COMPUTERIZATION AND SERVICE DELIVERY OF DEPOSIT MONEY BANKS IN NIGERIA, 2009-2023

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Abstract

The study examines the computerization of the service delivery of deposit money banks in Nigeria. Specifically, the study examines the effects of ATM, POS and Internet banking on the service delivery of deposit money banks in Nigeria. The researcher adopted an ex-post facto research design used in collecting data. Descriptive statistics and multiple linear regression tools with the aid of E-Views were used to analyse the data and the findings show that; ATM transactions had a significant negative relationship with the service delivery of deposit money bank in Nigeria(the P-value is 0.01707 while the t-statistics is 2.578346); POS transactions had no significant effect on the service delivery of deposit money bank in Nigeria(P-value is 0.3966 while the t-statistics -0.849849); and Internet banking had the non-significant positive effect the service delivery of deposit money bank in Nigeria (P-value is 0.009 while the t-statistics -3.649302). Overall, the findings suggest that Banks should focus on enhancing the reliability, security, and user experience of ATM and Internet banking services. Addressing common issues such as transaction failures, security concerns, and complicated interfaces could help mitigate the negative impact on customer deposits. The study's results highlight valuable insights for policymakers and bank management, aiding in the formulation of strategies to enhance electronic banking services in Nigeria.

Keywords: *Banking Service Delivery, POS Transactions, ATM Transactions, Internet Banking Services, NEFT*

Background to the Study

The Central Bank of Nigeria (CBN) has recently participated in a series of changes aimed at both strengthening the Nigerian monetary framework and imposing and improving Nigeria's overall economic execution to keep it on top of global trends. Ajayi (2020) posits that an E-Banking is a situation in which money is spent without being physically transmitted from one place to another. Nigeria's mission to transition from a cash to an e-banking economy has been prominent for some time. Banks are the mainstay of every economy and occupy central positions in the country's financial system as essential agents of economic development. By intermediating between the surplus and deficit savings units within an economy, banks mobilize and facilitate efficient allocation of funds thereby increasing the quantum of investments and economic activities.

Computerization in banking is a process of transacting banking operations electronically. It is a process of using electronic devices to carry out banking operations. Computerization does away with most visits to the bank. It is a state-of-the-art service that is just beginning to take off among banking customers, especially in Nigeria. Indeed, Computerization has the major potential for future development as it allows customers to do most of the things they do at the bank like make balance enquiries, payments, transfer of funds, and pay bills over the Internet. It also offers banking services outside of normal opening hours. It

has effectively "opened" banks for business twenty-four hours a day, seven days a week (Rubino, 2020). With the proliferation of the internet, coupled with the world's increasingly addicting to e-business, the trend of cash transactions is now giving way to electronic payment system. This growing acceptance of the digital lifestyle, as stated by Salehi and Alipour (2010), has brought a significant transformation in customers' expectations from their financial service providers. Offei and Nuamah (2016) posited that customers are now seeking faster and more convenient technology with a more rewarding banking experience.

In developing economies like Nigeria, financial sector developments have been accompanied by structural and institutional changes because of their crucial role in the economic development of the nation. In pursuance of its core mandate, the Central Bank of Nigeria has engaged in a series of reforms aimed at making the financial system formidable and enhancing the overall economic growth of Nigeria (Asaolu, 2013). The cashless policy was introduced in 2012 by the Central Bank of Nigeria and is aimed at achieving a cashless economy and was conceptualized by the apex bank to increase the proficiency of Nigeria's payment systems which will in turn improve the quality of service being offered to the banking public.

Banking services are now more automated and require less paperwork than in the past, according to Central Bank of Nigeria (CBN) reports and statistical bulletins from most Nigerian deposit banks. Before the effect of the cashless strategy procedure approaches on the display of fixed or deposit cash banks in Nigeria, tally Count, coins, and paper notes were used, and there was no improvement in bank performance. Furthermore, the cashless policy aims to plan some of the negative consequences associated with the use of actual money in the economy, such as high money costs, high risk of using money, high endowment, casual economy, failure, and debasement. According to Agbjuekere's (2018) review, the current banking environment is extremely powerful and undergoes rapid changes as a result of advancements and developments in data and correspondence innovation, expanded mindfulness, and client requests. The financial industry of the twenty-first century operates in a perplexing and serious environment characterized by changing conditions and a significant monetary environment. This has modified the strategy for a retail banking challenge. As a result, following the introduction of electronic banking and web computerized teller machines, the expanded reception, and entry of portable banking and web banking have added another appointment channel to retail banking that is, Web/Internet banking.

Adubgoi (2018) opined that the mission for banks in Nigeria to have proficient customer service conveyance and keep up overall importance in the framework has resulted in the misuse of the numerous advantages of Information Communication and Technology utilizing robotized contraptions critical in the business. Several outlines have also been written to broaden the significance of data and correspondence innovation to business bank execution. Another reason for the various e-banking examinations is buyer trust. Shopper fulfilment has the potential to expand an organization's client base, extend the use of a more unpredictable customer mix, and improve the company's reputation.

It overcomes the advantage of meeting buyers' needs better than continuously competing and eating them through better management in this manner. A satisfied customer will continue with his exoneration assistance regardless, whereas an unsatisfied customer will be willing to discontinue his exoneration assistance. There is a requirement to provide evidence of how much Information Communication and Technology exercises have influenced purchaser administration conveyance in Nigerian banks. A credit-only economy, also known as a cashless policy, is one in which an agreed-upon society is controlled to have the least amount of money available for use, with the remainder being executed electronically via direct debit, mobile payments (MB), internet banking (IB), Automated Teller Machines (ATMs), point of

sale stations (POSs), and Nibs Electronic Fund Transfer (NEFT), etc.

The upsurge in Information Communication Technology (ICT) is what has made cashless banking both possible and meaningful globally. E-Banking introduction in Nigeria has brought about changes in the banking patterns of the government, organizations, and individuals.

Banking transactions have witnessed a slow pace of technological transformation due to high levels of financial illiteracy, poor and irregular power supply and lack of trust in payment systems not involving physical cash. Therefore, banking customers have been subjected to high transaction costs with customers spending several hours in banks to do simple transactions as opposed to cashless transactions which reduce processing/transaction time. The long hours spent in banks and inefficiency through cumbersome documentation reduce customer satisfaction as well as increasing transaction costs and other overheads for banks. The absence of E-banking in Nigeria has over the years contributed to high cost of cash movement and cash management by banks thereby impacting negatively on banks profitability.

Several researches have been carried out in an effort to examine the relationship between computerization and service delivery but these have led to conflicting viewpoints and ambiguous conclusions. Studies by Njoku, Nwadike, and Azuama (2018); Werigbelegha and Avery (2018) found a link between computerization and service delivery. Contrarily, Dobre (2016) showed no statistically significant correlation between computerization and service delivery, while Effiong (2020) and Utile, Okwori and Ikpambese (2018) found that computerization have negative and insignificant effect on service delivery. The studied literatures' inability to come to a firm conclusion regarding the relationship between computerization and service delivery motivates this study.

Specifically, this study sought to: Determine the effect of Automated Teller Machine Transactions (ATM) on the service delivery of deposit money bank in Nigeria; Analyze the effect of Internet Banking Transactions (IBT) on the service delivery of deposit money banks in Nigeria; Determine the effect of Point of Sale Machine Transactions (POS) on the service delivery of deposit money bank in Nigeria.

Review of Related Literature

Related literature on the subject matter is reviewed under sub-sections of conceptual framework, theoretical framework and empirical review.

Conceptual Review

Under the conceptual review, the main concern of the researcher was to define and explain the relevant variables of the study as well as their respective measures as contained in the objectives of the study. This section gives an overview of Service Delivery, Computerization, Electronic Banking Processes, Automated Teller Machine transactions, Internet banking transactions and Point of Sale Machine Transactions.

Service Delivery

Service delivery in deposit money banks in Nigeria refers to the process of providing customers with banking services that meet their needs and expectations. This includes services such as account opening,

deposits, withdrawals, loans, and credit facilities, as well as electronic banking services like mobile banking, internet banking, and ATM services (Kama, 2021). Effective service delivery is critical for deposit money banks in Nigeria, as it can help to build customer loyalty, drive business growth, and improve competitiveness (Hanson, 2017).

Deposit money banks in Nigeria have made significant improvements in service delivery in recent years, with many banks investing in technology and staff training to improve customer experience (Ojo, 2022). For example, some banks have introduced online platforms that allow customers to open accounts, apply for loans, and access other banking services from the comfort of their own homes. Others have introduced mobile banking apps that enable customers to perform banking transactions on their mobile phones. These innovations have helped to improve service delivery and increase customer satisfaction.

Despite these improvements, there are still challenges facing service delivery in deposit money banks in Nigeria. One of the major challenges is the lack of adequate infrastructure, including reliable power supply and internet connectivity (Akinsanya, 2021). This can lead to downtime and disruptions in service delivery, which can frustrate customers and damage the reputation of the bank. Another challenge is the high level of competition in the banking industry, which can make it difficult for banks to differentiate themselves and attract and retain customers (Okeke, 2022).To address these challenges, deposit money banks in Nigeria need to prioritize service delivery and focus on building strong relationships with their customers (Hanson, 2017). This can involve investing in staff training and development, improving technology and infrastructure, and introducing innovative products and services that meet the needs of customers (Kama, 2021). Banks should also prioritize customer feedback and complaints, and use this information to improve service delivery and customer experience (Ojo, 2022).

Service delivery is a critical component of deposit money banks in Nigeria, and banks that prioritize service delivery are more likely to succeed in a competitive market. By investing in technology, staff training, and customer feedback, deposit money banks in Nigeria can improve service delivery, build customer loyalty, and drive business growth.

Computerization

The concept of computerization in deposit money banks in Nigeria refers to the use of technology to improve banking services and operations (Udak, 2020). This includes the use of automated teller machines (ATMs), point of sale (POS) terminals, mobile banking, and internet banking. Computerization has improved the efficiency and effectiveness of banking services, reduced the need for physical bank branches, and increased access to banking services, especially in rural areas. However, there are still challenges such as inadequate infrastructure, high cost of technology, and security risks. The impact of computerization on deposit money banks in Nigeria has been significant, with improvements in customer service, reduced transaction times, and increased accuracy (Babatunde & Raymond, 2019). Computerization has also enabled banks to offer a wider range of services, such as mobile banking and Internet banking, which have increased access to banking services, especially for the unbanked population [2]. Furthermore, computerization has improved the efficiency of banking operations, reduced the need for physical bank branches, and increased the use of digital channels for banking transactions.

Despite the benefits of computerization, there are still challenges facing deposit money banks in Nigeria, including inadequate infrastructure, high cost of technology, and security risks (Andabai, 2019). The lack of adequate infrastructure, such as reliable power supply and internet connectivity, has hindered the effective deployment of computerization in some areas. The high cost of technology has also made it

difficult for some banks to invest in computerization, while security risks, such as cyber-attacks and fraud, remain a major concern. To address these challenges, deposit money banks in Nigeria need to invest in adequate infrastructure, such as reliable power supply and internet connectivity, and ensure that their systems are secure and up-to-date. Banks should also prioritize customer education and awareness, to ensure that customers understand the benefits and risks of computerization. Furthermore, banks should collaborate with Fintech companies and other stakeholders to develop innovative solutions that address the challenges of computerization.

Computerization has transformed the banking industry in Nigeria, improving efficiency, effectiveness, and access to banking services (Muotolu & Chikwemma, 2019). However, there are still challenges that need to be addressed, including inadequate infrastructure, high cost of technology, and security risks. By investing in adequate infrastructure, prioritizing customer education and awareness, and collaborating with fintech companies and other stakeholders, deposit money banks in Nigeria can overcome these challenges and fully harness the benefits of computerization.

E-Banking

E-banking is a kind of banking that involves an electronic form of money transaction. Here banking services are fully automated such that transactions are concluded in a jiffy. It involves the use of a computer network in dispensing cash and transfers of funds. The primary objectives are to replace intensive labour operations and thus help reduce the waiting time of customers. For now, in Nigeria, e-banking is limited to the automated teller machine and electronic funds transfer. It also includes electronic devices such as SQL and MICR (Anyanwuocha, 2021).

The emergence of e-banking products brings to an end the era of mechanical and laborious banking. E-banking means not only electronic production, like, for instance, opening a letter of credit, but also the customer requests the services by electronic means and the bank supplies it the very same way. In banking operations, technical change encompasses the marketing and distribution function in addition to production. Like many other sectors, banking has been suffering changes due to development and improvements in ICT (Onodugo, 2015), which has been a useful tool for following market demands and practices. This development of new technologies has had a huge impact on organizations in terms of management and control, marketing and research, operations and decision-making. Banking technology is not a new topic. It has been a constant presence in the literature since the late 1980s and early 1990s. E-banking can be defined as a set of activities conducted from home instead of a physical bank location (Obiri *et al,* 2013). It is an "umbrella term for the process by which a customer may perform banking transactions electronically without visiting a brick-and-mortar institution. E-banking can be also referred to as online banking, cyberbanking, virtual banking and net banking. Moreover, there are three types of e-banking: internet banking, phone banking and mobile banking, which differ in terms of distribution channel, internet, phone and mobile phone, respectively.

Onodugo (2015) opined that e-banking is not something new. It started some time ago in the form of ATMs and telephone transactions. This first generation of solutions typically only allowed customers to view their statements online, conduct transfers between accounts and pay bills. Nowadays, the amount of operations that can be carried out using e-banking services is far greater. Customers can use e-banking to: pay utility bills and insurance premiums; fund transferences; consult current account and savings balances; carry out mortgage payments; option subscriptions; book orders online; book flights and railway tickets; and, purchase products online.

Automated Teller Machine Transactions

An automated Teller Machine (ATM) is a computer-controlled device that can be instructed to dispense cash and equally provide other services to customers who are identified with a personal identification number (PIN). The introduction of this service has greatly reduced the physical carriage of cash and frequent visits to the banks. With ATM, cash is dispensed at any time of the day and it must not necessarily be located within the banking premises. It could be located even in stores, shopping malls, fuel stations etc. This is different from the customary method where customers queue, and sometimes, for a very long period to withdraw cash or transfer funds. This is one of the main advantages of ATM.

ATM (Automated Teller Machine) transactions in Nigeria refer to the process of conducting financial transactions using an ATM, which allows individuals to withdraw cash, deposit funds, check balances, transfer money between accounts, and perform other banking activities without needing to visit a physical bank branch (Nnanna & Dogo, 2019). ATMs have become an essential part of the Nigerian banking system, providing convenience and accessibility to customers. The Central Bank of Nigeria (CBN) has made significant efforts to promote the use of ATMs in the country, resulting in their widespread adoption by both banks and customers. One of the main advantages of ATM transactions is the convenience they offer.

Customers can access their bank accounts 24/7 and perform various transactions at their convenience, eliminating the need to visit a physical bank during working hours. This accessibility has significantly improved customer satisfaction and banking efficiency in Nigeria. ATM usage in Nigeria has seen substantial growth over the years. According to data from the Nigerian Inter-Bank Settlement System (NIBSS), the total volume of ATM transactions increased from about 170 million in 2012 to over 1 billion transactions by the end of 2019 (Nwachukwu, Okeke &Udeh, 2020)

Internet Banking Transactions

Internet banking is an electronic payment system that enables customers of a bank or other financial institution to conduct a range of financial transactions through the financial institution's website via electronic devices like mobile phones, iPads, laptops, and Desktops. Olorunsegun (2010) opined that getting access customers to their various accounts in addition to wide-ranging information on bank products and services and making use of banks' websites without inconveniencing themselves by sending letters, faxes, original signatures, and or telephone confirmation, is what is referred to as Internet banking. In the words of Siyanbola (2013), it involves carrying out banking transactions using the internet (www) using electronic tools, for example, the computer, without visiting the banking hall. E-commerce is known to have been facilitated by Internet banking and is most frequently used to effect payment. Internet banking like mobile banking equally employs the use of the electronic card infrastructure to execute payment instructions and merchants use it for the final settlement of goods and services with their customers over the Internet. Some of the most widely used Internet banking transactions in Nigeria include the settlement of commercial bills as well as the purchase of air tickets through the websites of merchants.

It has been noticed that the Level of awareness of the saving populace of the benefits of this product is still very low. This implies that there is still room for improvement if the effectiveness of cashless banking is upheld as expected (Siyanbola, 2013). Internet banking (e-banking) is the use of Internet and telecommunication networks to deliver a wide range of value-added products and services to bank customers through the use of a system that allows individuals to perform banking activities at home or

from their offices or over the Internet (Uchenna, 2015). Some of these services are offered by traditional banks which also offer online banking, meanwhile, some are specifically online only without any physical presence. With online banking in traditional banks, customers could perform most routine transactions, including account transfers, balance inquiries, bill payments, and stop-payment requests. Some go as far as offering online loan applications. In addition, it has been made possible for customers to access account information at any time of the day, and from anywhere. Internet banking has improved banking efficiency in rendering services to customers. Internet banking is a type of e-banking service where customers' instructions are taken and attended to through the Internet and offer customers the freedom of enjoying banking services from the comfort of their homes and offices. This implies that customers can purchase goods by simply placing orders from the net, instructing their banks to pay the vendor the invoice amount involved, and the products are subsequently delivered to the destination where the buyer wants.

Point of Sale Machine Transactions

A point-of-sale machine is a small device that accepts Smart cards or e-cards to make cash withdrawals. This device is found in business environments (supermarkets, schools, etc.) for payment of goods and services. Point-of-sale terminals are the mode of e-banking that handles cheque verification, credit authorization, cash deposit and withdrawal, and cash payment. It enhances electronic fund transfer at the point of sale. Thus, customers' accounts would be debited immediately with the cost of purchase in an outlet such as a petrol station or supermarket. The implication of this is that customers can make payment for goods and services without necessarily coming in contact with physical cash as the purchase price would be debited from the buyer's card account and credited to the seller's account. They are indeed alternatives to handling or transacting cash for transfers and payments of goods and services purchased. Point-of-sale machine terminals allow merchants access to card payments for the sale of products and services, for example, recharge cards, bill payments, lottery tickets etc.

Recently, the trend has it that point-of-sale machine devices are now used for cash withdrawal and cash transactions because of mobile network problems on Internet banking platforms, long queues in the Automated Teller Machine stands and long queues in the banking hall. In another vein, Point-of-sale machine devices are now used for criminal activities since a good number of them are not been properly registered and since there is no permanent trace of the point of withdrawal.

Theoretical Review

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was developed by Davis Frederick in 1986. The theorist assumed that when users perceive that a type of technology is useful and also easy to use, they will be willing to use it. Consequently, the more employees recognize that the systems will make their tasks easier to perform; the higher the probability that they will use it and accept the new technology as being useful (Dillon and Morris, 1996). TAM model was based on the theory of reasoned action which posits that social behavior is motivated by an individual attitude which is designed to predict information system use (Lin 2007).

Thus, this study is anchored on the Technology Acceptance Model (TAM) that before the implementation of the cashless policy, Nigeria was a huge cash-based economy. To increase the effect of the policy on citizens, the people have to believe that the policy will be easy to use and also result in positive

performance thereby, leading to economic growth. E-banking products must also be reengineered to make electronic payment effortless which will stir the country toward a cashless economy (Nwankwo & Eze, 2013).

Empirical Review

Ele, Enang & Uguru (2024) investigated the impact of financial technology on banking service delivery in Nigeria for the period 2005-2022 with secondary data sourced from the CBN statistical bulletin. The study employed the autoregressive distributed lag (ARDL) to estimate the model. The major findings of the study Automated Teller Machine (ATM) transaction at a 5% level of significance has a positive impact on bank performance in Nigeria; Point of Sale (POS) terminal at a 5% level of significance has significant impact on bank performance in Nigeria; and online internet banking (ONLIT) transaction at 5% level of significance has significant impact on bank performance in Nigeria. While at a 90% level of confidence, they concluded that the effect is negative and significant.

Gbanador (2023) examined the influence of electronic banking systems (e-banking) on the performance of deposit money banks (DMBs) in Nigeria. The study adopted an *ex-post facto research* design and utilized secondary data collected from the Central Bank of Nigeria's statistical bulletin. Monthly time series data spanning 2019 to 2021 served the study. The Augmented Dickey-Fuller (ADF) and Phillips-Perron were used to test for stationarity. However, the result from the long-run analysis revealed that ATM and POS positively and insignificantly influence the performance of DMBs in Nigeria while Mobile banking has a positive and significant impact on DMBs' performance. The result from the Johansen Cointegration and the fully modified least squares shows evidence of a long-run relationship between e-banking and DMBs' performance. Thus, this study concludes that e-banking influences the performance of DMBs in Nigeria, and recommends that DMBS should sensitize clients regarding the benefit of using ATM, POS and other e-payment channels; and also offer quality mobile banking services to sustain their performance.

Nwafor (2022) examined deposit money banks' computerization and financial inclusion in Nigeria covering the period from 2013 to 2019. Data for the study were extracted from the Central Bank of Nigeria (CBN). The investigation employed the *Ex Post Facto* design given that it is targeted at analyzing the impact of some independent variables on a specified dependent variable. The Vector Error Correction Model (VECM) was used to estimate the structural parameters of the model. The major findings of the study were that point on sales contributes positively and significantly to financial inclusion in Nigeria, automated teller machines contribute positively and significantly to financial inclusion in Nigeria, web Pay contributes negatively and significantly to financial inclusion in Nigeria, mobile Pay (MOP) contributes negatively and significantly to financial inclusion in Nigeria and financial deepening contributes negatively and insignificantly to financial inclusion in Nigeria.

David (2022) investigated the impact of agency banking on financial inclusion and economic activity in Benue State, focusing on First Bank Ltd agency banking activities. The study was based on agency theory and it employed a survey design. The study analyzed both primary and secondary data with descriptive statistical tools and structural equation models. According to the study's findings, First Bank Ltd's agency banking activities have significantly increased financial inclusion and economic activity in Benue State. However, challenges such as cash shortages, security issues, network failures, and a lack of financial literacy were impeding the smooth operation of agency banking in the state. Based on these findings, the study recommended among others that other banks operating in the State should be encouraged to venture

into agency banking in the State to have a wider coverage of agency banking in the State. Also, the government should provide security and partner with the private sector to provide a national carrier communication network system to overcome the network failure challenge. Finally, banks should intensify efforts to educate the masses about the validity and potency of agency banking.

Ajayi (2020) examined the relationship between the electronic cashless policy and the performance of Nigeria's economy. This study made use of secondary quarterly annual time series data which was gathered from the Central Bank of Nigeria statistical bulletin and Nigerian Inter-Bank Settlement System (NIBSS) from (2009-2018). This study made use of descriptive statistics, unit root test, heteroscedasticity test, bound co-integration test and autoregressive distribution lag test in the first model because of the mixed order of stationarity. It was discovered from the auto-regressive distribution lag test that POS contribute positively to the economy. This study strongly suggests that since POS devices do not have any option for biometric recognition, there is a need for financial institutions to incorporate bio-metric recognition in POS machines, buttressing this point there is a need for any POS transaction to be validated by the owner of the account via USSD code sent to the account holders' phone or any other form of authentication before POS can validate any transaction.

Babatunde and Raymond (2019) investigated the relationship between internet usage, financial inclusion and economic growth in Nigeria for the period 1999 to 2016. Using the time series data for the period, the study utilizes the Engle-Granger Cointegration Test and the Fully Modified Ordinary Least Squares (FMOLS) approach for analysis. The results showed that internet usage and broad money have positive and significant effects on financial inclusion. Also, internet usage has a positive and significant effect on economic growth in Nigeria. However, the effect of financial inclusion on economic growth is negative, minimal and insignificant. Furthermore, the effect of the interacted coefficient of internet usage and financial inclusion on economic growth is positive, minimal and insignificant. Hence, the positive effect of internet usage on economic growth in Nigeria is not transmitted through the mechanism of financial inclusion.

Methodology

This covers the entire methodology that was followed in conducting this study as outlined in their various sub-sections.

Research Design

This study adopted the *ex post facto* design. It is ex-post facto given that the relevant materials will be gathered from such sources as textbooks, journal articles, the internet etc.

Population of the Study

The study adopted a case study approach which implies that Nigeria is a case study of the study. Thus, there was no well-defined population for this study.

Sampling Size and Sampling Technique

Since this study adopts Nigeria as a case study, the period covered (2012-2023) was adopted as the sample for this study. Hence, the study sample stood at 12 years.

Sources of Data and Method of Data Collection

This study made use of secondary data obtained from the Nigerian Exchange Group fact books, National Bureau of Statistics (NBS) and Central Bank of Nigeria statistical bulletins for the various years under study.

Methods of Data Analysis

The collected data for this study were computed and analyzed using descriptive statistics and multiple linear regression tools with the aid of E-Views 10.0 software. The decision was based on a 5% level of significance. Accept null hypothesis (Ho) if probability value (i.e. P-value or Sig.) is greater than or equal to (≥) stated 5% level of significance (α); otherwise, reject and accept alternate hypothesis (H1) if p-value or sig. Calculated is less than 5% level of significance (Osisioma, Egbunike & Jesuwunmi, 2015). The null hypothesis will be accepted if the computed p-value is greater than the significant level of 0.05 level ($p>0.05$). Otherwise, confirm the null hypothesis if the computed p-value is less than or equal to the significant level ($p\leq0.05$)

Model Specification and Operationalization of Variables

To achieve the stated objectives of the study, as well as test the study hypotheses, a multiple linear regression model was adopted as follows;

$Y=\beta o+\beta 1X1+\beta 2X2+\beta 3X3+\mu$ ***…………………………………………..eqn 1.***

Where;

Y = Service Delivery- Customer Deposit (dependent variable)

X = Computerization (explanatory/independent variable)

Explicitly, the equation was defined as:

Service Delivery = *f* (Computerization) + μ

Therefore, the broad model for this study was modified as;

$CD = \beta 0+\beta 1ATM+\beta 2IBT+\beta 3POS+\mu$ ***……………….……..eqn 2.***

Where;

CD = Customer Deposit

ATM = ATM transactions

IBT = Internet Banking transactions

POS = POS transactions

$\beta 0$ = Intercept or regression constant

$\beta 1, \beta 2\ \beta 3$ = Regression coefficients

μ = Stochastic error term.

Table 3.2: Operationalization of Variables

Concept	Proxy	Measurement	Source
Computerization ***(Independent variable)***	Volume of Internet Banking transactions	Total number of transactions carried out on the internet either using a card issued by Nigerian banks or internet banking platform.	Madugba (2020), Yusuf (2016)
	Volume of POS transactions	Total number of transactions carried out at point of sale using a card issued by Nigerianbanks	Madugba (2020), Yusuf (2016)
	Volume of ATM transactions	Total number of transactions processed at ATMs nationwide.	Madugba (2020), Yusuf (2016)
Service Delivery ***(Dependent variable)***	Customer Deposit	Defined as Customer Deposit	Madugba (2020), Tee and Ong, 2016; Yusuf (2016)

Source: Author's compilation, 2024

Data Presentation, Analysis and Discussion of the Findings

Data Presentation

The data comprised of total volume of Internet Banking transactions, total volume of POS transactions, and total volume of ATM transactions as well as Customer Deposit of Nigeria for the relevant years (2012-2023). The data is presented in table 4.1 below.

Table 4.1 Dataset

YEAR	CD (₦'B)	IBT	POS	ATM
2012	5,069.99	2,276,464	2,555,045	375,487,756
2013	5,160.85	2,900,473	9,402,255	295,292,940
2014	5,248.87	5,587,081	20,817,423	400,102,507
2015	5,873.45	7,981,361	33,720,933	433,587,623
2016	6,180.04	14,088,247	63,715,203	590,238,934
2017	6,388.65	28,991,097	146,267,156	800,549,099
2018	6,284.35	50,815,901	295,890,167	875,519,307
2019	6,336.50	103,497,007	438,614,182	839,819,922
2020	6,310.42	3,432,692,730	382,845,859	968,433,479
2021	6,323.46	10,321,579,925	2,743,555,841	1,599,187,337
2022	6,316.94	14,063,927,436	3,885,782,065	1,506,991,903
2023	6,320.20	12,192,753,681	3,314,668,953	1,553,089,620

Source: CBN statistics and reports (2024)

Data Analysis

Various statistical techniques were utilized in the analysis of data presented in table 4.1. These include descriptive statistics, and panel multiple regression analysis. The results from the panel multiple regression analysis were used in the testing of the research hypotheses which hadbeen stated in the first chapter of this work.

Descriptive Statistics

This was conducted to understand the behaviour of the data using various statistics including mean, standard deviation, skewness, and kurtosis. The result for the descriptive statistics analysis is as presented in Table 4.2 below;

Table 4.2 Descriptive Statistics Results

	CD	ATM	IBT	POS
Mean	5984.477	36.75926	39.90741	52.68519
Median	6297.385	33.33333	33.33333	50.00000
Maximum	6388.650	83.33333	66.66667	83.33333
Minimum	5069.990	13.66667	18.66667	16.66667
Std. Dev.	515.9217	15.02091	14.68659	17.89374
Skewness	-0.989197	0.595202	-0.020660	0.111009
Kurtosis	2.174576	3.302643	2.244195	2.414065
Jarque-Bera	2.297682	11.31490	4.297109	2.944586
Probability	0.317004	0.003491	0.116653	0.229399
Sum	71813.72	6616.667	7183.333	9483.333
Sum Sq. Dev.	2927927.	40387.35	38609.57	57313.27
Observations	12	12	12	12

Source: Researcher's computation using E-views 10.0 (2024)

Table 4.2 shows the result of descriptive statistics of the dependent variable and disaggregated independent variables. The result shows that Customer Deposit (CD) has the highest mean value of 5984.477while total volume of ATM transactions has the lowest mean value of 36.75926 in the variables obtained. Also, the result shows that Customer Deposit (CD) has the highest maximum value of 6388.650 while total volume of Internet Banking transactions has the lowest minimum value of 13.66667 in the variables obtained. The Customer Deposit (CD) has the highest standard deviation of 515.9217, while total volume of Internet Banking transactions has the lowest standard deviation of 14.68659 in the variables obtained. This means that low standard deviation indicates that the values tend to be close to the mean of the set while a high standard deviation indicates that the values are spread out over a wider range.

Model Evaluation

Residual and coefficient diagnostics were however conducted to assess the suitability of the model as stated in the previous section. These include normality test, multicollinearity test, and heteroscedasticity test and autocorrelation assessment.

Normality test

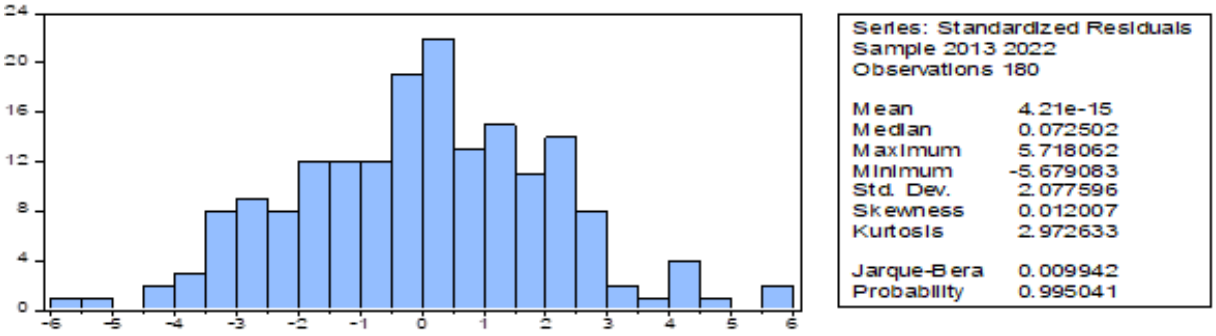

Fig. 4.1 Jarque-Bera Normality test results
Source: E-views 10.0 Output

The essence of a normality test is to determine if a dataset or sample follows a normal distribution. This is important because many statistical models assume normality, and deviations from normality can affect the validity of statistical inference. The Jarque-Bera test was employed in this case.As applied, if the p-value associated with the Jarque-Bera test is below a predetermined significance level ($p<0.05$), then we reject the null hypothesis and conclude that the data do not follow a normal distribution. With a p-value of 0.995041, there is sufficient evidence to conclude that the data were normally distributed.

Multicollinearity test

Table 4.3: Variance Inflation Factors

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.545303	22.35876	NA
ATM	0.000109	7.055723	1.004763
IBT	0.000116	8.627498	1.024060
POS	7.81E-05	9.911207	1.019929

Source: E-views 10.0 Output (2024)

Multicollinearity tests evaluate the degree of correlation between predictors, as high multicollinearity can lead to unreliable coefficient estimates and difficulties in results interpretation. These tests typically involve examining the correlation matrix, variance inflation factors (VIFs), and condition indices. VIF value of less than 10.0 signifies that no severe multicollinearity exists in the model. With a centered variance inflation factor (VIF) values of 1.004763, 1.024060 and 1.019929, there is sufficient evidence to conclude that the explanatory variables in the regression model are not highly correlated with each other.

4.2.2.3 Heteroscedasticity test

Table 4.4 Heteroscedasticity Test

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	262.3880	153	0.0610
Pesaran scaled LM	15.24302		0.0451
Pesaran CD	-1.094252		0.2738

Source: E-views 10.0 Output (2024)

Heteroscedasticity refers to the unequal spread of residuals (or errors) across the range of predictor variables in a regression model. Heteroscedasticity tests aim to detect this violation of the assumption of constant variance. Common tests include the Breusch-Pagan test and the White test, which assess the relationship between the squared residuals and the predictor variables.The statistics and probability value associated with the Breusch-Pagan LM test otherwise known as the Breusch-Pagan Godfrey test help determine whether there is evidence of heteroscedasticity in the regression model. A low p-value ($p<0.05$) suggests evidence against the null hypothesis in favour of the alternate hypothesis which indicates the presence of heteroscedasticity in the regression model. With a p-value of 0.0610, there is sufficient evidence to accept the null hypothesis, thus, conclude that the predictor variables in the regression model were homoscedastic.

Autocorrelation

Autocorrelation, also known as serial correlation, occurs when there is a correlation between the residual errors of a time series or panel data over time. Autocorrelation tests examine whether the residuals are independently distributed or if there is a systematic pattern of dependence. The Durbin-Watson statistic is commonly used to test for autocorrelation, with values close to 2 indicating no significant autocorrelation. The Durbin-Watson statistic as obtained from the panel regression results (see Appendix II) was utilized in this case. The Durbin-Watson statistic value of 1.557131 suggests a mild positive autocorrelation present in the residuals of the regression model.

Test of Hypotheses

Each of the hypotheses in this study was tested based on the result obtained from the panel multiple regression analysis. The result that relate to these hypotheses is summarized in Table 4.5 below:

Table 4.5 Panel Multiple Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	48.803	265.8059	17.67757	0.0000
ATM	-0.026945	0.010451	-2.578346	0.0107
IBT	-0.017797	0.010791	-3.649302	0.0009
POS	-0.007512	0.008839	-0.849849	0.3966

R-squared	0.553339	Mean dependent var	15.20246
Adjusted R-squared	0.537203	S.D. dependent var	2.135325
S.E. of regression	2.095228	Akaike info criterion	4.339174
Sum squared resid	772.6368	Schwarz criterion	4.410128
Log likelihood	-386.5256	Hannan-Quinn criter.	4.367943
F-statistic	3.305567	Durbin-Watson stat	1.557131
Prob(F-statistic)	0.021545		

Source: E-views 10.0 Output

The multiple regression line is as written below:

$CD = 48.803 - 0.026945ATM - 0.017797IBT - 0.007512POS + \mu$

From Table 4.5, when the independent variables- Automated Teller Machine Transactions (ATM), Internet Banking Transactions (IBT)and Point of Sale Machine Transactions (POS) are held constant (equal Zero), the dependent variable– Real Gross Domestic Product (RGDP), increased at a constant average of approximately 48.803%. However, a one percent rise in Automated Teller Machine Transactions (ATM), Internet Banking Transactions (IBT) and Point of Sale Machine Transactions (POS) decreases Real Gross Domestic Product (RGDP) by approximately 0.026%, 0.017% and 0.008% respectively. In addition, Adjusted R-squared of 0.537 indicates that the model explains approximately 53.7% of the variations while other variables not included in the model accounts for approximately 46.3% of the variations respectively.

Hypothesis one

Ho: Automated Teller Machine Transactions (ATM) has no significant effect on the service delivery of deposit money bank in Nigeria.

In order to test whether the variations in service delivery (proxy by customer deposit) in Nigeria caused by Automated Teller Machine Transactions (ATM) is significant, the T-test was carried out at 5% significance level with Ttab of +/-2.178813 given at $_{T0.05,12}$. From the result in Table 4.5, the Tcal of -2.578346 is greater than Ttab given at $_{T0.05,12}$. Hence, the null hypothesis which states that Automated Teller Machine Transactions (ATM) has no significant effect on the service delivery of deposit money bank in Nigeria fails to hold, thus rejected, and the alternative hypothesis accepted. The null hypothesis is further rejected given that at $_{T0.05,12}$, its probability value (p-value = 0.0107) is less than 0.05.

Hypothesis two

Ho: Internet Banking Transactions (IBT) has no significant effect on the service delivery of deposit money bank in Nigeria.

In addition, the T-test was also carried out at .05 significance level with Ttab of +/-2.178813 given at $_{T0.05,12}$ in order to test whether the variations inservice delivery(proxy by customer deposit)in Nigeriacaused by Internet Banking Transactions(IBT) is significant. From the results obtained, the Tcal of -3.6493 is greater than Ttab given at $_{T0.05,12}$. Hence, the null hypothesis which states that Internet Banking Transactions(IBT) has no significant effect on the Service Delivery(proxy by customer deposit)in Nigeria fails to hold, thus rejected, and the alternative hypothesis accepted. The null hypothesis is further rejected given that at $_{T0.05,12}$, its probability value (p-value = 0.0009) is less than 0.05.

Hypothesis three

Ho: Point of Sale Machine Transactions (POS) do not significantly affect the service delivery in Nigeria.

In addition, the T-test was also carried out at 5% significance level with Ttab of +/-2.178813 given at $_{T0.05,12}$ in order to test whether the variations in service delivery(proxy by customer deposit) in Nigeriacaused byPoint of Sale MachineTransactions(POS) is significant. From the results obtained, the Tcal of -0.8498 is less than Ttab given at $_{T0.05,12}$. Hence, the null hypothesis which states that Point of Sale Machine Transactions (POS) do not significantly affect the service delivery (proxy by customer deposit) in Nigeria holds, thus accepted, and the alternative hypothesis rejected. The null hypothesis is further accepted given that at $_{T0.05,12}$, its probability value (p-value = 0.3966) is greater than 0.05.

Discussion of Findings

Automated Teller Machine Transactions and Service Delivery

The study findings revealed that Automated Teller Machine Transactions (ATM) has a significant negative relationship (Coeff. = -0.0269{0.0107}) with Service Delivery (proxy by customer deposit) in Nigeria. The significant negative effect of Automated Teller Machine (ATM) transactions on service delivery, with a coefficient of -0.0269, suggests that increased ATM usage correlates with a reduction in customer deposits. This finding indicates that despite the widespread availability and convenience of ATMs, their current usage may be detracting from overall service quality or customer satisfaction. Potential factors contributing to this negative impact could include frequent technical issues, security concerns such as fraud, or user dissatisfaction with transaction limits and fees associated with ATM usage. The implications here are clear: banks need to reassess and enhance the reliability, security, and user experience of their ATM services to mitigate these negative effects. This aligns with the findings of Adu and Williams (2023) and Nwani, Nwaimo and Kanu (2020). These studies revealed that ATM transactions, NIP transaction, mobile banking transactions, and cheque transaction have significant impact of the performance of commercial banks in Nigeria.

Internet Banking Transactions (IBT) and Service Delivery

The study findings also revealed that Internet Banking Transactions (IBT) has a significant negative relationship (Coeff. = -0.0178{0.0009}) with Service Delivery (proxy by customer deposit) in Nigeria. The significant negative effect of Internet Banking Transactions (IBT), with a coefficient of -0.0178, on service delivery points to potential issues in the online banking experience. Despite the advantages of internet banking, such as 24/7 accessibility and convenience, the negative impact on customer deposits suggests that there may be underlying problems. These could range from security issues, such as phishing and hacking, to user interface challenges and difficulties in navigating online banking platforms. The implications for banks are substantial; there is a pressing need to invest in improving the security features, usability, and overall customer support for internet banking to foster a more positive user experience and encourage higher levels of customer deposits. This position is not in line with the findings of Madugba (2020) which showed that internet banking transactions have no significant impact on real gross domestic product.

Point of Sale Machine Transactions (POS) and Service Delivery

The finding that Point of Sale (POS) transactions have an insignificant negative effect on service delivery, with a coefficient of -0.0075, presents a different set of implications. While POS transactions are also negatively correlated with customer deposits, the lack of statistical significance suggests that their impact is relatively minor compared to ATMs and Internet banking. This could indicate that POS systems are either not as widely adopted or that they function more effectively without causing major disruptions to customer satisfaction or deposit levels. However, the negative direction of the effect, even if insignificant, still suggests room for improvement. Banks could consider promoting the use of POS transactions more aggressively, ensuring that both merchants and customers understand their benefits and feel confident in their security and reliability. This is not in consonance with the findings of Madugba (2020) which revealed that POS is significant determinant of real gross domestic product but however concluded that cashless policy has no significantly impact on economic growth in Nigeria.

Summary of Findings

This present study examined the implication of Electronic Banking Processes on Economic Sector Development in Nigeria. The study covered ten (10) years period (2013-2022) and placed more emphasis on Automated Teller Machine Transactions (ATM), Internet Banking Transactions (IBT) and Point of Sale Machine Transactions (POS). The Economic Sector Development being the dependent variable was assessed using the Real Gross Domestic Product. Below is a summary of findings gathered through a panel multiple regression analysis.

I. Automated Teller Machine Transactions (ATM) has a significant negative effect on service delivery of deposit money banks in Nigeria with the p-value of 0.01707 while the t-statistic is 2.578346.

ii. Internet Banking Transactions (IBT) has a significant negative effect on service delivery of deposit money banks in Nigeria with the p-value 0.009 while the t-statistic is -3.649302.

iii. Point of Sale Machine Transactions (POS) has an insignificant negative effect on service delivery of deposit money banks in Nigeria with the p-value of 0.3966 while the t-statistic is -0.849849.

Conclusion

The panel multiple regression analysis has provided valuable insights into the impact of various electronic banking channels on service delivery in Nigeria, measured through customer deposits. The analysis reveals that both Automated Teller Machine (ATM) transactions and Internet Banking Transactions (IBT) have significant negative effects on service delivery, with coefficients of -0.0269 and -0.0178 respectively. This indicates that increased usage of ATMs and Internet banking correlates with a decrease in customer deposits. In contrast, Point of Sale (POS) transactions, though also showing a negative coefficient of -0.0075, do not have a statistically significant effect on service delivery. These findings suggest potential areas for improvement in the functionality and customer experience associated with these electronic banking services to enhance their positive impact on customer deposits.

Policy Recommendations

Based on the findings, the following recommendations have been put forward.

i. Banks should focus on enhancing the reliability, security, and user experience of ATM and Internet banking services. Addressing common issues such as transaction failures, security concerns, and complicated interfaces could help mitigate the negative impact on customer deposits. Regular updates, customer feedback mechanisms, and enhanced security measures can restore customer confidence and encourage more deposits through these channels.

ii. Given that POS transactions have an insignificant impact on service delivery, there is potential for growth in this area. Banks should incentivize merchants to adopt POS systems and encourage customers to use POS transactions for their purchases. This can be achieved through promotions, lower transaction fees, and partnerships with retail outlets. Increasing the adoption of POS transactions can provide a more balanced electronic banking ecosystem that supports customer deposits.

iii. Banks should invest in customer education programs to improve the understanding and usage of electronic banking services. Workshops, online tutorials, and dedicated customer support can help customers navigate ATM, Internet banking, and POS systems more effectively. Educated customers are more likely to utilize these services efficiently, leading to improved customer satisfaction and potentially higher deposit levels.

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