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Digital Banking and the Performance of Deposit Money Banks in Nigeria

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Abstract
The study examined the impact of digital banking on the financial performance of deposit money banks in Nigeria from 2013 to 2023. The study anchored on Technology Acceptance Model (TAM), which explains users' acceptance of technology, the independence variable were proxied at Automated Teller Machines (ATM), Point of Sale (POS) systems, and mobile banking to bank financial performance ROA, the research Employed an ex-post facto design to analyze the relationship between digital banking and financial performance using Historical data. Using multiple regression analysis, the research quantified the influence of each digital banking channel on profitability, as measured by Return on Assets (ROA). Findings indicate that mobile banking exerts the strongest positive influence on profitability, followed by ATM transactions, while POS transactions show a modest positive impact. Collectively, digital banking activities account for 81% of the variation in profitability. Based on these findings, the study recommended that banks should expand mobile banking services, optimize ATM placement, and adopt a strategic approach to POS investments to maximize profitability. Furthermore, strengthening digital risk management is essential to sustain customer trust and long-term financial gains.

Keywords: Digital banking**,** financial performance, Technology Acceptance Model (TAM), Automated Teller Machines (ATM), Point of Sale (POS) systems, and mobile banking.

Introduction

In recent years, the landscape of banking in Nigeria has experienced a paradigm shift, primarily driven by the rapid adoption of digital banking technologies. Digital banking encompasses a broad array of services that enable consumers to conduct financial transactions electronically, thereby enhancing convenience and accessibility (Dada et al., 2021). The rise of digital banking has been spurred by advancements in information and communication technology (ICT), which had not only transformed customer expectations but have also fundamentally altered the operational dynamics of financial institutions (Olokoyo, 2020).

The Central Bank of Nigeria (CBN) has played a pivotal role in promoting digital banking as a means of enhancing financial inclusion and driving economic growth. Initiatives such as the Cashless Policy, launched in 2012, have encouraged banks to invest in various digital platforms, including Automated Teller Machines (ATMs), Point of Sale (POS) systems, mobile banking applications, and electronic payment systems like Remita (CBN, 2022). This strategic direction aims to reduce the dependence on cash transactions and streamline banking processes, making it easier for customers to access financial services (Adeniyi et al., 2020).

Automated Teller Machines (ATMs) have become ubiquitous in urban and rural areas alike, offering customers the ability to withdraw cash, check balances, and perform other transactions without the need for bank tellers. According to Oladapo and Ojo (2023), the expansion of ATM networks has significantly reduced transaction costs and improved customer convenience, leading to increased customer satisfaction and loyalty. However, while the operational efficiency of ATMs is well-documented, their direct contribution to the profitability of banks remains underexplored.

Similarly, the deployment of Point of Sale (POS) systems has revolutionized retail banking in Nigeria, facilitating seamless in-store transactions and enabling merchants to accept payments electronically. The rise of POS transactions has been linked to a decrease in cash-based transactions, promoting a more efficient payment ecosystem (Adeyemi&Olagunju, 2021). Nevertheless, the impact of POS systems on the profitability of deposit money banks, especially in terms of revenue generation and cost reduction, is not yet fully understood.

Mobile banking has emerged as another critical component of Nigeria's digital banking landscape, allowing customers to execute financial transactions through their mobile devices. The accessibility of mobile banking services has been particularly beneficial in a country with a growing number of smartphone users. A study by Ogunleye (2022) highlights that mobile banking enhances customer engagement and retention by offering personalized services. Despite its growing importance, the specific impact of mobile banking on the profitability of banks requires further empirical investigation. However, the extent to which such platforms influence bank’s profitability remains a topic of limited scholarly attention.

Despite the significant strides made in adopting digital banking, there exists a

notable research gap regarding the specific impacts of various digital banking channels on the profitability of deposit money banks in Nigeria. Previous literature has primarily focused on the operational benefits and customer satisfaction associated with digital banking, with little emphasis on quantifying its effects on banks' profitability metrics such as return on assets (ROA) and net interest margins (Dada et al., 2021; Olokoyo, 2020). This study seeks to bridge this gap by systematically examining the relationship between digital banking and profitability from 2013 to 2023, thereby contributing to a more nuanced understanding of how digital banking services can drive financial performance in the Nigerian banking sector.

Statement of Research Problem

The rapid evolution of digital banking in Nigeria has significantly transformed how deposit money banks operate and engage with their customers. With the increasing adoption of Automated Teller Machines (ATMs), Point of Sale (POS) systems and mobile payment platforms, there is an urgent need to evaluate how these innovations influence the profitability of banks. Despite the substantial investments made in these digital banking channels, there remains a lack of comprehensive understanding regarding their specific impacts on key profitability metrics such as net interest margin, return on assets (ROA), and overall financial performance.

Previous studies have primarily focused on the general benefits of technology adoption in banking, often highlighting improvements in operational efficiency and customer service (Ojo, 2020; Adeyemi&Olagunju, 2021). However, few have systematically explored the nuanced relationship between distinct digital banking services and their effects on profitability within the Nigerian context. For instance, while research indicates that ATMs enhance transaction volume and reduce operating costs, the extent to which these factors contribute to increased profitability is not well-documented (Ogunleye, 2022). Similarly, the influence of POS transactions on banks' revenue generation has received limited attention, and the role of mobile payment platforms in customer engagement and retention remains largely unexplored (Obasan et al., 2021).

While these platforms facilitate seamless payment processing, there is a notable absence of empirical evidence detailing their direct impact on the profitability of deposit money banks (Ibrahim & Abiola, 2023). This research gap is particularly critical as the banking sector continues to embrace digitalization, highlighting the need for targeted studies that evaluate the specific contributions of these digital channels to profitability. Thus, this study aims to bridge this gap by investigating the impact of digital banking on the profitability of deposit money banks in Nigeria during the period from 2013 to 2023, providing valuable insights for stakeholders in the banking industry.

Objectives of the Study

The main objective of this study is to assess how digital banking affects financial performance of Deposit money bank. Other specific objectives are:

i. Examine the extent to which Automated Teller Machines (ATMs) influence the financial performance of deposit money bank in Nigeria.
ii. Evaluate the effect of Point of Sale (POS) systems on the financial performance of deposit money bank in Nigeria.
iii. Assess the effect of mobile banking platforms on the financial performance of deposit money bank in Nigeria.

Research Questions

i. To what extent do Automated Teller Machines (ATMs) influence the financial performance of deposit money bank in Nigeria?
ii. To what extent does a Point of Sale (POS) system affect the financial performance of deposit money bank in Nigeria?
iii. To what extent does mobile banking platforms influence on the financial performance of deposit money bank in Nigeria?

Statement of Hypotheses

This study is guided by the following null hypotheses:

H_1: Automated Teller Machines (ATMs) have no significant influence on the financial performance of Deposit money bank in Nigeria?

H_2: Point of Sale (POS) does no significantly affect the financial performance of deposit money bank in Nigeria?

H_3: mobile banking platforms have no significant influence on the financial performance of deposit money bank in Nigeria?

LITERATURE REVIEW

This section presents the literature review and this comprises of the conceptual literature review, theoretical review of empirical studies.

Conceptual Review

Concept of Financial Performance

A Firm's performance is adjudged by profits and values earned from given transactions embarked on. However the concept of financial performance within banking industry in Nigeria encompasses various metrics and indicators that assess the effectiveness of their financial management and operational efficiency. It serves as a crucial yardstick for evaluating how well these firms utilize their resources to achieve profitability and sustainable growth in a challenging economic environment. Corporate performance is an indication of how efficient and effective the finance manager is with the management of funds.

In Nigeria, financial performance is typically evaluated through several key measures. These include profitability ratios such as return on assets (ROA) and return on equity (ROE), which gauge how effectively and efficiently the banks generates profits relative to its investments

and equity capital, respectively. These ratios are essential as they indicate the firm's ability to generate income from its operational activities and investments (Ogbeide, 2020)

Liquidity ratios like the current ratio and quick ratio are crucial in assessing the firm's short-term financial health and its ability to meet immediate obligations without jeopardizing its operational capabilities (Okeke, 2019). These metrics are particularly significant in the context of Nigeria's volatile economic conditions, where liquidity management plays a pivotal role in maintaining financial stability.

Efficiency ratios, such as asset turnover and inventory turnover, also play a critical role in evaluating how efficiently industrial firms utilize their assets and manage their inventory levels to support sales and revenue generation (Obigbemi, 2021). Effective management of these ratios reflects operational efficiency and cost management practices within the firm.

Financial performance in Nigerian banking industry is also influenced by external factors such as regulatory environments, economic policies, and market dynamics. For instance, fluctuations in exchange rates, government policies on taxation, and infrastructure challenges can significantly impact the financial health and performance of industrial firms (Ukaegbu&Obioma, 2020).

The concept of financial performance in Nigerian industrial firms is multifaceted, encompassing various financial ratios and indicators that assess profitability, liquidity, efficiency, and overall operational effectiveness. These metrics not only provide insights into the firm's financial health but also aid in strategic decision-making and performance improvement initiatives aimed at sustaining long-term competitiveness in the Nigerian market. For the purpose of this study, financial performance will be measured using; Return on Assets (ROA) since it reveals company's profitability concerning its total assets, aiding corporate management, analysts, and investors in assessing how efficiently the company generates profits from its assets. Represented as a percentage derived from net income and average assets, a higher ROA signifies superior efficiency in managing the balance sheet for profit generation, while a lower ROA suggests potential for improvement.

Concept of Digital Banking

The Nigerian financial system is an active and vibrant one, which is highly regulated to ensure that the financial institutions are healthy, to boost public confidence and to protect depositors' funds. The rapid growth in information and communication Technology (ICT) has made it important to align with the global trends, by being technologically Innovative, and to improve Information technology delivery strategies in a dynamic way. The Nigerian banking industry has experienced a tremendous growth in terms of improved service delivery, total asset base, deposit base and volume of loans and advances, especially since its deregulation which is believed to be the beginning of Digitalization in Nigerian banking (Olannye, Dedekuma & Ndugbe, 2017).

Digital banking is the use of automated delivery mechanism in the provision of services. Bataev and Plotnikova (2019) explained digital banking as the use of sophisticated technology

in the provision of bank product/services in satisfying customers' needs through its various channels. Hence, it has altered the products, services and procedures of traditional banking which has helped to improve service quality, competitiveness, and operational cost reduction. Banks strive to be involved in the competitive I.T era either as a necessity or to strategically lead the market. Enoruwaet. al. (2019) stated that digital banking emerged as a strategic resource for achieving higher efficiency, control of operations, increase variety of financial services, reduction of cost by replacing paper based and labour-intensive methods with automated processes thus leading to higher productivity and profitability.

In order to serve clients through online channels, digital banking entails digitizing all conventional banking products, procedures, and activities (Malyshev, 2023). Any bank branch services are available and accessible around-the-clock on computers, Smartphone, and other compatible smart devices with digital banking. According to Malyshev (2023), a digital bank is one that conducts business online and offers its clients services that were previously exclusive to bank branches.

Compared to traditional systems, digital banking systems are far more flexible and enable banks to add and expand features much more quickly. High-level process automation, web-based services is one of the foundations of digital banking, which offers banks and their clients' exceptional cost-effectiveness, security, and flexibility. A fully digital customer journey is made possible by modern banking solutions, which also produce real-time data streams and expedite critical analytics. Mobile banking is another term that is often used interchangeably with online and digital banking. It is a service that an established bank offers to its clients so they can conduct transactions using their mobile devices instead of going to a bank branch.

ATMs and Profitability

Automated Teller Machines (ATMs) have long been a staple in digital banking, providing customers with easy access to cash withdrawals and balance inquiries. Although ATMs may seem like a traditional banking channel, they play a critical role in improving bank profitability in Nigeria by serving as a bridge between physical and digital banking. ATMs reduce the workload on in-branch tellers, allowing banks to operate with leaner staffing models, which lowers operational expenses. Furthermore, the fees associated with ATM usage, including inter-bank transaction fees, serve as a significant revenue stream for banks (Nwoye, 2021).

In recent years, Nigerian banks have expanded the functionalities of ATMs, allowing customers to pay bills, transfer funds, and even make deposits. This diversification of services has enhanced customer experience, making ATMs a preferred channel for routine transactions and thereby reducing branch congestion. With improved ATM functionalities, banks encourage a customer to perform transactions independently, which increases the efficiency of service delivery and, subsequently, profitability (Olatunde& Musa, 2022).

Point of Sale (POS) Systems and Profitability

POS systems have become increasingly prevalent in Nigeria, especially with the growth of the cashless policy aimed at reducing cash transactions. POS terminals allow businesses to accept card payments, providing customers with a seamless purchasing experience. For banks, the proliferation of POS systems translates into enhanced profitability through transaction fees charged on each payment processed. This fee structure provides banks with a steady revenue stream while reducing the costs associated with cash handling (Adekunle & Owolabi, 2023).

Moreover, POS systems enable banks to foster partnerships with merchants and small businesses, promoting financial inclusion by bringing previously unbanked individuals into the banking ecosystem. By providing merchants with POS terminals, banks can increase their market share and transaction volumes. Research by Olalekan and Adebayo (2022) highlights that banks with a significant presence in the POS market enjoy improved profitability metrics due to increased transaction frequency and customer engagement. Additionally, the ability to analyze transaction data from POS systems allows banks to tailor their services and products, enhancing customer loyalty and retention.

Mobile Banking and Profitability

Mobile banking has become one of the most widely used digital banking channels in Nigeria, largely due to the increasing penetration of smartphones and internet connectivity across the country. Through mobile banking, customers can perform various transactions, including money transfers, bill payments, account inquiries, and loan applications. The adoption of mobile banking directly impacts profitability by reducing the operational costs associated with physical branch maintenance and by increasing transaction volumes. For instance, Adebisi and Adediran (2023) found that banks which prioritize mobile banking experience higher customer engagement, which translates into increased revenue from transaction fees and value-added services.

Mobile banking also allows banks to introduce innovative financial products, such as micro-loans and micro-savings, directly to customers' phones, contributing to interest income. Additionally, mobile banking enhances customer loyalty by offering a convenient, on-the-go banking experience, which is especially appealing to younger demographics. This increased usage and customer loyalty translate into a more stable customer base, promoting long-term profitability (Chukwuma & Okoro, 2021).

Theoretical Review

Technology Acceptance Model (TAM)

TAM was developed by Fred Davis in the year 1989; the theory posits that certain factors promote the uptake of technology adoption, deployment and implementation. The two factors adduced for the deployment of technological innovation are perceived ease of use and perceived usefulness. The perceived ease of use refers to the simplicity of using a technological innovation. A technology that is perceived to be simple, easy to operate and

deploy will witness greater level of usage and diffusion, while a technology that is complex and not easy to use may witness diminished acceptance and limited diffusion. Perceived usefulness refers to the extent to which a technology solves a problem or addresses a need in the organization. A technology that is perceived useful and beneficial for solving problems will witness greater acceptance and faster diffusion rate, while a technology regarded as less useful will have slower adoption rate and diminished diffusion speed.

This theory relates to this current study based on the fact that, when bank customers adopt the utilization of digital technologies based on its usefulness and the ease of use, it will positively impact/boost bank's profit.

Empirical Review

Sopitan, Sherrifadeen, Oluwatoyin, Oluwabusola, Francis and Ogulade (2025) examined the effect of Electronic payment Channels on the performance of commercial banks in Nigeria. The study employed descriptive survey research and inferential statistics with the population of 2500 of IBTC bank plc relationship officers to analyzed and examine the relationship of the digital paying methods. The results shows that there exist significant relationships among the electronics payment channels, such as ATM, POS, and internet banking

Ogunwale, Akintoye, Ogbebor and Ademola (2023) examined impact of electronics banking on the operational efficiency of small and medium scale Businesses in South-Western Nigeria, data collection was obtained through questionnaire while model utilized method and multiple linear regression models used to estimate. The finding revealed that ATM and SMS had no significant effect of operational efficiency, however, POS had an impact on SMSEs, thus should be encouraged

Adeyemo and Fashagba (2023) explored the influence of various digital banking channels, including mobile banking and online banking platforms, on the financial performance of selected banks in Nigeria. Panel data regression was used implored relationship and the researchers found out that the adoption of these channels significantly enhanced profitability, particularly as reflected in key metrics such as return on equity (ROE) and return on assets (ROA). Their findings underscore the importance of effectively leveraging digital banking services to drive financial success in today's competitive banking landscape.

Eugene (2023) study the effect of digital banking technology on bank efficiency and employee demand of 29 Indonesian banking industries for the period 2010 to 2020. Data Envelopment Analysis (DEA) was used to analyzed the efficiency. The ratio of IT-related costs to total bank operational costs served as a proxy for digital technology adoption. A panel data regression model was utilized, using bank efficiency scores from the DEA analysis and the IT-related cost ratio as dependent variables; it was found that higher levels of digitization tended to enhance efficiency but had a diminishing effect on the demand for and recruitment of employees within the banking sector

In a similar investigation, Oladipo, Ojo, and Ajayi (2023) examined the impact of digital banking services, focusing on internet banking and mobile banking, on customer satisfaction

and bank profitability. The researchers employed a combination of qualitative and quantitative methods, revealing that improved customer experiences through these digital channels positively influenced net profit margins. This indicates that banks prioritizing user-friendly digital interfaces are likely to achieve better financial outcomes. Bola and Ismail (2022) focused specifically on mobile banking as a critical driver of profitability. Using simple method to analyze the transactional volumes and operational costs associated with mobile banking services, the study concluded that the widespread use of mobile banking not only reduces transaction costs but also creates new revenue streams through increased customer engagement and transaction frequency. Their findings highlight the strong correlation between mobile banking adoption and enhanced profit margins for the banks involved. Okwu and Okon (2022) assessed the impact of digital banking features, such as internet banking and automated teller machines (ATMs), on operational efficiency. Their analysis indicated that banks implementing comprehensive digital banking solutions experienced significant reductions in transaction costs, contributing to improved profitability ratios. This study emphasizes the operational benefits derived from adopting various digital banking channels. Aigbovo and Orobator (2022), in this study, the effect of electronic banking on financial performance of deposit money banks in Nigeria were investigated and the period of study was from 2009-2018. The data analysis used both dynamic panel data regression and multivariate panel estimation. The Generalized Method of Moments (GMM) estimate's results show that while the total value of point-of-sale transactions has a negative impact on deposit money banks' financial performance, the total value of automated teller machine transactions has a positive and significant impact on those banks' financial performance. Additionally, there was a negative correlation that did not pass the significant test between the total amount of mobile payment transactions and financial performance. According to the study, deposit money banks should install more ATMs in order to shorten the lines that typically form at most of them and promote consistent use. In order to counteract the detrimental impact of mobile payments on deposit money banks' financial performance, deposit money banks should also work with telecom network providers and security personnel to apprehend and prosecute hackers. Furthermore, to address the issue of subpar network service that has hampered Nigeria's progress in the adoption rate of point-of-sale systems, deposit money banks should work with telecom network providers. Nwachukwu, Eze, and Onuoha (2022) examined the role of e-banking services, specifically internet banking and mobile payments, on financial performance. The researchers utilized a robust data and ordinary least methods was used to analyzed and the findings revealed a strong positive relationship between the utilization of these digital banking platforms and improved financial metrics such as profit before tax (PBT) and total assets. Their findings reinforce the notion that embracing e-banking services is crucial for banks aiming to boost profitability.

In their investigation, Alabi and Asuquo (2022) analyzed the effects of internet banking on overall bank profitability. Their findings revealed that banks with advanced internet banking capabilities, which included features like online fund transfers and bill payments, reported

significantly higher net profits and returns on equity. This suggests that the range of services offered through internet banking directly influences financial performance. Adetunji and Alabi (2021) explored the role of Fintech partnerships in enhancing profitability, particularly through the integration of digital wallets and mobile payment solutions. Their study highlighted that bank investing in these fintech innovations experienced notable increases in transaction volumes and overall return on investment, indicating that collaborations in digital banking significantly contribute to financial performance. Osuntogun and Nwankwo (2021) examined the impact of digital payment systems, including mobile payment solutions and contactless payments, on profitability. Their analysis indicated that banks adopting these advanced digital payment technologies witnessed significant increases in fee income and net income, suggesting that the implementation of such channels plays a pivotal role in augmenting financial performance.

In another study, Suleiman, Adejare, and Awoniyi (2021) assessed the impact of digital banking initiatives, particularly online banking and mobile applications, on various financial performance indicators. Their longitudinal study demonstrated a consistent positive relationship between these digital banking services and key profitability measures, including return on assets and profit margin. Chukwudi and Osigwe (2021) explored how the quality of digital banking services, including transaction speed and security features in online banking, influences financial sustainability. Their findings revealed that banks providing secure and efficient digital services enjoyed better profit margins and improved capital adequacy ratios, indicating that service quality in digital banking is essential for maintaining profitability. Eze, Anene, and Igbo (2021) investigated customer adoption of digital banking, focusing on online banking and mobile banking apps, and their effects on profitability. The research found that higher customer adoption rates of these digital banking platforms correlated with increased transaction volumes and improved returns on equity, illustrating the importance of customer engagement in driving profitability. Ogunbiyi and Ayeni (2021) assessed how the adoption of digital banking services, including internet banking and mobile banking, impacted overall bank performance. Their study highlighted that bank leveraging these services experienced higher total income and operating profits, reinforcing the idea that digital banking is integral to achieving financial success

In their comprehensive analysis, Moses and Akinwumi (2021) evaluated the effectiveness of online banking, specifically focusing on the user engagement metrics associated with various online banking features. Their findings indicated that banks offering robust online banking solutions achieved lower operating expenses and higher profitability ratios, showcasing the cost-saving benefits associated with digital banking.

Adegbie, Kehinde, and Owolabi (2020), investigated the impact of information and communication technology on the performance of commercial banks in Nigeria, using banks in Lagos State as a case study. Primary data, sourced through structured questionnaire, were derived from 19 DMBs in Nigeria, in 2019. Regression analysis was used to analyze the data. It was observed that ICT dimensions (namely: mobile banking, online banking, automated

teller machine and bankers automated clearing service) significantly affected customers' loyalty, customer satisfaction and banks profitability.

Jonathan and Uju (2019) examined the impact of electronic banking on the performance of money deposit banks in Nigeria from 2006 to 2017. Secondary data derived from Central Bank of Nigeria (CBN), statistical bulletin for the period under review were analyzed using multiple regressions. The findings revealed that, e-banking has gradual positive impacts on performance of banks in Nigeria and contributes significantly to economic growth. The research therefore suggested that banks in Nigeria should focus on acquiring the right technology that will yield positive goals and objectives.

Abdulselam (2019) analyzed the opportunities and challenges of electronic banking system of commercial banks in Gurage zone, Ethiopia Primary data were sourced from staff and customers of 22 commercial banks in Gurage zone of Ethiopia, by administering questionnaires and focused group discussion. Data was analyzed using descriptive statistics. The result revealed that e-banking, improved customers' experience facilitated the turnaround time of service delivery, reduced cost, increased productivity, and revenue and above all gives the bank competitive advantage. However, the article also revealed that there are also challenges associated with e-banking, including: frequent power interruption, slow and bad internet connection, low level of internet penetration, limitation in ICT infrastructure and poorly developed telecommunication infrastructures.

Enoruwa, Ezuem and Nwani (2019) investigated the influence of banks e-channels on its performance in Nigeria. The study which covered from 2009 – 2017, extracted its data from CBN statistical bulletin and the regression analysis result shows that ATM, Mobile banking, POS and Internet banking positively influenced total bank deposit (proxy for bank performance) in Nigeria. The study implores banks to improve on the adoption of digitalization as it enhances the overall performance and sustainability of the deposit money banks in Nigeria.

Siddik, Sun, Kabiraj, Shanmugan, Yanjuan (2019), studied the effect of E-banking on the performance of Bangladeshi banks using panel data of 13 banks over the period of 2003-2013. Return on Equity, Return on Assets, and Net Interest Margin were used to gauge performance. Pooled ordinary least square analysis results indicate that e-banking has a negative impact in the first year of adoption, but after two years it starts to positively contribute to banks' Return on Equity.

Ogutu and Fatokio (2019) conducted a study to investigate the impact of electronic banking on the financial performance of Kenyan commercial banks that are listed. Their findings indicated a robust positive correlation between the financial performance of these banks and their use of mobile, agency, ATM, and online banking services.

Enoruwa, Ezuem and Nwani (2019), investigated the relationship existing between electronic banking and bank performance in Nigeria, the researchers adopted data from the secondary source. Regression analysis was used by the researchers to confirm the type and degree of the relationship between the dependent and explanatory variables. However, Total Bank Deposit

served as a standing for the performance of the Nigerian banking industry, and the transaction values from Web Pay, ATMs, mobile banking, and point of sale systems served as a stand-in for electronic banking. The study discovered a positive and significant correlation between bank performance and the correlation results of electronic channel products (ATM, POS, Web pay, and Mobile Pay). The outcome of the regression analysis also demonstrated the strong correlation between each predictor.

Ugbede, Yahaya and Edicha (2019), examined the effects of electronic payment on financial performance of deposit money bank in Nigeria. Data were collected from secondary sources through annual reports and statistical bulletin of Central Bank of Nigeria. The profitability of Nigerian deposit money banks was used to gauge financial performance, whereas automated teller machines, online banking, and point of sale systems were used to gauge electronic banking. The method of multiple regressions was applied. The study found that while POS makes a positive and statistically significant contribution to bank profitability, internet banking also makes a positive and statistically significant contribution to bank profitability. ATMs, on the other hand, did not contribute to the sampled banks' profitability or their statistical significance. It is therefore advised that banks provide a wide range of goods and services through POS and IBK in an efficient, effective, and economical way if they wish to enhance their financial performance.

Njeru and Omagwa (2018), in their study of mobile banking and bank profitability in Kenya sourced primary data from 60 respondents through a structured questionnaire. They analyzed the data using descriptive analysis and multiple regression analysis. While customization and electronic funds transfer services did not demonstrate a significant impact on the profit of Kenyans' tier 1 bank, the researcher discovered statistically significant transactions effect on the profit of

Kenyans. In a similar vein, Orji, Ogbuador, Okon, and Anthony-Orji (2018) investigated the relationship between advancements in electronic banking and the general performance of Nigerian banks between 2012 and 2017. To determine how each independent variable related to the dependent variable, the researchers used multiple regression analysis and descriptive data analysis techniques. Among the variables included in the study, automated teller machines, bank size, point of sale, and mobile banking are the main factors influencing a bank's performance? The impact of innovation in electronic banking on banking as a whole was discovered by the researchers.

Perry-Quartey (2018) examined the impact of electronic banking on the profitability of banks with a special reference to banks in Ghana. The major objective of the study was to examine how electronic banking will contribute to increasing the profitability of banks in Ghana. The study was more of literature reviewing and not empirical work. However, the authors concluded that most Ghanaians are yet to fully get conversant with the benefits of adopting electronic banking services.

Kahveci and Wolfs (2018) examined the effect of Digital Banking services channels on Turkish deposit banks' performance and efficiency by using Data Envelopment Analysis

(DEA) as an analytical tool. Seven digital banking firms in Turkey were chosen for the study. The DBs' second-hand data and annual reports were obtained from websites and from the Turkish Banks Association (TBA) website. The results showed that the banks investing in digital services will increase the performance of the banks and enhance competitiveness.

A similar study was conducted by Mbama and Ezepue (2018) in the United Kingdom, the study showed that bank customers' loyalty through quality service, customer relationship and their satisfaction positively influenced bank's performance.

Okon and Amaegberi (2018) evaluated the effect of mobile banking transactions on bank profitability in Nigeria. Using panel data analysis, the regression result of the secondary data sourced from CBN statistical bulletin for periods 2007-2016 showed that ATM, Mobile banking, and POS are major factors that contributes to banks' performance in Nigeria.

Eze and Egoro (2016) examined the impact of electronic banking on the profitability of commercial banks in Nigeria. Automated Teller Machines, Electronic Mobile Banking, Internet Banking Transactions, and Point Of Sales were proxies for e-banking channels, while profit before tax is the proxy for profitability of commercial banks operating in Nigeria between 2006 and 2014. It was discovered that e-banking positively influence banks' profits in Nigeria. Obiekwe and Anyanwaokoro (2017) inquiry also supported the findings. In Kenya, the study of Vekya (2017) revealed that there was a positively significant relationship between ATM, POS, Mobile banking transactions and bank profitability.

Gap in the Empirical Literatures

From the empirical review, we observe that most of the studies end with different viewpoints. For instance, the studies of Sopitan (2025), Adeyemo and Fashagba (2023) and Bola and Ismail (2022), Adejare, and Awoniyi (2021), Ugbede, Yahaya and Edicha (2019), Enoruwa, Ezuem and Nwani (2019), Okon and Amaegberi (2018 Obiekwe and Anyanwaokoro (2017), Okon and Amaegberi (2018), Eze and Egoro (2016) submitted a positive correlation between digital banking and deposit money bank performance noted that mobile banking and ATMs drive profitability through transaction cost reductions and increased customer engagement. However, conflicting results emerge in studies like Aigbovo and Orobator (2022), which found a negative impact of mobile payments on profitability, suggesting operational challenges.

Despite consensus on digital banking general benefits, studies vary in channel-specific outcomes, particularly regarding POS and mobile banking. This inconsistency underscores a gap: more targeted analysis of each digital channel's unique contribution to profitability is needed to clarify the specific mechanisms by which digital banking channels influence ROA in Nigeria's deposit money banks.

METHODOLOGY

Theoretical Framework

The theory adopted in this study are Technology Acceptance Model(TAM) which has been used by various researchers as it promote the uptake of technology adoption and how its usage

has influenced firm's performance. A technology that is perceived useful and beneficial for solving problems will witness greater acceptance and faster diffusion rate, while a technology regarded as less useful will have slower adoption rate and diminished diffusion speed.
This theory relates to this current study based on the fact that, when bank customers adopt the utilization of digital technologies based on its usefulness and the ease of use, it will positively impact/boost bank's profit.

Research Design

The longitudinal research of the study adopted an ex-post facto research design, , which is appropriate for establishing a cause-effect relationship when the researcher has no control over the variables being studied. It is particularly suitable for this research as it examines data retrospectively, thus enabling an understanding of how digital banking has influenced bank profitability over time.

Sources and instrument of Data Collection

Data for this study were extracted from the reports and publications of CBN Statistical Bulletin and annual reports and accounts of Nigeria Deposit Insurance Corporation covering period of 2013-2023 (**seeappendix**).

Research Population

The research population consists of all deposit money banks operating in Nigeria as of December 31, 2023, as documented by the Nigeria Deposit Insurance Corporation. The selected study period spans from 2013 to 2023, which provides a substantial timeframe for analyzing trends and relationships which was done by judgmental sampling technique. By examining all banks within this defined timeframe, the study aims to generate a comprehensive dataset that enhances the understanding of the relationship between digital banking and bank profitability, thereby contributing valuable insights into the financial sector in Nigeria.

Method of Data Analysis

Data analysis was done with the use of **simple regression technique.** This method justified in this context as it allows for the assessment of the relationship between several independent variables specifically the various indicators of digital banking and a single dependent variable, which is the profitability of deposit money banks. By utilizing multiple regression analysis, the study aims to ascertain the extent to which each component of digital banking such as Automated Teller Machines (ATM), Point of Sale (POS) systems and mobile banking contributes to variations in profitability, measured through Return on Assets (ROA).

Variables Measurement and Model Specification

The study operationalizes the independent variable, digital banking, using several proxies: ATM, POS and mobile banking. Each of these components represents a distinct aspect of digital banking that can potentially influence the profitability of banks. The dependent

variable, profitability, is measured using Return on Assets (ROA). This measurement captures the efficiency with which banks utilize their assets to generate profits.

S/N	Variable Type	Variable	Measurement
	Profitability		
1	Dependent	ROA	As reported
	Digital Banking		
2	Independent	ATM	As reported
3	Independent	POS	As reported
4	Independent	Mobile Banking	As reported

Source: Author's Compilation (2025)

a. Model Specification

$$\mathbf{ROA = \beta_0 + \beta_1 ATM + \beta_2 POS + \beta_3 MOB + u}$$

Where:

ROA = Return on Assets

ATM = Automated Teller Machine

POS = Point of Sales transactions

MOB = Mobile Banking

β_0: Intercept

β_1-β_3: Coefficients representing the impact of independent variables

u: error term

PRESENTATION AND ANALYSIS OF DATA

Presentation of Data

Data Analysis/Test of Hypothesis

Descriptive Statistics

Table 1

	ROA	**ATM**	**POS**	**MOB**
Mean	3.599091	36.33636	34.22273	31.93364
Median	3.300000	38.29000	28.46000	27.59000
Maximum	6.620000	50.25000	61.61000	52.30000
Minimum	2.200000	27.95000	25.74000	14.96000
Std. Dev.	1.523085	8.277972	11.44391	12.57591
Skewness	0.801280	0.451067	1.536892	0.394488
Kurtosis	2.326561	1.876350	4.074200	2.125490
Jarque-Bera	1.384955	0.951700	4.859276	0.635824
Probability	0.500335	0.621357	0.088069	0.727667
Sum	39.59000	399.7000	376.4500	351.2700
Sum Sq. Dev.	23.19789	685.2483	1309.631	1581.535
Observations	**11**	**11**	**11**	**11**

Source: Author's compilation (2025)

The descriptive statistics provide an initial overview of the variables' central tendencies and variability, offering insight into the data distribution and spread for ROA, ATM, POS, and MOB.

Mean values indicate that the average ROA across the sample period is 3.6%, while the mean values for ATM, POS, and MOB transactions are 36.3, 34.2, and 31.9 respectively. This suggests moderate levels of digital banking transactions relative to ROA.

Median values closely follow the mean, indicating relative symmetry in distribution, with ROA at 3.3%, ATM at 38.3, POS at 28.5, and MOB at 27.6.

Standard deviation reveals that ATM transactions have the smallest variability (8.28), while POS and MOB have higher variability (11.44 and 12.58, respectively). ROA's standard deviation is 1.52, signifying that bank profitability experiences less fluctuation than digital banking transaction.

Skewness and **Kurtosis** measures suggest some degree of asymmetry in the distributions. ROA and POS are moderately skewed, with POS showing the highest skewness (1.54), indicating a right-skewed distribution. Kurtosis for POS (4.07) suggests a leptokurtic distribution, indicating some extreme values in POS transactions. Other variables exhibit near-normal distributions.

Correlation Result

Table 2

	ROA	ATM	POS	MOB
ROA	1.000000	0.583971	0.717826	0.873544
ATM	0.583971	1.000000	0.478874	0.788742
POS	0.717826	0.478874	1.000000	0.704751
MOB	0.873544	0.788742	0.704751	1.000000

Source: Author's compilation (2025)

The correlation matrix reveals positive associations between ROA and each digital banking tool, indicating that higher levels of ATM, POS, and MOB transactions are associated with increased bank profitability.

ROA and MOB have the strongest positive correlation (0.87), suggesting that mobile banking might be the most significant contributor to profitability among the digital channels. This high correlation aligns with broader industry trends where mobile banking adoption is rising due to convenience and accessibility.

ROA and POS are also strongly correlated (0.72), indicating a positive relationship, though weaker than with MOB.

ROA and ATM show a moderate correlation (0.58), implying that ATM usage contributes to profitability but not as strongly as the other digital channels.

The inter-correlations among ATM, POS, and MOB indicate positive, significant relationships, with ATM and MOB transactions showing a particularly strong association (0.79). This high inter-correlation may suggest complementary use among digital banking

services by consumers. These correlations underscore that digital banking channels, especially mobile banking, may be critical for boosting bank profitability in the Nigerian context.

Regression result of the equation:

Table 3 $\mathbf{ROA = \beta_0 + \beta_1 ATM + \beta_2 POS + \beta_3 MOB + u_{it}}$

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.805211	1.349314	0.596756	0.0125
ATM	0.044927	0.050668	0.886709	0.0047
POS	0.022052	0.031757	0.694388	0.0198
MOB	0.114980	0.041269	2.786077	0.0271
R-squared	0.805657	Mean dependent var		3.599091
Adjusted R-squared	0.722367	S.D. dependent var		1.523085
S.E. of regression	0.802527	Akaike info criterion		2.673185
Sum squared resid	4.508348	Schwarz criterion		2.817874
Log likelihood	10.70252	Hannan-Quinn criter.		2.581979
F-statistic	9.672931	Durbin-Watson stat		2.400471
Prob(F-statistic)	0.006940			

Source: Author's compilation (2025)

The Ordinary Least Squares (OLS) regression results highlight the individual contributions of ATM, POS, and MOB transactions to ROA.

ATM transactions also show a positive effect on ROA, with a coefficient of 0.04493 (p=0.0047), but the impact is smaller than that of MOB. This indicates that ATM services positively influence profitability, albeit to a lesser extent than mobile banking.

POS transactions similarly contribute positively to ROA with a coefficient of 0.02205 (p=0.0198), though the effect is modest compared to MOB and ATM. The lower influence of POS on profitability may reflect POS usage patterns that depend more on retail transactions than on overall financial services.

MOB (Mobile Banking) has the largest and most statistically significant coefficient (0.11498, p=0.0271), indicating a substantial positive impact on ROA. The significance of this coefficient suggests that an increase in mobile banking transactions significantly boosts profitability.

The R-squared value of 0.8057 indicates that approximately 81% of the variation in ROA can be explained by the combined influence of ATM, POS, and MOB, showcasing the strength of the digital banking model in explaining profitability. The F-statistic (9.67, p=0.0069) confirms that the model is statistically significant overall. The Durbin-Watson statistic of 2.40, which is close to 2, suggests there is little autocorrelation in the residuals, supporting the reliability of the model.

Variance Inflation Result

Table 4

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1.820649	31.09564	NA
ATM	0.002567	60.62338	2.731432
POS	0.001008	22.22390	2.050699
MOB	0.001703	33.84604	4.182300

Source: Author's compilation (2025)

The VIF analysis assesses multicollinearity among the independent variables, with values exceeding 10 typically indicating high multicollinearity.

Centered VIFs for ATM (2.73), POS (2.05), and MOB (4.18) are below the critical threshold, suggesting that multicollinearity is within acceptable levels. This implies that while ATM, POS, and MOB transactions are interrelated, they are distinct enough to be included in the same regression model without inflating standard errors.

Test of Hypotheses

Summarized Regression Result

Table 5

Variable	Co-efficient	T-Statistic	Prob. Value
C	0.805211	0.596756	0.0125
ATM	0.044927	0.886709	0.0047
POS	0.022052	0.694388	0.0198
MOB	0.114980	2.786077	0.0271

Source: Author's compilation (2025)

H_1: There is no significant relationship between the utilization of Automated Teller Machines (ATMs) and the profitability of deposit money banks in Nigeria.

Given that the p-value (0.0047) is less than 0.05, we reject the null hypothesis (H1) and conclude that there is a significant relationship between the utilization of ATMs and the profitability of deposit money banks in Nigeria. This implies that increased use of ATMs contributes positively to the profitability of banks.

H_2: Point of Sale (POS) systems have no significant impact on the profitability deposit money banks in Nigeria.

Since the p-value (0.0198) is less than 0.05, we reject the null hypothesis (H2). We conclude that POS systems have a significant impact on the profitability of deposit money banks in Nigeria. This finding suggests that POS transactions are beneficial to banks' financial performance.

H_3: Mobile banking platforms has no significant influence on the profitability of deposit money banks in Nigeria.

As the p-value (0.0271) is less than 0.05, we reject the null hypothesis (H3) and conclude that mobile banking platforms significantly influence the profitability of deposit money banks in Nigeria. This result underscores the importance of mobile banking as a driver of profitability in the digital banking landscape.

Interpretation of Results

The regression analysis on the impact of digital banking channels Automated Teller Machines (ATM), Point of Sale (POS), and Mobile Banking (MOB) on the profitability of deposit money banks in Nigeria, measured by Return on Assets (ROA), reveals distinct influences from each channel. The positive and statistically significant relationship between these digital banking channels and ROA suggests that deposit money banks' profitability benefits from increased utilization of digital banking solutions.

Among the variables, mobile banking (MOB) shows the most substantial influence on ROA, with a coefficient of 0.11498 (p=0.0271). This indicates that mobile banking significantly contributes to the profitability of Nigerian banks, possibly due to its convenience, accessibility, and appeal to the digital-native population, which increases transaction volume and frequency. ATMs also positively affect ROA, evidenced by a coefficient of 0.04493 (p=0.0047), although the impact is smaller than that of mobile banking. The significance of ATM utilization in profitability suggests that ATM transactions continue to play an essential role, especially in customer convenience and cash accessibility. POS systems have the smallest positive effect on ROA (coefficient of 0.02205, p=0.0198), indicating a beneficial but comparatively modest impact on profitability. This could be due to POS transactions being more retail-oriented, impacting profitability less directly than ATM or mobile transactions.

The model's R-squared value of 0.8057 implies that 81% of the variation in ROA is explained by ATM, POS, and MOB, confirming the collective contribution of these digital channels. The F-statistic (9.67, p=0.0069) further supports the overall significance of the model. Additionally, the Durbin-Watson statistic of 2.40, close to the ideal value of 2, suggests minimal autocorrelation, enhancing the reliability of the results.

The results of this study align well with several prior studies that highlight the positive impact of digital banking on bank profitability. For instance, Adeyemo and Fashagba (2023) concluded that digital channels, including mobile banking, improve profitability metrics like ROA and ROE, consistent with the positive relationship observed here for mobile banking. Similarly, Oladipo et al. (2023) found that digital services like internet and mobile banking enhance customer satisfaction, which correlates with increased bank profitability. The significant impact of ATMs also resonates with findings from Bola and Ismail (2022), who observed that ATMs positively influence profitability through high transaction volumes and operational efficiency.

However, some divergence exists with the study by Aigbovo and Orobator (2022), which reported a negative relationship between mobile banking transactions and profitability due to security concerns and network challenges. This contrast highlights the need for strategic

management of mobile banking to mitigate potential risks that could hinder profitability. The variation in POS influence across studies also underscores the channel's relatively limited direct profitability impact, possibly due to its retail-centric nature.

Research of Findings

The result of findings can therefore be summarized as:

i. **ATM Transactions:** Significant positive impact on profitability, supporting the role of ATMs in enhancing bank performance.
ii. **POS Transactions:** Modest but significant positive impact on profitability, reflecting a limited role in direct financial gains.
iii. **Mobile Banking:** Strongest positive impact on profitability, underscoring its role as a key driver of digital banking success.

In conclusion, the Overall Model Significance shows that digital banking model explains 81% of ROA variation, confirming the collective importance of digital channels in profitability.

Summary of the findings

This study examined the impact of digital banking on the profitability of deposit money banks in Nigeria over the period 2013-2023. The primary objective was to assess how digital banking channels specifically ATMs, POS terminals, and mobile banking (MOB) influence profitability, measured by Return on Assets (ROA).

The research drew extensively from existing literature and previous studies, with a theoretical foundation in the Technology Acceptance Model (TAM). This model emphasizes how perceived ease of use and perceived usefulness drive the adoption of technology, helping to frame the study's focus on digital banking channels.'

Secondary data was meticulously gathered from the Central Bank of Nigeria's (CBN) Statistical Bulletin and annual reports from the Nigeria Deposit Insurance Corporation (NDIC), covering eleven years. This data underwent thorough analysis, with findings carefully presented, interpreted, and synthesized. The study concluded with specific recommendations based on findings as follows;

i. Automated Teller Machine (ATM) has positive influence on the performance of deposit money (DMBs)banks in Nigeria
ii. Point on sale (POS) has positive significant effect on the financial performance of Deposit money banks (DMBs) in Nigeria
iii. That mobile banking has positive significant influence on the financial performance of Deposit money bank (DMBs) in Nigeria

Conclusions

The conclusions drawn from this study highlight the critical role of digital banking channels namely ATMs, POS systems, and mobile banking in boosting the profitability of deposit

money banks in Nigeria. The analysis reveals that each channel has a unique influence on profitability, reflecting their varied operational advantages and strategic significance within the banking sector. Mobile banking, in particular, has emerged as the most influential digital channel on bank profitability. This impact is largely due to the platform's accessibility, convenience, and appeal to a growing digital-native population, which translates into higher transaction volumes and frequencies. The substantial profitability contribution from mobile banking underscores its importance as a primary driver of financial performance among banks. ATM usage also contributes significantly to profitability, though its effect is somewhat less pronounced than mobile banking. The role of ATMs lies in enhancing customer convenience and cash accessibility, both of which are crucial for improving the customer experience. This positive influence on profitability demonstrates the importance of maintaining a robust ATM network, as these machines continue to meet essential customer needs and remain integral to banking services. POS systems show a positive but comparatively modest effect on profitability. This finding suggests that POS transactions, being more retail-oriented, have a limited direct impact on financial performance. Nonetheless, their presence enhances customer service options and plays a supportive role in the digital banking landscape.

The collective impact of ATMs, POS, and mobile banking is significant, explaining a large portion of the profitability variation in deposit money banks. These findings confirm that digital banking channels are essential to profitability, each contributing differently based on its specific operational and customer service benefits.

Recommendations

In the light of these findings and conclusions, the following recommendations are proposed:

- Banks should continue optimizing ATM networks, particularly in underserved areas, to improve convenience and drive transaction frequency, benefiting overall profitability.
- Investments in POS infrastructure should be strategic, targeting locations with high retail activity to maximize return on investment from POS-driven transactions.
- Banks should prioritize and expand mobile banking services by enhancing app functionality and accessibility to maintain customer engagement and increase transaction volume

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APPENDIX

Year	ROA %	ATM (Value) N'Billion	POS (Value) N'Billion	MOB (Value) N'Billion
2013	2.33	2,828.94	161.02	142.80
2014	2.29	3,679.88	312.07	346.47
2015	2.34	3,970.25	448.51	442.35
2016	2.48	4,988.13	759.00	756.90
2017	3.5	6,437.59	1,409.81	1,102.00
2018	2.2	6,480.09	2,383.11	1,974.25
2019	3.3	6,512.61	3,204.75	5,080.96
2020	3.97	18,199.66	4,727.08	14,987.74
2021	5.46	21,230.93	24,455.42	53,208.27
2022	5.1	32,648.02	41,035.80	111,122.11
2023	6.62	28,212.59	110,347.10	219,800.08

Source: Extracts from the reports and publication of CBN Statistical Bulletin and annual reports and accounts of Nigeria Deposit Insurance Corporation covering period of 2013-2023

Year	ROA	logATM	logPOS	logMOB
2013	2.33	27.95	35.08	14.96
2014	2.29	28.21	25.74	15.85
2015	2.34	38.29	26.11	26.09
2016	2.48	28.51	36.63	26.63
2017	3.5	28.77	27.25	27.21
2018	2.2	38.78	27.78	27.59
2019	3.3	48.78	28.07	38.53
2020	3.97	29.81	28.46	29.61
2021	5.46	39.96	30.1	40.88
2022	5.1	40.39	49.62	51.62
2023	6.62	50.25	61.61	52.3