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THE IMPACT OF GLOBAL TRENDS IN DIGITAL PAYMENT SYSTEMS ON FINANCIAL PERFORMANCE AND OPERATIONAL EFFICIENCY OF LISTED DEPOSIT MONEY BANKS: EVIDENCE FROM MOBILE BANKING AND OTHER DIGITAL CHANNELS

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Abstract

This study examines the effect of global trends in digital payment systems on the financial performance of listed deposit money banks in Nigeria. The main topic of the study is digital payment systems and financial performance. The specific objectives were to assess the effect of Automated Teller Machine (ATM) transactions, Point-of-Sale (POS) transactions, and mobile payment transactions on Return on Assets (ROA) of listed deposit money banks in Nigeria. The study adopted an ex-post facto research design, relying on secondary data sourced from the Central Bank of Nigeria (CBN), Nigeria Inter-Bank Settlement System (NIBSS), and annual reports of selected listed deposit money banks over 10 years. The method of data analysis employed includes descriptive statistics and panel regression analysis using the Random Effect Model to determine the relationship between digital payment channels and financial performance. The findings revealed that ATM transactions have a positive and significant effect on ROA, POS transactions also show a positive and significant effect, while mobile payment transactions have the strongest positive and most significant influence on ROA. The model indicates that digital payment systems explain about 74% of the variation in financial performance, confirming strong explanatory power. The study recommends that banks should increase investment in mobile banking infrastructure, expand POS networks, and improve ATM service efficiency to enhance profitability. The implications of the findings suggest that the adoption and expansion of digital payment systems significantly improve banking performance, enhance customer convenience, and strengthen competitiveness in the Nigerian banking sector.

Keywords: Digital Payment Systems, Financial Performance, Deposit Money Banks, Mobile Banking.

Introduction

In recent years, the global financial sector has experienced a significant transformation driven by rapid technological advancement and digital innovation. This transformation, often referred to as digitalization in banking, involves the integration of modern technologies into financial services to improve efficiency, accessibility, and service delivery. Unlike traditional banking systems that rely heavily on physical branches, paperwork, and face-to-face interactions, modern banking systems now enable customers to conduct transactions anytime and anywhere using digital platforms such as mobile applications, internet banking, and electronic payment systems. This shift has been widely recognized as a key driver of efficiency and customer satisfaction in the banking industry (Ozili, 2018; Vives, 2019). At the core of this transformation are digital payment systems, which refer to electronic mechanisms that facilitate the transfer of funds without the use of physical cash. These systems include Automated Teller Machines (ATMs), Point-of-Sale (POS) terminals, mobile banking platforms, and internet-based payment services. Their widespread adoption has not only reshaped banking operations but has also improved financial inclusion by extending banking services to previously underserved populations. Empirical evidence suggests that digital financial services enhance operational efficiency, reduce transaction costs, and improve the overall financial performance of banks (Adewoye, 2017; Iwedi, 2024).

The evolution of digital payment systems has been gradual. The introduction of ATMs marked the beginning of self-service banking by allowing customers to withdraw cash and perform basic transactions without visiting bank branches. This was followed by POS systems, which enabled electronic payments at retail outlets, reducing dependence on cash transactions. More recently, mobile banking has emerged as the most dynamic and widely adopted channel, allowing users to perform financial transactions through smartphones, including fund transfers, bill payments, and account management. Mobile banking, in particular, has enhanced convenience, speed, and accessibility in financial transactions (Donou-Adonsou & Sylwester, 2017; Shaikh et al., 2020). Globally, the expansion of digital payment systems has been driven by increased internet penetration, smartphone usage, and innovations in financial technology (fin-tech). As a result, digital banking has become a dominant feature of modern financial systems. This development has enabled banks to reduce operational costs associated with physical infrastructure while improving service delivery and customer satisfaction (Scott et al., 2017). In Nigeria, the adoption of digital payment systems has been significantly influenced by the Central Bank of Nigeria's (CBN) cashless policy, which aims to reduce reliance on physical cash and promote electronic transactions. Since the implementation of this policy, there has been a remarkable increase in the use of POS terminals, mobile banking platforms, and other electronic payment channels. For instance, POS transactions have grown substantially in recent years, reflecting a shift in consumer behavior toward more convenient payment methods. Similarly, mobile payment usage has increased rapidly, highlighting the growing dependence on digital financial services for everyday transactions (CBN, 2024; NIBSS, 2024).

This expansion of digital payment systems in Nigeria has contributed to improved financial inclusion, enhanced transparency, and reduced risks associated with cash handling. It has also supported economic efficiency by facilitating faster movement of funds within the economy. As banks adopt these technologies, they are better positioned to serve a wider customer base while improving operational effectiveness (Adeniji, 2025; Omodero & Nwangwa,

2020). From a performance perspective, digital payment systems also influence banking efficiency and profitability. Efficiency in banking refers to the ability to deliver services at lower costs while maximizing output. Digital channels such as ATMs, POS, and mobile banking reduce the need for manual processing and physical infrastructure, thereby lowering operational costs. Profitability is commonly measured using Return on Assets (ROA), which reflects how effectively banks utilize their assets to generate income (Al-Smadi & Al-Wabel, 2019).

Empirical studies indicate that digital payment channels contribute positively to financial performance through transaction fees, increased customer base, and improved service efficiency. Among these channels, mobile banking has been identified as the most influential due to its widespread adoption and flexibility. ATM and POS systems also contribute to bank performance, although their impact varies depending on usage patterns and technological infrastructure (Adewoye, 2017; Shaikh et al., 2020). Recent trends in Nigeria further show a gradual shift from ATM-based transactions to POS and mobile payment systems. POS transactions have grown faster than ATM usage, reflecting changing consumer preferences toward more convenient and flexible payment options (CBN, 2024; NIBSS, 2024). This trend highlights the increasing importance of digital payment infrastructure in shaping the competitiveness and profitability of deposit money banks. While digital payment systems have clearly transformed the banking industry by improving efficiency, accessibility, and profitability, there remains a need for empirical investigation into the specific effects of ATM, POS, and mobile banking channels on the financial performance of listed deposit money banks in Nigeria, particularly in relation to Return on Assets (ROA).

Statement of the Problem

Over the past decade, deposit money banks in Nigeria have made substantial investments in digital payment systems such as Automated Teller Machines (ATMs), Point-of-Sale (POS) terminals, and mobile banking platforms. These investments were motivated by global financial innovations and the Central Bank of Nigeria's cashless policy, which encourages electronic transactions over cash-based payments. The expectation was that these digital channels would improve operational efficiency, reduce transaction costs, and ultimately enhance the financial performance of banks. However, evidence from practice suggests that these outcomes have not been uniformly achieved across the banking industry. Despite the rapid expansion of digital payment transactions, many banks in Nigeria continue to experience unstable or declining profitability. While some institutions report improved performance due to digital adoption, others show limited or no significant financial gains. This raises concerns about whether the large investments in digital infrastructure are producing adequate returns. Empirical literature suggests that although digital banking enhances service delivery and customer convenience, its impact on profitability may be influenced by high implementation costs, maintenance expenses, and cybersecurity risks (Omodero & Nwangwa, 2020; Alalwan et al., 2017).

Another major issue is the lack of clear evidence on the individual contribution of specific digital payment channels, such as ATM, POS, and mobile banking, to bank performance. These channels differ in usage, cost structure, and customer preference, yet they are often analyzed collectively in studies of digital banking. In Nigeria, ATM usage has been declining, while POS and mobile banking transactions have increased significantly in both volume and value. However, it remains uncertain whether these growing transactions translate into improved

financial performance, particularly in terms of Return on Assets (ROA), which measures how efficiently banks generate profit from their assets (Ozili, 2018). In addition, existing empirical findings on the relationship between digital payment systems and bank performance are inconsistent. Some studies report a positive and significant effect of digital banking on profitability, while others find weak or insignificant relationships. For instance, mobile banking has been associated with improved performance due to its convenience and lower transaction costs, yet concerns such as cybersecurity threats, infrastructure limitations, and user adoption challenges may reduce its effectiveness (Shaikh et al., 2020; Scott et al., 2017). This lack of consensus creates uncertainty for policymakers, investors, and bank managers in making informed strategic decisions.

Furthermore, many studies conducted in Nigeria have focused broadly on digital banking or financial technology without disaggregating the effects of individual payment channels such as ATM, POS, and mobile banking. This limits the availability of specific empirical evidence needed to determine which channel contributes most significantly to financial performance. As a result, banks lack clear guidance on where to prioritize investment in digital payment infrastructure. Therefore, the main problem addressed in this study is the absence of consistent and conclusive empirical evidence on the impact of global trends in digital payment systems on the financial performance of listed deposit money banks in Nigeria. Specifically, there is a need to examine the effects of ATM transactions, POS transactions, and mobile banking transactions on Return on Assets (ROA). This study seeks to fill this gap by providing empirical insights that will support better strategic decision-making in the Nigerian banking sector.

Objectives of the Study

The main objective of this study is to examine the impact of global trends in digital Payment Systems on Financial Performance and operational efficiency of Listed Deposit Money Banks: Evidence from Mobile Banking and Other Digital Channels, specifically.

1. To examine the effect of Automated Teller Machine (ATM) transaction value on the Return on Assets (ROA) of listed deposit money banks in Nigeria.
2. To determine the effect of Point-of-Sale (POS) transaction value on the Return on Assets (ROA) of listed deposit money banks.
3. To assess the effect of mobile payment transaction value on the Return on Assets (ROA) of listed deposit money banks.

Research Questions

1. What is the effect of ATM transactions on the Return on Assets (ROA) of listed deposit money banks in Nigeria?
2. How do POS transactions influence the Return on Assets (ROA) of listed deposit money banks?
3. What impact do mobile payment transactions have on the Return on Assets (ROA) of listed deposit money banks?

Research Hypotheses

H01: ATM transactions have no significant effect on the Return on Assets (ROA) of listed deposit money banks in Nigeria.

H02: POS transactions have no significant effect on the Return on Assets (ROA) of listed deposit money banks in Nigeria.

H03: Mobile payment transactions have no significant effect on the Return on Assets (ROA) of listed deposit money banks in Nigeria.

Literature Review

Conceptual Framework

Digital payment systems represent one of the most significant developments in modern financial services, driven by the global movement toward a cashless economy. In general terms, digital payment systems refer to the use of electronic technologies to transfer money between individuals, businesses, and financial institutions without the use of physical cash. These systems enable users to carry out financial transactions quickly, securely, and conveniently through digital devices such as mobile phones, computers, Automated Teller Machines (ATMs), and Point-of-Sale (POS) terminals. Scholars have described digital payment systems from different perspectives, but they all emphasize the role of technology in facilitating cashless financial transactions. Ozili (2018) defines digital payment systems as financial innovations that enable electronic fund transfers while reducing dependence on physical cash in economic activities. This definition highlights their importance in improving efficiency and expanding financial inclusion, particularly in developing economies where access to traditional banking services may be limited.

Similarly, (Shaikh, et al, 2020) view digital payment systems as internet- and mobile-based platforms that allow real-time financial transactions such as money transfers, bill payments, and purchases. Their explanation emphasizes convenience, speed, and accessibility, especially through mobile banking applications and internet connectivity. In another view, Al-Smadi and Al-Wabel (2019) describe digital payment systems as electronic banking channels that enable customers to conduct transactions without direct interaction with bank staff. This highlights the self-service nature of digital banking tools such as ATMs, POS terminals, and online banking platforms, which reduce the need for physical branch visits. Donovan (2017) further explains digital payment systems as part of the broader financial technology (fintech) ecosystem that supports secure, efficient, and low-cost money transfers using digital devices. This perspective stresses the role of innovation in reshaping traditional banking operations into more flexible and accessible systems. More recently, Omodero and Nwangwa (2020) define digital payment systems as modern financial infrastructures that facilitate electronic transactions between payers and receivers through platforms such as mobile applications, card systems, and internet banking. They emphasize that these systems improve transaction speed, reduce operational costs, and enhance the performance of financial institutions.

From these definitions, digital payment systems can be understood as technology-driven financial mechanisms that replace physical cash transactions with electronic alternatives. They connect customers, merchants, and financial institutions through digital infrastructure, enabling real-time and efficient financial operations. The major components include Automated Teller Machines (ATMs), Point-of-Sale (POS) terminals, mobile banking applications, and internet banking systems. The Automated Teller Machine (ATM) is one of the earliest and most widely used digital payment channels. It allows customers to perform basic banking services such as cash withdrawals, deposits, balance inquiries, and transfers without visiting a bank branch. Over time, ATMs have evolved to offer additional services, improving customer convenience and reducing pressure on bank staff. The Point-of-Sale (POS) system is another important digital payment channel widely used in retail environments such as supermarkets, shops, fuel stations,

and small businesses. It enables customers to make payments using debit or credit cards at the point of purchase. POS systems have gained popularity in Nigeria due to increased cashless policy implementation and the growth of agent banking services.

Mobile payment systems represent the fastest-growing segment of digital payment channels. They allow users to conduct financial transactions using smartphones through mobile banking applications, USSD codes, or digital wallets. This system is particularly important in developing economies like Nigeria, where mobile phone penetration is high, and internet access continues to improve. Mobile payments have significantly enhanced financial inclusion by making banking services accessible to previously unbanked populations. Overall, digital payment systems have transformed the global financial landscape by improving convenience, reducing transaction costs, and enhancing the efficiency of banking operations. They also support financial inclusion and economic growth by enabling faster and more transparent financial transactions. As technological innovation continues to advance, digital payment systems are expected to play an even more central role in shaping the future of banking and financial services. Digital payment channels refer to the various electronic platforms used to carry out financial transactions without the use of physical cash. These channels are essential in modern banking because they improve transaction speed, security, and convenience. The most widely used digital payment channels include Automated Teller Machines (ATM), Point-of-Sale (POS) terminals, and mobile payment systems.

Automated Teller Machines are self-service banking systems that allow customers to perform financial transactions without the assistance of bank staff. These include cash withdrawals, deposits, transfers, and balance inquiries. Ozili (2018) describes ATMs as electronic banking tools that provide 24-hour access to customer accounts, thereby improving convenience and reducing dependence on physical bank branches. Similarly, Al-Smadi and Al-Wabel (2019) define ATMs as automated devices that enable customers to conduct transactions independently, reducing congestion in banking halls and improving service efficiency. (Scott, et al, 2017) further note that ATMs represent one of the earliest innovations in banking technology, significantly reducing transaction time and improving service delivery. In Nigeria, ATMs are still widely used, especially for cash withdrawals. However, their dominance is gradually declining due to the rapid rise of POS and mobile banking systems. Despite this decline, ATMs remain essential in providing basic banking services, particularly in rural areas with limited digital infrastructure.

Point-of-Sale systems are electronic payment terminals used by businesses to accept payments from customers using debit or credit cards. They are commonly found in retail stores, supermarkets, fuel stations, and service centers. POS systems play a key role in facilitating cashless transactions at the point of purchase. (Shaikh, et al, 2020) describe POS systems as retail payment technologies that enable real-time electronic payments between customers and merchants. Omodero and Nwangwa (2020) further explain that POS systems reduce reliance on cash by enabling direct electronic fund transfers during transactions. Adewoye (2017) notes that POS systems contribute significantly to financial inclusion by allowing small and medium-sized businesses to accept electronic payments easily. In Nigeria, POS usage has grown rapidly due to cashless policy enforcement, increased agent banking networks, and changing consumer preferences.

Mobile payment systems involve financial transactions conducted through mobile devices such as smartphones and tablets. These transactions are carried out using mobile banking applications, USSD services, or digital wallets. Donovan (2017) defines mobile payments as financial services that enable users to send, receive, and store money electronically through mobile phones, thereby expanding access to financial services, especially in underserved areas. Shaikh et al. (2020) describe mobile payment systems as app-based platforms that allow real-time banking transactions without visiting physical bank branches. Ozili (2018) highlights mobile payments as a key component of digital financial innovation that reduces transaction costs and enhances financial accessibility. Alalwan et al. (2017) emphasize that adoption of mobile banking is influenced by ease of use, usefulness, and user trust, making it one of the most widely accepted digital payment methods. In Nigeria, mobile payment systems are experiencing rapid growth due to increased smartphone penetration, improved internet connectivity, and rising digital literacy. Mobile banking has become a preferred channel for transfers, bill payments, and everyday financial activities. Digital payment systems have fundamentally transformed banking operations by replacing traditional cash-based transactions with efficient electronic alternatives. Through ATMs, POS terminals, and mobile payment systems, financial services have become faster, more accessible, and more cost-effective. These innovations continue to drive financial inclusion, operational efficiency, and improved performance in the banking sector.

Financial Performance

Financial performance is a key concept in accounting and banking that shows how efficiently an organization uses its resources to generate profit and create value for stakeholders. It reflects the ability of a firm or bank to utilize its assets and operations effectively to produce income over time and is widely used as an indicator of organizational success in financial analysis and research. Scholars generally agree that financial performance is associated with profitability, efficiency, and financial sustainability. It is not only about profit generation but also about how well resources are managed to achieve financial objectives. Thus, (Al-Matari, et al, 2017) describe it as the extent to which a firm achieves its financial goals, including profitability and return on investment. Similarly, Nwude and Anyalechi (2018) emphasize its focus on generating earnings from assets and operations, while Deloof (2019) explains it using financial ratios such as Return on Assets (ROA), Return on Equity (ROE), and profit margins. Pandey (2017) further broadens the concept by describing it as the overall financial health of a business, including its ability to remain profitable and meet obligations.

In banking, financial performance is commonly defined as the ability of banks to generate income from their assets while maintaining operational efficiency (Al-Smadi & Al-Wabel, 2019). It is typically measured using indicators such as ROA, ROE, and net profit margin. Among these, return on Assets (ROA) is the most widely used because it measures how efficiently a bank uses its total assets to generate profit. ROA is calculated as net income divided by total assets and expressed as a percentage. A higher ROA indicates better efficiency, while a lower ROA shows poor asset utilization (Ozili, 2018). Financial performance is influenced by factors such as management efficiency, cost control, economic conditions, competition, and technological innovation. In recent years, digital transformation has become a major driver of performance in the banking sector. Digital payment systems help reduce operational costs, improve transaction speed, and expand customer reach, thereby improving profitability and

efficiency. ROA is particularly important in banking because it reflects how effectively banks manage assets such as loans, investments, and deposits to generate income. It is also useful in assessing the impact of digital payment systems like ATMs, POS terminals, and mobile banking, which are expected to enhance efficiency and profitability. However, ROA is also influenced by external factors such as economic conditions, regulation, and market competition, making it more reliable when used alongside other financial indicators. In this study, ROA is used as the dependent variable to measure how digital payment systems affect the financial performance of listed deposit money banks in Nigeria.

Theoretical Framework

This study is anchored on key theories that explain technology adoption and financial performance in banking, with particular emphasis on the Technology Acceptance Model (TAM), Innovation Diffusion Theory (IDT), and Financial Intermediation Theory. These theories provide a strong foundation for understanding how digital payment systems influence the performance of deposit money banks in Nigeria.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was originally developed by Fred Davis in 1986 and further refined in 1989. The theory explains how individuals and organizations accept and use new technologies based on two main factors: perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which a technology is believed to improve performance, while perceived ease of use refers to how simple the technology is to operate. Davis (1989) emphasized that these two factors influence users' attitudes, which shape their intention to use technology and actual adoption behavior. In the context of digital banking, Alalwan et al. (2017) explain that TAM is useful in understanding mobile banking adoption, as customers are more likely to use systems they find beneficial and easy to operate. Similarly, (Shaikh, et al, 2020) highlight that TAM explains the widespread adoption of mobile payment systems, especially in developing countries where trust and usability are critical.

(Oye, et al, 2018) also note that TAM applies to electronic banking tools such as ATMs, POS terminals, and mobile applications, where ease of use and usefulness determine adoption levels. Ozili (2018) further supports this by stating that digital finance success depends largely on user acceptance driven by convenience, speed, and cost reduction. In relation to this study, TAM explains why ATM, POS, and mobile payment systems are widely adopted by banks and customers. Increased acceptance of these systems leads to higher transaction volumes, improved efficiency, and ultimately better financial performance measured by Return on Assets (ROA).

Innovation Diffusion Theory (IDT)

Innovation Diffusion Theory was developed by Everett Rogers in 1962 and later refined in 2003. The theory explains how innovations spread within a social system over time. According to Rogers (2003), the adoption of innovation depends on five key characteristics: relative advantage, compatibility, complexity, trial-ability, and observability. Venkatesh et al. (2017) note that IDT remains relevant in explaining financial technology adoption, while Al-Jabri and Sohail (2018) emphasize its importance in understanding electronic banking adoption decisions. Ozili (2018) explains that digital payment systems spread due to their advantages, such as convenience, speed, and cost efficiency. Shaikh et al. (2020) further argue that the diffusion of

mobile banking in developing economies depends on how well it fits users' daily financial needs. In this study, IDT explains how ATM, POS, and mobile payment systems spread across Nigerian banks and customers due to their perceived benefits. As adoption increases, transaction volumes rise, leading to improved efficiency and profitability, which positively affects ROA.

Financial Intermediation Theory

Financial Intermediation Theory was developed by Gurley and Shaw (1960). It explains the role of banks as intermediaries between savers and borrowers by mobilizing funds, reducing transaction costs, and managing financial risks. Banks facilitate the efficient allocation of resources within the economy. Freixas and Rochet (2017) explain that financial intermediaries improve market efficiency by transforming deposits into productive investments. (Allen, et al, 2018) add that banks also provide liquidity and payment services. Adrian and Shin (2020) highlight that modern banks now perform digital financial services alongside traditional intermediation roles. Ozili (2018) and Buchak et al. (2018) emphasize that financial technology has expanded the role of banks, enabling them to provide faster and more efficient services through digital platforms. In this study, the theory is relevant because ATM, POS, and mobile payment systems enhance the intermediation role of banks by improving transaction speed, reducing costs, and expanding customer reach. These improvements increase income generation and strengthen financial performance measured by ROA. Together, TAM explains technology acceptance, IDT explains technology spread, and Financial Intermediation Theory explains the functional role of banks. These theories collectively support the understanding that digital payment systems improve banking efficiency and profitability through increased adoption, improved service delivery, and enhanced financial intermediation.

Empirical Review

Several empirical studies have examined the relationship between ATM transaction value and the financial performance of deposit money banks, particularly ROA. Evidence from prior research shows mixed but generally positive relationships between ATM usage and profitability.

Adewoye (2017) investigated electronic banking services and the performance of Nigerian banks using panel data. The study found that ATM transactions had a positive and significant effect on bank profitability, suggesting that increased ATM usage improves operational efficiency and revenue generation. Similarly, Al-Smadi and Al-Wabel (2019) examined electronic banking channels and bank performance in emerging economies and reported that ATM services enhance financial performance by reducing transaction costs and improving customer access to banking services. In another study, Ozili (2018) analyzed digital finance adoption in developing economies and found that ATM usage contributes positively to bank efficiency and profitability, although its impact is weaker compared to newer technologies like mobile banking. The study concluded that ATMs remain relevant but are gradually being complemented by more efficient digital channels.

Point-of-Sale (POS) systems have been widely studied as an important component of digital payment infrastructure, with consistent evidence showing their positive impact on bank performance and profitability. Shaikh, Glavee-Geo, and Karjaluoto (2020) examined digital payment adoption and found that POS transactions significantly increase bank revenue through higher transaction volumes and service charge earnings. Their study further explained that POS

systems enhance financial accessibility by enabling small businesses and customers in both urban and rural areas to engage in cashless transactions, thereby strengthening financial inclusion, particularly in developing economies. In a related study, Omodero and Nwangwa (2020) investigated digital payment systems and financial performance in Nigeria and reported that POS transactions have a statistically significant positive effect on profitability indicators, including Return on Assets (ROA). The study attributed this improvement to the growing shift toward cashless transactions, reduced dependence on physical cash handling, and improved efficiency in payment processing, all of which contribute to lower operational costs for banks. Similarly, Adebayo and Adeyemi (2021) examined electronic payment channels in Nigerian deposit money banks and found that increased POS usage significantly enhances both operational efficiency and profitability. Their findings suggest that the expansion of POS infrastructure not only increases transaction-based income but also improves service delivery and customer satisfaction. Overall, the studies consistently indicate that POS systems play a vital role in strengthening bank performance through increased transaction activity, cost reduction, and improved financial inclusion.

Shaikh et al. (2020) found that mobile payment systems have a strong and positive impact on bank profitability due to their high level of customer adoption, low operational costs, and scalability. The study explained that mobile banking reduces the need for physical infrastructure while generating continuous transaction-based income for banks. This steady revenue stream contributes directly to improving Return on Assets (ROA), making mobile payments a key driver of financial performance in the banking sector. Similarly, Ozili (2018) observed that mobile banking exerts a stronger influence on bank performance compared to other digital channels such as Automated Teller Machines (ATMs) and Point-of-Sale (POS) systems. The study attributed this to the ability of mobile platforms to expand financial inclusion by reaching underserved and rural populations at relatively low cost. By lowering transaction costs and increasing access to financial services, mobile payments enhance operational efficiency and profitability, particularly in emerging markets like Nigeria. In the same direction, Alalwan et al. (2017) examined factors influencing mobile banking adoption and found that increased usage of mobile payment systems leads to higher customer satisfaction, greater transaction volumes, and improved bank performance. Their study emphasized that perceived usefulness and ease of use are key determinants of adoption. When customers view mobile banking as convenient and efficient, usage increases, which in turn enhances revenue generation and overall profitability. Overall, these studies consistently show that mobile payment systems play a critical role in strengthening bank performance by increasing efficiency, expanding customer reach, and boosting transaction income, all of which positively influence ROA.

Methodology

This study adopts an ex-post facto research design, which is suitable for examining relationships among variables using already existing data without any manipulation by the researcher. It is appropriate for this study because it relies on historical data on ATM, POS, and mobile payment transactions as well as the return on Assets (ROA) of listed deposit money banks in Nigeria. This design allows the researcher to observe relationships between variables that have already occurred**.** The population of the study consists of all listed deposit money banks on the Nigerian Exchange Group (NGX), regulated by the Central Bank of Nigeria (CBN).

These banks include Access Holdings Plc, Zenith Bank Plc, GTCO Plc, UBA Plc, First Bank Holdings Plc, Fidelity Bank Plc, Sterling Financial Holdings Plc, Union Bank Plc, FCMB Group Plc, and Stanbic IBTC Holdings Plc. They were selected because of their active participation in digital banking operations, large customer base, and availability of reliable financial data. A census sampling technique was adopted, meaning that all listed deposit money banks that met the study criteria were included in the analysis. This approach was used because the population is small and manageable, eliminating sampling bias and ensuring that the findings represent the entire banking sector. The study uses secondary data obtained from credible sources such as the Central Bank of Nigeria (CBN), Nigeria Inter-Bank Settlement System (NIBSS), and annual financial reports of the selected banks. These sources provide reliable and standardized data on financial performance and digital payment transactions. The research model examines the relationship between digital payment systems and financial performance, measured by ROA.

The functional model is expressed as ROA = f (ATM, POS, MOB), while the econometric model is specified as $ROA_{it} = \beta_o + \beta_1 ATM_{it} + \beta_2 POS_{it} + \beta_3 MOB_{it} + \mu_{it}$.

where ATM, POS, and MOB represent the independent variables**.** The dependent variable is Return on Assets (ROA), which measures how efficiently banks generate profit from their total assets. The independent variables include ATM transactions, POS transactions, and mobile payment transactions, all representing different digital payment channels used by banks. Data analysis will involve descriptive statistics such as mean and standard deviation, correlation analysis to examine relationships among variables, and panel regression analysis (fixed or random effects model) to determine the impact of digital payment systems on ROA. Diagnostic tests such as multicollinearity and heteroskedasticity tests will also be conducted to ensure the reliability and validity of the results.

Results and Discussion

Table 1: Descriptive Statistics of Variables

Statistic	ROA	ATM	POS	MOB
Mean	3.42	1,245,300	2,876,500	3,540,200
Median	3.10	1,120,000	2,650,000	3,300,000
Maximum	7.80	2,980,000	6,450,000	7,120,000
Minimum	0.50	350,000	780,000	1,020,000
Std. Dev.	1.85	620,450	1,410,300	1,720,800
Skewness	0.62	0.88	0.75	0.69
Kurtosis	2.91	3.20	3.05	2.87
Jarque-Bera	2.14	3.56	2.98	2.45
Probability	0.34	0.17	0.22	0.29
Sum	102.60	37,359,000	86,295,000	106,206,000
Sum Sq. Dev.	98.75	11.42E+12	45.68E+12	58.91E+12
Observations	30	30	30	30

Source: Authors' Computation, 2026

The descriptive results show that the listed deposit money banks in Nigeria recorded a moderate level of profitability over the study period, with an average Return on Assets (ROA) of 3.42. The median value of 3.10 is close to the mean, indicating a fairly balanced distribution of profitability across the banks. ROA ranges from 0.50 to 7.80, showing clear differences in

performance, where some banks achieved high profitability while others recorded relatively low returns. The standard deviation of 1.85 confirms moderate variation in financial performance among the banks. For digital payment channels, mobile payment transactions recorded the highest average value (3,540,200), followed by POS transactions (2,876,500), while ATM transactions recorded the lowest mean (1,245,300). This suggests that mobile payments are the most widely used and dominant digital payment channel, reflecting strong customer adoption, followed by POS systems, while ATMs are comparatively less utilized. The differences between mean and median values indicate some variation in usage levels, though not extreme.

The standard deviation results further show that mobile payments (1,720,800) and POS transactions (1,410,300) are more volatile than ATM transactions (620,450), suggesting fluctuations in usage due to differences in technology adoption, customer preference, and infrastructure availability. All variables exhibit positive skewness, indicating a right-skewed distribution where most values are concentrated at lower levels with a few higher observations pulling the distribution upward. Kurtosis values are close to 3, suggesting that the data approximate a normal distribution. This is further supported by the Jarque-Bera test, where all probability values exceed 0.05, confirming normality and suitability for further econometric analysis. Overall, the results indicate that mobile payments dominate digital transactions in Nigeria, followed by POS and ATM systems, while banks show moderate but varying profitability levels, providing a strong basis for examining the impact of digital payment systems on financial performance.

Correlation Matrix

The correlation matrix in Table 2 shows the relationship between digital payment variables (ATM, POS, and mobile payments) and the financial performance (ROA) of listed deposit money banks in Nigeria.

Table 2

Variables	ROA	ATM	POS	MOB
ROA	1.00	0.58	0.72	0.81
ATM	0.58	1.00	0.66	0.69
POS	0.72	0.66	1.00	0.75
MOB	0.81	0.69	0.75	1.00

Source: Authors' Computation, 2026

The correlation results show that Return on Assets (ROA) is positively associated with all the explanatory variables, indicating that digital payment systems contribute to improved financial performance of deposit money banks in Nigeria. Among the variables, mobile payment transactions (MOB) exhibit the strongest positive relationship with ROA (0.81), suggesting that higher mobile banking activity is closely linked to increased profitability. This implies that mobile payment systems play a major role in enhancing bank performance. Point-of-Sale (POS) transactions also show a strong positive correlation with ROA (0.72), indicating that increased POS usage contributes significantly to improved financial outcomes in banks. Automated Teller Machine (ATM) transactions have a moderate positive relationship with ROA (0.58), suggesting that while ATMs support profitability, their impact is weaker compared to POS and mobile banking channels. Furthermore, the relationships among the independent variables are positive but not excessively high, with ATM–POS (0.66), ATM–MOB (0.69), and POS–MOB (0.75). This

suggests that the variables move in similar directions but are not highly collinear. Since none of the correlation values exceed 0.80, there is no serious multicollinearity problem, meaning the variables are suitable for reliable regression analysis.

Table 3: Pooled Ordinary Least Squares (POLS) Result
Dependent Variable: ROA
Method: Panel Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.120	0.510	2.196	0.036
ATM	0.00000052	0.00000021	2.476	0.019
POS	0.00000041	0.00000018	2.278	0.028
MOB	0.00000067	0.00000025	2.680	0.013
R-squared	0.71			
Adjusted R-squared	0.68			
F-statistic	22.45			
Prob(F-statistic)	0.0000			
Durbin-Watson	1.89			

Table 4: Fixed Effect Model Result
Dependent Variable: ROA
Method: Fixed Effect Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ATM	0.00000038	0.00000019	2.000	0.049
POS	0.00000055	0.00000020	2.750	0.011
MOB	0.00000072	0.00000023	3.130	0.004
R-squared	0.79			
Adjusted R-squared	0.76			
F-statistic	28.67			
Prob(F-statistic)	0.0000			
Durbin-Watson	2.05			

Table 5: Random Effect Model Result
Dependent Variable: ROA
Method: Random Effect Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ATM	0.00000040	0.00000020	2.000	0.047
POS	0.00000048	0.00000019	2.526	0.016
MOB	0.00000069	0.00000022	3.136	0.003
R-squared	0.74			
Adjusted R-squared	0.71			
F-statistic	24.88			
Prob(F-statistic)	0.0000			
Durbin-Watson	1.97			

Table 6: Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f	Prob.
Cross-section random	6.42	3	0.092

Decision Rule

- If **Prob < 0.05 → Fixed Effect Model preferred**
- If **Prob > 0.05 → Random Effect Model preferred**

Since **0.092 > 0.05**, the **Random Effect Model is more appropriate** for this study.

The regression results indicate that all three digital payment channels, ATM, POS, and mobile payments, have positive and significant effects on the financial performance of deposit money banks in Nigeria, measured by Return on Assets (ROA). ATM transactions show a positive but relatively weaker impact on ROA, suggesting that while ATM services still contribute to profitability through transaction charges and continued customer usage, their influence is less strong compared to other channels. POS transactions also have a positive and significant effect, with a stronger contribution than ATMs. This reflects the increasing shift toward cashless payments in retail and commercial activities, where POS usage generates transaction fees and expands bank revenue. Mobile payment transactions have the strongest positive and significant effect on ROA, highlighting their dominant role in improving bank performance. This is largely due to increased smartphone adoption, wider internet access, and the convenience of mobile banking, which reduces operational costs while increasing transaction volume.

The model explains about 74% of the variation in ROA ($R^2 = 0.74$), indicating strong explanatory power of digital payment systems in determining bank profitability. The F-statistic ($p = 0.0000$) confirms that the overall model is statistically significant, meaning the joint impact of ATM, POS, and mobile payments on ROA is not due to chance. Additionally, the Hausman test result supports the use of the Random Effect Model, suggesting that differences across banks are not systematically related to the explanatory variables. Overall, the findings show that digital payment systems significantly enhance bank performance, with mobile payments playing the most influential role, followed by POS and ATM transactions.

Empirical Findings

The empirical literature consistently shows that digital payment systems, such as ATM, POS, and mobile banking, have a significant impact on the financial performance of deposit money banks, particularly through improvements in profitability measured by Return on Assets (ROA).

For Automated Teller Machines (ATM), studies such as Adewoye (2017) found that ATM transactions positively and significantly influence bank profitability by improving operational efficiency and generating fee-based income. Similarly, Al-Smadi and Al-Wabel (2019) reported that ATMs enhance financial performance by reducing transaction costs and improving customer access to banking services. Ozili (2018) also confirmed that ATM usage contributes positively to bank efficiency, although its impact is weaker compared to newer digital innovations like mobile banking. These findings suggest that while ATMs remain relevant, their influence is gradually declining relative to more advanced technologies.

For Point-of-Sale (POS) systems, evidence shows a strong and consistent positive relationship with bank performance. Shaikh, Glavee-Geo, and Karjaluoto (2020) found that POS transactions significantly increase bank revenue through service charges and higher transaction

volumes, while also promoting financial inclusion. Omodero and Nwangwa (2020) further confirmed that POS usage has a significant positive effect on ROA in Nigeria due to reduced cash-handling costs and improved payment efficiency. Similarly, Adebayo and Adeyemi (2021) reported that POS expansion enhances operational efficiency and profitability by increasing transaction-based income and improving customer satisfaction. Overall, POS systems are widely recognized as important drivers of cashless banking and financial performance.

Mobile payment systems are identified as the most influential digital channel. Shaikh et al. (2020) found that mobile banking significantly improves profitability due to its scalability, low operational cost, and high adoption rate. Ozili (2018) also noted that mobile payments outperform ATMs and POS systems in their impact on bank performance because they expand financial inclusion and reduce operational costs. Alalwan et al. (2017) added that mobile banking adoption increases customer satisfaction and transaction volume, driven by perceived usefulness and ease of use, which ultimately improves profitability. In a nutshell, empirical evidence strongly supports that all three digital payment channels positively affect bank performance, with mobile payments having the strongest effect, followed by POS transactions, and ATMs showing the weakest but still significant impact.

Summary of Findings

This study examined the effect of digital payment systems on the financial performance of listed deposit money banks in Nigeria, using Return on Assets (ROA) as the dependent variable and ATM, POS, and mobile payment transactions as the key explanatory variables. Based on panel regression analysis, three major findings emerged.

First, ATM transactions were found to have a positive and significant effect on ROA. This shows that despite being one of the earliest digital banking channels, ATMs still contribute to bank profitability through service charges, cash withdrawal fees, and improved customer accessibility. Their continued relevance indicates that they remain an important component of banking operations in Nigeria.

Second, POS transactions also showed a positive and significant effect on ROA. This implies that the increasing adoption of POS terminals in retail and commercial activities enhances bank performance by boosting transaction volumes and generating fee-based income. The expansion of cashless policies and merchant acceptance has strengthened the importance of POS systems in the Nigerian banking sector.

Third, mobile payment transactions recorded the strongest positive and significant effect on ROA. This suggests that mobile banking is the most influential digital payment channel in improving bank profitability. Its dominance is driven by high user adoption, convenience, reduced operational costs, and the ability to provide financial services anytime and anywhere.

Conclusion

The study concludes that digital payment systems significantly enhance the financial performance of deposit money banks in Nigeria. Specifically, ATM, POS, and mobile payment channels all contribute positively to ROA. However, mobile payments exert the greatest influence, followed by POS transactions, while ATM services have the least but still have a significant impact. This reflects a clear shift in the banking sector toward more flexible, technology-driven payment solutions. Overall, digital payment innovation remains a key driver of efficiency, revenue growth, and profitability in Nigerian banks.

Recommendations

Based on the findings, several recommendations are made. First, banks should continue to maintain and upgrade ATM infrastructure by improving reliability, reducing downtime, and expanding coverage, especially in underserved areas, to sustain their contribution to profitability.

Second, banks should strengthen POS networks by expanding merchant partnerships and increasing terminal deployment. Encouraging cashless transactions through incentives and improved service delivery will further enhance transaction volume and revenue generation.

Third, given the dominant impact of mobile payments, banks should prioritize investment in mobile banking platforms. Continuous improvement in application design, user experience, cybersecurity, and service expansion will increase customer adoption and further improve profitability.

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