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DIGITALIZATION AND SUSTAINABLE GROWTH OF LISTED DEPOSIT MONEY BANKS IN NIGERIA

Modozie, E. C.

Department of Accountancy, Chukwuemeka Odumegwu Ojukwu University, Igbariam,

Campus.

modozieemmanuel71@gmail.com

Abstract

This study examined the effect of digitalization on the sustainable growth of listed deposit money banks in Nigeria. Specifically, it investigated how information technology infrastructure investment influences the sustainable growth of these banks over time. The study adopted an Ex Post Facto research design, with a population of thirteen listed deposit money banks and a sample size of eleven, excluding those without complete 2024 financial reports. Secondary data were obtained from the banks' annual reports covering the period 2015 to 2024. The hypotheses were tested using the Panel Estimated Generalised Least Squares (EGLS) method after conducting diagnostic tests for heteroskedasticity and cross-sectional dependence. The findings revealed that information technology infrastructure investment has a positive and significant effect on the sustainable growth of listed deposit money banks in Nigeria ($\beta = 4.5521$, $p = 0.0000$), leading to the conclusion that increased digitalization enhances long-term financial sustainability within the banking sector. It was recommended that bank management teams should increase their capital allocation toward modern digital infrastructure that enhances automation, data security, and real-time service delivery. By doing so, banks can strengthen their operational resilience, improve customer satisfaction, and sustain profitability in a rapidly evolving financial environment.

Keywords: Digitalization, sustainable growth, Information technology infrastructure investment

1.0 Introduction

In recent years, the global business landscape has undergone a remarkable transformation driven by advances in digital technology. The banking industry, being one of the most sensitive and dynamic sectors of the economy, has not been left behind in this transformation. The widespread adoption of digital tools and platforms has revolutionized the way financial services are delivered, leading to improved efficiency, reduced transaction costs, and greater accessibility for customers (Saadaoui & Chouchene, 2025). Across the world, banks have continued to shift from traditional manual operations to technology-driven systems that promote real-time transactions and enhance customer experience. This transformation has given rise to what is commonly referred to as digitalization, a process that integrates digital technologies into all aspects of business operations. In Nigeria, the banking sector which contributes immensely toward economic growth and commerce (Nworie & Onochie, 2024) has witnessed rapid digital advancement over the past two decades, influenced by reforms in financial regulation, technological innovation, and changing consumer expectations. From the introduction of Automated Teller Machines (ATMs) and electronic fund transfers to the rise of internet and mobile banking, Nigerian banks have increasingly adopted technology as a key driver of competitiveness and performance (Ogbobe & Ezeala, 2024). As a result, the role of digitalization has expanded beyond mere operational support to becoming a central factor in shaping the long-term growth and sustainability of financial institutions.

Digitalization has become a crucial element of business strategy in the contemporary corporate environment, influencing how organizations operate, compete, and achieve their objectives. In today's economy, the pace of technological change compels businesses to continuously adapt to remain relevant and sustainable (Oshoiribhor, 2025). For the banking sector, digitalization is not only about automating processes but also about enhancing strategic decision-making, improving service delivery, and fostering innovation in financial products. Banks that effectively deploy digital technologies are able to streamline operations, increase customer satisfaction, and access broader markets through online platforms (Nguemo & Ekokotu, 2025). Furthermore, digitalization supports data-driven decision-making by enabling banks to collect, analyze, and utilize large volumes of customer and operational data. This analytical capability allows banks to identify market trends, manage risks more effectively, and tailor products to meet customer needs. In developing countries like Nigeria, digitalization has contributed significantly to financial inclusion by providing access to financial services for individuals who were previously excluded from the formal banking system (Saadaoui & Chouchene, 2025). Through mobile banking, digital payment systems, and online platforms, banks have reached millions of customers who lack access to physical branches. Consequently, digitalization serves as both a technological and developmental

tool, enhancing not only profitability but also the social and economic contributions of banks to national development.

The link between digitalization and sustainable growth has become increasingly important in the global financial discourse. Sustainable growth refers to a firm's ability to maintain consistent expansion without jeopardizing its long-term stability or depleting its resources (Huang et al., 2019). For banks, this involves maintaining financial profitability while ensuring operational efficiency, environmental responsibility, and social accountability. Digitalization contributes to sustainable growth by improving cost efficiency, promoting resource optimization, and fostering innovation in banking services (Nguemo & Ekokotu, 2025). With advanced technological infrastructure, banks are able to minimize waste, reduce paperwork, and implement environmentally friendly processes that align with global sustainability standards. In the Nigerian banking industry, sustainable growth has become a central concern due to increasing competition, economic fluctuations, and regulatory changes. Therefore, technology investment in digital platforms, infrastructure, and innovation has become a strategic necessity for maintaining competitiveness and ensuring long-term viability (Azmi et al., 2020). However, while many studies have examined the relationship between digitalization and profitability, few have focused on how digitalization influences sustainable growth specifically.

In a well-functioning banking environment, digitalization should serve as a strong foundation for growth, stability, and competitiveness. The adoption of modern technology in the banking sector is intended to enhance efficiency, improve service delivery, and support long-term profitability (Agboola et al., 2019). When digital tools and infrastructure are effectively integrated, banks can expand their operations, manage risks more accurately, and sustain customer trust. The use of digital channels such as internet banking, mobile banking, automated teller machines, and online payment systems should contribute to improved financial performance (Theiri & Hadoussa, 2024). Through digitalization, banks are expected to reduce operational costs, minimize errors, strengthen decision-making through data analytics, and ensure sustainable growth that benefits both shareholders and the wider economy.

However, despite heavy investments in information technology infrastructure and digital platforms, many banks still struggle to achieve stable and sustainable growth (Nguemo & Ekokotu, 2025). While digital tools have improved accessibility and customer interaction, the actual contribution of digitalization to long-term financial sustainability remains uncertain. Several banks continue to experience challenges such as weak digital infrastructure, system inefficiencies, cyber threats, and inconsistent technological policies. The heavy costs associated with implementing and maintaining digital systems have also placed financial pressure on some institutions, affecting their overall performance. Furthermore, digitalization in many Nigerian banks is still concentrated on operational convenience rather than strategic value creation. This suggests that while digital

technologies have been widely adopted, their utilization in driving sustainable growth may not have achieved the desired results (Saadaoui & Chouchene, 2025).

The continued gap between technological investment and sustainable growth has serious implications for the stability of the banking sector and the economy at large. If banks continue to invest heavily in digital systems without realizing proportional growth in profitability and sustainability, the long-term viability of these institutions could be threatened. Ineffective digital integration may lead to declining returns on investment, reduced shareholder confidence, and increasing operational risks. Furthermore, the inability of banks to translate digitalization into sustainable performance could hinder financial inclusion, weaken competitiveness, and slow economic development. This situation calls for a deeper examination of how digitalization truly affects the sustainable growth of listed deposit money banks in Nigeria, with a view to determining whether technological investments are achieving their intended purpose of supporting enduring financial and operational stability.

1.1 Objective of the study

The main aim of this study is to examine the effect of digitalization on the sustainable growth of listed deposit money banks in Nigeria.

The specific objective was to determine the effect of information technology infrastructure investment on the sustainable growth of listed deposit money banks in Nigeria.

1.2 Hypothesis

H_0: Information technology infrastructure investment has no significant effect on the sustainable growth of listed deposit money banks in Nigeria.

2.0 Literature Review

2.1 Conceptual Review

2.1.1 Digitalization

Digitalization refers to the process of integrating digital technologies into all areas of business operations to improve efficiency, productivity, and value creation (Saadaoui & Chouchene, 2025). It involves the transformation of business models, services, and internal processes through the use of information and communication technologies (Theiri & Hadoussa, 2024). Scholars describe digitalization as the adoption and use of digital tools such as online platforms, mobile applications, and data analytics to enhance the delivery of products and services (Nguemo & Ekokotu, 2025). In the banking sector, digitalization goes beyond automation; it signifies a fundamental shift in how banks operate, interact with customers, and manage information. Digitalization enables organizations to convert traditional processes into more efficient digital operations. It allows banks to deliver faster, more secure, and more personalized services (Nduokafor et al., 2024). Through the use of technologies such as artificial intelligence, blockchain, and mobile banking, financial institutions can improve operational accuracy, reduce transaction costs, and strengthen customer satisfaction. Digitalization also promotes financial inclusion by expanding access to banking services beyond physical branches to remote and underserved areas. In this sense, it represents a transformation that redefines how institutions create and deliver value.

Over time, digitalization has evolved from simple computerization to a strategic driver of business performance and sustainability (Dibie & Nworie, 2025). It now encompasses the use of big data analytics, cloud computing, and digital communication channels that enable organizations to make real-time decisions. For banks, this transformation enhances transparency, promotes compliance with regulatory standards, and helps in risk management. The widespread adoption of digital technologies in the banking sector has led to a reconfiguration of operational processes, allowing for greater flexibility and adaptability in a competitive environment (Saadaoui & Chouchene, 2025). Therefore, digitalization represents a continuous process of technological integration that reshapes how businesses function and compete in a rapidly changing global economy.

2.1.2 Information Technology Infrastructure Investment

Information Technology Infrastructure Investment refers to the allocation of financial and material resources toward the development and maintenance of hardware, software, networks, and digital systems that support an organization's technological operations (Nguemo & Ekokotu, 2025). It represents the foundation upon which digital processes and services are built. This form of investment includes expenditures on servers, communication systems, data centers, cybersecurity tools, and software applications that enable efficient data processing and communication within an organization. In the banking sector, such investments are crucial for ensuring smooth operations, maintaining service reliability, and improving customer experience. Information technology infrastructure investment ensures that the technological backbone of an institution remains functional, secure, and scalable (Mohamad et al., 2017). For banks, these investments allow for efficient management of transactions, online banking, and digital payment systems. They also provide the necessary tools for real-time monitoring of financial activities and compliance with regulatory frameworks. Investing in IT infrastructure not only supports daily operations but also helps financial institutions remain competitive in a rapidly digitalized world. Without adequate IT infrastructure, organizations face challenges such as data breaches, system failures, and poor service delivery (Nworie et al., 2022).

Furthermore, IT infrastructure investment is linked to innovation and long-term sustainability (Nguemo & Ekokotu, 2025). A strong technological foundation enables the integration of emerging technologies like artificial intelligence, data analytics, and blockchain into banking operations. This integration helps institutions to predict market trends, manage risks effectively, and deliver innovative financial solutions. It also enhances data storage capacity, supports business continuity, and reduces operational costs over time. Therefore, information technology infrastructure investment is more than just expenditure; it is a strategic commitment to future readiness, efficiency, and growth in a technology-driven environment (Khan et al., 2013).

2.1.3 Sustainable Growth

Sustainable Growth refers to the ability of an organization to expand its operations and profitability over time without compromising its long-term stability, financial health, or the environment in which it operates (Nguemo & Ekokotu, 2025). It involves maintaining a balance between short-term financial performance and long-term development goals (Rahim, 2017). In the banking sector, sustainable growth represents consistent profitability achieved through responsible management of financial, technological, and human resources (Huang et al., 2019). It ensures that expansion and innovation occur

within the limits of available resources while safeguarding the interests of stakeholders. Sustainable growth emphasizes the importance of resilience and adaptability in a changing economic environment. For banks, this means growing revenues and returns on equity without exposing the institution to unnecessary risks or excessive leverage. It involves maintaining adequate capital, optimizing operational efficiency, and continuously improving service quality.

In recent years, the idea of sustainable growth has expanded to include environmental and social dimensions. For banks in Nigeria, sustainable growth is particularly relevant as it reflects their ability to remain profitable amid technological change, economic uncertainty, and regulatory pressures (Rahim, 2017). Ultimately, sustainable growth is a measure of an organization's capacity to maintain long-term performance while aligning its operations with economic, social, and environmental well-being. It ensures that development today does not hinder the ability to thrive in the future.

2.2 Theoretical Framework

The Technology Acceptance Model (TAM) was developed by Fred Davis in 1986 and later expanded in 1989 as part of his doctoral research at the Massachusetts Institute of Technology (Nguemo & Ekokotu, 2025). The model was derived from the Theory of Reasoned Action developed by Fishbein and Ajzen in 1975, which sought to explain how individual attitudes and intentions influence behavior. Davis adapted this theory to the study of technology adoption by proposing a framework that explains how users come to accept and use new technologies. Since its introduction, the Technology Acceptance Model has become one of the most widely applied frameworks for studying user behavior toward information systems and digital innovations across various fields, including banking, education, healthcare, and commerce.

The main postulations of the Technology Acceptance Model are centered on two key determinants: perceived usefulness and perceived ease of use (Nguemo & Ekokotu, 2025). Perceived usefulness refers to the degree to which a person believes that using a particular system will enhance job performance, while perceived ease of use refers to the degree to which an individual believes that using the system will be free of effort. These two factors jointly influence a user's attitude toward using a system, which in turn affects their behavioral intention to use it. The model proposes that behavioral intention leads directly to actual system usage. Over time, scholars have extended the model to include other variables such as social influence, trust, and facilitating conditions, but the central idea remains that individuals adopt technology when they find it beneficial and easy to use.

The Technology Acceptance Model is relevant to this study on digitalization and sustainable growth of listed deposit money banks in Nigeria because it provides a theoretical basis for understanding how banks adopt and integrate digital technologies into their operations. The model helps explain why some financial institutions are more

willing to invest in information technology infrastructure than others. When bank managers and employees perceive that digital tools can improve operational efficiency, customer satisfaction, and profitability, they are more likely to embrace digital transformation. Similarly, when technological systems are user-friendly and reliable, their adoption becomes smoother, leading to improved performance outcomes (Nworie et al., 2025). Therefore, the Technology Acceptance Model serves as an appropriate framework for explaining how digitalization efforts contribute to the sustainable growth of deposit money banks through enhanced acceptance and effective utilization of technology.

2.3 Empirical Review

Nguemo and Ekokotu (2025) explored how investments in technology contribute to the sustainable growth of listed deposit money banks in Nigeria. The study assessed the extent to which technology-related expenditures influence banks' ability to achieve long-term stability and growth. Key indicators such as technology expenses and information technology infrastructure investments were used to represent technology investment, while sustainable growth rate served as the measure of bank sustainability. Using an ex-post facto research design and panel least squares regression analysis on data sourced from annual reports of listed banks between 2020 and 2024, the results revealed that both technology expenses and IT infrastructure investments exert a positive and statistically significant effect on the sustainable growth of Nigerian banks at the 1% level. The study therefore concluded that investment in technology plays a crucial role in driving sustainable growth within Nigeria's banking sector.

Saadaoui and Chouchene (2025) investigated how digitalization enhances the financial performance of African banks, with financial stability as a mediating factor and non-performing loans as a moderating variable. Drawing on data from African banks covering 2000 to 2021, the panel data analysis revealed that digitalization significantly improves bank performance. Moreover, the results demonstrated that financial stability serves as an important intermediary in the relationship between digitalization and bank performance, reinforcing the idea that technology adoption strengthens institutional resilience and operational efficiency.

Oshoiribhor (2025) analyzed the influence of information and communication technology (ICT) on Nigeria's banking sector performance. The study focused on how spending on digitalization, the number of telecommunication services, and internet usage affect the banking sector's contribution to the country's gross domestic product (GDP). Employing a machine learning-based Ordinary Least Squares (OLS) regression model and using secondary data from the 2024 Central Bank Statistical Bulletin, the findings revealed that both digitalization expenditure and internet usage have a direct and significant impact on the banking sector's GDP contribution. Overall, ICT-related variables explained approximately 82.7% to 85.4% of the variations in Nigeria's banking sector performance, highlighting the pivotal role of digital infrastructure in financial development.

Theiri and Hadoussa (2024) assessed how digitalization strategies influence the financial performance of banks in Tunisia. Using data from 12 banks between 2010 and 2020, the study applied the generalized least squares estimation technique to address issues of heteroscedasticity and autocorrelation. Findings indicated that digital transformation positively affects financial performance—measured by return on assets and return on equity—through investments in payment tools, digital platforms, and cybersecurity. The study concluded that banks embracing digital channels are better positioned to enhance profitability, maintain financial stability, and foster transparency in operations.

Ogbobe and Ezeala (2024) investigated how technological disruptions affect the financial performance of Nigerian deposit money banks from 2015 to 2023. The study used automated teller machines (ATMs), point-of-sale (POS) terminals, and mobile banking transactions as indicators of technological innovation, while return on equity (ROE) and earnings per share (EPS) represented financial performance. Secondary data from banks' annual reports, the Central Bank of Nigeria (CBN), and the Nigeria Deposit Insurance Corporation (NDIC) were analyzed using multiple regression in SPSS version 9.0. The results showed that ATM usage, POS transactions, and mobile banking activities all have positive and significant effects on both ROE and EPS, demonstrating that technological advancements substantially improve profitability and efficiency in Nigeria's banking industry.

Iwedi (2024) examined how the adoption of digital banking technologies affects the operational efficiency of commercial banks in Nigeria. The study synthesized prior literature to establish key theoretical foundations, including those related to technological adoption, customer experience, and regulatory compliance. Employing a quasi-experimental design supported by financial time series analysis, the study revealed a significant and positive association between digital banking adoption and banking efficiency. Results from panel unit root tests showed that variables were non-stationary at level but became stationary after differencing, while cointegration analysis confirmed a long-term relationship between digital adoption and efficiency. Additionally, Granger causality tests indicated a one-way causality from electronic fund transfers to operational efficiency. The study concluded that encouraging the adoption of digital banking technologies could improve the efficiency and overall performance of commercial banks in Nigeria.

Nnonyelu and Onwuzuligbo (2024) investigated the influence of digital disruption on the operational performance of commercial banks in Anambra State, Nigeria. The study specifically assessed how mobile banking affects customer satisfaction and how point-of-sale (POS) usage influences bank profitability. Using a descriptive survey design, data were collected from 277 respondents drawn from a population of 899, determined through the Taro Yamane formula. Hypotheses were tested using simple linear regression, and results indicated that digital disruption significantly enhances the operational performance of commercial banks in the state.

Nwankwo (2022) explored how emerging digital technologies influence organizational performance, focusing on Fidelity Bank in Anambra State. The study investigated the effects of email, internet technology, and e-commerce on bank performance. Utilizing a survey design and a five-point Likert scale questionnaire distributed to 200 bank employees, the study achieved a 94.68% response rate. Data were analyzed using ANOVA with SPSS version 23, and findings showed that all three digital technologies—email, internet use, and e-commerce—have significant and positive effects on the performance of Fidelity Bank.

Festus et al. (2020) analyzed the contribution of information and communication technology (ICT) tools to the sustainable performance of banks in Nigeria. Using a cross-sectional design and structured questionnaires, data were collected from 510 top and middle managers across 19 quoted deposit money banks. The findings revealed that ICT components such as mobile banking, online banking, automated teller machines, and automated clearing services significantly improve customer loyalty, satisfaction, profitability, and service delivery.

Azmi et al. (2020) explored how digitalization influences bank performance by interviewing 30 employees from ten banks. The study evaluated performance based on employee efficiency, operational costs, and profitability. Findings showed that digitalization positively affects all three factors, enhancing overall bank performance and supporting the transition from traditional banking services to comprehensive financial solutions.

Agboola et al. (2019) examined how digitalization enhances the performance of commercial banks in Nigeria. Using purposive and simple random sampling methods, 370 non-managerial employees participated in the study. A self-developed questionnaire analyzed with SPSS version 25 revealed a modest but positive and significant correlation between digitalization and bank performance ($r = 0.114^*$, $p < 0.05$), as well as between product innovation and performance ($r = 0.186$, $p < 0.001$). The study established that digital transformation contributes meaningfully to the improved efficiency and competitiveness of commercial banks

2.4 Gap in Literature

Although numerous studies such as those by Nguemo and Ekokotu (2025), Saadaoui and Chouchene (2025), Oshoiribhor (2025), Theiri and Hadoussa (2024), Ogbobe and Ezeala (2024), Iwedi (2024), Nnonyelu and Onwuzuligbo (2024), Nwankwo (2022), Festus et al. (2020), Azmi et al. (2020), and Agboola et al. (2019) have examined various aspects of digitalization and its influence on bank performance, most of these studies concentrated largely on profitability, efficiency, and financial performance indicators, rather than on sustainable growth. While several of these investigations established that digitalization, ICT expenditure, and technological innovation contribute positively to operational efficiency and financial outcomes, they paid limited attention to how such technological

advancements translate into long-term sustainability outcomes for banks. Furthermore, few studies have examined the combined role of information technology infrastructure investment as a driver of sustainable growth in the Nigerian banking industry using robust panel techniques that address cross-sectional dependence and heteroskedasticity. Many prior works also relied on survey or descriptive designs rather than objective financial data over extended periods. This has created a methodological and conceptual gap in understanding whether continuous digitalization investments yield sustainable growth beyond short-term performance improvements. Therefore, this study seeks to fill this gap by empirically analyzing the long-term effect of digitalization—particularly information technology infrastructure investment—on the sustainable growth of listed deposit money banks in Nigeria, using a comprehensive ten-year dataset (2015–2024) and advanced econometric estimation techniques to ensure reliability and depth of analysis.

3.0 Methodology

This study employed an ex-post facto research design to examine the effect of digitalization on the sustainable growth of listed deposit money banks in Nigeria. The choice of this design is appropriate because the study relied on historical data that already exist in the banks' published financial statements, and therefore, the researcher had no control over the variables being studied (Nworie et al., 2023; Nworie & Orji-Okafor, 2024). This design enabled the evaluation of the impact of digitalization, represented by information technology investments, on banks' sustainable growth over time. The population of the study comprised all the thirteen (13) deposit money banks listed on the Nigerian Exchange Group (NGX) as of 2024. These banks include Access Holdings Plc, Ecobank Transnational Incorporated, First City Monument Bank Plc, First Bank Plc, Fidelity Bank Plc, Guaranty Trust Holding Company Plc, Jaiz Bank Plc, Stanbic IBTC Holdings Plc, Sterling Bank Plc, Union Bank of Nigeria Plc, United Bank for Africa Plc, Unity Bank Plc, and Zenith Bank Plc.

The study adopted a purposive sampling technique, selecting banks that had complete and accessible annual reports covering the study period (2015–2024). Out of the thirteen listed deposit money banks, eleven (11) met this criterion, while Jaiz Bank Plc and Unity Bank Plc were excluded because their 2024 annual reports were not available at the time of the study. Therefore, the final sample size consisted of eleven listed banks in Nigeria. The study relied solely on secondary data, which were obtained from the audited annual reports and financial statements of the sampled banks for the period 2015–2024. Data relevant to digitalization, sustainable growth, and firm size were extracted from these reports. The secondary data approach was adopted because it provides reliable, verifiable, and comparable information necessary for trend and panel analyses across multiple years.

The study consisted of one independent variable, one dependent variable, and one control variable. The measurements are summarized in Table 3.1.

Variables	Measurement	Source/Authority
Independent Variables:		
IT Infrastructure Investment (ITII)	Information Technology (IT) Capital Expenditures / Total Capital Expenditures	Onuorah and Okoh (2021), Ugwuanyi and Ugwuanyi (2023), Okeke (2024), Paul (2024)
Dependent Variables		
Sustainable Growth (SG)	Return on Equity × (1 – Dividend Payout Ratio)	Kanyarat (2023), Taiwo, Johnson, Aderemi and Tajudeen (2023)
Control Variable		
Firm Size (FZ)	Natural Logarithm of Total Assets (LnTA)	Zhang, Qin and Liu.(2021), Omaliko and Okpala (2022)

Source: Researcher's Compilation (2025)

Data collected were analyzed using both descriptive and inferential statistical techniques. The descriptive analysis provided insights into the mean, standard deviation, minimum, and maximum values of the variables.

Before model estimation, a series of diagnostic tests were conducted to ensure the validity and robustness of the panel regression results. Heteroskedasticity test was conducted to verify the constancy of error variance across observations. Cross-sectional dependence test was conducted to detect interdependence among the sampled banks. After the diagnostic tests, the Panel Estimated Generalized Least Squares (EGLS) regression model was employed to test the study's hypotheses. The EGLS estimator was chosen because it efficiently handles panel data with potential issues of heteroskedasticity, autocorrelation, and cross-sectional dependence, providing more reliable parameter estimates than conventional pooled OLS.

In line with the previous researches, the study adapted and modify the Models of Oladunjoye and Tshidzumba (2023) and Okeke (2024) in examining the relationship between degitalization and sustainable growth of listed deposit money banks in Nigeria. This is shown below as thus:

Oladunjoye and Tshidzumba (2023): $\mathbf{FMP = \beta_0 + \beta_1 TECH + \mu}$

Okeke (2024): $\mathbf{ROCE = \beta_0 + \beta_1 FICTH + \beta_2 FICTS + \beta_3 FSZ + \mu}$

Where:
FMP = Financial Market Performance
TECH = Technology Adoption
ROCE = Return on Capital Employed

FICTH = Funding for ICT Hardware
FICTS = Funding for ICT Software
FSZ = Firm Size
Thus, to ascertain the effect of degitalization on sustainable growth of listed deposit money banks on the NGX, the study adopt the following models in a bid to provide answers to the null hypotheses of the study.

The modified functional model for the study is expressed as:

$SGit = \beta 0 + \beta 1 ITIIit + \beta 2 FZit + \mu it$

Where:

SGit = Sustainable Growth of bank *i* in year *t*

ITIIit = Information Technology Infrastructure Investment of bank *i* in year *t*

FSZit = Firm Size (control variable) of bank *i* in year *t*

β0 = Intercept term

β1,β2 = Coefficients of explanatory variables

μit = Error term

The decision rule was based on the probability value (p-value) of each coefficient. The null hypothesis was rejected when the p-value was less than 0.05, indicating a statistically

significant relationship between digitalization and sustainable growth of listed deposit money banks in Nigeria.

Data Presentation and Analysis

4.0 Data Analysis

4.1 Descriptive Analysis

Table 4.1 Descriptive Statistics

	SG	ITII	FZ
Mean	0.107823	0.001922	9.327908
Median	0.097700	0.001362	9.459073
Maximum	0.525817	0.012945	10.63651
Minimum	-0.174979	9.36E-07	7.880253
Std. Dev.	0.096332	0.001945	0.698794
Skewness	1.186266	2.438143	-0.500697
Kurtosis	6.787740	12.17144	2.360451
Jarque-Bera	91.55612	494.5118	6.470809
Probability	0.000000	0.000000	0.039344
Sum	11.86048	0.211470	1026.070
Sum Sq. Dev.	1.011514	0.000412	53.22608
Observations	110	110	110

Source: Researcher's Compilation (2025)

Table 4.1 presents the descriptive statistics of the variables used in the study, namely Sustainable Growth (SG), Information Technology Infrastructure Investment (ITII), and Firm Size (FZ). The average value of Sustainable Growth (SG) is 0.1078, indicating that on average, listed deposit money banks in Nigeria achieved a sustainable growth rate of approximately 10.78% during the study period. The maximum and minimum values of 0.5258 and –0.1749, respectively, show that while some banks recorded strong sustainable growth, others experienced negative growth, possibly due to variations in operational efficiency or capital structure. The standard deviation of 0.0963 suggests moderate variability in the sustainable growth rates among banks. The positive skewness value of 1.1863 indicates that the distribution of sustainable growth is right-skewed, implying that most banks experienced growth rates below the mean, with a few outperforming significantly. The kurtosis value of 6.7877, which is higher than the normal value of 3, shows a leptokurtic distribution, meaning the data are more peaked with heavy tails. The Jarque-Bera probability of 0.0000 suggests that SG is not normally distributed at the 5% significance level.

For Information Technology Infrastructure Investment (ITII), the mean value is 0.0019, suggesting that, on average, the proportion of investment in IT infrastructure relative to total capital expenditure among the sampled banks is approximately 0.19%. The maximum value of 0.0129 and minimum value of 9.36E-07 indicate that while some banks committed substantial resources to IT infrastructure, others invested very little during the study period. The standard deviation of 0.0019 demonstrates a moderate dispersion among banks in their IT infrastructure spending. The skewness of 2.4381 indicates a high degree of right skewness, implying that most banks have IT investment values lower than the mean, while a few banks invested substantially more. The kurtosis value of 12.1714, far above 3, indicates a highly peaked distribution, suggesting the presence of extreme values in IT expenditure across banks. The Jarque-Bera probability of 0.0000 reveals that the distribution of ITII is not normal, showing significant deviations that may reflect differing strategic priorities or financial capacities among banks.

Firm Size (FZ) has a mean value of 9.3279, suggesting that, on average, listed deposit money banks in Nigeria maintain a substantial asset base when expressed in logarithmic form. The maximum value of 10.6365 and minimum value of 7.8803 show wide variations in bank sizes, indicating the coexistence of both large and relatively smaller banks within the sample. The standard deviation of 0.6988 shows moderate variability in asset size among the banks. The negative skewness value of –0.5007 suggests a left-skewed distribution, implying that most banks have asset sizes above the mean. The kurtosis value of 2.3605, being slightly below 3, indicates a platykurtic distribution, meaning that the data are relatively flatter and have lighter tails than a normal distribution. The Jarque-Bera probability of 0.0393, which is slightly below 0.05, indicates that the distribution of firm size marginally deviates from normality, possibly due to the dominance of a few very large banks in the industry.

Table 4.2 Model Diagnostics

Test Type	Test Statistic / Value	Probability
Pesaran CD (Residual Cross-Section Dependence Test)	4.882600	0.0000
Likelihood Ratio (Panel Cross-Section Heteroskedasticity Test)	43.45028	0.0000

Source: Researcher's Compilation (2025)

Table 4.2 presents the model diagnostic results for the study. The Pesaran Cross-Section Dependence (CD) test statistic of 4.8826, with a probability value of 0.0000, indicates the presence of cross-sectional dependence among the sampled banks. This means that the residuals across the banks are not independent of one another, implying that shocks or changes in one bank may influence others. Such dependence is common in panel data

involving financial institutions operating within the same regulatory and economic environment, where market conditions, technological policies, or macroeconomic factors can affect all banks simultaneously. The significance of this test at the 5% level suggests that the assumption of cross-sectional independence is violated, justifying the use of estimation methods that can correct for this issue.

The Likelihood Ratio test for panel cross-section heteroskedasticity has a value of 43.4503 with a probability of 0.0000, showing that the null hypothesis of homoskedasticity is rejected. This result confirms the presence of heteroskedasticity across the banks, meaning that the variance of the error terms differs from one bank to another. This outcome suggests that some banks exhibit greater variability in their financial performance or technology investment than others, possibly due to differences in size, risk exposure, or operational structure. Given these results, the use of the Panel Estimated Generalised Least Squares (EGLS) model in this study is appropriate, as it effectively corrects for both cross-sectional dependence and heteroskedasticity, ensuring that the parameter estimates are reliable and robust for policy and managerial interpretations.

4.2 Test of Hypothesis

H_0: Information technology infrastructure investment has no significant effect on the sustainable growth of listed deposit money banks in Nigeria.

Table 4.3 Test of Hypothesis
Dependent Variable: SG
Method: Panel EGLS (Period SUR)
Date: 08/02/25 Time: 01:37
Sample: 2015 2024
Periods included: 10
Cross-sections included: 11
Total panel (balanced) observations: 110
Linear estimation after one-step weighting matrix
Period SUR (PCSE) standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ITII	4.552069	0.817233	5.570099	0.0000
FZ	0.067361	0.003525	19.11003	0.0000
C	-0.528623	0.033901	-15.59332	0.0000

Weighted Statistics

R-squared	0.728420	Mean dependent var	1.603616
Adjusted R-squared	0.723343	S.D. dependent var	3.112383
S.E. of regression	0.990991	Sum squared resid	105.0808
F-statistic	143.4950	Durbin-Watson stat	2.046001
Prob(F-statistic)	0.000000		

Source: Researcher's Compilation (2025)

Table 4.3 presents the results of the test of hypothesis on the effect of digitalization, measured through information technology infrastructure investment (ITII), on the sustainable growth (SG) of listed deposit money banks in Nigeria. The model validity statistics show that the adjusted R-squared is 0.7233, indicating that approximately 72.33% of the variations in banks' sustainable growth are explained by changes in information technology infrastructure investment and firm size. This demonstrates a strong explanatory power of the model, suggesting that the variables included effectively capture the factors influencing sustainable growth among the banks. The F-statistic probability value of 0.0000 further confirms that the model is statistically valid at the 5% level, meaning the combined effect of the independent variables on sustainable growth is significant. The Durbin-Watson statistic of 2.0460 indicates the absence of

autocorrelation among residuals, confirming that the estimates are not biased by serial correlation. The constant term (C = -0.5286, p = 0.0000) is negative and significant at the 5% level, implying that in the absence of both IT infrastructure investment and firm size, sustainable growth would decline substantially. This suggests that digitalization and firm size are necessary conditions for maintaining sustainable growth in Nigerian banks.

The coefficient of information technology infrastructure investment (β = 4.5521, p = 0.0000) is positive and statistically significant at the 5% level, showing that ITII has a strong positive effect on the sustainable growth of listed deposit money banks in Nigeria. This implies that a one-unit increase in IT infrastructure investment results in approximately a 4.55-unit increase in sustainable growth, holding other variables constant. This marginal effect indicates that as banks allocate more resources to technological infrastructure, their capacity to sustain long-term growth improves considerably. Similarly, firm size (β = 0.0674, p = 0.0000) exerts a positive and significant effect on sustainable growth at the 5% level. This means that larger banks are more capable of sustaining growth, likely due to economies of scale, resource availability, and greater adaptability to digital innovations. Therefore, the hypothesis stating that information technology infrastructure investment has no significant effect on the sustainable growth of listed deposit money banks in Nigeria is rejected, as the findings provide strong statistical evidence that such investments significantly enhance banks' sustainable growth over time.

4.3 Discussion of Findings

The finding that information technology infrastructure investment has a positive and significant effect on the sustainable growth of listed deposit money banks in Nigeria (β = 4.5521, p = 0.0000) suggests that consistent investment in technological infrastructure enhances the long-term financial and operational stability of banks. This result shows that as banks expand their IT infrastructure—through improved data centers, secure digital platforms, and automation technologies—their ability to sustain profitability and competitiveness over time strengthens. The positive coefficient indicates that even a marginal increase in technology infrastructure investment leads to a substantial improvement in sustainable growth, likely because advanced systems enhance efficiency, reduce transaction costs, and improve service delivery. This outcome aligns with the growing understanding that in modern banking, technological capability is not merely a support function but a key driver of growth and resilience. In this study, the significant statistical relationship confirms that banks that have consistently upgraded their IT systems are better equipped to maintain stability in the face of market disruptions and regulatory changes.

The result is supported by several previous studies that have shown similar outcomes in different contexts. For instance, Nguemo and Ekokotu (2025) found that both technology expenses and IT infrastructure investments significantly enhanced the sustainable growth

of Nigerian banks, which closely aligns with the present finding. Similarly, Saadaoui and Chouchene (2025) demonstrated that digitalization improves bank performance across African countries by strengthening financial stability and efficiency. Oshoiribhor (2025) also reported that ICT expenditure and internet usage have a direct and significant impact on the banking sector's contribution to Nigeria's GDP, emphasizing the role of technological advancement in promoting sector-wide growth. Moreover, Theiri and Hadoussa (2024) observed that digitalization strategies in Tunisian banks led to improved financial outcomes through better digital platforms and cybersecurity frameworks. These findings are further supported by Iwedi (2024), who established that digital banking technologies significantly enhance operational efficiency in Nigerian commercial banks. The consistency of these results across multiple studies reinforces the conclusion that investment in IT infrastructure is essential for ensuring sustainable growth in the banking sector. The current finding therefore contributes to the empirical evidence that long-term sustainability in modern banking depends on strategic technological investment that supports innovation, operational efficiency, and customer retention.

5.0 Conclusion and Recommendation

5.1 Conclusion

The finding that information technology infrastructure investment has a positive and significant effect on the sustainable growth of listed deposit money banks in Nigeria demonstrates that continuous technological advancement has become a central driver of long-term stability and competitiveness within the banking sector. This outcome shows that when banks allocate more resources to modernizing their digital systems, automating operations, and improving connectivity across service channels, they are better positioned to achieve growth that is both consistent and resilient to market fluctuations. The result reflects how digital capabilities now shape operational efficiency, customer engagement, and financial sustainability, particularly in a period marked by rising customer expectations, regulatory changes, and global competition. The evidence suggests that banks that have consistently upgraded their information technology frameworks are able to lower transaction costs, expand outreach, and enhance their service delivery without compromising financial soundness. This relationship also underscores the transformation of technology from a supporting function into a strategic asset that influences profitability and the ability to maintain long-term financial balance. In addition, the finding shows that technological investment has multiplier effects on organizational processes, including improved decision-making speed, enhanced risk management, and better resource allocation. It further reflects the growing role of technology in aligning banking operations with sustainable practices such as energy efficiency, reduced paper use, and digital financial inclusion. The strong statistical significance of the result also demonstrates that the Nigerian banking industry is gradually integrating global trends in financial digitalization, moving away from traditional dependence on physical structures and manual processes. Overall, the result reveals that technological readiness is not only

linked to short-term performance gains but also represents a long-term foundation for enduring stability and competitiveness within the Nigerian financial system.

5.2 Recommendation

Based on the finding that information technology infrastructure investment has a positive and significant effect on the sustainable growth of listed deposit money banks in Nigeria ($\beta = 4.5521$, $p = 0.0000$), it is recommended that bank management teams increase their capital allocation toward modern digital infrastructure that enhances automation, data security, and real-time service delivery. By doing so, banks can strengthen their operational resilience, improve customer satisfaction, and sustain profitability in a rapidly evolving financial environment.

In addition, the Central Bank of Nigeria (CBN) should encourage digital investment by creating supportive regulatory frameworks and incentives for technological innovation. Such measures would help banks adopt more advanced systems without facing undue compliance burdens and would further promote long-term stability across the banking industry.

5.3 Contribution to Knowledge

This study contributes to existing literature by extending the discussion on digitalization beyond short-term profitability and operational performance to focus on its long-term effect on the sustainable growth of listed deposit money banks in Nigeria. It provides empirical evidence using information technology infrastructure investment as a major explanatory variable, thereby addressing the limited attention given to this aspect in previous studies by Nguemo and Ekokotu (2025), Saadaoui and Chouchene (2025), Oshoiribhor (2025), Theiri and Hadoussa (2024), Ogbobe and Ezeala (2024), Iwedi (2024), Nnonyelu and Onwuzuligbo (2024), Nwankwo (2022), Festus et al. (2020), Azmi et al. (2020), and Agboola et al. (2019). By employing the Panel Estimated Generalised Least Squares method on a ten-year dataset (2015–2024), this research advances methodological rigor through the use of diagnostic tests for heteroskedasticity and cross-sectional dependence, which were rarely considered in earlier works. The study also contributes conceptually by linking digitalization directly to sustainability outcomes rather than limiting analysis to financial or operational indicators. Moreover, it expands the discourse on how technological investments can serve as a foundation for long-term bank stability and resilience within a developing economy context. In doing so, it enriches the theoretical and empirical understanding of digital transformation in banking and provides a more comprehensive view of how digitalization supports sustainable institutional growth.

5.4 Limitations of the Study and Suggestion for Further Studies

This study used data from only eleven listed deposit money banks in Nigeria due to incomplete financial reports from some banks, which may limit how well the results represent the entire banking industry. The research also relied solely on secondary data from annual reports, which may not fully capture qualitative aspects such as employee attitudes, customer experience, or management strategies related to digitalization. In addition, the study focused on a ten-year period, and changes in economic conditions or government policies during that time could have influenced the results beyond what the model captured.

Future studies can expand the scope by including more financial institutions such as microfinance banks or fintech companies to provide a broader understanding of how digitalization affects sustainable growth across the financial sector. Researchers may also consider combining quantitative data with interviews or surveys to capture human and organizational factors influencing technology investment decisions. Comparative studies between Nigeria and other developing countries could also help explain how differences in technological readiness and regulatory environments shape the relationship between digitalization and sustainable growth.

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