rate are statistically insignificant in the long run. Critically, Credit to the private sector and the interaction term UEM*INFR (0.037879 and $p = 0.0000$) are positive and significant. This implies that a 1 percent increase in the joint effect of unemployment and inflation raises literacy by about 0.037879. Confirming the adaptive response of the West African citizens when both joblessness and price instability are high. Then their opportunity cost for schooling falls, and they reallocate time for education as a long-run hedge. Thus, unemployment and inflation are harmful individually, their complementary effect is beneficial for education in West Africa.

Table 4.: Short-Run and Long-Run Panel ARDL Estimates: Complementary Impact of Unemployment and Inflation on literacy rate in West Africa from 2000 to 2023.

Variable	Coefficient	Short Run		Coefficient	Long Run	
		Std. Error	Prob.		Std. Error	Prob.
SAV	0.011698	0.005458	0.0332	-0.012357	0.013467	0.3599
UEM	-0.084815	0.120062	0.4807	-0.253281	0.041243	0.0000
INFR	0.077920	0.064652	0.2294	-0.194927	0.043782	0.0000
CPS	-0.005425	0.012446	0.6634	0.114106	0.012312	0.0000
INTR	-0.024988	0.027059	0.3568	0.002842	0.061721	0.9633
EXR	-0.001141	0.002705	0.6735	0.004891	0.005486	0.3736
UEMP*INFR	-0.005035	0.004991	0.3142	0.037879	0.007620	0.0000
C	0.916718	0.331876	0.0062			
CointEq	-0.268202	0.091566	0.0038			
Log-Likelihood		-49.24010				

Source: Author's computation using EViews

4.5 Long-Run Bounds Test Estimates

Table 5 accounts the country-specific bounds test results indicating long-run relationship for Cape Verde and Ghana. For these two countries, their F-statistics exceed the lower and upper critical values of 3.210 and 4.163 at the 5% level. Evidencing a strong long-run relationship between the macroeconomic variables and literacy across West Africa and the use of the long-run Panel ARDL estimates.

Table 5 .Bounds Test (Long Bounds Test) Results

Cross-Section		Obs.	LITR
			F-Stat.
1		23	***4.307988
2		23	***7.562212
Literacy rate			3.21 - 4.163

Note *** indicates computed F-Stat > critical value at 5% level of significance
This division gives insight into the results analysed above. The descriptive results indicate low volatility in literacy rate (LITR) across the region, with a mean of 4.313484 and a negative

skewness of -0.41426. This reflects persistently low literacy levels and asymmetry in distribution. The kurtosis values for inflation, exchange rate, and saving exceed three, specifying leptokurtic distributions with heavy tails. The Jarque-Bera test rejects the null hypothesis of normality at the 5% level for all variables except literacy. Empirically, none of the variables exercise a statistically significant effect on literacy rate at the 5% level in the short run, except saving that shows a positive increase of 0.011698 at 0.0332 significant level. Unemployment -0.084815, $p = 0.4807$, inflation 0.077920, $p = 0.2294$, credit to the private sector -0.005425, $p = 0.6634$, interest rate -0.024988, $p = 0.3568$, exchange rate -0.001141, $p = 0.6735$, and the interaction term UEM*INFR -0.005035, $p = 0.3142$ are all statistically insignificant. The interaction term implies a -0.005035 decrease in literacy in the short run, suggesting that unemployment and inflation act as substitutes when macroeconomic instability is high. The error correction term is negative and significant (CointEq = -0.268202, $p = 0.0038$), indicating that about 27% of disequilibrium is corrected annually.

Whereas in the long run, a 1 percent rise in the unemployment rate lowers literacy by about -0.253281 with $p = 0.0000$. Also a 1 percent growth in inflation rate diminishes literacy by about -0.194927 at a probability of 0.0000. Credit to the private sector has a positive increase of about 0.114106 and statistically significant on literacy at $p = 0.0000$. Saving, interest rate, and exchange rate are statistically insignificant in the long run. Critically, the interaction between unemployment and inflation rates yields a positive and statistically significant effect on literacy. A 1 percent increase in interaction term (UEM*INFR) leads to about a 0.037879 increase in literacy at $p = 0.0000$. This infers that when stag inflation occur, the opportunity cost for schooling disappears and households convert time for education to travel out as a long-run hedge. This aligns with the adaptive response mechanism under Endogenous Growth Theory (Romer, 1986; Lucas, 1988). In contrast, the individual negative effects of unemployment and inflation connote Human Capital Theory (Becker, 1962; Schultz, 1961), which theorises that macroeconomic volatility lessens investment in education. The Panel Bounds results specify a strong cointegration for 2 West African countries (Cape Verde and Ghana), representing a long-run relationship between unemployment, inflation, and literacy over the 23-year period. This finding is consistent with UNECA (2023) and ECOWAS Vision 2050, which documented persistent low literacy and disparities in education outcomes across West Africa.

The Granger causality results imply that the interaction term cannot be used to forecast literacy in the short run but not the reverse. The Diagnostic (Autocorrelation) results present the LM test with Rao F-statistic values of 3.495047, 5.132491, and 0.564450 at lags 1, 2, and 3, with probability values of 0.0078, 0.0004, and 0.6885 respectively. This signifies that autocorrelation happens at shorter lags later disappears at lag 3. The Impulse Response Function (IRF) analysis shows that a shock to the interaction interactive term leads to a persistent expansion in literacy in West Africa over the forecast horizon. Overall, the findings suggest that unemployment and inflation individually constrain literacy in West Africa, but their complementary term is positive in the long run. This aligns with the view that education serves as a coping strategy during periods of labour and price instability, though the magnitude remains minimal at 0.037879.

4.6 Causality Test Results

Table 6 shows the pairwise Granger causality results, indicating literacy rate does not Granger-cause the interaction term ($Zbar\text{-Stat} = 3.856$, $p = 0.0001$) and $UEM*INFR$ does not Granger-cause literacy ($p = 0.1204$) in West Africa. This implies unidirectional causality running from literacy rate to the interaction term in the short run but the behaviour of literacy in the past is capable of predict the interaction behaviour.

Table 6. Causality Test Results

Null Hypothesis:	Zbar-Stat.	Prob.
$UEM*INFR$ does not homogeneously cause LITR	1.55320	0.1204
LITR does not homogeneously cause $UEM*INFR$	3.85609	0.0001
$UEMINFR$ does not homogeneously cause UEM	-1.21331	0.225
UEM does not homogeneously cause $UEM*INFR$	4.43293	9.00E-06

4.7 Diagnostic Test (Autocorrelation)

Table 7 presents the LM test for serial correlation in the residuals of the literacy model, indicating the significant of autocorrelation at lags 1 and 2, with p-values of 0.0078 and 0.0004, respectively that later disappeared at lag 3 ($p = 0.6885$). The Rao F-statistic values affirm that the residuals are free from autocorrelation at higher lags, indicating that the model is correctly specified.

Table 7. Diagnostic Test (Autocorrelation)

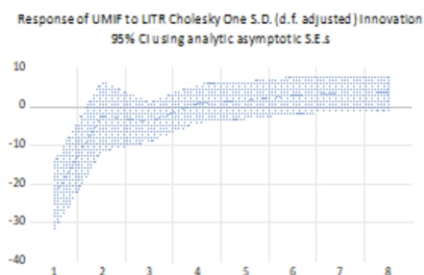
Model	Lag	Rao F-stat	Prob.	Lag	Rao F-stat	Prob.	Lag	Rao F-stat	Prob.
	1	3.495047	0.0078	2	5.132491	0.0004	3	0.564450	0.6885

Source: Extract from Author's computation

4.8 Impulse Response Function

Figure 1 spectacles that a positive shock to $UEM*INFR$ produces a positive and persistent effect on literacy rate in West Africa. Following the shock, the response is initially high and positive between periods 1 and 2, declines in period 3, and rebounds between periods 4 and 8. The response remains above zero throughout the forecast horizon. This pattern proposes that increases in the joint effect of unemployment and inflation generate sustained improvements in education outcomes over the long run, consistent with the adaptive response mechanism.

Figure 1: Impulse Response Function of Literacy Rate to $UEM*INFR$ Shock



Source: Author's computation

5. Conclusion and Recommendation

The study was inspired by the weak literacy outlook and the high incidence of youth unemployment that have induced low employability and outward migration in the region (ECOWAS Vision 2050). The findings establish that unemployment and inflation are key constraints to literacy accumulation in West Africa in the long run especially for the period under review. High unemployment shrinks expected returns on education, whereas inflation erodes household income and capacity to invest in schooling. This supports the Human Capital Theory (Becker, 1962; Schultz, 1961), which contends that macroeconomic stability is necessary for human capital investment sustainability. Also the interaction term has a minimal positive and significant effect on literacy in the long run. This aligns with Endogenous Growth Theory (Romer, 1986; Lucas, 1988), which underscores time allocation between work and education. The result advocates an adaptive coping mechanism whereby households pursue education when both joblessness and price instability are high. Based on these findings, the study concludes that while unemployment and inflation individually depress literacy, their joint effect induces adaptive human capital investment. Credit to the private sector also emerges as a significant enabler of literacy. Policy interventions aimed at employment stabilization, inflation control, education quality reform, and financial access are therefore critical to translating this adaptive response into sustained literacy gains across West Africa.

The findings recognize the complementary impact of unemployment and inflation as a significant factor influencing literacy in West Africa. A stable macroeconomic environment is critical because a literate population is a productive population that translate into greater wealth of a nation. Having stable employment and low inflation eases the cost of education and rises household capacity to invest in education. To that end, West African governments should pursue macroeconomic stability by maintaining single-digit inflation, promote youth employment generation, quality education and skills development to align school curricula with labour market needs. This will reduce the incidence of out-of-school youth and heavy brain drain, and ensure that the adaptive response to unemployment and inflation translates into employable skills across West Africa. By implementing policies that stabilize employment, control inflation, and improve education quality, West African countries can mitigate the negative impact of macroeconomic instability and promote sustainable improvements in literacy, in line with ECOWAS Vision 2050 and the SDGs 2060 goals.

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DEVELOPMENT AND VALIDATION OF A COMPOSITE FLOOD IMPACT INDEX (CFII) FOR ECOWAS COUNTRIES

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Abstract

Flood disasters represent a major socio-economic and environmental challenge within the Economic Community of West African States (ECOWAS). Assessing disaster severity through individual indicators provides only a partial representation of flood impacts, as isolated metrics often fail to capture their multidimensional nature. This study developed and statistically validated the Composite Flood Impact Index (CFII) for the comparative assessment of multidimensional flood impacts across ECOWAS countries. The study covered the fifteen ECOWAS member states over the period 2000–2023 and utilized data from the Emergency Events Database (EM-DAT). The CFII was constructed from flood frequency (ff), total persons affected (tpa), and total deaths (td) using Min-Max normalization and an equal-weighting aggregation framework. Statistical validation was conducted using an Independent Samples t-test. The principal findings revealed significant variation in flood impacts across the region and enabled the ranking and classification of countries into distinct vulnerability groups. Statistical validation confirmed the discriminatory capability of the CFII. The study contributes a transparent, reproducible, and standardized framework for multidimensional flood assessment. The CFII complements traditional single-indicator approaches and supports comparative flood risk assessment and evidence-informed disaster risk planning across ECOWAS.

Keywords: Composite Flood Impact Index (CFII); Flood Risk Assessment; Disaster Economics; ECOWAS; Socio-economic Vulnerability.

JEL Classification: Q54; O10; R11

1. Introduction

Natural disasters represent an intensifying global threat, causing systemic disruptions to human settlements and national economies. Between 2000 and 2019, hydrological hazards, predominantly floods, emerged as the most frequent disaster type, representing 44% of all recorded catastrophes and impacting approximately 1.6 billion people worldwide (UNDRR, 2020b). The African continent is uniquely susceptible to these shocks; while it accounts for roughly 20% of global reported disaster events, it suffers a disproportionate share of disaster-related fatalities, estimated at 60% (Abina & Meenakshi, 2024; UNDRR, 2020b). Within the West African sub-region, the scale of the hazard is particularly acute, as evidenced by Nigeria, where floods have affected over 12 million people and caused nearly 1,790 deaths since the late 1970s (Echendu, 2022; Shakeri et al., 2021).

Flood disasters constitute a primary environmental and development challenge within the

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Economic Community of West African States (ECOWAS). The region's vulnerability is compounded by anthropogenic factors, including rapid unplanned urbanization, soil degradation, and inadequate drainage infrastructure, which interact with erratic rainfall patterns to exacerbate humanitarian impacts (Echendu, 2022). Managing these risks is a regional priority essential for protecting the sub-region's pursuit of sustainable development (Echendu, 2022).

A critical challenge in managing these events lies in the inherent multidimensionality of flood impacts. Conventional reliance on individual indicators, such as flood frequency, fatalities, or economic losses, provides only a partial assessment of disaster severity (Abina & Meenakshi, 2024). While mortality counts offer an unambiguous measure of severity, they often fail to capture the broader social disruption represented by the total number of persons affected (Abina & Meenakshi, 2024). Similarly, monetary damage estimates can be biased toward developed nations with higher asset values, potentially masking the true burden in lower-income settings where the relative welfare cost of loss is higher – (Abina & Meenakshi, 2024; Kukeli, 2025).

Academic literature has progressively evolved from single-indicator assessments toward multidimensional frameworks, such as the Universal Disaster Severity Classification Scheme (UDSCS) and the life years lost index '–(Caldera & Wirasinghe, 2022; Panwar & Sen, 2020). Despite these advances, the application of a standardized multidimensional framework for comparative flood impact assessment across the ECOWAS region remains limited (Echendu, 2022). This study contributes to the literature by developing and statistically validating the Composite Flood Impact Index (CFII) for the ECOWAS region. The primary objective is to develop and statistically validate the CFII for the comparative assessment of multidimensional flood impacts across ECOWAS countries, utilizing three core indicators: flood frequency (ff), total persons affected (tpa), and total deaths (td) (Abina & Meenakshi, 2024).

The study offers three distinct contributions: methodologically, it advances a distribution-sensitive framework for cross-country assessment; empirically, it provides a comparative ranking and classification of ECOWAS countries based on historical exposure; and in terms of policy, it provides an evidence-based framework to support regional disaster planning and resource prioritization (Abina & Meenakshi, 2024; Echendu, 2022). The remainder of this paper is organized into sections covering the literature review, methodology, empirical findings, discussion, conclusion, and policy recommendations.

2. Literature Review

The conceptualization of a flood disaster has transitioned from a reductionist reliance on physical intensity toward a recognition of its multidimensional socio-economic footprint '–(Abina & Meenakshi, 2024; Caldera & Wirasinghe, 2022). While traditional assessments often depend on isolated indicators such as flood frequency (ff), fatalities, or affected population, scholarly discourse suggests that any single metric provides only a partial and potentially biased representation of disaster severity (Abina & Meenakshi, 2024). For

instance, a focus exclusively on total deaths (td) captures the finality of human loss but frequently overlooks the broader humanitarian scale and social disruption represented by the total persons affected (tpa) '—(Abina & Meenakshi, 2024; Caldera & Wirasinghe, 2022). Conversely, metrics centered on monetary losses often exhibit a developed-nation bias, as absolute damage costs are inherently higher in economies with greater asset values, thereby masking the relative welfare burden in lower-income settings (Panwar & Sen, 2020). Consequently, the integration of ff, tpa, and td is increasingly viewed as a complementary triad essential for a holistic accounting of hydrological shocks (Abina & Meenakshi, 2024; Fuje et al., 2023).

Methodologically, the evolution of composite indices has provided a robust mechanism for measuring these multidimensional phenomena by facilitating the comparison of heterogeneous data points —(Abina & Meenakshi, 2024; UNDRR, 2020a). The construction of such indices typically follows a rigorous sequence involving indicator selection, normalization to reconcile disparate scales, the assignment of weighting schemes, and mathematical aggregation —(Abina & Meenakshi, 2024; Khan et al., 2023). Scholarly approaches to weighting vary significantly, ranging from equal weighting, which ensures policy neutrality, to data-driven methods such as Principal Component Analysis (PCA) and Entropy Weighting, or expert-led subjective frameworks like the Analytic Hierarchy Process (AHP) —(Abina & Meenakshi, 2024; Khan et al., 2023). Furthermore, the aggregation process often employs linear additive models or geometric means to mitigate dimensional imbalances and ensure that the resulting scores remain statistically robust and reproducible (Abina & Meenakshi, 2024; Di Noia et al., 2024).

Empirical literature has advanced several frameworks to quantify disaster impacts, yet comparative regional assessments remain uneven. Notable contributions include the Universal Disaster Severity Classification Scheme (UDSCS), which seeks to standardize severity ratings across hazard types '—(Caldera & Wirasinghe, 2022), and the use of the life years lost index, which integrates mortality, morbidity, and displacement into a non-monetary measure of human cost (Panwar & Sen, 2020; Peters, 2025). Other studies have adapted the Multidimensional Poverty Index (MPI) framework to examine disaster risk profiles in lower-middle-income countries (Abina & Meenakshi, 2024). However, previous empirical investigations have largely concentrated on global aggregates or specific national cases such as studies focused on India, Brazil, or the individual drivers of flooding in Nigeria and Ghana rather than standardized sub-regional comparisons (Alves, 2023; Echendu, 2022; Panwar & Sen, 2020).

Despite these methodological and empirical advancements, the application of a standardized multidimensional framework for comparative flood impact assessment across the Economic Community of West African States (ECOWAS) regional bloc remains limited (Abina & Meenakshi, 2024; Echendu, 2022). While the sub-region faces acute vulnerability due to rapid urbanization and inadequate infrastructure, there is a lack of systematic evidence comparing disaster severity across the entire fifteen-member grouping using a unified, validated baseline (Echendu, 2022). This study contributes to the literature

by developing and statistically validating the Composite Flood Impact Index (CFII) tailored to the ECOWAS context. By standardizing regional hazard footprints, the research advances a distribution-sensitive tool for disaster risk management, providing the empirical foundation for the methodological sequence detailed in the following section.

3. Methodology

This study adopts a multidimensional quantitative research design to systematically evaluate the socio-economic impact of flood disasters across the fifteen member states of the Economic Community of West African States (ECOWAS) (Osuchukwu, 2025). The analysis covers a temporal scope from 2000 to 2023, a period selected to maximize data reliability and consistency within the sub-region while aligning with contemporary reporting standards (Abina & Meenakshi, 2024; UNDRR, 2020b). Primary data are extracted from the Emergency Events Database (EM-DAT), maintained by the Centre for Research on the Epidemiology of Disasters (CRED) (Abina & Meenakshi, 2024; UNDRR, 2020b). EM-DAT serves as a standardized global repository, recording events that meet specific severity criteria: ten or more fatalities, one hundred or more people affected, a declaration of a state of emergency, or a call for international assistance '(Caldera & Wirasinghe, 2022; UNDRR, 2020b).

Three core indicators are selected to capture the multifaceted scale of a flood disaster: flood frequency (ff), total persons affected (tpa), and total deaths (td) (Abina & Meenakshi, 2024; UNDRR, 2020b). Fatalities are prioritized as a sensitive measure of disaster severity due to the finality and lack of ambiguity associated with death '(Abina & Meenakshi, 2024; Caldera & Wirasinghe, 2022). The total number of people affected, comprising those injured, homeless, or requiring immediate assistance provides a broader measure of social disruption and humanitarian scale (Abina & Meenakshi, 2024; UNDRR, 2020b). Flood frequency is incorporated to account for a nation's chronic environmental exposure to recurrent hydrological shocks '(UNDRR, 2020a).

Data preparation involves the annual aggregation of these indicators for each country —(Idroes et al., 2023; Khan et al., 2023). To address extreme statistical skewness and reconcile the differing measurement scales of raw data, a Min-Max normalization procedure is implemented —(Idroes et al., 2023; Khan et al., 2023). This technique transforms raw values into a standardized index ranging from 0 (lowest regional impact) to 1 (maximum recorded impact) —(Khan et al., 2023). The normalization equation is defined as:

$$I_x = \frac{x - x_{\min}}{x_{\max} - x_{\min}} \quad (1)$$

where I_x is the standardized value, x is the raw indicator value for a given country, and $x_{\min}$ and $x_{\max}$ represent the minimum and maximum values observed across the entire sample for that specific indicator, respectively (Khan et al., 2023).

The standardized indicators are aggregated to construct the Composite Flood Impact Index (CFII) (Abina & Meenakshi, 2024). While the general weighted index framework is expressed as:

$$CFII = \sum_{i=1}^3 w_i z_i \quad (2)$$

(where w_i denotes the weight of indicator i and z_i its standardized value), this research utilizes an equal-weighting operational equation:

$$CFII = \frac{ff_{norm} + tpa_{norm} + td_{norm}}{3} \quad (3)$$

The adoption of an equal-weighting framework ensures a transparent, reproducible, and policy-neutral framework for cross-country comparison (Abina & Meenakshi, 2024). This approach is preferred over Principal Component Analysis (PCA), which extracts weights from covariance structures and may overemphasize statistical variance, or Entropy Weighting, which assigns influence based on information dispersion (Grzywinska-Rapca, 2021; Uriel & Ornelas, 2022). Furthermore, it avoids the expert-led subjective biases inherent in the Analytic Hierarchy Process (AHP) '(Caldera & Wirasinghe, 2022; Uriel & Ornelas, 2022).

Nations were ranked according to their CFII scores and classified into three comparative cohorts: Most-Hit (top quintile), Moderate, and Least-Hit (bottom quintile) (Abina & Meenakshi, 2024; Hong & Lingling, 2023). An Independent Samples t-test was specified to assess whether the CFII distinguishes between the Most-Hit and Least-Hit groups (Hong & Lingling, 2023; Naoaj, 2023). The null hypothesis (H_0) states that there is no statistically significant difference between the two groups. Statistical significance was evaluated at the 5% level ($p < 0.05$) (Khurana, 2021; Uriel & Ornelas, 2022).

1. Results, Data analysis, and Discussion

The empirical assessment of flood impacts across the Economic Community of West African States (ECOWAS) reveals a landscape defined by extreme statistical skewness and pronounced regional disparities. Derived from normalized values of flood frequency (ff), total persons affected (tpa), and total deaths (td), the Composite Flood Impact Index (CFII) provides a robust numerical baseline for comparing disaster severity. As detailed in Table 1, the CFII scores span the full range from 0.0000 to 1.0000, unearthing significant gaps in historical hazard exposure during the 2000–2023 study period.

Table 1: Composite flood impact index (CFII) scores and ranking of ECOWAS member states (2000–2023)

SN	Countries	ff	tpa	td	Norm-ff	Norm-tpa	Norm-td	CFII	Rank	Grouping
1	Burkina Faso	17	676053	141	0.3125	0.0454	0.0521	0.1367	5	Most Hit
2	Ghana	25	2010330	325	0.4792	0.1386	0.1221	0.2466	3	Most Hit
3	Mali	22	354701	144	0.4167	0.0230	0.0533	0.1643	4	Most Hit
4	Niger	28	3477484	843	0.5417	0.2410	0.3191	0.3673	2	Most Hit
5	Nigeria	50	14349164	2633	1.0000	1.0000	1.0000	1.0000	1	Most Hit
6	Benin	11	1329201	148	0.1875	0.0910	0.0548	0.1111	7	Moderate
7	Côte d'Ivoire	13	78995	190	0.2292	0.0038	0.0707	0.1012	9	Moderate

8	Guinea	15	594088	41	0.2708	0.0397	0.0141	0.1082	8	Moderate
9	Senegal	15	914335	102	0.2708	0.0621	0.0373	0.1234	6	Moderate
10	Sierra Leone	10	68870	183	0.1667	0.0031	0.0681	0.0793	10	Moderate
11	Cabo Verde	2	25150	4	0.0000	0.0000	0.0000	0.0000	15	Least Hit
12	Gambia	9	94670	29	0.1458	0.0049	0.0095	0.0534	12	Least Hit
13	Guinea-Bissau	4	58542	5	0.0417	0.0023	0.0004	0.0148	14	Least Hit
14	Liberia	5	48841	4	0.0625	0.0017	0.0000	0.0214	13	Least Hit
15	Togo	9	391351	80	0.1458	0.0256	0.0289	0.0668	11	Least Hit

Source: Author's computation (2025) using Excel

Nigeria occupies the apex of the regional ranking, recording the maximum score across all three dimensions due to overwhelming absolute losses in mortality, displacement, and event frequency. In contrast, the second-ranked Niger (0.3673) exhibits impact primarily driven by extreme human vulnerability, recording the second-highest fatalities despite a lower frequency of events compared to Ghana. The statistical "step-down" from Nigeria to the rest of the sub-region suggests a pronounced concentration of multidimensional impact in select high-exposure economies, while Cabo Verde serves as the absolute baseline for the low-severity cohort. This uneven distribution justifies the systematic classification into Most-Hit, Moderate, and Least-Hit groups, allowing for a more granular analysis of regional vulnerability.

The Independent Samples t-test, presented in Table 2, validates the discriminatory capability of the CFII by assessing mean differences in the flood indicators between the Most-Hit and Least-Hit groups.

Table 2 : Independent Samples t-test Validation Matrix

Disaster Variable	Mean Cluster (N=5)		Mean Diff Variance	t-Statistic	P-value	Statistical Inference
	Most-Hit	Least-Hit				
Ff	1.1833	0.2417	0.9416	9.1285	0.0000***	Highly Significant
Tpa	173,897.80	5,154.60	168,743.20	2.5638	0.0110**	Significant at 5%
Td	34.0500	1.0167	33.0333	4.5442	0.0000***	Highly Significant

Source: Author's Computation (EViews 13, 2026)

The results confirm a statistically significant asymmetry in physical exposure across all three core indicators. Flood frequency (ff) and mortality (td) are highly significant ($p < 0.01$), while the total number of persons affected (tpa) is significant at the 5% level ($p = 0.0110$). Consequently, the study rejects the null hypothesis at the 5% significance level, confirming that the CFII effectively partitions the ECOWAS sub-region into distinct and statistically robust risk profiles.

Methodologically, the CFII complements existing single-indicator approaches by

integrating ff, tpa, and td into a transparent, equal-weighting framework for multidimensional flood assessment (Abina & Meenakshi, 2024). The findings extend those of Echendu (2022), who identified Nigeria and Ghana as persistently flood-prone due to unplanned urbanization and inadequate drainage. They are also consistent with Abina and Meenakshi (2024), who linked heightened disaster impacts in lower middle-income countries to the interaction of economic and geographical vulnerabilities.

Overall, the empirical findings demonstrate that the Composite Flood Impact Index provides a transparent and reproducible framework for assessing multidimensional flood impacts across ECOWAS countries. By integrating flood frequency, affected population, and fatalities into a single standardized measure, the CFII complements existing single-indicator approaches and contributes to more consistent comparative flood risk assessment within the region.

5. Conclusion and Policy Recommendations

This study evaluated the multi-dimensional nature of flood disasters across the fifteen member states of the Economic Community of West African States (ECOWAS) spanning the period 2000–2023. The central objective focused on the development and validation of the Composite Flood Impact Index (CFII), designed to provide a robust numerical baseline for regional comparison. By synthesizing flood frequency (ff), total persons affected (tpa), and total deaths (td), the methodology contributes a distribution-sensitive framework that captures the multifaceted scale of flood disasters more accurately than traditional models.

The principal findings highlight extreme variations in flood severity across West Africa, revealing a landscape defined by pronounced disparities in historical hazard exposure. The systematic ranking and classification of nations into "Most-Hit," "Moderate," and "Least-Hit" cohorts identify distinct vulnerability profiles within the regional bloc. Furthermore, statistical validation through inferential testing confirms the capability of the index to effectively distinguish between these groupings, providing the empirical rigor necessary for cross-country assessment.

The CFII advances disaster research by complementing single-indicator approaches that often prioritize a single dimension of loss, such as mortality or economic damage alone. By integrating diverse metrics of frequency and human impact, the index offers a holistic understanding of regional risk that aligns with the global priority of understanding multidimensional hazards. Conclusively, the CFII serves as a transparent, reproducible, and standardized tool for comparative flood impact assessment. Its implementation provides a data-driven foundation for future disaster risk management and resource prioritization within ECOWAS, ensuring that regional strategies are informed by a scientifically grounded accounting of hazard intensity and vulnerability.

Policy Recommendations

The following policy implications are derived directly from the empirical findings of this study and the successful validation of the Composite Flood Impact Index (CFII).

- i. Institutional Adoption of CFII. ECOWAS is encouraged to adopt the CFII. This adoption would improve regional risk identification and governance.

- ii. Harmonized Data Protocols. Member states should standardize flood reporting. This would strengthen data integrity and regional monitoring efforts.
- iii. Integrated Resilience Planning. Agencies should incorporate CFII into development plans. This transition could mitigate persistent human capital erosion.
- iv. Evidence-Based Resource Allocation. ECOWAS should prioritize investments in Most-Hit nations. Targeted funding could strengthen structural anchors like manufacturing.
- v. Periodic CFII Updating. Institutions should regularly update index parameters. This ensures decision-making remains grounded in current hazard data.

Implementing these recommendations would significantly strengthen evidence-based flood risk governance, regional coordination, and long-term resilience across ECOWAS. By adopting a standardized, multidimensional approach to hazard assessment, member states can foster socio-economic stability. This transition is essential for ensuring that regional developmental goals are protected against the growing threat of transboundary climate shocks.

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BUSINESS RELATED INSTRUCTIONS AND PROFIT OUTCOME OF IGBO TRADERS IN THE BUILDING MATERIALS MARKET

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Abstract

The study assessed the relationship between business related instructions and profit outcome of Igbo traders in the building materials market within Lagos and Ogun States, specifically targeting Alaba Suru market in Lagos and Ota market in Ogun state, Nigeria. It adopts cross-sectional survey research design, data were collected from 210 respondents using structured questionnaire, data generated from the respondents were analysed using the SmartPLS. The study showed a strong positive relationship between business related instructions and profit outcome of Igbo traders; the study therefore recommends that traders should prioritize business related instructional practices in their business operations to increase their profit outcomes.

Keywords: Apprentice, Building Materials, Igbo, Profit Outcome, Related Instructions, Trader

1. Introduction

Business related instructions are essential elements of the Igbo apprenticeship system which are often used as a means of training the apprentice.

According to Daurio (2020), related instruction is a basic tool in apprenticeship programs. Strauss (1968) in his study stated that related instructions is instrumental to the training in apprenticeship programs. Lippolis (2025) also affirmed that related instruction is a critical component of apprenticeship which helps the apprentices to acquire the skills they need to be successful in any occupation in the future.

The indigenous business instructions framework of the Igbo business model of apprenticeship provides years of tutelage to young men and women under a master craft man or “Oga” under this model, related business instruction has indeed offered the apprentices an opportunity to acquire business acumen, healthy work attitude, market dynamics and discipline, deal with suppliers and customers, and interaction with other practitioners. (Okwuowulu, 2022).

Profit outcome cannot be separated from the success of any business not only in Nigeria but also across the world, and even more pronounced among the Igbo traders in Nigeria. Interestingly, related instructions can be viewed or believed as one of the key elements that contribute to the profit outcome of the Igbo traders in Nigeria. This concept or phenomenon has played a significant role in promoting Igbo traders. Despite of geopolitical biases, the Igbos share similar cultural practices and patterns, which are based on similar cults and

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socio-cultural institutions (Agama & Ohajionu, 2021). According to Kennedy and Elechi (2023), the Igbo people among many other things are persevering, enterprising wherever they in a business activity and successful.

Finally, Ndi Igbo are people that are industrious, enterprising, successful, resilient and above all human investors and nation builders (Iloanya & Nwanegbo-Ben, 2021). It is observed that many of these so-called Igbo apprentices achieve excellence in their calling because of related instructions from their “Oga” apart from being trained and settled well by their master (Kennedy & Elechi (2023).

There appears to be a paucity of academic literature attempting to link related instructions with profit outcome particularly among the Igbo traders in Nigeria. This study attempts to examine how business-related instructions affect the profit outcome of Igbo traders in the building materials market.

2. Literature Review

Linking related instructions and profit outcome

Generally, related instruction forms a crucial component of the apprenticeship process among Igbo traders. It entails shop-based learning, practical hands-on training, where apprentices acquire theoretical knowledge and technical skills relevant to their trade (Adim & Amadi, 2020). For instance, in the context of Igbo apprenticeship, related instruction may involve learning about market dynamics, customer relations, and financial management to prepare apprentices for entrepreneurship (Ifeanyi, et al.; 2020). This blend of theoretical and practical education equips apprentices with a holistic understanding of their craft and the business landscape (Ifechukwu-Jacobs, 2022). Related instruction in Igbo apprenticeship serves as a vital bridge between theoretical knowledge and practical skills, enabling apprentices to gain a comprehensive understanding of their trade and its broader context. By incorporating shop-based learning, hands-on practices, apprentices not only acquire technical skills but also develop critical thinking abilities and problem-solving skills necessary for entrepreneurship (Ifeanyi et al., 2020). This structured educational component not only enhances the quality of apprenticeship but also prepares individuals for diverse career pathways beyond traditional trades. However, challenges may arise in ensuring the relevance and adaptability of related instruction to evolving market demands and technological advancements, highlighting the need for ongoing curriculum updates and industry collaboration (Adim & Amadi, 2020).

Furthermore, the Experiential Learning Theory, developed by Kolb (1984) also support related instructions during apprenticeship. The theory posits that learning is a continuous process that occurs through experiences. Kolb's theory sets out a four-stage learning model: concrete experience, reflective observation, abstract conceptualization, and active experimentation. In the context of the apprenticeship and entrepreneurial performance of small and medium enterprises (SMEs) among Igbo traders, the Experiential Learning Theory holds significant relevance. Apprenticeship, which involves hands-on learning and practical experience under the guidance of a mentor, aligns closely with Kolb's concept of

concrete experience. Apprentices engage directly with the business environment, gaining practical skills and insights into entrepreneurial practices (Nwanna & Osakwe, 2021).

Furthermore, the reflective observation stage of Kolb's learning cycle corresponds to the period when apprentices reflect on their experiences and observations in the workplace. They analyze their actions, outcomes, and the strategies employed by successful entrepreneurs, thereby enhancing their understanding of business operations (Ifeanyi, et al. 2020). However, some criticisms and challenges exist regarding the Experiential Learning Theory. Critics argue that Kolb's model may have oversimplified the learning process by focusing primarily on individual experiences and neglecting the influence of social and environmental factors (Nasir et al., 2018). In the context of Igbo traders in Nigeria, where social networks and community dynamics play a crucial role in entrepreneurship, this critique highlights the limitations of an individual-centric approach to learning.

Moreover, while the Experiential Learning Theory emphasizes the importance of reflective observation and abstract conceptualization, its application may encounter challenges in environments where access to formal education and theoretical frameworks is limited (Ezekafor, et al. 2023). In regions with inadequate educational infrastructure, such as rural areas in Nigeria, apprentices may face barriers in transitioning from practical experiences to abstract conceptualization and theoretical understanding. By implications, the Experiential Learning Theory offers valuable insights for enhancing apprenticeship programs and entrepreneurial performance among Igbo traders. By incorporating reflection and conceptualization into apprenticeship curriculum, stakeholders can promote deeper learning and critical thinking skills among apprentices (Okpokwasili & Onwuatiegwu, 2024). Additionally, recognizing the importance of experiential learning can inform the design of training interventions and capacity-building initiatives tailored to the needs of SMEs. The Experiential Learning Theory presents a robust framework for understanding how individuals acquire knowledge and skills through hands-on experiences (Kolb, 1984). One of its key strengths lies in its emphasis on the active engagement of learners in real-world tasks and reflection on their experiences, fostering deep understanding and practical application of concepts (Kolb, 1984). In the context of apprenticeship and entrepreneurial performance among Igbo traders, the Experiential Learning Theory offers valuable insights into the effectiveness of hands-on training and experiential learning activities in cultivating entrepreneurial competencies and business acumen (Uju, et al. 2022). However, the theory's primary weakness lies in its limited consideration of socio-cultural factors and the role of social interactions in shaping learning experiences and outcomes. The Social Learning Theory, posits that individuals learn by observing and imitating the behaviors of others within their social environment. This theory complements the Experiential Learning Theory by highlighting the importance of social dynamics, role modeling in shaping entrepreneurial attitudes and behaviors among Igbo traders in Nigeria's dynamic business landscape.

3. Methodology

This study adopted a cross-sectional survey design using structured survey questionnaire.

The population for the study includes all the Igbo traders in the building materials market in Lagos and Ogun States, specifically targeting Alaba Suru in Lagos and Ota in Ogun state, owing to their status as economic hubs with the highest demand for building and construction resources (Oyalowo, 2022). The study employed cluster sampling approach, to select 230 respondents after a sample determination exercise via Cochran's Formula (1977). A primary source of data was utilized through structured survey questionnaire. The questionnaire was distributed and retrieved through drop-off pick procedure, however, only 210 copies of the questionnaire were retrieved. The collected questionnaire were analysed using both descriptive and regression analysis techniques.

4. Analysis and Discussion

The data analysed in this study considered the prediction of both structural and measurement models. Following the recommendations of Bollen & Stine (1992) and Liao, et al. (2022). All the constructs and items in the measurement model had loading factors not lower than 0.70. All the constructs had values above 0.70. The findings, as shown in Figures 1 and 2, showed that only few items with loading factors less than 0.7 were removed. Significant values, R-squared (R^2), and path coefficients were assessed by using SMART-PLS and the bootstrapping estimate.

H₀₁: There exists no significant relationship between business related instructions and profit outcome of Igbo traders in the building materials market

The hypothesis consists of one independent variable (business related instructions for apprentice) and one dependent variable (profit outcome of Igbo traders in the building materials market) in Lagos and Ogun States, Nigeria. All variables in the study were analysed using a standardized questionnaire employing a five-point Likert scale. The variables were measured using six (6) items. PLS-SEM is commonly used for predicting the relationship between variables (Hair, 2021). Figure 1, illustrates the standardized estimates that indicate the relationship between related instructions for apprentice and profit outcome of Igbo traders in the building materials market [BMM].

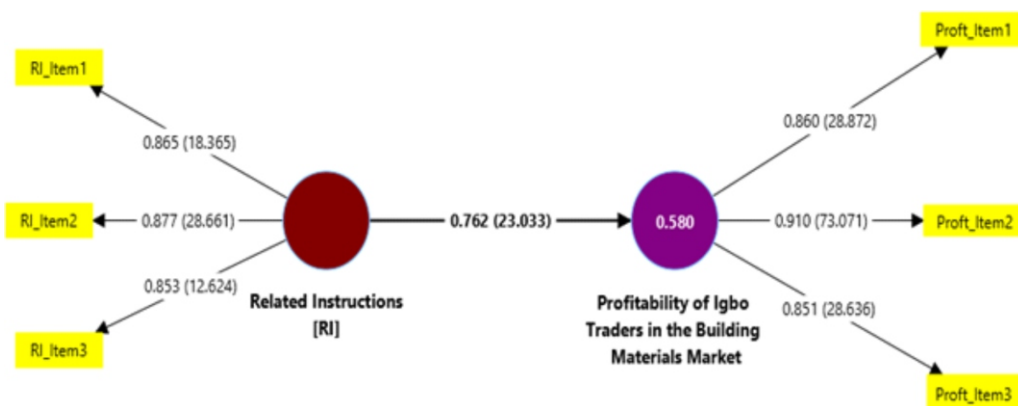


Figure 1 Predictive relevance (Path co-efficient and T-values) of business related instructions and profit outcome of Igbo Traders in the Building Materials Market

It is important to note that all the items related to related instructions for apprentice and profit outcome of Igbo traders, as shown in Table 1, showed a factor loading greater than the threshold of 0.70 as suggested by Thakkar (2020). This indicates a strong and positive relationship between the variables.

Table 1 Loading for Business Related Instructions and Profit Outcome of Igbo Traders

		Factor Loading	Composite Reliability	AVE	Cronbach's Alpha	No. of Indicators
Indicators			≥ 0.8	≥ 0.5	≥ 0.7	
RELATED INSTRUCTIONS		0.831	0.838	0.628	0.828	3
PROFIT OF IGBO TRADERS		0.827	0.890	0.683	0.846	3

Discriminant validity

The Fornell-Larcker criterion results demonstrate that discriminant validity is effectively established among the constructs of related instructions for apprentice and profit outcome of Igbo traders, as indicated by the square roots of the average variance extracted (AVE) for each construct being greater than the correlations between them. Specifically, the square root of the AVE for related instructions for apprentice is 0.864, while for profit outcome, it is 0.880, both of which exceed the correlation values, confirming that these constructs are distinct from one another. This distinction is crucial for the study as it ensures that the constructs are measuring different underlying concepts, thereby reducing the risk of multicollinearity and enhancing the robustness of the model. For Igbo traders in the building materials industry, this finding implies that focusing on related instructions for apprentice can lead to improved profit outcome without conflating the effects of different operational strategies, thereby allowing traders to implement targeted interventions that can enhance their business performance effectively.

Table 2 Discriminant Validity – Fornell Larcker Criterion

Discriminant	Related Instructions	Profit Outcome of Igbo Traders	Q²predict
Related Instructions	0.864		0.207
Profit outcome of Igbo Traders	0.880	0.859	0.267

The Common Method Bias (CMB)

Collinearity statistics was used to evaluate the common method bias in the SEM-PLS program. Liu, (2019) suggested that a VIF value higher than 3.3 suggests the presence of bias in the model. On the other, if the collinearity test, is equal to or lower than 3, then the

model may be free from common method bias. The result from the table shows the variance for CMB to be 2.45 and 2.70, while the combined variance was 51.847%, see Table 3

Table 3
Common Method Bias for Related Instructions and Profit Outcomes of Igbo Traders in the Building Materials Market

SN	Variables	VIF [<3]	Decision	Variance Factor in % [> 50]
1	Related Instructions	2.45	Free of CMB	51.847
2	Profit Outcome of Igbo Traders	2.70	Free of CMB	

Evaluation of the Model fitness

The evaluation of model fitness in this study followed the recommendations of Hair (2021). This analysis utilized various fit indices to assess the alignment between the sample data and the predictions of the model. The results indicated a strong model fit, with an RMSR value of 0.053 (below the 0.08 threshold), a GFI of 0.924 (exceeding the 0.9 criterion), and a CMIN/DF value below 3 and this confirmed the adequacy of the model. Incremental fit measures also supported this conclusion, with NFI and CFI values of 0.918 and 0.925, respectively, both surpassing the 0.9 cutoff. These findings suggest that the model effectively captures the relationship between related instructions for apprentice and the profit outcome of Igbo traders in the building materials market. This model provides a reliable framework for understanding these dynamics. For the study, this implies that the model can be confidently used to inform strategies aimed at enhancing related instructions for apprentice and fostering the profit outcome of Igbo traders within the building materials market.

Evaluation of the Inner Structural Model for related instructions and profit Outcomes

To determine the significance of the path coefficients, inner structural model was employed. In PLS-SEM, using bootstrapping is crucial to assessing the level of significance (Méndez-Suárez, 2021). This inner model demonstrates the impact of related instructions on apprentice for the profit outcome of Igbo Traders in the building materials market, are presented in Table 3

Path Coefficients (β) and T-statistics estimation related instructions and profit outcomes

Partial Least Square was employed to obtain the path coefficients and standardised coefficient. The values obtained were used to test the significance of the hypothesis. The bigger the value, the more significant the influence on the profit outcome of Igbo Traders in the building materials market. This hypothesis predicted that business related instructions for apprentice significantly relates to the profit outcomes of Igbo Traders as displayed in Table 4

Table 4
Path Coefficients for Business Related Instructions and Profit Outcome of Igbo Traders in the Building Materials Market

Variables and Cross Loading	Path efficient	Co- efficient	Std. Dev. (STDEV)	T-Statistics (O/ STDEV)	P Values
Business Related Instructions -> Profit outcome of Igbo Traders	0.762		0.055	23.033	0.000
	R Square (R ²)		R Square (R ²) Adjusted		
Profit Outcome of Igbo Traders	0.580			0.571	

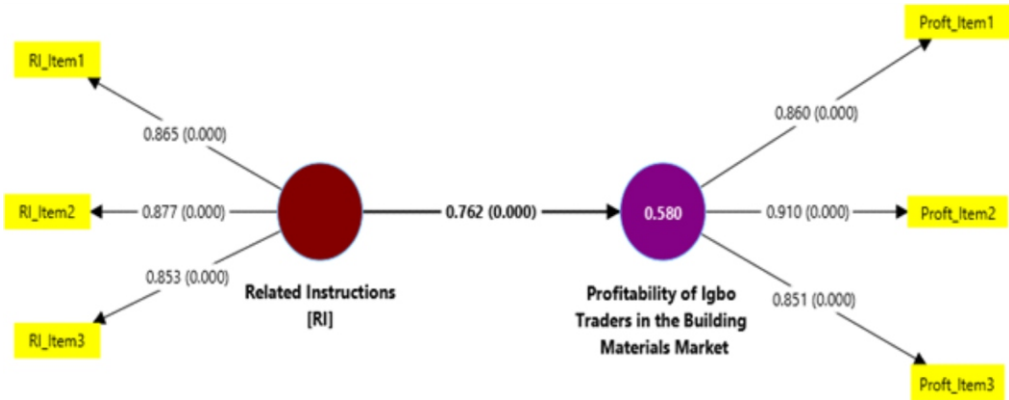


Figure 2 Predictive Relevance (Path co-efficient and P-values) of Business Related Instructions and Profit Outcome of Igbo Traders in the Building Materials Market

From table 4, it is revealed that there is a strong positive relationship between related instructions and the profit outcome of Igbo traders in the building materials market, with a path coefficient of 0.762. This high coefficient indicates that as the effectiveness of related instructions increases, so does the profitability of these traders. The T-statistic of 23.033, which is significantly above the threshold of 1.96, confirms the statistical significance of this relationship, with a p-value of 0.000 indicating that the results are highly reliable. Additionally, the R-squared value of 0.580 suggests that approximately 58% of the variance in profit outcome can be explained by business related instructions, for apprentice while the adjusted R-squared of 0.571 indicates a good model fit after accounting for the number of predictors.

5. Conclusion and Recommendations

The major purpose of this study was to establish the relationship between related instructions and profit outcome among the Igbo traders in the building materials market within Lagos and Ogun States, with specific targets at Alaba Suru in Lagos and Ota in Ogun state, Nigeria. The finding from the descriptive result revealed that 75% of the Igbo traders

who received structured instructional training reported a significant increase in their profit margins.

Furthermore, the study demonstrated that there is a strong positive relationship between business related instructions and the profit outcome of Igbo traders in the building materials market. This finding underscores the importance of comprehensive training programs that equip the traders with necessary technical knowledge and market insights. For Igbo traders, this suggests that investing in robust training curriculum can directly enhance their profit outcome and position them more favorably in a competitive market. For Igbo traders in the building materials market, these findings imply that enhancing the clarity and effectiveness of related instructions for apprentice can lead to substantial improvements in profit. This underscores the importance of structured training and clear communication of business practices, which can empower traders to make informed decisions and optimize their operations. By focusing on improving these instructional frameworks, Igbo traders in building materials can better navigate market challenges, ultimately leading to increased sales and profit. Therefore, investing in training programmes and resources that enhance understanding of business processes is crucial for sustaining competitive advantage in the building materials market.

The findings indicate that structured apprenticeship programs, which include business related instructions significantly enhance the profit outcome and operational efficiency of building materials traders. Specifically, traders who engaged in comprehensive training reported notable increases in profit margins and customer retention, highlighting the critical importance of education and skill development in driving business success. For Igbo traders, this suggests that investing in effective apprenticeship models can lead to substantial financial benefits and competitive advantages in a rapidly evolving market.

It is recommended based on the finding obtained from the study that there is a need to develop and implement a structured apprenticeship programs that incorporate both theoretical knowledge and practical training. These programs should be designed to cover essential areas such as product knowledge, customer service skills, and business management practices. Traders can collaborate with local educational institutions or vocational training centers to create a curriculum tailored to the specific needs of the building materials market. This partnership can facilitate workshops, seminars, and hands-on training sessions, ensuring that apprentices gain relevant skills that directly contribute to their performance in the field.

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INFLATION AND HOUSEHOLD'S WELFARE OF RESIDENTS OF KETU/ADIE-OWE IN ADO-ODO/OTA LOCAL GOVERNMENT AREA OF OGUN STATE, NIGERIA.

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Abstract

This study examined the effect of inflation on household welfare among residents of Ketu/Adie-Owe Community of Ado-Odo/Ota Local Government Area, Ogun State, Nigeria. Specifically, the study examined the relationship between inflation and household income, determined the effect of inflation on household consumption expenditure, and assessed the impact of inflation on household welfare indicators. A descriptive survey research design was adopted for the study. Data were collected through a structured questionnaire administered to 120 respondents selected from the study area. Data collected were analyzed using descriptive statistics and simple linear regression analysis with the aid of SPSS version 27. The findings revealed that inflation has a significant effect on household welfare ($R = 0.508$, $R^2 = 0.258$, $F = 41.135$, $p < 0.05$), indicating that inflation accounted for 25.8% of the variation in household welfare. In addition, inflation was found to have a significant effect on household welfare indicators ($R = 0.791$, $R^2 = 0.625$, $F = 196.622$, $p < 0.05$), accounting for 62.5% of the variation in household welfare indicators. The study concluded that inflation significantly affects household welfare, household consumption, and household welfare indicators in Ketu/Adie-Owe Community of Ado-Odo/Ota Local Government Area, Ogun State. The study recommended that the government should implement effective monetary and fiscal policies aimed at controlling inflation and stabilizing prices. Furthermore, programmes that enhance household income and social welfare should be strengthened to mitigate the adverse effects of inflation on households.

Keywords: Inflation, Household's Income, Household Consumption Expenditure, Household's Welfare Indicators, Cost of Living.

1. Introduction

Inflation is a critical economic variable that directly influences household expenditure patterns, particularly in developing economies. Rising inflation erodes purchasing power, alters consumption behavior, and affects the financial well-being of households. Globally, countries with stable inflation rates, such as Germany and Canada, demonstrate how effective monetary policies can mitigate adverse effects on consumer spending (Anderson & Patel, 2021). In recent years, high level of poverty has been a serious threat to the Nigerian economy and indeed, a scourge that has thrown her citizens into uncertainty and penury. Adam Smith submitted that poverty is the inability to purchase necessities required by nature (Yunusa et al., 2023).

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Price stability is among the macroeconomic variable indicators that determine the level of economic activities and general well-being of the citizens of a country. Price stability determines the level of inflation in a country. At the individual level, inflation exerts a heavy influence on the cost of living which affects their standard of living. At aggregate level, it distorts stability of price which hinders sustainable economic growth. Inflation, refers to the continuous rise in general price level which results in a fall in the value of money over a given time period such that more money chases fewer goods and services which impacts the economy adversely (Chimobi, 2010).

Nigeria, as one of the largest economies in Africa with economic growth of over 3% in 2023 according to the Nigerian Gross Domestic Product (GDP) report released in February 2024 by the National Bureau of Statistics (NBS). Also, with a huge population of over 200 million which was supposed to support commerce, poverty still remains significant with 133 million extremely poor people representing 63% of the nation's population (National Bureau of Statistics, 2024).

This study focuses on the effect of inflation on household welfare in Ketu/Adie-Owe Community located in Ado-Odo/Ota Local Government Area of Ogun State, Nigeria. The study specifically examines how the persistent increase in the prices of goods and services has affected the welfare and living conditions of households within the community. The study also covers the period from 2020 to 2025, a period characterized by persistent inflationary trends, economic instability, and increases in the cost of living in Nigeria.

The broad objective of this study is to examine the effect of inflation on household welfare of residents of Ketu/Adie-Owe of Ado-Odo/Ota Local Government, Ogun State; while the specific objectives are to; examine the relationship between inflation and household's income resident of Ketu/Adie-Owe community of Ado-Odo/Ota Local Government Area, Ogun State; determine the effect of inflation on household's consumption expenditure of Ketu/Adie-Owe community of Ado-Odo/Ota Local Government Area, Ogun State; and assess the impact of inflation on household welfare indicators resident of Ketu/Adie-Owe community of Ado-Odo/Ota Local Government Area, Ogun State.

2. Literature Review

2.1 Relationship Between Inflation and Household Welfare

Quadri et al (2020) posited that inflation refers to the persistent increase in the general price level of goods and services over a period of time. It reduces the purchasing power of money and affects the standard of living of households. Household welfare, on the other hand, refers to the economic and social well-being of individuals and families, measured through indicators such as income, consumption, health, education, housing, and access to basic necessities.

The relationship between inflation and household welfare is generally negative because rising prices reduce the real value of household income and savings. When inflation increases faster than wages and salaries, households experience a decline in purchasing power, making it difficult to afford essential goods and services such as food, healthcare, transportation, and education.

2.1.1 Inflation and Household's Cost of Living

Inflation has significantly increased the cost of living among households in Nigeria, especially in Lagos State, Ogun States and other states in recent years. Rising prices of goods and services have affected housing, electricity, transportation, and education, thereby reducing household welfare and purchasing power. National Bureau of Statistics (2024), Nigeria's inflation rate rose consistently throughout 2024 due to exchange rate depreciation, rising fuel prices, and increased production costs. This rise in inflation has forced many households to spend a larger proportion of their income on basic necessities, leaving little for savings and investment (NBS, 2024).

Over the past few years, food prices in Nigerian cities have consistently increased. For instance, between January 2021 and January 2024, food prices in Nigeria increased by more than 20% (National Bureau of Statistics, 2024). All indications suggest that this trend is likely to continue in the near future, except interventions are made by all stakeholders. In Port Harcourt for instance, the Consumer Price Index (CPI) for food was 442 percent in March 2021, up from 353.9 percent the previous year, and by January 2024, it had risen to 865.7 percent (National Bureau of Statistics, 2022). This clearly demonstrates that food prices in the country are rising at an increasing rate and reducing people's actual income. As a result, an overwhelming majority of the people remain poor, with limited physical, social, and economic access to adequate, safe, and nutritious food to meet their nutritional requirements (FAO & WHO, 2021).

2.2 Theoretical Review

2.2.1 Keynesian Theory of Inflation

The Keynesian Theory of Inflation was developed from the ideas of the British economist John Maynard Keynes, in 1936. The theory explains inflation as a situation where aggregate demand in the economy exceeds aggregate supply. According to Keynesian economists, when consumers, businesses, and government increase spending beyond the productive capacity of the economy, excess demand is created, leading to a rise in the general price level. This type of inflation is often referred to as demand-pull inflation. The theory explains that inflation affects household welfare by reducing the purchasing power of income. When prices rise continuously, households are unable to purchase the same quantity of goods and services with their income. This leads to a decline in real income, reduced consumption, and lower living standards. Keynesian economists therefore recommend policies such as fiscal discipline, taxation, and monetary control to reduce excessive demand and stabilize prices.

2.2.2 Cost-Push Inflation Theory

The Cost-Push Inflation Theory explains inflation as a result of increasing costs of production. According to this theory, inflation occurs when producers increase the prices of goods and services because of rising production costs such as wages, fuel prices, transportation costs, electricity tariffs, taxes, and raw material costs. Unlike the Keynesian theory, which emphasizes excess demand, cost-push inflation focuses on supply-side

factors. The theory argues that when the cost of producing goods increases, producers transfer the additional cost to consumers by raising selling prices. As production costs continue to rise across different sectors of the economy, the general price level increases, resulting in inflation. Cost-push inflation is therefore associated with a reduction in aggregate supply rather than an increase in demand.

2.2.3 Welfare Theory

Welfare Theory of inflation was propounded by Arthur Cecil Pigou in 1951, and it focuses on the well-being and quality of life of individuals and households within an economy. The theory examines how economic activities, government policies, income distribution, and market conditions affect human welfare. Welfare economists argue that the ultimate objective of economic activities should be the improvement of people's standard of living and social well-being. The theory emphasized that welfare can be measured through factors such as income, consumption, health, education, housing, and access to social services. Welfare theory explains that economic growth alone does not guarantee improved welfare unless it positively affects the living conditions of households.

Relevance of the Theories to the Study

The theories discussed above are highly relevant to this study because they provide explanations for the causes of inflation and its effects on household welfare in Ketu/Adie-Owe, Ogun State. The Keynesian Theory of Inflation explains how excess demand for goods and services contributes to rising prices in the economy. This theory is important in understanding how increasing consumer demand and government spending create inflationary pressure that affects households. The Cost-Push Inflation Theory is relevant because it explains how rising production costs such as fuel prices, electricity tariffs, transportation costs, wages, and raw materials lead to inflation. The Welfare Theory is also relevant because it focuses on the standard of living and well-being of households. The theory explains how inflation reduces purchasing power, increases poverty, lowers food consumption, and worsens living conditions. These theories provide a comprehensive explanation of the relationship between inflation and household welfare. They help this study to understand how inflation affects rent, transportation, electricity bills, school fees, food prices, and general living conditions of households in Ketu/Adie-Owe, Ogun State.

2.3 Empirical Studies on Household Welfare

Studies show that household welfare depends largely on income level, employment, access to services, and price stability. Murjani (2019) employed inflation, unemployment, and economic growth to know whether poverty responded positively to changes in the aforementioned variables. The study's methodological gap was thought to be bridged by ARDL. Inflation, unemployment, and economic growth all have a substantial impact on poverty, thanks to Autoregressive Distributive Lag (ARDL). The findings demonstrated that, in the long run, inflation, unemployment, and economic growth all have a major impact on poverty. Only inflation and economic growth have been shown to have a major impact on

poverty in the short run. Yolanda (2017) offered fresh insight into the influence of inflation on poverty and the human development index in Indonesia. The study spans the years 1997 to 2016, and data on inflation and poverty rates were collected. The results of a simple model revealed that the rate of inflation has a positive and significant influence on poverty in Nigeria.

Siyan et al. (2016) examined the influence of unemployment and inflation on poverty in Nigeria between 1980 and 2014. VAR model, and granger causality was employed to estimate the desirable data. It was revealed that the increase in poverty in Nigeria was attributed to the previous high inflation and unemployment in the country. Their results demonstrated that there is existence of relationship that runs through inflation to poverty and not other way round. Paul and Sharma (2012) examined the effect of inflation rate on poverty in different period. It was revealed that the poor people were badly hurt with rate of inflation in the economy. The study conducted by Talukdar (2012) in developing countries assessed the influence of inflation on poverty. The study considered 115 developing countries between 1981 and 2008. It was revealed that inflation rate positively and significantly influences poverty in developing countries. It was stated empirically that inflation is negatively related to poverty in low income economies.

Moghalu and Ude (2023) “used the ordinary least square technique (OLS), error correction mechanism (ECM), the Granger causality test and data from 1980-2017 to determine how poverty, unemployment, life expectancy at birth affects inequality in Nigeria. The results revealed that both the national poverty index and unemployment rate were positively related to inequality though statistically insignificant at level. This findings implies that as poverty and unemployment rate increased, inequality increased correspondingly, inferring close links among the variables. Furthermore, the Granger causality test revealed bidirectional causality between poverty and inequality over the period of the study”. Ajibola et al. (2018) “in another similar study utilized the OLS, Johansen co-integration, Granger causality test techniques and data from 1980 to 2013 to examine poverty and inequality in Nigeria with respect to its implications to inclusive growth. The results of cointegration test revealed that a long-run relationship exists among the variables.

The finding revealed that inequality had a negative impact on poverty”. Utilizing descriptive statistics and logistics regression model, Muhammad and David (2019) “as well investigated the relationship between poverty and unemployment in Niger State, Nigeria. The findings revealed that a proportionate relationship existed between poverty and unemployment”. Annual data from 1986-2019, OLS regression technique and Granger causality test was employed by Gamba et al. (2021) to examine the effect of unemployment on poverty in Nigeria. The results revealed that unemployment and income inequality had a positive and significant effect on poverty while inflation had a negative and insignificant effect on poverty. Also, it was found that a bidirectional causality exist between inflation and unemployment while a one-way causation run from inflation to income inequality. In an evaluation of the relationship between economic inequality and poverty dynamics in Nigeria.

3. Methodology

The study adopted a descriptive survey research design which enhances objectivity and ensures that the findings of the study can be generalized to the larger population within Ketu/Adie-Owe of Ado-Odo/Ota Local Government Area, Ogun State. The study was carried out on the residents of Ketu/Adie-Owe, located in Ado-Odo/Ota Local Government Area of Ogun State, Nigeria. The choice of Ketu/Adie-Owe for this study was informed by its proximity to Crawford University. Therefore, the area provides a suitable environment for examining the relationship between inflation and household welfare.

3.1 The population of the study

The population of the study comprises of all households residing in Ketu/Adie-Owe of Ado-Odo/Ota Local Government Area, Ogun State. The target population includes household heads, parents, guardians, salary earners, traders, and other adult residents who are knowledgeable about household expenditures and welfare conditions. The population was selected because households are directly affected by inflation through increased prices of goods and services, reduced purchasing power, and changes in living standards. The respondents provided reliable information concerning how inflation affects their welfare and economic survival.

3.2 Sample Size

Due to the large size of the population and the inability of the researcher to study all households within the study area, a sample size was selected for the study. A total of one hundred and twenty (120) respondents were selected for the study. The sample size was considered adequate because it represents a reasonable proportion of the target population and allows for effective administration and retrieval of questionnaires. The selected respondents consisted of household heads and adult residents from different parts of Ketu/Adie-Owe.

3.3 Sampling Technique

The study adopted a simple random sampling technique in selecting respondents for the study. The simple random sampling technique gave every member of the population an equal opportunity of being selected as the area was partitioned into different sections and randomly distributed questionnaires among households within the community. This technique was chosen to reduce bias and ensure fairness in the selection process.

3.4 Source of Data

The data were obtained directly from respondents through the administration of questionnaires. The questionnaire was designed to gather information on respondents' demographic characteristics and their opinions regarding the effects of inflation on household welfare. The questionnaire contained structured questions relating to: Increase in prices of goods and services

I. Changes in household income and expenditure

- ii. Household food consumption patterns
- iii. Housing and accommodation costs
- iv. Transportation expenses
- v. Access to healthcare and education
- vi. Savings, purchasing power, and standard of living

The questionnaire adopted a four-point Likert scale format as follows:

Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2, Strongly Disagree (SD) = 1. The Likert scale was used because it simplifies data analysis and allows respondents to express the degree of their agreement or disagreement with each statement.

3.5 Method of Data Analysis

The data collected from respondents were analyzed using descriptive statistical tools such as frequency tables, Chi-square, and mean scores. The demographic data of respondents were presented using tables and percentages, while responses relating to the research questions were analyzed using mean scores. The decision rule for the Likert scale responses was based on a criterion mean of 2.50.

Therefore, any item with a mean score of 2.50 and above was accepted, while any item with a mean score below 2.50 was rejected. The Statistical Package for Social Sciences (SPSS) was also used in analyzing the data where necessary. The analysis helped the researcher to draw meaningful conclusions concerning the effect of inflation on household welfare in Ketu/Adie-Owe of Ado-Odo/Ota Local Government Area.

4. Data Analysis

4.1 Descriptive Statistics

Table 4.1 shows the distribution of the questionnaires administered and retrieved for the study. A total of 120 questionnaires were distributed to respondents, representing 100% of the sample size. The high response rate of 100% indicates a strong level of participation among respondents and provides adequate data for the study on the Inflation And Household's Welfare of Ketu/Adie-Owe of Ado-Odo/Ota Local Government, Ogun State, Nigeria.

Table 1: Descriptive Statistics

Description	Frequency	Percentage (%)
Valid Responses	120	100
Invalid Response	0	0
Total	120	100.0

Source: Field Survey, 2026

4.2 Descriptive Analysis of the Respondents' Demographics

This section provides the frequency distributions of the demographics of the respondents. Table 2 presents the descriptive statistics of the demographic information of the respondents. The table shows that out of 120 representing 100% respondents were valid across all demographic variables, including gender, age, marital status, occupation, and educational qualification.

Table 2: Respondents' Demographics Frequency Distribution

Statistics						
		Gender	Age	Marital Status	Occupation	Educational Qualification
N	Valid	120	120	120	120	120
	Missing	0	0	0	0	0

Source: Field Survey, 2026

4.3 Gender Respondents' Demographics Frequency Distribution

The gender distribution table reveals that the majority of the respondents were female. Out of 120 valid responses, 91 respondents representing 76.8% were female, while 29 respondents representing 24.2% were male. This implies that females constituted a larger proportion of the participants in the study. The cumulative percentage reached 100%, confirming that all valid responses were accounted for in the gender classification.

Table 3: Gender Respondents' Demographics Frequency Distribution

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	91	75.8	75.8	75.8
	Male	29	24.2	24.2	100.0
	Total	120	100.0	100.0	

Source: Field Survey, 2026

4.4: Age Respondents' Demographics Frequency Distribution

The age distribution table shows that respondents were grouped into four age categories. Respondents aged 18–25 years were 19, representing 15.8% of the sample. The majority of the respondents, 77 representing 64.7%, were within the age range of 26–35 years. Those aged 36–45 years were 9, accounting for 7.5%, while respondents aged 46 years and above were 15, representing 12.5% of the sample.

This indicates that the study was dominated by respondents within the 26–35 years age bracket, suggesting that most participants were young to middle-aged adults.

Table 4: Age Respondents' Demographics Frequency Distribution

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-25	19	15.8	15.8	15.8
	26-35	77	64.2	64.2	80.0
	36-45	9	7.5	7.5	87.5
	46 and above	15	12.5	12.5	100.0
	Total	120	100.0	100.0	

Source: Field Survey, 2026

4.5: Marital Status Respondents' Demographics Frequency Distribution

The Marital Status shown in the table below shows that the single has a higher respondent of 74, which represent 61.7%. While the married respondents were 46, which represent 38.3%.

Table 5: Marital Status Respondents' Demographics Frequency Distribution

Marital Status					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single	74	61.7	61.7	61.7
	Married	46	38.3	38.3	100.0
	Total	120	100.0	100.0	

Source: Field Survey, 2026

4.6: Occupation Respondents' Demographics Frequency Distribution

The occupation distribution table shows that respondents were grouped into three age categories. The majority of the respondents occupation, Civil Servant were 64, representing 53.3% of the sample. Trader were 43, representing 35.8% of the sample. While Artisan were 13, representing 10.8% of the sample. This indicates that the study was dominated by Civil Servant.

Table 6: Occupation Respondents' Demographics Frequency Distribution

Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Civil Servant	64	53.3	53.3	53.3
	Trader	43	35.8	35.8	89.2
	Artisan	13	10.8	10.8	100.0
	Total	120	100.0	100.0	

Source: Field Survey, 2026.

4.7: Education Qualification Respondents' Demographics Frequency Distribution

The educational qualification distribution in the table above shows that respondents were grouped into two educational qualification categories. The majority of the respondents were graduate with 107 respondents, representing 89.2% of the sample. The respondents with secondary school level were 13, representing 10.8% of the sample. This indicates that the study was dominated by graduates.

Table 7: Education Qualification Respondents' Demographics Frequency Distribution

Educational Qualification					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Secondary level	13	10.8	10.8	10.8
	Graduate	107	89.2	89.2	100.0
	Total	120	100.0	100.0	

Source: Field Survey, 2026.

4.8 Discussion of Findings

The model summary showed a moderate positive relationship between inflation and household welfare ($R = 0.508$). The coefficient of determination ($R^2 = 0.258$) indicated that inflation explained 25.8% of the variation in household welfare, while the remaining 74.2% was explained by other factors not included in the model. The regression analysis revealed that inflation has a significant effect on household consumption. The model summary showed a strong positive relationship between inflation and household consumption ($R = 0.713$). The coefficient of determination ($R^2 = 0.509$) indicated that inflation accounted for 50.9% of the variation in household consumption. The result of the regression analysis showed that inflation has a significant effect on household welfare indicators. The model summary revealed a strong positive relationship between inflation and household welfare indicators ($R = 0.791$). The coefficient of determination ($R^2 = 0.625$) indicated that inflation explained 62.5% of the variation in household welfare indicators.

5. Conclusion

Based on the findings of this study, it was concluded that inflation significantly affects household welfare in Ketu/Adie-Owe Community of Ado-Odo/Ota Local Government Area, Ogun State. The study established that inflation has a significant relationship with household welfare and significantly influences household consumption and welfare indicators. The findings imply that increases in the general price level affect the ability of households to maintain their standard of living and meet essential needs. The conclusion emphasized that inflation reduces purchasing power and influences household welfare outcomes. Therefore, inflation remains a critical economic issue that requires effective policy intervention to protect household welfare and promote economic stability.

5.1 Recommendations

Based on the findings and conclusion of the study, the following recommendations are made:

- i. Government should strengthen monetary and fiscal policies aimed at controlling inflation and ensuring price stability in the economy.
- ii. Programmes that enhance household income generation, employment opportunities, and entrepreneurship should be expanded to reduce the adverse effects of inflation on households.
- iii. Social welfare programmes such as food assistance, conditional cash transfers, and subsidies should be strengthened to support vulnerable households during periods of high inflation.
- iv. Government should encourage increased agricultural and industrial production to improve the supply of goods and reduce inflationary pressures.
- v. Households should be encouraged to adopt prudent financial management practices, including budgeting and savings, to cope with rising prices.
- vi. Economic policymakers should continuously monitor inflation trends and implement timely interventions to safeguard household welfare and improve living standards.

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IMPACT OF TRADE OPENNESS ON INDUSTRIAL GROWTH: EVIDENCE FROM LOW-INCOME ECONOMIES IN ECOWAS

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Abstract

This study investigates the impact of trade openness on industrial growth in low-income economies within the ECOWAS region. Secondary data were sourced from the World Development Indicators (WDI) for the eight low-income ECOWAS countries identified by the World Bank, covering the period 1998–2023. The analysis was based on panel data from these eight countries and estimated using the Driscoll and Kraay regression technique, which corrects for cross-sectional dependence, heteroskedasticity, and serial correlation. The findings reveal that while trade openness does not have a significant impact on industrial growth, gross capital formation and real exchange rates have positive and significant impacts. Conversely, foreign direct investment (FDI) and inflation negatively affect industrial growth in these countries. Therefore, the study concludes that trade openness alone is insufficient to drive industrial growth in low-income ECOWAS countries. It recommends policies that promote capital formation, maintain exchange rate stability, improve the quality and productivity of foreign direct investment, and keep inflation at stable levels to support industrial growth.

Keywords: Trade Openness, Industrial Growth, Industrialisation, Low-Income Countries, ECOWAS

JEL Classification: O14, F14, O55, E22

1. Introduction

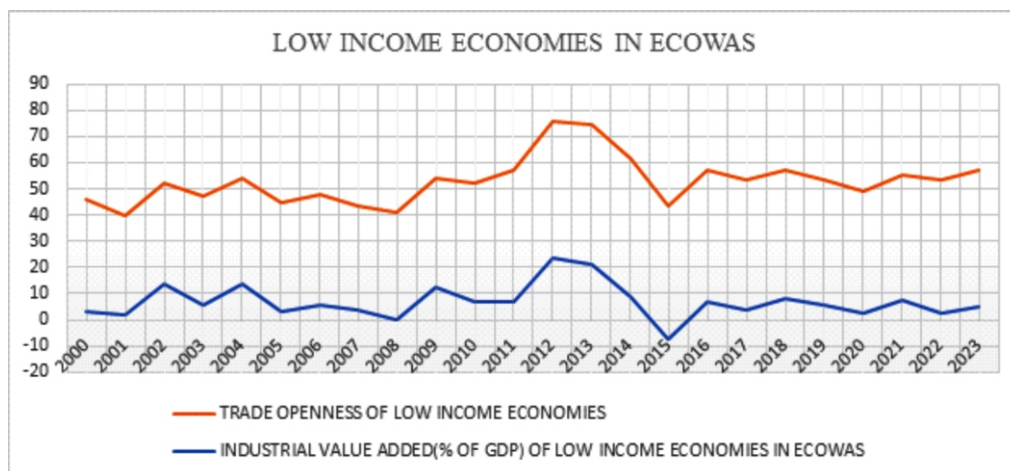
As a cornerstone of economic development, industrialisation is a key driver of structural transformation and increased productivity through diversification (Odeleye and Olunkwa, 2019; Agility et al., 2025). Diversification towards industrialisation is key to building a strong, resilient economy (Afolabi, 2022). For instance, industrialisation not only fosters innovation and technological progress but also strengthens economic resilience. The benefits of industrialisation, from improved infrastructure to better access to markets, offer profound opportunities for both developed and developing nations to prosper. China, Singapore, Malaysia, and South Korea, among others, are notable economies that employed this route to drive structural economic transformation and competitiveness (Adeoti, 2020). While shocks are somewhat inevitable, industrialised economies are often less affected by both internal and external shocks than natural resource-based economies or some emerging economies. Many Sub-Saharan African countries rely heavily on natural resources, are import-dependent, and have small open economies (Ogunjimi, 2020). By embracing industrial growth, African nations have the potential to reduce poverty, improve living conditions, and strengthen their global competitiveness in an increasingly interconnected world.

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In the same vein, trade openness is fundamental for enhancing industrial growth as it connects countries to global markets, technology, and capital. By opening up to international trade, countries can leverage comparative advantages, attract foreign investment, and promote innovations (Ikechi, Chinedum, & Nwokoro, 2022). Industries benefit from trade openness because it enhances access to production inputs, leading to greater efficiency and productivity (Abinabo & Abubakar, 2023). Moreover, exposure to global competition drives local industries to adopt more advanced technologies, which is essential for industrial expansion. Furthermore, trade openness is a strong component that contributes to economic performance (Wiredu *et al.*, 2020). Largely, a country's trade potential is signified by its GDP growth, which attracts foreign investment and thus creates more trade opportunities.

Empirical studies have, over the years, had mixed reactions on the impact of trade openness on industrial growth. For instance, some studies have revealed that trade openness has a positive effect on industrial output growth (Muhamad & Khadim, 2017; Fahad & Ergun, 2017). Contrarily, other empirical studies argued that trade Openness has a significant and negative impact on output (Adu-Gyamfi *et al.*, 2020; Akorsu and Okyere, 2023). In this connection, Figure 1 is a graphical presentation of Trade Openness and Industrial Value Added of Low-Income Economies in ECOWAS

Figure 1: Trade Openness and Industrial Value Added of Low-Income Economies in ECOWAS



Source: Authors' Computation from the World Development Indicator, 2025

Between 2000 and 2005, the industrial value-added fluctuated significantly. It started at 3.38% in 2000 and had a sharp decline in 2001 to about 1.74%. It rose to 13.66% in 2002 before falling again in 2003. These indicate an inconsistency in industrial performance across the region. The period from 2005 to 2015 saw more notable fluctuations as well. For example, in 2008, which was the period of global economic downturn experienced a drastic drop to 0.33%, followed by a rise to 12.68% in 2009. It declined again to -7.4% in 2015

during the global oil price shock, reflecting a contraction in industrial activity. After the downturn in 2015, the industrial value-added rebounded in 2016 to about 6.95%. The sector's performance became relatively more stable, though it remained below the peaks of 2012 and 2013. By 2023, the figure stood at 4.80%, reflecting modest industrial output but significantly lower than the early 2010s.

From 2000 to 2015, trade openness, measured by total trade as a percentage of GDP, trended upward in the low-income ECOWAS economies. It grew steadily from 42.59% to 53.63% in 2013. This reflects an increasing engagement in international trade, with ECOWAS low-income economies becoming more integrated into global markets. Trade openness dipped in 2015, which could be due to the global oil shock. From 2016, it kept fluctuating slightly till 2020 but remained relatively high. The highest value of 52.93% occurred in 2014, with a modest decline to 46.58% in 2020. However, by 2023, trade openness rebounded to 52.15%, showing a resilient recovery and continuing reliance on global trade.

However, despite the potential benefits of trade openness, the relationship between trade openness and industrial growth remains complex, particularly in low-income economies. Most of the member states in ECOWAS have been ranked lowest in terms of openness to trade on the continent and the world at large (Ikechi, Chinedum, & Nwokoro, 2022). Despite the importance of openness to trade in aiding economic development, it seems to have a low impact on low-income countries and ECOWAS at large. Similarly, Low-income economies in ECOWAS have struggled with fluctuating industrial growth despite increasing trade openness. This reveals that trade liberalisation has not always led to the desired industrial expansion in many of these countries. Factors such as inadequate infrastructure, limited access to financing, and the persistence of high trade barriers—both domestic and international—often hinder the full benefits of trade openness. Furthermore, low-income economies face the challenge of competing with more advanced industrialised nations that dominate global markets. As a result, their potential to foster industrial growth in these nations is often unachievable. This brings about the question of what factors limit the impact of trade on industrial development. This paper seeks to explore the degree of relationship between trade openness and industrial growth in low-income economies.

Additionally, some existing literature on the impacts of trade openness and industrial growth focuses more on high-income or emerging economies, with limited attention given to low-income countries. In particular, low-income nations in ECOWAS, which are Burkina Faso, Gambia, Guinea-Bissau, Liberia, Mali, Sierra Leone, Niger, and Togo, remain underexplored. This research seeks to fill this gap by providing empirical evidence from low-income ECOWAS nations, exploring how trade openness impacts industrial growth in this selected region.

2. Literature Review

Generally, the impact of trade openness on industrialisation has generated mixed results over the years. Some studies have found positive relationships between trade openness and industrial growth. For instance, Agility et al. (2025) found that trade openness has a positive

impact on industrial growth. Similarly, Omoregbee et al. (2025) confirmed from their studies that trade openness induces sectoral performance, especially industrial growth. Contrarily, Fankem & Feyom (2023) examined the effects of trade openness on industrialisation in Sub-Saharan Africa. They discovered that trade openness negatively affected industrialisation in Sub-Saharan Africa. They observed that the negative impact was particularly significant in countries with low levels of foreign direct investment and inadequate human capital. Likewise, Ikechi, Chinedum, and Nwokoro (2022) studied trade relations and openness among ECOWAS member nations from 2000 to 2019. They found that trade within ECOWAS remains low, despite efforts to enhance economic integration and trade openness among member states. Another study is that of Akintunde et al. (2021), who analysed the impact of trade openness on manufacturing performance in West Africa and found a negative relationship between trade openness and manufacturing output. Similarly, Ugoke et al. (2016) also found that trade openness negatively affected industrial production in Nigeria.

Many other studies focused on the impact of trade openness on economic growth. While recent studies such as Akorsu & Okyere (2023) and Adu-Gyamfi *et al* (2020) posited that trade Openness has a significant negative impact on GDP, Oloyede (2021) also investigated the relationship between trade openness and macroeconomic outcomes in Africa's regional economic communities (RECs), specifically focusing on ECOWAS and SADC. The study revealed a positive, but statistically insignificant, link between trade openness and economic growth in both ECOWAS and SADC. Other studies found that trade openness has a positive impact on economic growth. For example, Ijirshar (2019) studied the influence of trade openness on economic growth among ECOWAS countries and found that trade openness positively impacted long-term growth. Similarly, Saibu (2004) focused on the causality between trade openness and economic growth in Nigeria. Through causality tests, Saibu found a unidirectional relationship, where increased trade openness led to economic growth, although this effect depended on the level of economic development.

In the same manner, among other macroeconomic variables that affect industrial output growth are: Gross capital formation, foreign direct investment inflow, exchange rate, and inflation. For instance, Oyegun and Chibuzor (2023) identified a positive and significant relationship between gross capital formation and output growth, whereas Ajose and Oyedokun (2018) reported a negative, insignificant relationship between the two variables. Keji (2023) discovered a negative impact of FDI on industrial growth, while Amire (2022) reported that FDI had no significant effect on industrial performance. Also, Obani & Agu (2024) discovered that FDI has a long-term positive effect on the growth of the manufacturing sector in Sub-Saharan Africa. Ukuwanna, Ihugba & Okoro (2022), Oseni, Adekunle, and Alabi (2019), Akinmuregun and Falana (2018), and Simon-Oke & Aribisala (2010) all found a significant positive impact between exchange rate and industrial output growth. In contrast, Okafor, Adegbite, and Busari (2018) discovered that exchange rates negatively impact industrial growth, despite inflation having a positive effect. Modebe and Ezeaku (2016), however, found inflation to have a negative but statistically insignificant impact on industrial growth.

While some evidence supports the positive effects of trade openness on industrial growth, several studies have also discovered negative effects. This mixed effect persists, particularly in regions with low levels of foreign investment and human capital, such as low-income ECOWAS economies. These previous findings reveal the complex nature of the relationship between trade openness and industrial growth, specifically in low-income economies. This study also fills a gap by providing more current data, providing a fresh insight into the topic.

3. Methodology

3.1 Theoretical Framework

This study is anchored on the Endogenous Growth Theory developed by Romer (1986, 1990) and Lucas (1988). The theory explains long-run economic growth as a process driven by factors within an economy. For instance, human capital accumulation, innovation, technological progress, and knowledge creation. Unlike the Solow growth model, which treats technological progress as an exogenous factor, the Endogenous Growth Theory argues that economic growth depends on deliberate investment decisions and policies that promote research and development, education, learning, and knowledge accumulation. These activities generate spillover effects that improve productivity and sustain long-run growth.

The theory further argues that policies that strengthen the productive capacity of an economy can influence long-term growth. In this regard, trade openness can serve as a channel through which firms gain access to larger markets, advanced technologies, improved production methods, and intermediate inputs. Greater exposure to international markets can also increase competition, encourage innovation, and promote efficiency, thereby supporting industrial development. From this perspective, trade openness contributes to industrial growth when domestic industries have the capacity to absorb and utilise the knowledge and technologies that accompany international trade.

The Endogenous Growth Theory provides an appropriate framework for this study because it links trade openness with the mechanisms through which industrial growth can occur. Specifically, it explains how increased trade integration may improve industrial performance by facilitating technology transfer, knowledge diffusion, productivity enhancement, and capital accumulation. These channels are consistent with the study's objective of examining whether trade openness influences industrial growth in the eight low-income ECOWAS countries. The theory therefore offers a sound basis for analysing the relationship between trade openness and industrial growth in these economies.

3.2 Model Specification

The empirical model for this study is adapted from the work of Agility et al. (2025), which was specified as:

$$IND_{it} = \alpha_0 + \alpha_1 TRD_{it} + \alpha_2 FDI_{it} + \alpha_3 EXR_{it} + \alpha_4 INF_{it} + \alpha_5 GDP_{it} + \mu_t + \varepsilon_t \quad (3.1)$$

Where IND is industrial development, EXR is the exchange rate, FDI is foreign direct investment, GDP is economic growth, and INF is the inflation rate. This is further modified

and specified in the equation. 3.3. The notations in equation The functional form of the model is specified as follows:

$$ING = F(GCF, FDI, REEX, TOP, INF) \quad (3.2)$$

The equation is expressed as:

$$IN_{it} = \beta_0 + \beta_1 GCF_{it} + \beta_2 TOP_{it} + \beta_3 FDI_{it} + \beta_4 REEX_{it} + \beta_5 INF_{it} + U_t \quad (3.3)$$

Where ING is industrial growth, TOP is trade openness, FDI is foreign direct investment, REEX is the exchange rate, and INF is the inflation rate. For this study, capital stock is replaced with gross capital formation (GCF). U represents the error term, and t represents time, while β_0 is the constant. β_1 to β_5 are the parameters to be estimated.

Cross-sectional dependence is a common issue in panel data analysis because countries may be exposed to common shocks, regional spillovers, or shared economic conditions. When cross-sectional dependence is present, conventional fixed-effects and random-effects estimators may produce inconsistent standard errors, leading to unreliable statistical inference. To examine this issue, the study first applied Pesaran's (2004) cross-sectional dependence test. Accordingly, the study employed the Driscoll and Kraay (1998) estimator. The Driscoll-Kraay estimator extends the fixed-effects model by producing standard errors that are robust to cross-sectional dependence, heteroskedasticity, and serial correlation. This approach is suitable for macro-panel data where countries are likely to experience common shocks that induce correlation across cross-sectional units. Consequently, the Driscoll-Kraay estimator provides a reliable basis for statistical inference in the presence of these econometric issues.

3.3 Population and Sources of Data

The low-income countries in ECOWAS as of 2023 were considered based on data availability. The time series data are from 1998 to 2023. These countries include Gambia, Togo, Liberia, Mali, Sierra Leone, Burkina Faso, Guinea-Bissau, and Niger. Data are collected from the World Bank Development Indicators. The sources of data, description, and measures of variables are well summarised in Table 1.

Table 1: Sources and Description of Data

Variables	Code	Description	Measurement	Source
Industrial growth	ING	Gross industrial value added as % of GDP	%	WDI,2025
Gross capital formation	GCF	Gross capital formation as % of GDP	%	WDI,2025
Foreign direct investment	FDI	Total FDI as % of GDP	%	WDI,2025
Real effective exchange rate	REER	Real effective exchange rate index	Index	WDI,2025
Trade openness	TOP	Total trade as a percentage of GDP.	%	WDI,2025
Inflation	INF	Consumer price index	Index	WDI,2025

Source: Compilation from World Development Indicators

4. Results and Discussion

This section presents the results of the descriptive analysis, diagnostic tests, and regression estimation, and discusses their implications in relation to the study objectives and the existing literature.

Table 2 reports the descriptive statistics for the variables used in the analysis. Industrial growth (ING) averaged 17.286, with moderate variation across the sample. Trade openness (TOP), measured as total trade (exports plus imports) as a percentage of GDP, recorded a mean of 45.473%, indicating that trade accounted for nearly half of economic output on average, although the relatively large standard deviation points to substantial differences in trade integration across countries and over time. Gross capital formation (GCF) averaged 17.082%, suggesting moderate investment levels during the study period. Foreign direct investment (FDI) exhibited considerable variability, reflecting significant fluctuations in capital inflows across the sample. Similarly, the real exchange rate (REEX) showed wide dispersion, indicating notable differences in exchange rate movements among the countries. Inflation (INF) averaged 5.182%, with the observed range showing that the sample experienced both periods of deflation and episodes of relatively high inflation.

Table 2 Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
ING	17.286	6.548	3.243	31.074
TOP	45.473	21.066	29.54	107.751
FDI	6.189	13.387	-2.575	103.337
INF	5.182	5.886	-3.503	47.643
REEX	39.916	53.496	27.56	196.62
GCF	17.082	9.069	12.84	42.075

Source: Authors' computation

The Pesaran (2004) cross-sectional dependence test was conducted to determine whether the error terms were correlated across the panel units. The test produced a CD statistic of -2.286 with a p-value of 0.0223. Since the p-value is less than the 5% level of significance, the null hypothesis of no cross-sectional dependence is rejected. This indicates the presence of cross-sectional dependence among the low-income ECOWAS countries, suggesting that shocks affecting one country may also influence others. Consequently, the study employed the Driscoll and Kraay estimator, which provides robust standard errors in the presence of cross-sectional dependence, heteroskedasticity, and serial correlation.

Table3 Cross-Sectional Dependence Test

Test	Statistic	p-value	Decision
Pesaran CD Test	-2.286	0.0223	Reject H ₀ : Cross-sectional dependence exists.

Source: Authors' computation

Table 4 presents the regression results of the study. The model is statistically significant, as indicated by the F-statistic of 23.37 ($p = 0.0001$), suggesting that the explanatory variables are jointly significant in explaining industrial growth. The R-squared value of 0.032 indicates that the model explains 3.2% of the variation in industrial growth.

Table 4: Driscoll/Kraay Panel Regression

DV= ING	Coef.	Std. Err.	T	P>t	[95% Conf. Interval]	
TOP	0.032	0.035	0.910	0.370	-0.040	0.104
GCF	1.22	0.501	2.435	0.022	0.619	2.225
FDI	-0.311	0.032	-9.72	0.000	-0.497	0.035
INF	-0.082	0.030	-2.760	0.011	-0.143	-0.021
REEX	0.421	0.154	2.740	0.011	0.011	0.741
CONS	12.673	2.279	5.560	0.000	7.980	17.366
Within R²	0.032					
Probability	0.0001					
F-Statistics	23.37					
Observation	208					

Source: Authors' computation; significant at 1%, 5%, and 10% respectively.

Surprisingly, trade openness has no significant impact on industrial growth in low-income countries. This contradicts similar studies by Fankem & Feyom (2023) and Ijirshar (2019), who found that trade openness has a negative impact on industrial growth. This could be a result of the limited scope of the study, as it focuses mainly on Nigeria. This result also came as no surprise because countries in the sub-region are import-dependent, especially on consumable goods, which has discouraged industrialization. Gross Capital Formation has a positive and significant impact on industrial output growth in the sub-region. As GCF in the sub-region increases, industrial growth increases. This lends credence to a similar study by Oyegun and Chibuzor (2023) but contradicts Ajose and Oyedokun (2018), whose findings reveal a negative impact. It is obvious from the coefficient that the low-income countries in the ECOWAS region have consistently recorded low performance in the industrial sector because, among other factors, the level of domestic investment is low. Interestingly, foreign direct investment has a negative impact on industrial growth. This is similar to the discovery of Keji (2023), who found a negative impact of FDI on industrial growth, and, contrarily, Obani & Agu (2024) found that FDI has a long-term positive effect on industrial growth. The real effective exchange rate is positively significant. As the domestic currency appreciates relative to that of the trading partners, industrial output grows in the low-income countries of the ECOWAS region. The spillover effect comes from the low cost of importing raw materials for domestic firms. However, aside from the fact that exports become more expensive, the value of the coefficient shows a minimal impact. By implication, aside from that, exporting industrial output might be too expensive, and the quality is not at par with

international standards, which perhaps creates demand for importing similar products. This finding agrees with Akinmuregun and Falana (2018), Ukuwanna, Ihugba & Okoro (2022), and Oseni, Adekunle, and Alabi (2019), while it contradicts Okafor, Adegbite and Busari (2018). The structure of the African economy makes it highly vulnerable to external price shocks. Interestingly, inflation has a negative impact on industrial growth. Inflation drives up the average cost of production, which also trickles down to the prices of consumable goods, with no exception to industrial growth.

5. Conclusion and Recommendations

The study concludes that trade openness is not a significant determinant of industrial growth in the low-income ECOWAS countries. Instead, industrial growth is significantly influenced by gross capital formation, foreign direct investment, inflation, and the real exchange rate. It recommends policies that promote capital formation, maintain exchange rate stability, improve the quality and productivity of foreign direct investment, and keep inflation at stable levels to support industrial growth. In addition, governments should strengthen the macroeconomic environment to encourage productive investment and sustained industrial development.

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SALES GROWTH AND FINANCIAL PERFORMANCE OF LISTED CONSUMER GOODS FIRMS IN NIGERIA

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Abstract

This study examined the influence of sales growth on the financial performance of listed consumer goods firms in Nigeria. The objective was to determine how sales growth shapes key performance indicators such as return on equity, return on assets, and net profit margin. An ex post facto research design was adopted, and purposive sampling technique was used to extract data from the Annual Reports and Accounts of fifteen (15) listed consumer goods firms selected from the twenty-one (21) firms on the Nigerian Exchange. The study covered a ten-year period from 2014 to 2023. Prior to estimation, relevant diagnostic tests were conducted to ensure the validity and reliability of the regression model. Panel data was employed to assess the extent to which sales growth affects the financial performance of the sampled firms. The findings indicated that sales growth has a positive and statistically significant effect on return on equity. Conversely, no significant relationship was found between sales growth and return on assets or net profit margin. Based on these outcomes, the study recommends that consumer goods firms in Nigeria strengthen operational efficiency strategies to enhance cost control and optimize resource utilization.

Keywords: sales growth, return on assets, return on equity, net profit margin

1. Introduction

Profitability is a key indicator of financial performance, reflecting a firm's ability to generate returns, sustain operations, and create shareholder value. Shubita (2024) notes that financial performance encompasses both a firm's current achievements and its capacity for long-term growth and stability, while Hayati et al. (2022) emphasize its importance in evaluating managerial decisions, strategic direction, and resource utilization. Financial performance is commonly measured using return on assets (ROA), return on equity (ROE), and net profit margin (NPM). ROA assesses how efficiently assets generate profit, ROE measures returns to shareholders, while NPM indicates the proportion of revenue retained as net profit. In Nigeria, sustaining profitability has become increasingly difficult for consumer goods firms due to inflation, currency depreciation, infrastructural challenges, unstable power supply, and other macroeconomic pressures. Against this background, this study examines the relationship between sales growth and the financial performance of listed consumer goods firms in Nigeria from 2014 to 2023, a period characterized by significant economic disruptions, including recession, the COVID-19 pandemic, foreign exchange instability, and persistent inflation.

The relationship between sales growth and profitability is particularly important in the Nigerian fast-moving consumer goods (FMCG) sector. NielsenIQ (2024) reported that the

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sector recorded an 18.1% increase in sales value in 2023, despite a 3.3% decline in sales volume, suggesting that price increases rather than higher consumption largely accounted for the growth in sales value. Furthermore, FMCG transaction volumes declined by 17.4% in 2024, reflecting continued pressure on consumers' purchasing power. These trends raise questions about whether increases in sales revenue translate into improved profitability, as rising production and operating costs may offset revenue gains. Therefore, this study investigates the impact of sales growth on the financial performance of listed consumer goods firms in Nigeria, using ROA, ROE, and NPM as measures of financial performance.

1.1 Aim and Objectives.

The main aim of this study is to assess the impact of sales growth and financial performance of listed consumer goods firms in Nigeria. While the specific objectives are to:

- i. Examine the relationship between sales growth and Return of Asset of listed consumer goods firms in Nigeria.
- ii. Investigate the impact of sales growth on Return of Equity of listed consumer goods firms in Nigeria.
- iii. Examine the impact of sales growth and Net Profit Margin of listed consumer goods firms in Nigeria.

1.2 Research Questions

- i. What is the relationship between sales growth and Return on Asset of listed consumer goods firms in Nigeria?
- ii. What is the impact of sales growth on Return on Equity of listed consumer goods firms in Nigeria?
- iii. What is the impact of sales growth on Net Profit Margin of listed consumer goods firms in Nigeria?

1.3 Research Hypotheses

The research hypothesis is stated in null form:

- i. **H₀1:** Sales growth has no significant impact on the Return on Asset in listed consumer goods firms in Nigeria
- ii. **H₀2:** Sales growth has no significant impact on the Return on Equity of listed consumer goods firms in Nigeria.
- iii. **H₀3:** Sales growth has no significant impact on the Net Profit Margin of listed consumer goods firms in Nigeria.

1.4 Significance of the Study

The significance of this study lies in its ability to provide valuable insights into how sales growth influences the financial performance of consumer goods firms—an essential sector often affected by market volatility and shifting consumer preferences (Khurana et al., 2022). Academically, the study contributes to corporate finance literature by deepening understanding of the dynamic relationship between sales fluctuations and firm performance. Ultimately, these insights support not only firm-level success but also broader economic development and social well-being.

1.5 Scope of the Study

This study focuses on Nigeria's consumer goods sector, covering firms that produce essential items such as food, beverages, personal care products, electronics, and household goods. The 2014–2023 period was selected to capture key financial and operational shifts, including declines in FMCG profit margins and transaction volumes (Ologunabe, 2023; Aghogho, 2024), as well as major disruptions such as the 2016 recession, the COVID-19 pandemic, and persistent inflation—all of which affected sales performance. The sample consists of 15 listed consumer goods firms on the Nigerian Exchange Group (NGX), selected for their relevance and data availability.

2. Literature Review

2.1 Conceptual Review

Financial performance

Financial performance reflects a firm's ability to use its resources efficiently to generate profit and create value. Profitability is a key component, commonly measured by Net Profit Margin (NPM), Return on Assets (ROA), and Return on Equity (ROE). NPM measures the proportion of revenue converted into profit, ROA assesses how efficiently assets generate returns, while ROE indicates the returns earned on shareholders' equity. These measures provide useful insights into a firm's financial health, profitability, and ability to create shareholder value (Sriyono & Andesto, 2022; Sumilat et al., 2023; Ariyo-Edu, 2023).

Revenue growth is also important to financial performance because sustained increases in revenue support profitability and business continuity. Revenue growth is measured as the percentage change in revenue between periods and may indicate a firm's ability to expand its market and remain competitive. However, increased revenue does not always translate into higher profits, as rising operating and production costs can reduce margins (Qiao et al., 2019; Lee, 2014). NPM therefore provides an important measure of how effectively firms convert sales revenue into profit, with higher margins generally indicating better cost control and profitability (Nikmah & Wahyuningrum, 2020).

Sales Growth

Sales growth represents the increase in a firm's revenue over time and indicates market demand, competitiveness, and business expansion (Goh et al., 2022; Raman et al., 2022). It can strengthen a firm's ability to attract customers, expand market share, generate profits, and meet financial obligations. However, the effect of sales growth on profitability depends on factors such as economies of scale, operating efficiency, cost management, and market conditions (Helo et al., 2022; Shubita et al., 2019).

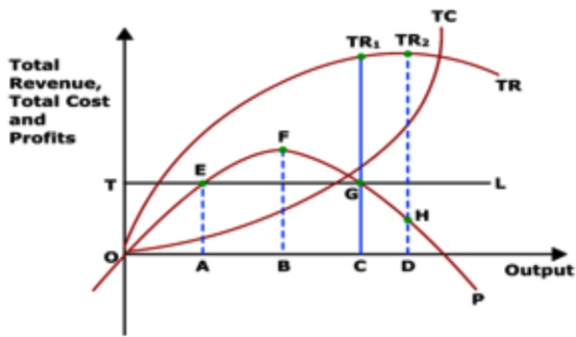
Empirical evidence on the relationship between sales growth and financial performance remains mixed. Some studies report a positive effect on profitability, particularly ROE (Salim et al., 2019; Latief & Mahiri, 2022; Sumilat et al., 2023), while others find no significant relationship (Amalia, 2021; Pramesti et al., 2021). Thus, increased sales do not necessarily lead to higher profitability, as the outcome depends on how efficiently firms manage costs and convert revenue growth into financial returns.

2.2 Theoretical Review

Sales Revenue Maximization Theory

Baumol's Sales Revenue Maximization Theory (1958) suggests that managers of firms with separated ownership and control may prioritize sales revenue over profit maximization. After achieving a satisfactory profit level, managers focus on increasing sales to enhance market share, competitiveness, managerial rewards, and job security. Sales expansion can also support economies of scale and long-term sustainability (Baumol, 1959; Yadav et al., 2022). However, excessive emphasis on sales growth may increase financial risks and conflict with shareholders' interests (Olaoye, 2022).

Fig 1 Baumol's Revenue Maximization Model



Source :*Researchers' illustration based on Baumol (1967).*

Baumol's model shows that a firm maximizes profit at output level OA, where total profit (P) is highest at point E. Sales maximization, however, occurs at a higher output OD, where total revenue (TR) reaches its maximum (TR2), but is subject to a minimum profit constraint represented by line TL. The firm prioritizes maximizing sales rather than profits while ensuring profits do not fall below the minimum level.

2.3 Empirical Review

Empirical evidence on sales growth and financial performance remains mixed across countries and sectors. Some studies report positive effects of sales growth on profitability and firm value (Kurniawati & Anggraini, 2023; Sani & Abubakar, 2022; Sumilat et al., 2023; Olaoye & Olaoye, 2022), while others find no significant relationship (Afinindy et al., 2023; Iskandar, 2021; Nur & Mahiri, 2022). These differences suggest that the effect of sales growth may depend on industry conditions, cost management, leverage, and operational efficiency.

Studies in Nigeria provide further evidence of a positive relationship. Sani and Abubakar (2022) found that sales growth significantly improves profitability in healthcare firms, while Olaoye and Olaoye (2022) reported a positive relationship between sales revenue and profitability in brewery firms. Similarly, Okerekeoti (2022) found that revenue growth positively influences financial performance in Nigerian manufacturing firms.

3. Methodology

3.1 Research Design

This study employed an **ex post facto research design** to achieve its objectives. This approach is appropriate as it focuses on events that have already occurred, as highlighted by Nwala et al. (2020). Quantitative data was collected from each sampled firm over a ten-year period (2014–2023) to examine sales revenue impact **Return on Assets (ROA)**, **Return on Equity (ROE)**, and/or **Net Profit Margin (NPM)**.

3.2 Population, Sample Size and Sampling Technique

The study population comprises 21 consumer goods firms listed on the Nigerian Exchange Group (NGX) as of December 2023. A purposive sampling technique was used to select 15 firms with complete financial data for 2014–2023. The remaining six firms were excluded due to incomplete information.

3.3 Source of Data

The study employed secondary data obtained from the annual reports of 15 selected listed consumer goods firms for 2014–2023. Data on sales revenue, total assets, shareholders' equity, operating costs, net profit after tax, and debt components were extracted and used to compute sales growth, operating efficiency, financial performance, and capital structure measures.

3.4 Method of Data Analysis

The study employed panel data analysis to examine the effect of sales growth on the financial performance of the sampled firms. Three separate panel regression models were estimated, using ROA, ROE, and NPM as the dependent variables.

Diagnostic tests were conducted to ensure the reliability of the results, including tests for heteroscedasticity and autocorrelation. The t-test and F-test were used to assess the significance of individual variables and the overall models, respectively, while R^2 was used to determine the explanatory power of the models.

3.5 Measurement and Description of Variables

The variables in the study include the independent variable, sales revenue and the dependent variable, financial performance. Sales revenue is proxied by sales growth, while financial performance is measured using return on capital employed (ROA), return on equity (ROE), and net profit margin (NPM).

Table 1 Measurement and Description of Variables

	Variables	Definitions and Measurement	Scale	source
1.	Sales growth	Change in sales/sales $t-1$	Ratio	Latief Z Nur1, Eli Achmad Mahiri 2022
2.	Return on Asset	EAT/Total Asset X 100%	Ratio	Nur et al.(2022), Fatoki et al (2021)
3.	Return on Equity	EAT/Total Equity X 100	Ratio	Choiriyah et al.(2020)
4.	Net Profit Margin	EAT/sales X 100	Ratio	Choiriyah et al.(2020)

Source: Researcher's Measurement and Description of Variable, 2025.

Model Specifications

$$FP_{it} = \beta_0 + \beta_1 SG_{it} + \mu_{it} \dots\dots\dots (I)$$

$$ROA_{it} = \beta_0 + \beta_1 SG_{it} + \mu_{it} \dots\dots\dots (i)$$

$$ROE_{it} = \beta_0 + \beta_1 SG_{it} + \mu_{it} \dots\dots\dots (ii)$$

$$NPM_{it} = \beta_0 + \beta_1 SG_{it} + \mu_{it} \dots\dots\dots (iii)$$

Where:

FP = Dependent variable (Financial Performance, measured as ROA, ROE, NPM)

Independent variables SG = Sales Growth

β_0 = Intercept/constant;

β_0, β_1 = Coefficients for independent variables that estimate the direct impact of revenue expansion, capital structure on financial performance.

μ = the residual/error term

it = Panel data

4. Analysis and Discussion

4.1 Summary statistics of the variables

Table 2: Descriptive statistics results

Variable	Observations	Mean	Std. dev.	Minimum	maximum
ROE	150	0.1138884	0.5197691	-3.723443	2.93071
ROA	150	0.0402398	0.0882179	-0.3009522	0.3005281
NPM	150	0.0641766	0.6270159	1.215387	7.417728
S.G	150	0.1364128	0.3259755	-0.9993271	2.301891

Source: Researchers' Computation (2025)

The descriptive statistics in Table 2 summarize key metrics. The mean ROA was 0.0402 (SD = 0.0882), ranging from -0.3010 to 0.0301, indicating wide variation and occasional losses relative to assets. The mean ROE was 0.1139 (SD = 0.5198), with a range of -3.7234 to 2.9307, showing significant differences in shareholder returns. Net profit margin averaged 0.0642 (SD = 0.6270), with values from -1.2154 to 7.4177, suggesting firms generally experienced losses. Sales growth had a mean of 0.1364 (SD = 0.3260), ranging from -0.999 to 2.302, indicating overall growth but a non-normal distribution.

4.2 Correlation Analysis

Table 3 Correlation Analysis

	ROA	ROE	NPM	SG	F.AGE
ROA	1.0000				
ROE	0.3275	1.0000			
NPM	0.5264	0.1918	1.0000		
SG	0.0732	0.0930	0.0303	1.0000	
F.AGE	-0.2601	0.0175	-0.0704	-0.1720	1.0000

Source: Researchers' Computation (2025)

The correlation analysis was carried out to check the strength of the statistical relationship between the independent variables sales growth and the dependent variable proxied by

(return on asset, return on equity and net profit margin). In table 3 above, it is revealed that there exists a positive relationship. ROA and NPM have a strong positive correlation (0.5264), meaning firms with higher margins tend to also have better returns on assets.

4.3 Examining the impact of Sales growth on Financial performance of Listed Consumer Goods Firms in Nigeria

$$\text{Model 1: } FP_{it} = \beta_0 + \beta_1 SG_{it} + \mu_{it} \dots\dots\dots (I)$$

Table 4 Diagnostic Test for Model Validity in Panel Data Regression

	Tests	χ^2	P-value
Heteroskedasticity	Breusch-Pagan / cook -Weisberg test	87.77	0.0000
Normality	Jacque Bera test		0.0000
Autocorrelation	Wooldridge test	0.546	0.4722
Hausman Specification	Hausman Specification test	4.02	0.4035
Panel Test	Breusch and Pagan Lagrangian Multiplier test for random effect	59.11	0.0000

Source: Researchers' Computation (2025)

The heteroscedasticity test showed p-values below 0.05, indicating non-constant error variance, which can lead to inefficient regression estimates. The null hypothesis of homoscedasticity was rejected ($p = 0.0000$). Residuals were also found to be non-normally distributed based on skewness and kurtosis ($p = 0.0000$). Autocorrelation testing returned a p-value of 0.4722, suggesting residuals are independent and free from serial correlation.

To address heteroscedasticity, robust or feasible GLS methods can be applied. The Hausman test favored the Random Effects (RE) model over Fixed Effects (FE) ($p = 0.4035$), indicating no endogeneity concerns. The Breusch-Pagan Lagrange Multiplier (LM) test confirmed significant variation across entities ($p = 0.000$), supporting the use of RE over pooled OLS. Overall, panel data models are more appropriate than pooled regression for analyzing the effect of sales growth on financial performance for NGX-listed firms.

$$\text{Model 1: } ROE_{it} = \beta_0 + \beta_1 SG_{it} + \mu_{it} \dots\dots\dots (i)$$

Table 5: Feasible GLS Analysis: Sales Growth and Return on Equity of Listed consumer goods firms in Nigeria.

ROE	COEF.	ROBUST STD.ERR.	Z	P> Z	(95%CONF.	INTERVAL)
SG	.2497331	.079215	3.15	0.002	.0944746	.4049915
F.AGE	.0017918	.0027784	.64	0.519	-.0036537	.0072374
CONS	.2452329	.1297347	1.89	0.059	-.0090424	.4995082
Wald χ^2	20.76			0.0004		
Obs	150/15					

Source: Researchers' Computation (2025)

Model 2: $ROA_{it} = \beta_0 + \beta_1 SG_{it} + \mu_{it}$ (eqn i)

Table 6: Feasible GLS Analysis: Sales Growth and Return on Asset of Listed consumer goods firms in Nigeria.

ROA	COEF.	ROBUST STD.ERR.	Z	P>/Z/	(95%CONF.	INTERVAL)
SG	.0085609	.0205005	0.42	0.676	-.0316194	.0487412
F.AGE	-.0011155	.0006746	-1.65	0.098	-.0024378	.0002067
CONS	.1682534	.0421978	3.99	0.000	.0855471	.2509596
Wald χ^2	25.31			0.000		
Obs	150/15					

Source: Researchers' Computation (2025)

Model 3: $NPM_{it} = \beta_0 + \beta_1 SG_{it} + \mu_{it}$ (eqn i)

Table 7 Feasible GLS Analysis: Sales Growth and Return on Net Profit Margin of Listed consumer goods firms in Nigeria.

NPM	COEF.	PANELCORRECTED STD.ERR.	Z	P>/Z/	(95%CONF.	INTERVAL)
SG	.0359865	.906107	0.40	0.691	-.1416072	.2135803
F.AGE	.0010363	.0004635	-	0.025	-.0019447	-.001279
CONS	.1748147	.0384754	2.24	0.000	.0992044	.250025
Wald χ^2	12.67		4.54	0.0130		
Observation	150/15					

Source: Researchers' Computation (2025)

4.4 Discussion of findings

In table 7, Using the Random Effects Generalized Least Squares (GLS) regression model—selected on the basis of the Hausman and model-selection tests which confirmed its superiority over the pooled OLS model—this study assessed the effect of sales growth on the financial performance of listed consumer goods firms. The model exhibited adequate explanatory power ($R^2 = 0.3483$ for ROE) and a statistically significant Wald chi-square statistic, indicating overall robustness. The results reveal that sales growth has a positive and statistically significant effect on Return on Equity (coefficient = 0.2497, $p = 0.002$), implying that firms with higher sales growth tend to generate stronger equity returns. This finding aligns with the work of Nasution (2018), Ullah et al. (2020) and Sumilat et al. (2023), who reported a positive and significant impact of profitability measures on firm growth, but contrasts with Onaolapo and Kajola (2010) who documented a negative relationship between ROE and earnings growth. Conversely, when financial performance is measured by Net Profit Margin (NPM), sales growth exerts a positive but statistically insignificant influence (coefficient = 0.03599, $p = 0.691$), supporting earlier evidence by Gusti (2020) and Rini Meidiyustiani (2016) that sales growth does not necessarily translate into improved profitability, yet diverging from Hayati (2022) and Muhammad Basir et al. (2021) who observed a significant positive effect of sales growth on net income. Accordingly, the null hypothesis of no effect is rejected for ROE but retained for NPM,

underscoring that while sales growth significantly drives equity returns in Nigeria's listed consumer goods firms, it does not automatically improve profit margins.

According to Ramadhani and Nisa (2019), positive sales growth reflects a company's good financial condition, while negative sales growth indicates financial distress. Therefore, sales growth is a key metric that, when positive, suggests strong financial performance and operational stability, helping the company maintain its position in the market. Amanda (2019) found that increased sales growth reduces the potential for financial distress, a finding corroborated by Lifia's study (2020).

The results indicate that sales growth has a significant positive effect on return on equity (ROE). This implies that as firms successfully expand their revenues, they deliver greater value to shareholders, resulting in higher returns. This finding aligns with the study by Sumilat et al. (2023), which revealed that sales growth positively influences ROE, suggesting that firms with higher sales growth tend to achieve better profitability ratios. Furthermore, the outcome supports the Revenue Maximization Theory proposed by Baumol (1959), which posits that firms pursuing sustained revenue growth ultimately enhance shareholder wealth. Similarly, the findings of Shubita (2024) revealed a significant negative relationship between profitability (measured by ROA) and tax avoidance, indicating that higher profitability reduces firms' tendencies to engage in tax avoidance practices.

The findings of this study provide valuable insights into the key determinants of financial performance among listed consumer goods firms in Nigeria. The analysis reveals several important patterns that contribute to the broader understanding of financial dynamics within the sector. The study confirms that Sales Growth (SG) has a nuanced impact on financial performance, partially supporting the initial hypotheses. Specifically, SG exerts a statistically significant effect only on Return on Equity (ROE), while demonstrating no significant impact on Return on Assets (ROA) and Net Profit Margin (NPM). This indicates that while top-line revenue expansion successfully enhances shareholder returns, it does not inherently drive broader asset efficiency or core profit margins. Consequently, an increase in sales volume alone is insufficient for comprehensive financial health, as its impact is likely diluted by underlying cost structures, pricing strategies, or capital allocation decisions.

5. Conclusion and Recommendation

This study investigates the impact of sales growth on the financial performance of listed consumer goods firms in Nigeria. Specifically, it focuses on fifteen firms selected from the twenty-one consumer goods companies listed on the Nigerian Exchange Group, covering a ten-year period. Drawing on data from audited annual reports and employing rigorous statistical analysis, the study identifies key factors influencing the improvement—or lack thereof—in financial performance within the sector. This study significantly advances the literature on financial performance by empirically examining the interplay between sales growth and profitability in listed consumer goods firms in Nigeria. Unlike prior studies that

often rely on short-term or regionally constrained datasets, this research leverages a decade of audited financial data (2014–2023) from Nigeria's fast-moving consumer goods (FMCG) sector. By applying multiple regression and OLS techniques, the study offers robust, context-specific insights that are both empirically grounded and practically relevant. It establishes a clear and positive relationship between sales growth and return on equity, validating the Revenue Maximization Theory within the Nigerian FMCG context.

Based on the findings of this study, the following recommendations are deemed imperative for enhancing sales growth and financial performance in listed consumer goods firms in Nigeria:

Implement Revenue Growth Strategies: Companies should invest in strategies that stimulate sustainable revenue growth, such as product innovation, market expansion, customer loyalty programs, and digital transformation initiatives that tap into emerging markets.

Adopt Integrated Financial Planning: Firms should incorporate integrated financial planning that aligns revenue growth objectives with financing strategies. This ensures that expansion efforts are supported by a stable financial foundation, minimizing risks associated with over-leverage or inefficient resource allocation.

Develop Risk Management Frameworks: Given the volatility of external factors such as exchange rates and inflation, firms must adopt comprehensive risk management practices to protect revenue streams and profitability from macroeconomic shocks.

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FINANCIAL TECHNOLOGY AND FINANCIAL INCLUSION OF THE RESIDENTS OF ADO-ODO OTA LOCAL GOVERNMENT AREA, OGUN STATE, NIGERIA.

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Abstract

This study examined the effect of financial technology on financial inclusion among residents of Ado-Odo/Ota Local Government Area, Ogun State, Nigeria, focusing on mobile banking services, Point-of-Sale (POS) usage, and fintech-based digital financial services in relation to access to, usage of, and convenience of financial services. A descriptive survey research design was adopted, and data were collected through structured questionnaires administered to traders, artisans, and other residents within the study area. The data were analysed using descriptive statistics and multiple regression analysis with the aid of SPSS version 27. The findings revealed that mobile banking services have a significant positive effect on access to financial services, POS usage has a strong and significant positive effect on usage of financial services, and fintech-based digital financial services have a significant positive effect on the convenience of financial services. The study concludes that financial technology significantly enhances financial inclusion in the study area and recommends improved digital infrastructure, expansion of POS services, and promotion of fintech adoption through digital literacy programmes.

Keywords: Financial Technology, Financial Inclusion, Ado-Odo/Ota Local Government Area, Point-of-Sale (POS), Mobile Banking Services.

1. Introduction

Financial inclusion has become a major global development objective over the past two decades as economies seek to integrate individuals and businesses into formal financial systems. Globally, financial inclusion refers to access to and usage of affordable financial services including savings, credit, payments, and insurance. This steady increase reflects deliberate policy efforts and technological advancements aimed at reducing financial exclusion. However, millions of adults, particularly in developing regions, remain outside the formal financial system, limiting their economic participation and vulnerability to shocks. The expansion of digital financial services has been identified as a significant contributor to this global progress (Sumalatha, 2025).

Digital financial infrastructure has accelerated the pace of financial inclusion across continents. Growth in mobile money accounts, electronic transfers, and online banking platforms has expanded access to previously underserved populations. Digital platforms have reduced transaction costs, increased convenience, and enhanced financial

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transparency. Evidence indicates that digital financial services significantly influence improvements in financial inclusion indicators such as account ownership and transaction frequency (Aruoriwo & Iworiso, 2024). This transformation demonstrates that global financial inclusion growth is increasingly linked to the expansion of digital service delivery systems.

In Nigeria, financial inclusion has improved considerably over the past decade, although gaps remain across regions and income groups. National financial data show that financial inclusion rates increased from approximately 56 % in 2012 to about 64 % in 2023, and further to about 74 % by 2025 (Kumar and Ahuja, 2025). Despite this progress, over one third of the adult population remains financially excluded due to challenges such as poverty, low financial literacy, rural isolation, and infrastructural limitations continue to affect participation in formal financial systems (Omenihu, Brahma, Katsikas, Vrontis, Siachou, and Krasonikolakis, 2024). Financial inclusion in Nigeria now extends beyond bank account ownership to include digital payments, savings behavior, deposit mobilization, and electronic transaction usage (Iwedi, Owakah & Wofuru-Nyenke, 2023).

The growth of financial technology has contributed significantly to inclusion expansion in Nigeria. Data on digital banking channels indicate consistent growth in ATM transactions, POS deployment, web banking usage, and mobile banking subscriptions between 2009 and 2024. Web banking technology demonstrates a positive and significant influence on financial inclusion indicators such as deposit ratios, while ATM, POS, and mobile banking technologies show positive contributions to financial access (Iwedi et al., 2023). Similarly, digital banking platforms between 2009 and 2023 reveal measurable improvements in financial participation across Nigeria (Onyeogo, Ikeora, Nduka & Ugorji, 2025). Digitalization therefore remains central to Nigeria's financial inclusion expansion.

Digital services represent technology driven financial platforms including automated teller machines, point of sale systems, mobile banking applications, and web based banking platforms. Globally, digital payments have grown significantly, with billions of transactions processed annually through mobile and internet platforms. The expansion of digital finance has been linked to increased savings rates, improved payment efficiency, and broader financial participation (Sumalatha, 2025). Digital financial services enhance financial outreach by eliminating physical distance barriers and enabling real time transactions.

In Nigeria, digital financial services have expanded rapidly over the last decade. Growth in POS terminals, ATM networks, web banking transactions, and mobile banking subscriptions reflects increasing adoption of digital platforms. Financial technology indicators between 2009 and 2019 show consistent upward trends in electronic transactions and digital payment volumes (Iwedi et al., 2023). Digital banking expansion from 2009 to

2023 further demonstrates the strengthening of digital financial infrastructure nationwide (Onyeogo et al., 2025). Digitalization has also been identified as a predictive factor in improving financial inclusion performance in Nigeria (Ehimare, 2022). These trends suggest that digital services play a critical role in expanding access to financial systems.

The change in financial systems through digital services has made it easier for people and businesses to take part in financial activities around the world and in Nigeria. Digital platforms have made transactions faster, more convenient, and more transparent. While data show that financial inclusion has improved because of digital finance, there are still differences between areas. Some places have better infrastructure, internet access, and higher digital skills than others, which means not everyone can fully use these services. The use of ATMs, POS machines, mobile banking, and online banking shows how important technology is for financial participation, but it also shows that more support is needed in some areas to make financial inclusion reach everyone. It is due to these differences and challenges that this study aims to examine the effect of digital services on financial inclusion in Ado-Odo/Ota Local Government Area.

The broad objective of this study is to examine digital services on financial inclusion in Ado-Odo Ota Local Government; while the specific objective is to examine the effect of internet banking on access to financial services in Ado-Odo Ota Local Government. The study focuses on digital financial services and their effect on financial inclusion in Ado-Odo Ota Local Government Area of Ogun State, Nigeria. It specifically examined three key digital service variables: internet banking, Point-of-Sale (POS) services, and fintech-based digital financial services. By concentrating on these components, the study provided a clear understanding of how digital financial innovations influence access to and usage of financial services within the study area.

This paper examined how internet banking enhances access to financial services such as account management, fund transfers, savings, and bill payments among residents. It also assessed how the increasing use of Point-of-Sale (POS) terminals has improved the usage of financial services by making transactions faster, easier, and more accessible, especially for individuals with limited access to traditional banking halls. In addition, the study evaluated the role of fintech-based digital financial services in improving the convenience of financial services through digital wallets, mobile applications, and other online payment platforms. The study is limited geographically to Ado-Odo Ota Local Government Area in Ogun State, Nigeria, covering residents, small business owners, and users of digital financial services within the area, without extending to other local governments or states in Nigeria.

2. Literature Review

2.1 Conceptual Framework

2.1.1 Digital services and Digital financial services

Digital services are services that are provided through digital technology such as mobile phones, computers, the internet, and other electronic devices. These services help people to carry out different activities online without going physically to offices, banks, shops, or other places. Digital services have become very common in today's world because they make work easier, faster, and more convenient for people (Yahaya, 2026). According to Asif, Khan, Tiwari, Wani, and Alam (2023), digital financial services refer to financial services that are provided through digital technology such as mobile phones, computers, the internet, automated teller machines (ATMs), and other electronic platforms. These services allow people to carry out financial activities electronically without the need to visit a physical bank or financial institution. Digital financial services have become an important part of modern banking and financial systems because they make financial transactions easier, faster, and more convenient.

Digital financial services involve the use of digital channels to provide banking and financial activities such as money transfer, savings, bill payment, withdrawals, deposits, online shopping payments, and access to loans or insurance services. These services are usually provided through mobile banking applications, internet banking platforms, mobile wallets, USSD banking services, point of sale (POS) terminals, and other electronic payment systems (Austin-Olowo, Ailemen, Oladipo, and Monday, 2023). The idea of digital financial services developed from the growth of information and communication technology (ICT) and the increasing use of digital devices around the world. In the past, people depended mainly on traditional banking methods, which required visiting bank branches before carrying out financial transactions and this process often involved long queues, delays, and transportation costs. However, the introduction of digital financial services has changed the way people access and use financial services.

2.1.2 Financial Inclusion

Financial inclusion refers to the process of making financial services available, affordable, and easy to access for everyone in society. These financial services include savings, money transfers, loans, insurance, deposits, withdrawals, and payment services. Financial inclusion helps people to participate in financial activities through formal financial institutions such as banks, microfinance banks, and other financial service providers. Financial inclusion simply means giving people the opportunity to use banking and financial services without difficulty. It focuses mainly on people who do not have easy access to financial services, especially low-income earners, rural dwellers, women, unemployed individuals, and small business owners. Financial inclusion helps such people to save money safely, make payments, receive money, and access loans or other financial support when needed (Nkechika, 2022).

The concept of financial inclusion became more important because many people in developing countries were excluded from the formal financial system. In the past, many

people depended on cash transactions and local savings methods because banks and financial institutions were either too far away or difficult to access (Soetan et al., 2021). Some people also avoided banks because of high charges, complicated banking processes, lack of proper identification documents, or low income. As a result of these problems, governments and financial institutions started creating policies and programs to encourage more people to use formal financial services (Nkechika, 2022).

According to Yahaya (2026), financial inclusion is important because it helps people improve their financial condition and standard of living because when people have access to financial services, they can save money for future needs, send and receive money safely, pay bills easily, and handle emergencies better. Small business owners can also access loans and other financial support to improve and expand their businesses which can increase income levels, reduce poverty, and improve economic activities in society.

2.1.3 Mobile Banking Services

According to David-West, Iheanachor, and Umukoro (2020), mobile banking services refer to banking services that allow customers to carry out financial transactions through mobile phones and other portable devices. These services help customers to access their bank accounts and perform banking activities without visiting the bank physically. Mobile banking has become an important part of modern banking because it makes transactions easier, faster, and more convenient for users. Mobile banking has improved the delivery of banking services by increasing customer access to digital financial platforms.

Mobile banking services involve the use of mobile applications, internet services, SMS, and USSD codes to perform financial activities. Through these services, customers can transfer money, check account balances, pay bills, buy airtime, and receive transaction notifications using their mobile phones. Mobile banking services have helped to reduce the stress linked with traditional banking methods where customers had to visit banking halls before carrying out transactions (Anene & Okeji, 2021). Ohiani (2021) explained that the development of mobile banking services is closely connected to improvements in information and communication technology (ICT) and the increase in smartphone usage across the world. In the past, banking activities were mostly carried out manually, and customers spent a lot of time in banks before completing transactions.

However, mobile banking services have changed this process by making financial services available through mobile devices. Mobile banking has made banking activities more accessible and has improved the relationship between banks and customers. There are different forms of mobile banking services used by banks and financial institutions. One common type is mobile app banking, where customers use banking applications installed on smartphones to access financial services. Another type is USSD banking, which allows customers to use special codes on their phones to carry out transactions even without

internet connection. SMS banking is also used to provide account updates and transaction alerts to customers (Ashiru, Balogun, and Paseda (2023).

2.2 Theoretical Review

2.2.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was Propounded by Fred D. Davis in 1989., and it stands as one of the most influential and widely validated theoretical frameworks within the domains of information systems, organizational behavior, and consumer technology research. This model was explicitly developed to explain and predict user acceptance of information technology systems by uncovering the psychological and behavioral determinants that influence individuals choose to adopt, use, or reject a technological innovation (Ogbonna, Agba, Ibeyenwa, Anaemena, and Anoruoh, 2023).

As an American information systems scholar who earned his doctorate from the MIT Sloan School of Management, Davis observed that organizations were investing heavily in state-of-the-art information technology systems but were facing massive financial losses because employees simply refused to use them (Owakah and Wofuru-Nyenke, 2022). To resolve this critical issue, Davis adapted the Theory of Reasoned Action (TRA), an earlier socio-psychological framework formulated by Martin Fishbein and Icek Ajzen in 1975. While the original Theory of Reasoned Action was a broad model designed to predict general human behavior based on personal attitudes and subjective social norms, Davis customized it specifically for human-computer interaction. The relationship between the Technology Acceptance Model and the study is established through a clear conceptual link where digital services function as the external variables that shape cognitive perceptions, which ultimately drive financial inclusion metrics.

2.2.2 Diffusion of Innovation (DOI) Theory

The Diffusion of Innovation (DOI) Theory is one of the major theories used to explain how new ideas, technologies, and innovations spread among people in a society. The theory was propounded by Everett M. Rogers in 1962. Rogers developed the theory to explain the process through which people become aware of new innovations and decide whether to accept or reject them. The theory focuses on how innovations are communicated over time and how they gradually spread within a social system (Ohiani, 2021).

Before the development of the Diffusion of Innovation Theory, many studies focused mainly on the technical benefits of innovation without properly explaining why some people quickly accepted new technologies while others delayed or refused to use them. Rogers observed that people respond differently to innovation because of factors such as social influence, personal experience, communication, and perceived benefits. As a result, he developed the theory to explain how innovation moves from one group of people to another through interaction and communication (David-West, Oni, & Ashiru, 2022).

The major idea behind the Diffusion of Innovation Theory is that innovations do not spread to everyone at the same time. Instead, the spread happens gradually as people learn about

the innovation, observe others using it, and decide whether to adopt it. According to the theory, diffusion refers to the process through which information about an innovation is communicated among members of a society over time. The theory explains that people are more likely to adopt innovations when they believe the innovation provides benefits and fits into their daily lives (Shaikh, Amin, Noordin, & Shaikh, 2023).

The theory identifies five important characteristics that influence the adoption of innovation. These characteristics are relative advantage, compatibility, complexity, trialability, and observability. Relative advantage refers to the degree to which an innovation is considered better than the previous method it replaces. If people believe that a new technology saves time, reduces stress, or improves performance, they are more likely to accept it. Compatibility refers to how well the innovation fits with the values, lifestyle, and needs of the users. Complexity focuses on how easy or difficult the innovation is to understand and use (Koloseni & Mandari, 2024).

Furthermore, trialability refers to the ability of people to test or try an innovation before fully accepting it. When users are allowed to experiment with a technology on a small scale, they become more confident about adopting it. Observability refers to how visible the results and benefits of the innovation are to other people in society. When people see others successfully using a new technology, they are more likely to develop trust and interest in it. These five characteristics play a major role in determining how quickly innovations spread among individuals and communities (Okoli & Tewari, 2021).

3. Methodology

3.1 Research Design

The adopted research design for this research is descriptive survey design. This design serves as a useful means of obtaining information about people's opinions, attitudes, preferences and experiences by asking relevant questions. The design is adopted for this paper because a group of people were studied systematically by collecting and analysing data from a chosen sample considered sufficiently representative of the entire population.

3.2 Area of the Study

This study was conducted in Ado-Odo/Ota Local Government Area, located in Ogun State, South-West Nigeria. Ado-Odo/Ota is one of the major local government areas in the state and shares a boundary with Lagos State, making it a strategic commercial and residential hub. The area is made up of several towns and communities such as Ota, Sango-Ota, Iju, Atan, and Ado-Odo, with a mix of urban, semi-urban, and rural settlements. The local government area is characterized by a high level of commercial activities, small and medium-scale enterprises (SMEs), artisanship, trading, and industrial presence. Due to its

proximity to Lagos and its growing population, there has been increased adoption of digital financial services such as mobile banking, Automated Teller Machines (ATMs), Point-of-Sale (POS) services, internet banking, and mobile money platforms.

Ado-Odo/Ota Local Government Area is therefore considered suitable for this study because it presents a diverse population with varying levels of access to digital financial services. The area provides an appropriate setting to examine how digital financial services influence financial inclusion among individuals, small business owners, and households. The findings from this area provide relevant insights into improving digital financial service delivery and enhancing financial inclusion at the local government level.

3.3 Population of the Study

The population of the study is 400, consisting of traders, artisans, and small business owners operating within Lusada Market and Atan Market in Ado-Odo/Ota Local Government Area of Ogun State, Nigeria, reflecting individuals who frequently engage in mobile banking, POS transactions, and other fintech-based financial services.

3.4 Sample Size

The sample size for this study was determined using the Taro Yamane (1967) statistical formula, which is widely adopted in social science research for calculating an appropriate sample size from a known population. The formula is stated as:

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

Where: **n** is sample size, **N** represents population size, **e** stands for the error term. Given the total population of the study as 400, the sample size is calculated as follows:

$$n = \frac{400}{1 + 400(0.05^2)} \quad n = \frac{400}{1 + 400(0.0025)} \quad n = \frac{400}{1 + 1} \quad n = \frac{400}{2}$$

Therefore, the sample size for this study is 200 respondents, which implies that out of the estimated total population of 400 traders and business operators in Lusada and Atan Markets, 200 respondents were selected for data collection. This sample size is considered adequate and representative of the population, as it allows for reliable statistical analysis and valid generalization of findings within the study area.

3.5 Sampling Technique

The study employed purposive sampling to select respondents who are most relevant to the research objectives. Purposive sampling is appropriate in this context because the study specifically targeted adult residents of Ado-Odo/Ota Local Government Area, Ogun State

who have knowledge or experience with digital financial services such as mobile banking, ATMs, POS terminals, internet banking, and mobile money platforms. This technique ensures that the respondents chosen can provide relevant and accurate information regarding financial inclusion

3.6 Data Collection

The study will use a structured questionnaire as the instrument for data collection. The questionnaire consists of two sections. Section A captures demographic data of the respondents, including age, gender, educational level, occupation, while section B contains statements that relate to the study objectives, which respondents rated using a five-point Likert scale ranging from Strongly Agree to Strongly Disagree.

3.7 Methods of Data Analysis

The data collected from the questionnaires were analyzed using descriptive statistics and regression analysis. Descriptive statistics such as frequency counts and percentages were used to summarize respondents' demographic information. For Section B of the questionnaire, which uses a five-point Likert scale (Strongly Agree to Strongly Disagree), responses were assigned numerical values (Strongly Agree = 6, Agree = 5, Slightly Agree = 4, Slightly Disagree = 3, Strongly Disagree = 2, Strongly Disagree = 1) to calculate mean scores and identify general trends in respondents' perceptions.

4. Data Analysis

4.1 Descriptive Statistics of the Distribution of the Questionnaire

Table 1 shows the distribution of the questionnaires administered and retrieved for the study where a total of 210 questionnaires were distributed to respondents, representing 100% of the sample size. Out of these, 200 questionnaires were properly completed and found suitable for analysis, representing 95.2% of the total responses received. However, 10 questionnaires, representing 4.8%, were either incomplete or improperly filled and were therefore excluded from the analysis. The high response rate of 95.2% indicates a strong level of participation among respondents and provides adequate data for the study on the influence of digital services on financial inclusion in Ado-Odo/Ota Local Government Area.

Table 1: Descriptive Statistics of the Distribution of the Questionnaire

Description	Frequency	Percentage (%)
Valid Responses	200	95.2
Invalid Response	10	4.8
Total	210	100.0

Source: Field Survey, 2026

4. 2: Respondents' Demographics Frequency Distribution

Table 2 presents the demographic characteristics of the respondents. The gender distribution indicates that 112 (56.0%) respondents were male, while 88 (44.0%) respondents were female. The age distribution shows that 67 (33.5%) respondents were between 18–25 years, 77 (38.5%) respondents were between 26–35 years, 36 (18.0%) respondents were between 36–45 years, while 20 (10.0%) respondents were aged 46 years and above. With respect to occupation, 70 (35.0%) respondents were civil servants, 43 (21.5%) were traders, 55 (27.5%) were artisans, 21 (10.5%) were farmers, 3 (1.5%) worked in the banking sector, 3 (1.5%) were teachers, 2 (1.0%) were social media managers, 2 (1.0%) were software developers, while 1 (0.5%) respondent was an engineer/entrepreneur.

Table 2: Respondents' Demographics Frequency Distribution

Variables	Categories	Frequency	Percentage (%)
Gender	Male	112	56.0
	Female	88	44.0
	Total	200	100.0
Age	18–25	67	33.5
	26–35	77	38.5
	36–45	36	18.0
	46 and above	20	10.0
	Total	200	100.0
Occupation	Civil Servant	70	35.0
	Traders	43	21.5
	Artisan	55	27.5
	Farmers	21	10.5
	Banking	3	1.5
	Teacher	3	1.5
	Social Media Manager	2	1.0
	Engineer/Entrepreneur	1	0.5
	Software Developer	2	1.0
	Total	200	100.0

Source: Field Survey, 2026

4.3. Descriptive Analysis for Mobile Banking Services

Table 3 presents respondents' perceptions of mobile banking services. For the statement that mobile banking services make it easy to carry out financial transactions, 61 (30.5%) respondents strongly agreed, 41 (20.5%) agreed, 36 (18.0%) slightly agreed, 35 (17.5%) slightly disagreed, 13 (6.5%) disagreed, while 14 (7.0%) strongly disagreed. For the statement that respondents can access their bank accounts using mobile banking at any

time, 62 (31.0%) strongly agreed, 45 (22.5%) agreed, 45 (22.5%) slightly agreed, 20 (10.0%) slightly disagreed, 17 (8.5%) disagreed, while 11 (5.5%) strongly disagreed. Concerning the statement that mobile banking reduces the need to visit the bank physically, 50 (25.0%) respondents strongly agreed, 73 (36.5%) agreed, 34 (17.0%) slightly agreed, 21 (10.5%) slightly disagreed, 15 (7.5%) disagreed, while 7 (3.5%) strongly disagreed.

Table 3: Descriptive Analysis for Mobile Banking Services

Items	Frequency	Percentage (%)
Mobile banking services make it easy for me to carry out financial transactions		
Strongly Agree	61	30.5
Agree	41	20.5
Slightly Agree	36	18.0
Slightly Disagree	35	17.5
Disagree	13	6.5
Strongly Disagree	14	7.0
Total	200	100.0
I can access my bank account using mobile banking at any time		
Strongly Agree	62	31.0
Agree	45	22.5
Slightly Agree	45	22.5
Slightly Disagree	20	10.0
Disagree	17	8.5
Strongly Disagree	11	5.5
Total	200	100.0
Mobile banking reduces the need to visit the bank physically		
Strongly Agree	50	25.0
Agree	73	36.5
Slightly Agree	34	17.0
Slightly Disagree	21	10.5
Disagree	15	7.5
Strongly Disagree	7	3.5
Total	200	100.0
Mobile banking services are simple and easy to use		
Strongly Agree	61	30.5
Agree	56	28.0
Slightly Agree	36	18.0
Slightly Disagree	27	13.5
Disagree	12	6.0
Strongly Disagree	8	4.0
Total	200	100.0

Source: Field Survey, 2026.

Table 4 presents the regression analysis of the effect of mobile banking services on access to

financial services in Ado-Odo/Ota Local Government Area. The model summary reveals a correlation coefficient (R) of 0.261, indicating a positive relationship between mobile banking services and access to financial services. The coefficient of determination (R^2) is 0.068, indicating that mobile banking services explain 6.8% of the variation in access to financial services, while the remaining 93.2% is explained by other factors not captured in the model.

Table 4: The Regression Analysis of the effect of Mobile Banking Services on Access to Financial Services in Ado-Odo/Ota Local Government Area.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.261 ^a	.068	.064	.82690
a. Predictors: (Constant), Internet Banking Services				
Source: Author Computation Using SPSS 27				

4.5. The ANOVA result

The ANOVA result shows an F-statistic of 14.494 with a significance value of 0.000. Since the p-value is less than the 0.05 level of significance, the regression model is statistically significant. The coefficient table reveals that mobile banking services have a positive regression coefficient ($B = 0.264$), implying that a 1% increase in mobile banking services will lead to an estimated 26.4% increase in access to financial services. The t-value of 3.807 and the associated p-value of 0.000 confirm that this effect is statistically significant.

Table 5: ANOVA Result for Hypothesis One

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.911	1	9.911	14.494	.000 ^b
	Residual	135.386	198	.684		
	Total	145.297	199			
a. Dependent Variable: Access to Financial Services						
a. Predictors: (Constant), Mobile Banking Services						
Source: Author Computation Using SPSS 27						

4.6 Discussion of Findings

The study revealed that mobile banking services have a positive and statistically significant effect on access to financial services. The regression results showed that mobile banking services explain 6.8% of the variation in access to financial services as shown in table 4.8. This indicates that mobile banking contributes to improving how individuals access financial services by making it easier for them to carry out transactions without necessarily visiting the bank physically. The regression coefficient contains in table 4.10 further shows that a 1% increase in mobile banking services leads to approximately a 26.4% increase in access to financial services.

This means that as mobile banking usage increases among individuals, their level of access to financial services also improves significantly, especially in terms of speed, convenience, and availability of financial transactions. This finding is in line with the study of Aruoriwo and Iworiso (2024), who reported that mobile banking enhances financial accessibility by reducing barriers such as distance, cost, and time. Their study emphasized that mobile banking adoption plays a key role in improving financial inclusion by allowing users to access financial services conveniently through digital platforms. It also supports the idea that digital financial tools are becoming essential in bridging the gap between formal financial institutions and underserved populations, particularly in developing areas where physical banking infrastructure may be limited.

5. Conclusion

The study concludes that digital financial services are important determinants of financial inclusion in Ado-Odo/Ota Local Government Area. Specifically, as mobile banking, POS services, and fintech-based platforms has proven to significantly influence access, usage, and convenience of financial services. Although the strength of influence varies across the variables, all relationships are statistically significant, confirming that digital financial services play a vital role in improving financial participation among individuals. The study further concludes that POS services have the strongest effect among the variables examined, followed by mobile banking, while fintech services show a weaker but still significant effect. Overall, the findings suggest that when digital financial services are widely adopted and effectively utilized, they improve financial inclusion by making financial services more accessible, usable, and convenient.

Based on the findings of this study, the following recommendations are made:

- i. Financial institutions and service providers should promote mobile banking adoption by improving user accessibility, awareness, and ease of use. This will enhance financial access, especially among individuals in underserved areas.
- ii. The expansion of POS infrastructure should be prioritized in both urban and rural communities. This will increase financial service usage by reducing distance barriers and making transactions more convenient for users.
- iii. Fintech service providers should improve the usability and reliability of digital financial platforms. This will further enhance convenience and encourage more users to adopt digital financial services.
- iv. Government and regulatory bodies should support policies that encourage financial technology expansion. This will ensure wider financial inclusion and improved access to financial services across different population groups.
- v. Regular awareness campaigns should be carried out to educate the public on the benefits of digital financial services. This will help increase trust and adoption, especially among individuals who are still dependent on traditional banking methods.

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