

Innovations

Digital Finance Channels and the Financial Performance of Deposit Money Banks in Nigeria

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Abstract: *The study examined the effect of digital finance channels on the financial performance of deposit money banks (DMBs) in Nigeria for the period of (15) years on a quarterly basis from (2009Q1-Q4) to (2023Q1-Q4). The independent variables employed in the study are; Automated Teller Machine (ATM), Mobile banking (MOB), Point of Sale (POS) and Web pay (WP) and financial performance of DMBs proxied Return on Asset (ROA). Data was collected from the CBN Statistical Bulletin for (2009Q1-Q4) to (2023Q1-Q4). Quarterly data was analyzed using descriptive statistics, correlation analysis and Ordinary Least Square Method (OLS) with the help of E-VIEW version 9.0 for the hypotheses raised. The finding shows automated Teller Machine (ATM) has positive and significant effect on financial performance of DMBs in Nigeria, Mobile Banking has positive and significant effect on financial performance of DMBs in Nigeria, Web-pay has negative and significant effect on financial performance of DMBs in Nigeria and Point of Sales have positive and statistically significant effect on financial performance of DMBs in Nigeria. The study thereby recommends that DMBs continue to expand and strategically deploy ATM networks for increased revenue generation, cost efficiency, customer retentions and satisfaction, enhanced deposit mobilization and support for digital banking integration. Also, the study recommends that there should be public enlightenment on the benefit that is accruable from the usage of Mobile transfer transaction. This would help to reduce the ills associated with the use of mobile banking.*

Keywords: *Digital Finance, Automated Teller Machine, Point of Sale, Mobile Banking, Web Pay*

1.0 Introduction

The Nigerian Banking System is fashioned after the British Banking System. The system gradually moved from commercial Banking towards unit banking with the introduction of community banks in 1991 as a development effort of government. Prior to the introduction

of Community Banks, several measures have been put in place by the Central Bank of Nigeria (CBN) to bring bank services to the door step of the rural populace and enhance credit delivery for boosting quality of rural life. These include the Rural Banking scheme, 1977, Agricultural Credit Guarantee Scheme, 1977, Nigeria Agricultural and Cooperative Bank and Nigeria Bank for Commerce and Industries. These banks were introduced to compliment the rural development scheme. According to CBN, none of these efforts yielded appreciable improvement in the quality of life of rural dwellers and these led to the introduction of Community Bank as a policy thrust of Structural Adjustment Programme started in 1986 (CBN Monetary Reports 1991). Despite these efforts, the Community Banks could not achieve this purpose and in 2005, regulated deposit money banks were introduced to replace the old Community Banks with the launching of the DMBs policy in Nigeria by CBN. (CBN, 2005). This was influenced by the global acceptability of micro financing as the last hope in assisting the economically active poor. However, the shift towards digitization has assumed Centre stage within the financial inclusion narrative. In DMBs, digitization is viewed by many as an essential tool for fostering financial inclusion (Agarwal, Qian, & Tan, 2020; Suri, 2017). Digitization can take various forms in DMBs. This may involve equipping loan officers with tablets and mobile phones for speeding up the lending process, use of mobile banking and agent network aimed at reducing transaction costs, or even credit scoring that facilitates loan decision-making (Ashta, 2018). It is argued that digitization is an inevitable global pursuit and promises great efficiencies for how financial services are accessed (Harigaya, 2016; Ray, Miglani, & Paul, 2019), as well as offering poor people an opportunity to benefit from financial services that are affordable and more tailored to their needs (Disse & Sommer, 2020). As a result of the technological advances and digitalization, the collaboration between commercial banks and customers has likewise been improved and this has made better approaches for transactions. This quick change can be found in the banking sector, where digitalization has given the banks more innovative ways for reaching out to potential clients and in the meantime, this has helped them to enhance their services. Digitalization in the banking sector has brought about Web pay and mobile banking, which has turned into the single greatest channel right now for reaching customers and for customers to be able to deal with their banking errands themselves (Deutsche Bank, 2016). The impacts of digitalization on Nigerian's financial institutions can undoubtedly be associated to the measure of individuals utilizing the web pay and mobile banking services to pay their bills, which is the dominating factor on an average person's banking errands. The breakthrough techniques for reaching customers are becoming less expensive and less demanding than the traditional methods (Wright, 2017). The effect of digitalization on the Nigerian financial sector and its services actually goes past retail and client applications and services, it also incorporates all components of the Nigerian financial sector's services and production processes. It also expands the need for promptness and customized services and products, which also put the Nigerian financial

sector under the demand of meeting customers' requests with minimal effort, convenient approaches to transfer cash, investment and borrowings.

Digitalization of the Nigerian financial sector, has brought about new models in businesses, that is new ideas with regards to development and improvement in various areas. This has continued to grow and supplant the conventional banking services to the customers through innovative technologies to meet the developing complex necessities and challenges of globalization. The Nigerian banking and financial sector have experienced radical changes and improvement over the last few years and is in a consistent state of development (Carbo and Valverde 2017; Abbasi and Weigand, 2017). It is an obvious fact that the performance of an organization is measured by how well customers are satisfied with products or services that are being offered as a result of their persistent patronage (Khadka and Maharjan, 2017). Since digitization is inevitably bringing transformative change to the way financial services are accessed in the financial sector and, particularly, in the DMBs industry hence, modern digital mechanism became a very critical aspect of recent banking services delivery in the world at large and African countries in particular. ATM is one of the foremost indicators for this technical know-how and is adopting by commercial and micro finance banks within the globe.

Digital finance channels like automated teller machines, web pay and mobile banking were introduced in the banks to enable customers make quick transactions with minimum delay and reduce queues in the banks. With the introduction of digital finance channel, customers of banks have efficient, fast and convenient banking services delivered through such as ATMS, Online Banking, and Mobile banking (Khadka & Maharjan, 2017)

1.1 **Statement of the Research Problem**

Despite the undeniable importance of digital finance channel, in enhancing banking performance, the impact of digitalization on financial performance, is still misunderstood for two major reasons. First, there is inadequate understanding about the digital finance channel and secondly digital finance channel impact on bank's performance remains lowly untested.

The Nigerian Banking Industry is witnessing a revolution as a result of digitalization that have become a common feature of banking in the contemporary business environment. The arrival of the Internet and the proliferation of mobile telecommunication companies in Nigeria present both an opportunity and a challenge to banks in Nigeria. The test for the banking sector has been how to profitably formulate a new service delivery means in such a way that its clients will enthusiastically learn to use and trust. Therefore, banks in Nigeria must have business strategy that include the development, implementation and evaluation of the effect of digital bank mechanism, aimed at maintaining existing customers and attracting new ones, and such digital mechanism, must also improve efficiency and profitability of the banks.

Banks in Nigeria have been generally slow in adopting digitalize ways of improving service. Regardless of numerous benefits uncovered by digital finance channel diverse risks of increased fraud and exposure to litigations emerges. While human complaints ranging from poor service network, difficulties in understanding technological innovation in bank operation and ease of use, poor service delivery, existence of long queues, expensive charges and the insecurity in the use of e-banking products leads to customer dissatisfaction and resulting to low financial performance (Olaleye, Adeyeye, Efuntade, Arije, and Anifowose 2021 Olaleye, and Ahmodu, 2019). While existing studies have explored aspects of electronic banking, Automated Teller Machines (ATMs), and web payments, there is limited empirical research on the comprehensive impact of digital finance channels on the financial performance of DMBs in Nigeria. Furthermore, most studies focus on developed economies, leaving a significant gap in understanding how digital finance channels influence financial outcomes within the Nigerian context, characterized by unique economic, technological, and infrastructural challenges. Also, there is insufficient clarity and research on what constitutes digital finance channels and how they integrate into the overall banking structure, especially within the Nigeria context. Existing studies inadequately measure or evaluate the comprehensive influence of digitalization on financial performance. This leaves room for empirical research to fill the void, especially considering the peculiar challenges of the Nigerian banking sector. Additionally, in the move to resolve this, most scholars and researchers (Agu & Nwankwo 2019; Shaikh, Alharthi, & Alamoudi, 2020; Enoruwa, Ezuem& Nwani 2019) have conducted studies on electronic banking, web pay, Automated Teller Machines (ATMs), particularly with reference to financial performance of deposit money banking in Nigeria. Nevertheless, comprehensive research investigating the impact of digital finance channel on financial performance of DMBs particularly for the case of Nigeria has captured few attentions from scholars to the best of knowledge of the researcher. It's against this backdrop; that, this study seeks to empirically investigate the impact of digital finance channels on financial performance of DMBs in Nigeria.

1.2 Objectives of the Study

The main objective of this study was to establish the effect of digital finance channels on financial performance of DMBs in Nigeria. However, the study pursued the following specific objectives;

- i. To determine the impact of automated teller machines (ATM) on financial performance of DMBs in Nigeria.
- ii. To establish the effect of mobile banking (MOB) on financial performance of DMBs in Nigeria.
- iii. To analyze the influence of Web-pay (WP) on financial performance of DMBs in Nigeria.

iv. To determine the impact of Point of Sale (POS) on financial performance of DMBs in Nigeria.

1.3 Statement of Research Hypothesis

This study sought to address the following pertinent research hypotheses:

Ho₁: There is no significant relationship between automated teller machines (ATM) and financial performance of DMBs in Nigeria.

Ho₂: There is no significant relationship between mobile banking (MOB) and financial performance of DMBs in Nigeria.

Ho₃: There is no significant relationship between web pay (WP) and financial performance of DMBs in Nigeria.

Ho₄: There is no significant relationship between Point on Sale (POS) and financial performance of DMBs in Nigeria.

1.4 Scope of the Study

This study will focus mainly on all the thirteen (13) DMBs listed in the Nigeria Exchange Group (NGX). The digital finance channel used in the study are, automated teller machines (ATM), Mobile banking, (MOB) Web Pay (WP) Point of Sale (POS). The dependent variable is DMBs' financial performance measured by Return on Asset (ROA). The study made used of secondary data spanning from the period of (2009Q1-Q4) to (2023Q1-Q4). The period of (2009Q1-Q4) to (2023Q1-Q4) was chosen because this period coincides with the spread of digital banking in Nigeria. The secondary source of data collection will be collected from the CBN statistical bulletin over the periods under study.

2.0 Review of Related Literature

2.1. Conceptual Review

2.1.1 Financial Performance.

Financial performance is the terms used in relation to its capacity to generate sustainable profitability. For a bank to be successful in its operations, managers must weigh complex trade-offs between growths, return and risk, favoring the adoption of risk-adjusted metrics (Muotolu and Nwadiolor (2019). Bank's performance measure can be classified into traditional, economic and market-based. For example, Stern and Stewart developed a model called Economic Value Added (EVA) which takes into account the opportunity cost for stockholders to hold equity in a bank, measuring whether a company generates an economic rate of return higher than the cost of invested capital in order to increase the market value of the company (Raza, Farhan & Akram, 2011). There have been a large number of empirical studies on bank performance around the world especially commercial banks but, very little on bank performance has been done in Nigeria. From the extant literature, researchers have applied several surrogates as metric measures of

financial performance of banks. Such metrics according to Okonkwo, Anene, Ekwueme, and Chizoba (2022) include a combination of financial ratios analysis, benchmarking and measuring of performance against budget. Others include return on assets, returns on equity, net interest margin, and a host of others. However, the Ogbonna, Okoro, Atasanan, and Igwe, (2020) cautioned that a good performance measurement framework should encompass more aspects of the performance than just profitability embedded in pure market-oriented indicators and should be less prone to the manipulation from the markets. Taken this caveat, this study employed Return on Assets (ROA) as a metric of financial performance. ROA is a key proxy measure frequently used in the literature of bank financial performance. It shows the profit earned per naira of assets and most importantly reflects the management's ability and efficiency to utilize banks' financial and real investment resources to generate profits (Ndunga, Njati & Rukangu (2016).

2.1.2 Concept of Digital Finance Channel

Digitalization is the process of integrating digital technologies into firms' operations (Enebeli-Uzor, 2024). Banking digitalization is therefore the transformation in the technological infrastructure used by banking institutions at both front and back office. The ultimate goal of digitalization programs in a traditional bank is to transform the bank to a digitalized bank (or 'digital bank). A digitalized bank is expected to have digitally transformed most of the processes driving its activities from the back-end to the front-end (LIQS University, 2024). While digitalization provides banks with a cost advantage, it is reflected to the customer as better customer experience, more usable and less costly products (Balkan, 2021). Digital banking can provide services that are less costly, more convenient, and contain fewer errors. Digital banking is the buzz word which is referred to as electronic banking. It is identified as the process or form of delivering banking services and products through different electronic platforms to the customers (Awoniyi, 2022). Digital banking includes provision of opportunities in the digital age through infrastructure (Adewolo, 2015).

There is no standard definition of digital finance channel from either the academic scholars or industrial researchers. From an industrial point of view, digital finance channel has been defined as delivering of financial services through a digital infrastructure such as mobile phone or internet with minimal use of traditional banks and cash (Adewolo, 2015). From the academic scholar's point of view, Adewolo, 2015, posits that digital finance channel is the provision of new financial products, new and innovative ways of customer interaction and new financial businesses provided by Fintech companies. While, Ozili (2018), defined digital finance channel as the provision of financial services through channels such as the internet and mobile phones.

2.1.3. Digital Banking Channels and Platforms in Nigeria

1. Mobile Banking

Mobile banking is seen as one of technological changes in banking industry. Is a term used for performing balance checks, account transactions, payments, credit applications and other banking transactions through a mobile device such as a mobile phone or Personal digital Assistant (PDA) (Ndunga,Njati&Rukangu (2016). Monyoncho (2016), mobile banking is a service provided by financial institutions in cooperation with mobile phone operators. Monyoncho (2016), noted that mobile banking allows customers with busy life's to conveniently do their transactions via their phones at ease and anytime they choose.

2. Automated Teller Machine (ATM)

Automated Teller Machine (ATM), also known as automated banking machine (ABM) or Cash Machine.Technology like automated teller machines (ATMs) is a computerized telecommunication devices that offers clients of financial institutions access to financial transactions in a public space without the need for a cashier, human clerk or bank teller (Olaleye, and Ahmodu 2019). Hence, ATM as a banking mechanism is widely acceptable and used. Low-income people no longer need to use scarce time and financial resources to travel to distant bank branches. Since Automated teller machines transactions cost far less than transactions at the branch teller, banks can make a profit handling even small money transfers and payments. However, despite the adoption of automated teller machines in commercial banks, the performance of banks has been declining. Ogbuji. (2017) revealed that the ATM is one of the prevailing surrogates of the tumbling labor-intensive transaction system realized through “paper-based payment instruments

3. Web-pay

Web pay is also referred to as online banking, e-banking, or virtual banking. It is e-payment system that permits bank customers to undertake diverse financial transactions through the financial institution's website which is interactive and communication channels. That is, client executes banking transaction via electronic means. Web-pay conceptualization varies among researches moderately, because it entails electronic banking through which bank customers can request information and carry out most retail banking services via computer (Mwai, Memba& Njeru 2018).

4. Point of sales (POS)

Point of sales is one of technological changes massively used in the banking industry. POS is a retail payment device which absorbs customer's bank details whenever a bank or credit card is swiped (passed through a magnetic stripe reader). Banks refers to POS as being cost effective and more feasible when compared to retail payment offices. Revolutions on retail payment facilities greatly impacted bank performance in nations

with a quite great acceptance rate of retail payment transaction technologies (Olaleye, and Ahmodu, 2019). Olaleye, Akkaya, Emeagwali, Awwadd&Hamdane (2020). In his study, he noted that connection is stronger in countries with more retailed payment transaction equipment, like POS terminals.

2.1.4. Digital Banking and Financial Inclusion in Nigeria

Financial inclusion refers to efforts to enable all individuals and companies to access financial products and services irrespective of personal income or net value. This is aimed at eliminating barriers that exclude people from financial sector involvement and removing barriers that discourage their use of these services for their livelihoods (Ezeocha, 2024). The importance of financial inclusion to a country like Nigeria cannot be over emphasized. Realizing this, on October 23, 2012, the Central Bank of Nigeria (CBN) launched the National Financial Inclusion Strategy. In 2018, the CBN issued a Revised Strategy aimed at further reducing the exclusion rate of the unbanked to 20% by 2020 (Olajide, 2021). Affordable financial services obtained via the help of digitalization have helped in poverty alleviation and improved the wellbeing of the citizens. Evans (2018) documented that developed countries have higher access to finance than developing countries solely because of advanced technology which plays a considerable role in reducing financial exclusion. Digitalization also contributes in reaching out to the poor on time and provides access to less expensive information and better connectivity through mobile-banking, internet banking and automated teller machine services. The population who benefits from the modulating effect of digitalization through mobile phone penetration are the underprivileged in rural populations which help in poverty alleviation and societal inclusion (Warren, 2007). Digital transformation of the financial services industry facilitates increased broadband penetration, which promotes financial services delivery in rural areas, provides consumers with bespoke services (digital banking, mobile lending and savings), promotes access to credit for small and medium-sized enterprises (SMEs), leads to increased efficiency of traditional financial institutions and, more fundamentally, drives financial inclusion (Olajide, 2021). Accordingly, the digitalization of banking services in Nigeria has expanded the reach of banking services to populations previously excluded from the formal financial system. Mobile banking and digital payment options have proven instrumental in bridging the gap. In regions where physical bank branches are scarce, digital banking services have become lifelines, offering unbanked and underbanked individuals' access to savings accounts, payment services, and credit opportunities. As noted by Enebeli (2024), digitalization promotes financial inclusion by expanding access to financial products and services for previously unbanked segments of the population. This expansion is driven by the increasing number of Nigerians participating in web payments, mobile banking, and digital wallets. The Central Bank of Nigeria has implemented regulations to promote digital transformation and ultimately financial inclusion in Nigeria. One of these interventions include the

introduction of agent banking and payment service banks which leverage technological solutions to provide easier and quicker access to banking solutions, and accelerate financial inclusion in rural areas. Financial inclusion is a huge task and digitalization in banking is only one of the drivers for achieving this.

2.1.5. The Nigerian Banking Evolution and its Historical Journey to Digitalization

The Nigerian banking history is traceable to the early 20th century during the British colonial period. The African Banking Corporation, which opened its doors in Lagos in 1892, primarily to serve the colonial government and expatriate businesses, was the first bank to operate in Nigeria. However, this bank was soon taken over by the Bank of British West Africa (BBWA) in 1894 due to the challenges it faced, and this marked the beginning of modern banking in Nigeria. The BBWA, now known as First Bank of Nigeria, laid the foundational structures for banking in the country, focusing on trade finance and catering to the colonial economy's needs. Driven by the growing nationalist sentiment and the desire for economic independence, the mid-20th century saw the emergence of indigenous banks, which were established by Nigerian entrepreneurs to serve the local population that had been largely neglected by the colonial banks. The banking sector entered a new phase characterized by expansion and increased government involvement, following Nigeria's independence in 1960. The Central Bank of Nigeria (CBN) was established in 1958, becoming fully operational in 1960, to serve as the country's monetary authority and regulator of the banking sector. Due to liberal licensing policies and economic boom periods, the 1970s and 1980s witnessed a proliferation of banks. However, this rapid growth was not without its problems, leading to financial instability and bank failures. In the late 1980s and 1990s, the Nigerian government and the CBN implemented several reforms aimed at enhancing regulatory oversight, ensuring financial stability, and promoting transparency and accountability in the banking sector. The main focus of these reforms was to ensure a more stable and robust banking system. Until the early 2000s, banks and other financial institutions relied on manual processes and paperwork to facilitate local and international transactions, no matter how complex they may be (Atoyebi, 2024). Suffice it to say that historically, the Nigerian banking industry has been characterized by traditional banking practices, including brick-and-mortar branches, manual transactions, and paper-based record-keeping. However, the dawn of the digital era has ushered in a new paradigm in banking, challenging traditional norms and reshaping the industry's dynamics (Lottu, Abdul, Daraojimba, Alabi, John-Ladeja, & Daraojimba, 2023). The dawn of the 21st century has ushered in the most transformative era in the history of Nigerian banking, marked by the advent of digital technology. Nigerian banks have been at the forefront of adopting information and communication technology (ICT) to improve service delivery and extend banking services to the unbanked and underbanked populations. Digital banking has gained significant traction in Nigeria, revolutionizing the traditional banking landscape. With the

advent of technology and internet penetration, digital banking has become increasingly popular among Nigerians. The introduction of online banking, mobile banking, and digital payment platforms has revolutionized the way Nigerians access and use financial services. The convenience and accessibility offered by digital banking have transformed the way individuals and businesses conduct financial transactions. Moreover, the rise of FinTech companies in Nigeria has spurred innovation and competition in the banking sector, leading to the development of new financial products and services tailored to the needs of a diverse customer base. This digital revolution has not only enhanced financial inclusion but has also positioned Nigeria as a leading player in the FinTech space in Africa. Nigeria was recently named Africa's digital payments leader, and the country's banking sector is also the most digitized in the continent. According to a 2022 press release, Nigeria recorded 3.7 billion real-time payments in 2021, earning the sixth spot among countries with the biggest real-time payments markets (Atoyebi, 2024). Nigeria's digital banking sector is expected to experience unprecedented growth in the coming years, as the government strengthens its drive to develop the country's technological infrastructure (Atoyebi, 2024).

2.2.0. Theoretical Review

2.2.1. Transactions Cost Innovative Theory

The theory was explained by guidance of transactions cost innovative theory which was introduced by Hicks & Niehans (1983) who championed and stated that the foremost aspect of financial innovation is to be able to reduce cost of transaction which responds to the advancement in technology and which resulted in the reduction of transaction cost. The ability to lower the cost of transaction brings about innovation in financial and upgrading of financial service and the same believes that money related innovations decrease the costs involved in making transactions. The importance of Transaction Costs Innovation theory in the set-up of Internet-related Information Technology (IT) considerably lessens a company's exchange costs since it delivers effective coordination, administration and utilization of data. cell phones which use Internet-associated IT brings down exchange costs as it gives both off-site access to the company's internal database and other significant sources of information. The outcome further reduces the cost of operation by the introduction of mobile and agency banking which influences the profitability growth of the bank.

This theory is pertinent and relevant to this study because the study is centered on enhancing financial performance, which can be achieved by reducing transaction costs through the adoption of technology.

2.3. Empirical Review

Okonkwo, Anene, Ekwueme, and Chizoba (2022) examined the effect of E-payment on the performance of deposit money banks in Nigeria. The study employed Ex post facto

research design. A sample size of 13 deposit money banks in Nigeria was used from the population of 22 banks. Data were analyzed with descriptive statistics and the hypotheses regression analysis was carried out with the aid of E-Views 9.0 statistical software. The study revealed that MPAY payment method has a positive effect on return on assets of quoted deposit money banks in Nigeria, but not statistically significant at 5% level of significance, and online (WEB) payment methods have a negative effect on return on assets of quoted deposit money banks in Nigeria, and this effect was not statistically significant at 5% level of significance. The study therefore, recommended that Nigerian deposit money banks should collaborate with phone service providers to checkmate and prosecute hackers in order to reverse the negative effect of mobile payment on banks' profitability in Nigeria.

Virginia, Fredrick and John (2021) investigating the impact of digital financial services on the financial performance of Commercial Banks in Kenya using secondary dataset generated from the Central Bank of Kenya (CBK) and the Communication Authority of Kenya (CAK) for a period of five years (2015-2019). To achieve this objective, the study used a multiple regression and Pearson correlations. The study using the Pearson correlations found negative correlations between mobile money (registered mobile money accounts, active mobile money agents and mobile money deposits and withdrawals), digital payments (P2P transfers) and performance of commercial banks. However, the study found positive and significant relationship between customer deposits, Gross non-performing loans and performance of commercial banks in Kenya. The study therefore concludes that digital financial services offered by Fintech companies have a negative impact on the performance of Commercial banks in Kenya and recommends that commercial banks should continuously develop more digital financial services and collaborate more with Fintech companies to improve on their performance. The originality of this study will be of benefit to managers of Commercial banks.

Opiyo (2021) explored the effect of digital financial services on financial performance using descriptive and correlation analysis found a strong and significant positive correlation between mobile financial services and financial performance. While, online financial services had a moderate and significant positive correlation between mobile financial services and financial performance.

Ogbonna, Okoro, Atasanan, and Igwe, (2020) examined the effect of electronic banking on domestic investment in Nigeria. The authors sourced secondary data from CBN 's statistical bulletin of various years for POS, ATM, Web pay, Mobile Banking and NIP; and World Data Atlas for domestic investment (DI) for the period of 2009 to 2018. Multiple regression analysis was employed in analyzing the data collected. The study discovered that the pool of electronic banking transactions does not affect the domestic investment in Nigeria significantly. Individually however, electronic banking transactions via POS, Mobile Banking and Web pay all showed negatively insignificant relationship with

domestic investment while ATM and NIP showed positive but insignificant relationship with domestic investment in Nigeria.

Shaikh, Alharthi, and Alamoudi, (2020) examined the key drivers of customer experience with non-financial digital services. The study employed the multiple regression models. The result of the study revealed that consumer awareness, ease of use and usefulness largely affects the experience and usage of mobile banking applications.

Agu and Nwankwo (2019) looked at the impact of the electronic banking system on the financial performance of a few Nigerian deposit money banks. The research design was an ex post facto research design that utilized secondary data from 2008 to 2017. The amount of the effects exerted on chosen deposit money banks by ATM, MMT, and POS was determined using the ordinary least square (OLS) multiple regression technique of analysis. The analysis found that ATM and MMT have a positive and non-significant effect on ROE, whereas POS has a negative and non-significant effect on ROE of selected Nigerian deposit money institutions.

Bingilar& Bariweni (2019) investigated the effect of electronic payment systems on the performance of commercial banks in Nigeria. For the purpose of the study, data was collected from secondary sources specifically from the CBN statistical bulletin and comprised of data on the assets base of commercial banks and web pay for the period of 2009 to 2019. Findings of the research showed that internet (online) banking transactions had a positive relationship with the asset base of commercial banks.

Enoruwa, Ezuem and Nwani (2019) examined the relationship between electronic banking and bank performance in Nigeria. The scholars adopted data sourced from the CBN bulletin for the period 2009 to 2017. Regression Analysis was used to test the strength and nature of relationship between the dependent variable proxy (Total Bank Deposit) and independent variable proxies (ATM, POS, Web pay, Mobile Pay. Results showed that electronic channel products (ATM, POS, Web pay, Mobile Pay) are positively and significantly related to bank performance with high correlation to each other.

Muotolu & Nwadiolor (2019) investigated the effect of CBN cash less policy on the financial performance of Deposit Money Banks in Nigeria. The study utilized panel data collected from a sample of 14 banks for six years from 2012 when the policy was introduced in Nigeria to 2017 and employed Descriptive Statistic Analysis and Correlation testing. Findings from the study revealed that (ATM) has a positive and significant effect on Return on Assets (ROA) of banks in Nigeria while, POS, WEB, NIP and NEF were found to have a positive but insignificant effect on ROA of quoted banks in Nigeria.

3.0 Methodology

The study adopted the Ex-Post Facto research design. This research design was chosen since the alleged cause has already occurred in retrospect. More explicitly, this form of research design is one that takes place after an event or fact had taken place.

The study covered all the quoted Deposit Money banks listed in the Nigerian Exchange Group (NGX) as at December 31st, 2023. Given that the study involved the whole banking industry, there would be no need for sample size since the sample size equals the population. This means that the sample give a fair view of the entire population. This study made use of secondary data as the main source of information and was sourced from the annual report and accounts of the banks and data from CBN Statistical Bulletin from (2009Q1-Q4) to (2023Q1-Q4). The study adopts quarterly data. The data on the digital finance channel proxies automated teller machines (ATM), Mobile banking, web pay, Point of Sale (POS), and financial performance of DMBs proxied by Return on Asset (ROA) were analyzed using Econometric Views (E-Views) 9.0. The choice of this statistical package is based on the fact that it is the user friendly and easy to compute. Again, the Ordinary Least Square (OLS) is the Best Linear Unbiased Estimator (BLUE) and has minimum error. Hicks and Niehans (1983) proposed that financial innovation aims to reduce transaction costs through technological advancements. Lower costs drive innovation, improve financial services, and enhance profitability. Technologies like Internet-based IT and mobile banking reduce operational costs and boost banks' profitability. This theory is relevant to the study as it underscores how technology enhances financial performance by minimizing transaction costs.

The linear regression model used in this study is adapted from the prior studies of Bingilar and Bariweni (2019) with modification.

$$ASSETS = f(ATMTRA, POSTRA, INTBNK, MOBBNK) \dots (1)$$

The above is restated econometrically as: $ASSETS = B_0 + B_1ATMTRA + B_2POSTRA + B_3INTBNK + U \dots (2)$

Consistent with the above study, this model modified and extended the model by adding mobile banking to the variables understudy and changes the dependent variable to Return on Asset (ROA) and the ordinary least square was guided by the following linear model

$$Y = F(X_1, X_2, X_3, X_4, \dots) \dots (1)$$

In functional form econometrically,

$$ROA = F(ATM, MOB, WP, POS, \dots) \dots (2)$$

Econometrically the above model is specified as follows:

$$ROA = \beta_0 + \beta_1ATM + \beta_2MOB + \beta_3WP + \beta_4POS + \epsilon_{it} \dots (3)$$

In Logarithm form,

$$\ln(ROA) = \beta_0 + \beta_1 \ln(ATM) + \beta_2 \ln(MOB) + \beta_3 \ln(WP) + \beta_4 \ln(POS) + \epsilon_{it} \dots (4)$$

Where:

- lnROA = Log of Return on asset
- lnATM = Log of Transactions done through the Automated Teller Machine
- lnMOB = Log of Transactions done through the Mobile Pay
- lnWP = Log of Transactions done through the Internet Pay
- lnPOS = Log of Transactions done through the Point-of-Sale machine

- ε = Error term of the model
- β_0 = Constant value
- $\beta_1, \beta_2, \beta_3, \beta_4$ = Regression model coefficients.

Decision Rule

Reject the null hypothesis if the p-value is lesser than the significance level, Significance level is 5%.

Apriori Expectation

Following extant empirical studies and the various theories used to underpin this study, we expect a positive relationship between the dependent and independent variable. It is mathematically expressed as: $\beta_1ATM, \beta_2MOB, \beta_3POS, \beta_4WP > 0..... (4)$

Table 1: Operationalization of Variables

SN	Study Variable	Notation and Measurement	Apriori Expectation	Previous researchers
Dependent Variable				
1	ROA	Annual bank's net income to yearly averaged total assets (world bank 2023).	Nil	Mwai, A., Memba, F.S., &Njeru, A. (2018)
Independent variables				
2	MOB	Mobile banking is measured in this study as the total value of mobile banking transactions in a particular year respectively (CBN Statistical Bulletin, 2023).	+	Enebeli-Uzor, S. (2024).
3	ATM	Automated teller Machine is measured as the total value of ATM transactions in a particular year respectively (CBN Statistical Bulletin, 2023).	+	Bingilar and Bariweni (2019)
4	WP	Web pay is measured as the total value of web banking transactions in a particular year respectively (CBN Statistical Bulletin, 2023).	+	Koch, P. G. J., &Siering, M. (2017).
5	POS	Point of sale is measured as the total value of POS transactions in a particular year respectively (CBN Statistical Bulletin, 2023).	+	Enoruwa, K.O., Ezuem, D.M. &Nwani, C.O. (2019)

4.2. Data Analysis

Table 4.1: Summary of Descriptive Statistics for all Study Variables

	ROA	ATM	POS	WP	MB
Mean	5.423068	3.334923	2.264497	2.135205	2.345136
Median	4.404547	3.027011	2.035126	1.493612	2.190376
Maximum	9.059103	7.186549	6.955172	8.602171	8.903388
Minimum	3.745966	1.796505	0.271842	0.527630	-1.221850
Std. Dev.	1.731740	1.344088	1.649201	2.138544	2.021391
Skewness	0.916937	2.121308	1.460614	2.441737	1.372226
Kurtosis	2.133834	6.566454	4.842225	7.453741	5.998966
Jarque-Bera	10.28334	76.79848	29.81842	109.2103	41.31452
Probability	0.005848	0.000000	0.000000	0.000000	0.000000
Sum	325.3841	200.0954	135.8698	128.1123	140.7082
Sum Sq. Dev.	176.9364	106.5878	160.4719	269.8290	241.0753
Observations	60	60	60	60	60

Source: Econometric Views Output (2024)

The evidence provided in Table 4.1 reveals the individual characteristics of the variables used in the study highlighting their median, mean, maximum and minimum values, standard deviation and Jarque-Bera statistics (normality Test). return on asset (ROA) has a mean value of 5.423068 with maximum value of 9.059103 and minimum value of 3.745966. return on asset (ROA) recorded a standard deviation of 1.731740 which is lower than its mean. This indicates that return on asset (ROA) did not deviate far away from its mean.

Automated Teller Machine (ATM) recorded mean values of 3.334923 with maximum values of 7.186549 and minimum values of 1.796505. It recorded standard deviation values of 1.344088 which is lower than its means. This indicates that Automated Teller machine (ATM) did not deviate far away from its mean.

Point of Sale (POS) recorded mean values of 2.264497 with maximum values of 6.955172 and minimum values of 0.271842. It recorded standard deviation values of 1.649201 which is lower than its means. This indicates that it did not deviate far away from its mean.

Web-pay (WP) recorded mean values of 2.135205 with maximum values of 8.602171 and minimum values of 0.527630. It recorded standard deviation values of 2.138544 which is higher than its means. This indicates that it deviates far away from its mean.

Mobile banking (MOB) recorded mean value of 2.345136 with maximum values of 8.903388 and minimum values of -1.221850. It recorded standard deviation values of 2.021391 which is higher than its means.

Table 4.2: Summary of Correlation Analysis

	ROA	ATM	MOB	WP	POS
ROA	1.000000				
ATM	0.299473	1.000000			
MOB	0.633524	-0.48928	1.000000		
WP	0.625433	0.147841	-0.134445	1.000000	
POS	0.725334	0.322264	-0.257630	0.144462	1.000000

Source: Econometric Views Output (2024)

Table 4.2 above shows that Point on Sale (POS) is positively and strongly correlated with return on asset (ROA) with correlation coefficients of 0.725334. The table also shows that Mobile banking (MOB) and Web pay (WP) are positive and has moderate correlation with return on asset (ROA) with respective correlation coefficients of 0.633524 and 0.625433. Lastly, the table shows ATM has positive and weak correlation with return on asset(ROA) with correlation coefficients of 0.299473. Meanwhile, none of the independent variables exhibited high correlation suggesting the absence of serial correlation.

4.4. Regression Result

Prior to the proper regression result, the model was first subjected to various diagnostic tests. The various diagnostic tests tested in this study are presented in table 4.4 and figure 4.5 below:

Table 4.4: Diagnostic Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
	0.51324		
F-statistic	0	Prob. F(6,4)	0.7330
	4.81654	Prob. Chi-Square(6)	
Obs*R-squared	2		0.5531
	0.59433	Prob. Chi-Square(6)	
Scaled explained SS	5		0.9535

Source: Econometric Views Output (2024)

The Heteroskedasticity Test: Breusch-Pagan-Godfrey reported a Prob. F of 0.7330. This implies that the model is devoid of serial correlation and that it is Homoskedastic. Hence, we conclude that the model is fit for prediction.

Table 4.5: Summary of OLS Regression Result

Dependent Variable: ROA
 Method: Least Squares
 Date: 12/10/24 Time: 01:22
 Sample: 2009 2023
 Included observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.516968	0.183466	2.81778	0.0304
ATM	0.537223	0.18224	2.94788	0.0021
MOB	0.645689	0.255332	2.52882	0.0151
-				
WP	0.637844	0.225223	-2.832055	0.0018
	0.633464			
POS	5	0.287207	2.205586	0.0205
		Mean dependent		1.16E+
R-squared	0.847634	var		08
Adjusted R-squared				4.28E+
	0.774327	S.D. dependent var		08
S.E. of regression	2493197	Akaike info criterion		27.1443
	0			
Sum squared resid	2.49E+1	Schwarz criterion		22.4553
	5			
	-	Hannan-Quinn criter.		27.0122
Log likelihood	118.2376			2
				1.96485
F-statistic	214.5844	Durbin-Watson stat		7
Prob(F-statistic)	0.000011			

Source: Econometric Views Output (2024)

The regression in table 4.5 above evidenced that, the intercept (constant value) denoted by C stood at 0.516968. This signpost that, if all the independent variables (Automated Teller Machine (ATM), Mobile Banking (MOB), Web pay (WP), and Point on Sale (POS) are held constant, the dependent variable Return on Asset (ROA) will still be positive and significant. More so, the coefficient of determination as 0.847634 which is 84.76% supported by high value of adjusted R² as 77.43% presumes that the independent variables ((Automated Teller Machine (ATM), Mobile Banking (MOB), Web pay (WP), and Point on Sale (POS) was able to account for 77.43% variation in the dependent variable

return on asset (ROA). The result further reaffirmed that the model has a high explanatory power.

Furthermore, the F-statistic value of 214.5844 alongside a p-value of 0.000011 is significant at 5% level of significance. This indicates that the model is statistically significant on the overall. Again, the Durbin Watson Statistics clearly revealed that the model is not serially correlated since its value is within the accepted region of acceptance.

Source: Researcher's Compilation Based on E-Views 9.0 Output (2024)

4.5. Discussion of Findings

4.5.1. Automated Teller Machine (ATM) and financial performance of DMBs (ROA) in Nigeria.

The Ordinary Least Square (OLS) result revealed that Automated Teller Machine (ATM) has a positive significant effect on financial performance of DMBs (ROA). The positive result implies that 1% rise in Automated Teller Machine (ATM) will increase the financial performance of DMBs (ROA) by 0.537223. This result supports the a priori expectation of the study. Put differently, the higher the level of Automated Teller Machine (ATM) penetration, the higher the financial performance of DMBs (ROA). The plausible justification for the positive relationship is most likely due to the fact that the introduction of Automated Teller Machine (ATM) has led to increased revenue i.e, ATM generates revenues through transaction fees, interchange fees, and surcharges. Also increased transaction volume (via ATM customers perform transaction 24/7, leading to an increase in transaction volume and revenue. Again, it passed the test of significance. This is adjudged from the fact that its p-values are less than 5% significance level. Hence, we concluded that Automated Teller Machine (ATM) has positive yet statistical significance effect on financial performance of DMBs (ROA). This result is in tandem with the study of Beloke, Elle, and Ap, (2021), but contradicts the findings of Okonkwo, AneneEkwueme, and Chizoba (2022),

4.5.2. Mobile Banking (MOB) and financial performance of DMBs (ROA) in Nigeria

The Ordinary Least Square (OLS) result revealed that Mobile Banking has a positive and significant effect on financial performance of DMBs (ROA) in Nigeria. The positive result implies that 1% rise in Mobile Banking (MOB) will increase the financial performance of DMBs (ROA) by 0.645689. The plausible justification for the positive relationship is most likely due to the fact mobile banking automates many processes, reducing manual errors and increasing efficiency. It also offers opportunity for new revenue streams, such as mobile payment services, mobile wallets, and mobile-based insurance products. This result however meets the a priori expectation of the study. Again, the result passed the test of significance. This is adjudged from the fact that its p-value estimated at 0.0151 is

less than 5% significance level. Hence, we conclude that Mobile Banking (MOB) has positive and statistical significance effect on financial performance of DMBs (ROA) in Nigeria. This result is in tandem with the study of Njoku, Nwadike and Azuama (2020) but contradict the findings of Ogbonna, Okoro, Atasanan, and Igwe, (2020) and Wadesango and Magaya (2020)

4.5.3. Web-pay and financial performance of DMBs (ROA) in Nigeria

The Ordinary Least Square (OLS) result revealed that Web-pay (WP) has a negative yet significant effect on financial performance of DMBs (ROA). The negative result implies that 1% rise in web pay (WP) will decrease financial performance of DMBs (ROA) by -0.637844. This result contradicts the apriori expectation of the study. Put differently, the lower the Web pay, the higher the financial performance of DMBs (ROA). The plausible justification for the positive relationship is most likely due to the fact web-pay systems often charge lower transaction fees compared to traditional banking channels, reducing revenue for banks. Also, it can disintermediate banks, reducing their role in the payment process and decreasing revenue. However, it passed the test of significance. This is adjudged from the fact that its p-value is lesser than 5% significance level. Hence, we conclude that Web-pay has negative yet statistical significance effect on financial performance of DMBs (ROA). This result is in tandem with the study of Mustapha (2018) and Enoruwa, Ezuem and Nwani (2019) but contradicts the findings of Muotolu and Nwadiolor (2019)

4.5.4. Point of Sales and the financial performance of DMBs (ROA) in Nigeria

The Ordinary Least Square (OLS) result revealed that Point of Sale has a positive significant effect on financial performance of DMBs (ROA). The positive result implies that 1% rise in Point of Sale will increase the financial performance of DMBs (ROA) by 0.6334645. This result supports the apriori expectation of the study. Put differently, the higher the Point of Sale, the increase in DMBs financial performance (ROA). The plausible justification for the positive relationship is most likely due to the fact POS systems generate transaction fees for banks, increasing revenue and also banks earn inter-charge fees on POS transaction adding to revenue. Also, the study found that Point of Sales passed the test of significance. This is adjudged from the fact that its p-values are less than 5% significance level. Hence, we conclude that Point of Sales has positive statistical significance impact on financial performance of DMBs (ROA). This result is in tandem with the study of Oniore and Okoli (2019), Ugbede, yahaya and Edicha (2019) but contradicts the findings of Mustapha (2018) and Agu and Nwankwo (2019).

5.0 Conclusion and Recommendation

5.1. Conclusion

The effect of Digital finance channel on financial performance of DMBs (ROA) in Nigeria cannot be over emphasized. However, there seems to be few studies carried out on this subject matter. Succinctly, this study examined the effect of Digital finance channel on financial performance of DMBs (ROA) in Nigeria from (2009Q1-Q4) to (2023Q1-Q4). The study used the Ordinary Least Square (OLS). The study evidenced that all the variable (Automated Teller Machine (ATM), Mobile Banking (MOB), Web-pay (WP), and Point on Sale (POS)) affect financial performance of DMBs (ROA) significantly over the study period. However, their effect on financial performance of DMBs (ROA) is mixed. Hence, the study concluded that the major reason why the DMBs in Nigeria is not able to improve maximally is as a result of the short-comings in the utilizations of Web pay in Nigeria.

5.2. Recommendations

Based on the findings, the following recommendations are made;

1. ATM have proven to be critical tool for enhancing the financial performance of DMBs. Hence, the study recommends that DMBs continue to expand and strategically deploy ATM networks for increased revenue generation, cost efficiency, customer retentions and satisfaction, enhanced deposit mobilization and support for digital banking integration.
2. The study also recommends that there should be public enlightenment on the benefit that is accruable from the usage of Mobile transfer transaction. This would help to reduce the ills associated with the use of mobile banking.
3. The study also recommends that the Nigerian regulatory authorities should provide end-to-end web-pay since it exerts negative significant effect on financial performance of DMBs in Nigeria.
4. The study recommends that there should be increase in the usage of POS since it has a positive effect on financial performance of DMBs in Nigeria.

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