

# ELECTRONIC BANKING INSTRUMENTS AND PERFORMANCE OF DEPOSIT MONEY BANKS IN NIGERIA: THE CAMEL EVALUATION APPROACH

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## **Abstract**

*The study examined the interplay between Electronic Banking Instruments and Banks' Performance in Nigeria. E-banking instruments were measured in the study with Automated Teller Machine (ATM), Point-of-Sale (POS) and Mobile Payment (M-Pay) while banks' performance was measured with CAMEL rating system. Data were sourced from the Central Bank of Statistics Bulletin and Annual Reports of Nigeria Deposit Insurance Corporation from 2010 – 2019. Data collected were tested for normality using Jarque-Bera statistics and were analysed using Pearson Product Moment Correlation analysis. Results from the analyses revealed that ATM, POS and M-Pay shown negative but insignificant relationship with capital adequacy ratio; ATM and M-pay had negative but insignificant relationship with assets quality while POS had significant negative relationship with assets quality; ATM and M-Pay were positively but insignificantly related with management efficiency while POS has negative but insignificant relationship with management efficiency. Findings further revealed that each of ATM, POS and M-Pay had significant positive relationship with ROA while on the other hand exerted positive but insignificant relationship with banks' liquidity. It was therefore recommended (among others) that Nigerian banks should step-up their awareness creation on the benefit of utilizing e-banking products and that federal government*

*should create a more enabling environment to enhance e-banking activities.*

**Keywords:** E-banking Instruments, Automated Teller Machine, Point-of sale, Mobile Payment, CAMEL, Bank Performance

## **Introduction**

The role of the banking sector in any economy cannot be overemphasized; particularly as it concerns resources mobilization for vibrant economic activities in the economy. As such, rosy performance by banks in general and deposit money banks in particular remain an issue of focus in fostering a nation's economic wellbeing. Hence, such rosy performance is a product of effective and efficient banking operations. Therefore, the banks' management team, as well as the banking sector regulators are always interested in such policies that will bring about improved operations of the banks.

Consequently, banking operations in recent times have metamorphosed from manual recording, ledger and filing systems to electronic system. This is a sequel to the advancement in the information and communication technology (ICT), which has reduced the world to one global village; which also necessitated the computerization of modern business for effective service delivery. Adewuyi (2011) observed that the adoption of

ICT in the banking sector, otherwise referred to as electronic banking (or simply, e-banking) and application of its concepts, techniques, policies, and implementation strategies to banking services has become a subject of fundamental importance and concerns to all banks and indeed a prerequisite for local and global competitiveness because, it directly affects the management decisions, plans, product and services to be offered by banks.

The dawn of electronic banking system in Nigeria became inevitable, as the nation cannot operate in isolation, in the face of the ever-dynamic advancement in the business world, financial reporting system and in fact, globalized approach to human endeavours. Hence, the Nigerian banking industry, according to Onodugo (2015) adopted electronic banking system in the early 2000s. Electronic banking refers to the process by which banking activities are conducted via electronic and internet aided means, such that manual approaches which warrant physical contacts of customers and banks' staff are drastically reduced. It is the process by which bank customers initiate and conduct banking transactions via electronic device without necessarily visiting the banking hall. The Central Bank of Nigeria (CBN, 2003) defined electronic banking as a means whereby banking business is transacted using automated process and electronic devices such as personal computers, telephones, internet, card payments and other electronic channels. The e-banking system has been adjudged as perhaps one of the most useful tools in contemporary world economies (James, 2012). Thus, Onodugo (2015) asserts that the application of e-banking concepts, techniques, policies, and implementation strategies to banking services has become a subject of fundamental importance and concerns to all banks and indeed a pre-requisite for local and global competitiveness because, it directly affects the management decisions, plans, products and services to be offered by banks; due to emergence of global economy, electronic banking has increasingly become an inevitable tool of banking business strategy and a strong catalyst for economic development.

Consequently, the huge potential benefits accruable from ICT-based system warranted the necessary redirection of the operational approaches of most organized business entities, particularly the banks; hence, the inevitable huge investment on the structural capital base of banks; as such, Babatunde and Salawudeen (2017) opine that Nigeria banks have no doubt invested hugely on technology and have to a large extent adopted electronic and telecommunication networks for delivering a wide range of value added products and services. Apochi (2017) identified the merits associated with electronic banking channels to include convenience, reduced risk of cash related crimes, more service options, cheaper access to off banking hall services, access to credit and ease of using account anywhere in the world. The concern however is, in the face of the huge investments in e-banking facilities and the identified benefits accruable therefrom, to what extent have these translated into better performances of Nigerian banks?

Electronic banking, according to Onodugo (2015) consists of the following, mobile banking, internet banking, telephone banking, electronic card, et cetera. On their part, Ogbonna, Okoro, Atsanan and Igwe (2020) identified the electronic banking products/instruments to includes Automated Teller Machines (ATMs), Point-of-Sales (POS), Electronic Funds Transfer (EFT), Internet Banking (IB), Mobile Banking (MB), and NIP (NIBSS Inter-bank transfer). In this study however, ATM, POS and MB were used to proxy for electronic banking. The choice of these e-banking platforms is based on the fact that they are the most commonly used by both the high, middle and low income earners in the Nigerian society.

Banks performance, on the other hand, banks performance has to do with the reflection of the way by which the banks resources are utilized in a manner that enables the achievement of the bank's set objectives. It is an impression of sound operational output of a bank based on some generally acceptable indicators from the financial records of a bank. The performance of business organizations generally (including banks) are usually measured with reference to

the financial figures from the organizations' financial statements. As such, financial performance indicators like profits, earnings and returns are commonly used for firms' performance studies including banks. Harelimana (2017) observes that profit is the ultimate goal of commercial banks hence all the strategies designed and activities performed thereof are meant to realize this grand objective; in this regard, profitability measures in form of variety of ratios like Return on Asset, Return on Equity and Net Interest Margin are used to measure banks' performance. In this study however, banks' performance is measured with CAMEL performance rating system. CAMEL is an acronym for five components of bank safety and soundness: Capital adequacy, Asset quality, Management quality, Earning ability and Liquidity (Harelimana, 2017).

### **Statement of the Problem**

The need for Nigerian banks to brace-up with the challenges of modernization in global businesses operations, occasioned by advancement in information technology, resulted to additional investment and operational costs of the banks on ICT facilitates. As posited by Babatunde and Salawudeen (2017), Nigeria banks have no doubt invested hugely on technology in the course of adopting electronic and telecommunication networks for delivering a wide range of value added products and services as per global standards. Several benefits have been associated with the dawn of E-banking system in Nigeria, ranging from convenience, reduction in the risk of cash related crimes, offering more service options, among others. It is however unclear about the aftermath of such huge additional cost associated with the required ICT compliance with respect to the overall performance of Nigerian banks. Hence, Ali and Emenike (2016) posit that unfortunately not every increase in the customers' satisfaction (as may be associated with E-banking services) transfers into the higher bank profits, especially in the case of very expensive investments in technology like automated teller machines (ATMs). Thus, can it said that the dawn of electronic banking system in the operations of

Nigerian Deposit Money Banks (DMBs) has influenced the banks' overall performance?

Indeed, there is evidence of existing empirical studies on the impact of electronic banking in Nigeria; however, while some of the studies reviewed related the electronic banking platforms to macro-economic variables (like Ogbonna, et al, 2020; Okoro, 2014; et cetera), others who related e-banking to banks' performance mostly used financial performance measures like Return on Assets (ROA) to measure performance (like Oniore & Okoli, 2019; Muotolu & Nwadiolor, 2019, among others). Yet, some under studies on e-banking system and banks' performance, focused only on ATM (Ahaiwe, 2011; Jegede, 2014). This study is not aware of any empirical work on the subject matter which utilized multiple measures of e-banking system and CAMEL approach to performance evaluation. It is the believe of the author of this paper that CAMEL approach to banks' performance evaluation remains outstanding and all-encompassing with respect to banks' stability and soundness; hence, Harelimana (2017) asserts that CAMEL is an acronym for five components of bank safety and soundness.

Beside the foregoing gap in literature, it is also observed that the previous studies found conflicting associations among the e-banking proxies as they relate to the performance proxies. For instance, Okoro (2014) found, on the one hand, that ATM and POS exert significant influence on intermediation efficiency of banks in Nigeria while on Mobile services was found having insignificant association with intermediation efficiency proxy. Also, while Muotolu and Nwadiolor (2019) on the one hand found that ATM exerts positive significant impact on ROA, they on the other hand found that POS, NIP and WEB exert insignificant effect on ROA. These mixed findings suggest an inconclusive research in this area; hence, the drive for this study.

### **Objectives of the Study**

The main objective of this study is to examine the interplay between electronic banking instruments and banks' performance in Nigeria,

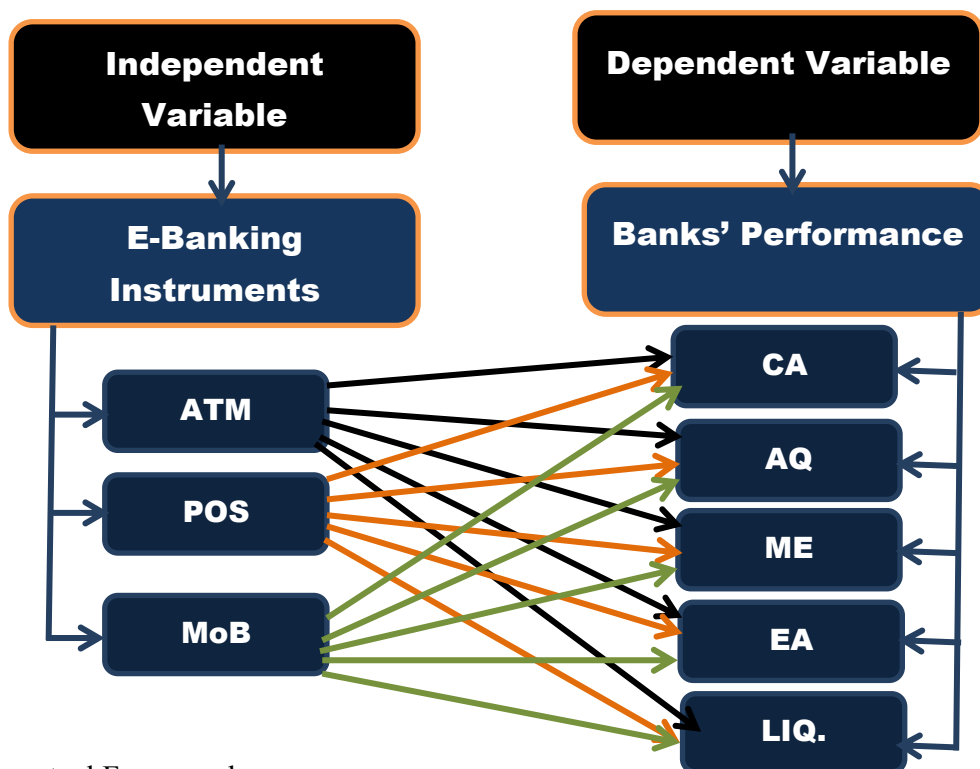
using the CAMEL rating system. Consequently, the specific objectives of the study are to:

- i. Evaluate the effect of each of the E-Banking proxies (namely; ATM, POS & MoB) on Capital Adequacy of Nigerian banks;
- ii. analyze the effect of each of the E-Banking proxies (ATM, POS & MoB) on Assets Quality of Nigerian banks;
- iii. determine the relationship between each of the E-Banking proxies (ATM, POS & MoB) and Management efficiency of Nigerian banks;
- iv. assess the relationship between each of the E-Banking proxies (ATM, POS

- & MoB) on Earning Ability of Nigerian banks; and
- v. examine the effect of each of the E-Banking proxies (ATM, POS & MoB) on Liquidity Ratio of Nigerian banks

**Conceptual Review**

The key variables of this study include: E-Banking Instruments (proxied with Automated Teller Machine, Point-of-Sale and Mobile Banking) and Banks’ Performance (measured with Capital Adequacy, Assets Quality, Management Efficiency, Earnings Ability and Banks’ Liquidity). The interplay between the independent and dependent variables are typified in the conceptual framework in fig. 1.



**Fig. 1:** Conceptual Framework

*Source: Author’s Conceptualization*

**Key:** CA is the acronym for Capital Adequacy  
 AQ is the acronym for Assets Quality  
 ME is the acronym for Management Efficiency  
 EA is the acronym for Earnings Ability  
 LIQ stands for Liquidity

**Concept of Electronic Banking**

Jegede (2014) asserts global competition in the banking sectors has forced management and executives to recognize that they must think

differently about banking activities and management. Hence, the adoption of e-banking approach in the operations of Nigerian banks became inevitable. Electronic banking,

according to Okoro (2020), is the use of computers and telecommunications to enable banking transactions to be done by computer or telephone instead of human interaction. Akinyele and Olorunleke (2010) see electronic banking as the provision of information about a bank and its products via a page on the internet. For Idowu (2011) cited in Izogo, Nnaemeka, Ezema and Onuoha (2012), electronic banking is a means whereby banking business is transacted using automated processes and electronic devices such as personal computers, telephones, fax machines, internet, card payments and other electronic channels.

The electronic banking system has a two-face effect on the operations of the banking industry in particular and the economy in general. Hence, Oniore and Okoli (2019) observe that in as much as the utilization of the electronic system of banking comes with numerous challenges in regards to risk; the deposit volume in the banking industry has increased and also the fraudulent practices experienced by the Banks in Nigeria since it was introduced in the country. Onodugo (2015) asserts that e-banking consists of the following, mobile banking, internet banking, telephone banking, electronic card, et cetera. On their part, Ogbonna, Okoro, Atsanan and Igwe (2020) identified the electronic banking products/instruments to include Automated Teller Machines (ATMs), Point-of-Sale (POS), Electronic Funds Transfer (EFT), Internet Banking (IB), Mobile Banking (MB), and NIP (NIBSS Inter-bank transfer).

**A. Automated Teller Machine:** Automated Teller Machine (ATM), also known as Automated Banking Machine (ABM) or Cash Machine, according to Jegede (2014) is a computerized telecommunications device that provides the clients (customers) of a financial institution with access to financial transactions in a public space without the need for a cashier, human clerk or bank teller. Ahaiwe (2011) opines that ATM can offer significant benefits to both the banks and their depositors. The machine can enable depositors to withdraw cash at more convenient times and places other than banking hours. ATM reduces the

number of human deployment by banks thereby reducing cost of operations. Jegede (2014) reveals that on most modern ATMs, the customer is identified by inserting a plastic ATM card with a magnetic stripe or a plastic smart card with a chip that contains a unique card number and some security information such as an expiration date or CVVC (CVV); authentication is provided by the customer entering a personal identification number (PIN). Using an ATM, customers can access their bank accounts in order to make cash withdrawals, credit card cash advances, and check their account balances as well as purchase prepaid cellphone credit. Ali and Emenike (2016) affirm that efficient and effective provision of ATM services in Nigeria has been bedeviled with numerous challenges; majorly, the issue of poor power supply which not only slows down the speed of electronic transactions but also increases the cost of providing electronic banking services as most of the required ICT infrastructure, including ATM cannot function without electricity. Consequently, there is an increase in the waiting time per transaction, and banks pass the high cost to customers. They also identified the issue of inadequate security as another challenge that confronts the efficient operations of ATMs in Nigeria.

**B. Point-of-Sale (PoS):** Afsaneh, Ali, Davood and Davood (2017) define Point-of-Sale (POS) as a device which provides automatic transfer of purchasing price from seller's account via telephone or network connection to bank systems. POS is among the most common payment devices for credit cards, debit cards, checks, smart cards, electronic bank transfer (EBT) and other electronic transactions in a retail and wholesale environment (Amir, 2010 in Afsaneh, et al, 2017). These terminals are used in face-to-face deals. POS is apart from payment, POS includes different performances including account balance, account billing, postponing a purchase and daily reports which has benefits of a small bank branch for its owners (Begona, Dolores & Zaida, 2014).

**C. Mobile Banking (MoB):** Porteous (2006) defines mobile banking as a subset of electronic banking in which customers access a range of banking products, such variety of savings and credit instruments, via electronic channels. Venable Telecommunications (2008) in Harelimana (2017) opines that mobile banking can be defined as financial transactions that are based on wireless handsets. Hence, it involves accessing and providing banking and financial services through a mobile device with the help of mobile telecommunication devices. Mobile banking today is most often performed via SMS or the Mobile Internet, providing two different types of customer account access: a web-based interface and a simple text messaging interface. This therefore means the customer can bank virtually anywhere anytime (Harelimana, 2017).

#### **Concept of Banks Performance (The CAMEL Rating System)**

Performance measurement according to Neely, et al (cited in Al-Matari, Al-Swidi and Fadzil, 2014) refers to the process of measuring the action's efficiency and effectiveness. Amaefule, Okoye, Kalu and Nwosu (2018) observed that it can be seen as an indicator to measure the effectiveness of an organization in running its daily operations. This will determine whether organizations are able to survive in the market or not.

**A. Capital Adequacy Ratio:** The capital adequacy ratio (CAR) is a measure of how much capital a bank has available, reported as a percentage of a bank's risk-weighted credit exposure. It establishes that banks have enough capital on reserve to handle a certain amount of losses, before being a risk for becoming insolvent. The Central bank of Nigeria (CBN) reports that banks are required to maintain a minimum regulatory capital adequacy ratio of 10%/15% on an ongoing basis. Sangmi and Tabassum (2010) noted that the CAR reflects the internal wealth of banks to be able to withstand losses in cases of economic crises. The higher value of this ratio reflects the better resilience ability of a bank to crises situations.

**B. Assets Quality:** Assets Quality is an aspect of bank management entails the evaluation of a firm asset in order to facilitate the measurement of the level and size of credit risk associated with its operation; it relates to the left-hand side of a bank balance sheet and focused on the quality of loans which provides earnings for a bank (Abata, 2014).

**C. Management Efficiency:** Management efficiency has to do with management assessment which determines whether an institution is able to properly react to financial stress. This component rating is reflected by the management's capability to point out, measure, look after and control risks of the institution's daily activities. It covers management's ability to ensure the safe operation of the institution as they comply with the necessary and applicable internal and external regulations.

**D. Earnings Ability:** This measures a bank's ability to produce earnings to be able to sustain its activities, expand, remain competitive are a key factor in rating its continued viability. Examiners determine this by assessing the bank's earnings, earnings' growth, stability, valuation allowances, net margins, net worth level, and the quality of the bank's existing assets.

**E. Liquidity:** Bank's liquidity can be looked at by reference to interest rate risk sensitivity, availability of assets that can easily be converted to cash, dependence on short-term volatile financial resources and ALM technical competence. Anh, Hang andHuong (2020) reveals that liquidity refers to the bank's ability to perform its obligations, primarily to the depositors.

#### **Theoretical Framework**

This study is hinged on such theories as technology acceptance theory and innovation diffusion theory.

**Technological Acceptance Theory:** This theory, according to Chuttur (2009) is credited to Fred David in 1958 which he proposed in his Doctoral thesis at the MIT Sloan School of Management. In his proposition, he believed that a system use is a response that can be explained or predicted by user innovation, which in turn is directly influenced by two

external stimulus comprising of the actual system features and capabilities. David, in his TAM theory identified three factors that can explain any system users' motivation, namely; perceived ease of use, perceived usefulness of the system and the user's personal attitude toward using the system. He hypothesized that the attitude of a user toward a system is a major determinant of whether the user will actually use or reject the system; however, he noted also that the said personal attitude of the user is directly influenced by two major beliefs: perceived ease of use and perceive usefulness of the system; but in all, both a system user's perceptions and personal attitude (Chuttur, 2009) are believed to be directly influenced by the system design characteristics.

David's TAM hypothesis clearly defines the electronic banking system applications in Nigeria's banking industry. Firstly, the adoption of the e-banking approach in the operations of the Nigerian banks (despite its huge capital requirement) was based on the users' (banks) perceptions of improved productivity in terms of service delivery, customer satisfaction and of course financial performance; and upgrading to modern global business competitive requirements driven by ICT. Secondly, the acceptance and patronage given to the various E-banking instrument by banks' customers was based on the customers perception of ease of use and the usefulness of the platforms. However, the level of patronage in this regard was being determined by the customers' attitude based on their level of exposure and literacy. This underscores the reason why some banks' customers do not use any of the e-banking platforms and prefer manual approach to banking. In all however, the perception and attitude of banks' customers in Nigeria is influenced by the e-banking system design characteristics which offers them opportunity to transact from anywhere rather than visiting the bank hall and paying huge sums to clients without meddling with physical cash.

On the basis of the foregoing explanations, the TAM theory is considered suitable for this study, hence its adoption as a theoretical hinge for the study.

**Innovation Diffusion Theory:** Innovation, according to the Shorter Oxford English Dictionary as cited in Ofurum, Amaefule, Okonya and Amaefule (2018) is the alteration of what is established (that is what has been in existence) or the introduction of something new. Diffusion of innovations is a theory that seeks to explain how, why, and at what rate new ideas and technology spread. Ofurum, et al (2018) asserts that Everett Rogers, a professor of communication studies, popularized the innovation diffusion theory in his book titled "Diffusion of Innovations" which was first published in 1962; in his fifth edition of the book published in 2003, Rogers argues that diffusion is the process by which an innovation is communicated over time among the participants in a social system, while diffusion of innovation is the process by which an innovation is communicated through certain channels over time among the members of a social system. Given that decisions are not authoritative or collective, each member of the social system faces his/her own innovation-decision that follows a 5-step process; namely, 1) Knowledge – person becomes aware of an innovation and has some idea of how it functions, 2) Persuasion – person forms a favorable or unfavorable attitude toward the innovation, 3) Decision – person engages in activities that lead to a choice to adopt or reject the innovation, 4) Implementation – person puts an innovation into use, 5) Confirmation – person evaluates the results of an innovation-decision already made.

These postulations by Everett Rogers support the scenario in the Nigeria's banking sector operations with respect to how the innovation of electronic banking instruments was adopted by the banks and gradually diffuses within the operations of all banks in Nigeria, including the micro finance banks. As such, almost all Nigerian bank customers' accounts are today associated with one E-banking instrument or the other. Notably, at the inception of E-banking in Nigeria, many banks' customers were adverse to e-banking products on the note of questionable internet security; however, the innovation has gradually diffused and has become entrenched in the today's banking system in Nigeria such that almost all banks'

customers are becoming at par with the innovation. It is against this backdrop that the innovation diffusion theory is considered relevant as a theoretical underpin of this study.

### **Empirical Review**

The literature provides evidence of existing empirical works on the nexus between electronic banking and banks performance in Nigeria. Some of the empirical works reviewed in the course of this study are reported as follows:

In the study on the effect of electronic banking on bank performance in Nigeria, Amos, Umar and Busari (2020) utilized secondary data derived from the audited annual financial statement of the deposit money banks quoted on the Nigerian Stock Exchange from 2008–2017 and employed regression analysis technique to analyze the data collected. The findings of the paper revealed that each of the e-banking proxies (namely; ATM, POS, IB and MB) exerted no significant impact on return on equity (ROE), return on assets (ROA), and earnings per share (EPS). Thus, e-banking has no significant impact on the performance of banks in Nigeria. With the findings, the concluded that investment in electronic banking has not improved the performance of deposit money banks in Nigeria. Ogbonna, et al (2020) examined the effect of electronic banking on domestic investment in Nigeria. The authors sourced secondary data from Central Bank of Nigeria's statistical bulletin of various years for POS, ATM, Internet Banking, 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 do not affect the domestic investment in Nigeria significantly. Individually however, electronic banking transactions via POS, Mobile Banking and Internet Banking all showed negatively insignificant relationship with domestic investment while ATM and NIP showed positive but insignificant relationship with domestic investment in Nigeria.

Njoku, Nwadike and Azuama (2020) conducted an examination into the impact of electronic

banking on economic growth in Nigeria over the period of 2009 – 2018 using quarterly data. Secondary data were collected from the CBN statistical Bulletin and the Nigerian Bureau of Statistics so as to establish the relationship between the dependent variable (Real GDP) and the independent variables (Automated Teller Machines, Point-of-Sale, Internet Banking and Mobile Banking). The authors adopted the Vector Error Correction Model (VECM) and the results of the analysis show that electronic banking proxies jointly impacted on the economic growth of Nigeria significantly. Individually, the result of the analysis shows that Automated Teller Machine has a significant relationship with RGDP, while Point of Sales, Internet Banking and Mobile Banking, individually have no significant effect on RGDP for the period under consideration. Oniore and Okoli (2019) conducted an investigation into the impact of electronic banking on the performance of money deposit banks in Nigeria. The authors used time series quarterly data from 2006 to 2017 and adopted Ordinary Least Squares as main tool of analysis. The study found that in the long-run, all the variables are correctly signed, except inter-bank transfer that is negatively signed. The policy implication of the findings is that electronic banking has gradual positive impacts on performance of banks in Nigeria (measured with ROA) and hence could contribute to the process of economic growth.

Enoruwa, Ezuem and Nwani (2019) examined the relationship between electronic banking and bank performance in Nigeria. The scholars adopted data sourced from the Central Bank of Nigeria (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. In their study, Muotolu and Nwadiakor (2019) investigated the effect of Central Bank of Nigeria 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 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.

Mustapha (2018) studied electronic payment technology effect on bank performance in emerging economies – evidence from Nigeria using regression analysis to analyse the data collected from fourteen deposit money banks in Nigeria and found that ATM has a negative significant effect on banks' performance; POS has positive significant effect of banks' performance while MoB also exerts positive significance on banks' performance measured with return on equity. Ali and Emenike (2016) evaluated the impact of ATM on the banking service delivery in Nigeria using descriptive and regression analyses on the value of ATM transactions and customer deposit series for the sample period ranging from January 2009 to December 2013. The results of descriptive statistics show that private sector saving deposits and private sector demand deposit series are normally distributed but the private sector time deposits and the value of ATM transaction are not normally distributed. The regression results indicate that ATM transactions positively and significantly impacts private sector demand deposits in Nigeria with statistical evidence of no significant impact on private sector savings deposits and private sector time deposits.

Jegede (2014) conducted a study to investigate the effects of ATM on the performance of Nigerian banks. The author collected primary data through the aid of questionnaire administration used to collect the data from a convenience sample of 125 employees of five selected banks in Lagos State with interswitch network. The primary data collected through the questionnaire were analyzed statistically by using chi-square technique. The results indicate that less than the benefits, the deployment of ATMs terminals have averagely improved the

performance of Nigerian banks because of the alarming rate of ATM fraud. Similarly, ATM service quality is less correlated to security and privacy of users and providers. Okoro (2014) examined the impact of selected e-payment instruments on the intermediation efficiency of the Nigerian economy using time series data of 2006 – 2011. Multiple regression technique was employed in the study for the analysis of the data collected for the banks' intermediation efficiency indicator (the ratio of currency outside bank to broad money supply) as a dependent variable and the e-payment proxies (ATM, POS, MoB and IB) as the independent variables. The study found that there is significant relationship between ATM, PoS, IB and the intermediation efficiency of the Nigerian economy. However, the study also reveals that there is no significant relationship between Mobile Banking (MB) and intermediation efficiency of the Nigerian economy within the period under study. Ahaiwe (2011) evaluated the effect of automated teller machines on banks' services in Nigeria. The author used primary data collected through survey design and analyzed the data with Chi-Square statistics. The study found (among other things) that banks with ATM deployment makes more profit than those without ATM deployment; indicating that ATM has affected the profitability performance of banks; and that the use of ATM by bank customers reduces the risk of carrying cash.

### **Methodology**

The study employed Ex-post facto research design in its development. Ex-post facto design is appropriate in any after-the-fact research in which case an investigation or evaluation is carried out using already existing data (information) from the past event. This study utilized data from the publications of Central Bank of Nigeria (CBN) statistical bulletin and Nigeria Deposit Insurance Corporation (NDIC) reports for a period covering 2010 – 2019. Data collected were subjected to normality test using Jarque-Bera statistics to confirm the nature of distribution for the series. Pearson Correlation statistics was adopted in analyzing the data and testing for hypotheses. The analyses were conducted with the aid of Statistical Programme for Social Sciences (SPSS) version 21. The

statistics were conducted at 5% level of significance. With Correlation coefficient, if  $r > 0$ , it signifies positive relationship between the

dependent and independent variables but if  $r < 0$ , it signifies negative relationship between the dependent and independent variables.

Five models in line with the objectives of the study are stated as follows:

- CAR = F(ATM, POS, MPAY)
- NPL = F(ATM, POS, MPAY)
- NIM = F(ATM, POS, MPAY)
- ROA = F(ATM, POS, MPAY)
- ALR = F(ATM, POS, MPAY)

Where: CAR is the acronym of Capital Adequacy Ratio

NPL is the acronym of Non-Performing Loans

NIM is the acronym of Net Income Margin

ROA is the acronym of Return on Assets

ALR is the acronym of Average Liquidity Ratio

ATM is the acronym of Automated Teller Machine

POS is the acronym of Point-of-Sale

M-Pay is the acronym of Mobile Payment

The dependent and independent variables of the study are operationalized as follows:

**Table 1: Variables measured**

S/N	Variable	Measurement Proxy	Support Sources
<b>Dependent (CAMEL):</b>			
1.	C = Capital Adequacy	CAR	Dahiyat (2018)
2.	A = Assets Quality	NPL	Dahiyat (2018); Kadioglo, Telceken and Ocal (2017)
3.	M = Management Efficiency	NIM	Salhuteru and Wattimena (2015)
4.	E = Earning Ability	ROA	Roman and Şargu (2013)
5.	L = Liquidity	ALR	Dahiyat (2016)
<b>Independent Variable:</b>			
6.	ATM	ATM Values	CBN Statistics
7.	POS	POS Values	CBN Statistics
8.	M-Pay	Mobile Pay.	CBN Statistics

Source: Author's Desk

### Data Presentation, Analysis and Results

The data used in the analysis of this study are presented in appendix 2.

### Results and Interpretations

The results of the Normality Test are presented in Appendix 3. The results of the five models reveal that the p-value of the Jarque-Bera Statistics are 0.73, 0.65, 0.77, 0.80 & 0.79 for the five models respectively. Each of the result

is greater than 0.05; this implies that the null hypotheses that the data series follow normal distribution are accepted. Therefore, the study affirms that the data series are all normally distributed and therefore support valid inferences from the results.

The Pearson correlations results for the five models are presented in appendix 4. The results are summarized on table 2.

**Table 2: Summarized Results of Pearson Correlation**

Model (Dependent Var.)	Parameter	ATM	POS	M-PAY
CAR	R	-0.09	-0.18	-0.23
	p-val.	0.81	0.61	0.52
NPL	R	-0.55	-0.64	-0.61
	p-val.	0.10	0.04	0.06
NIM	R	0.13	-0.02	0.04
	p-val.	0.73	0.99	0.91
ROA	R	0.81	0.80	0.83
	p-val.	0.04	0.05	0.03
ALR	R	0.59	0.65	0.58
	p-val.	0.08	0.04	0.08

*Source: Deductions from Appendix 4*

From the results on table 2, the following findings are deduced:

1. There is a negative but insignificant relationship between each of the three covered electronic banking instruments (ATM, POS & M-Pay) on capital adequacy ratio of the Nigerian deposit money banks. The inference is signified from the value of the coefficients of determination (r) which are all negative against the backdrop of their respective p-values which are all greater than the significant level of 0.05. This finding disagrees with Enoruwa, et al (2019) who found that electronic channel products (ATM, POS, Mobile Pay) are positively and significantly related to bank performance
2. ATM and M-Pay negatively but insignificantly relate with NPL while POS exerts negative significant relationship with NPL.
3. There is a positive but insignificant relationship between ATM, M-Pay and NIM while POS has negative and insignificant relationship with NIM.
4. Each of the three electronic banking instruments (ATM, POS & M-Pay) exerts significant positive relationship with ROA. This finding agrees with Oniore and Okoli (2019) who found that electronic banking has positive impact on ROA; it also agrees with Enoruwa, et al (2019) to the extent of their finding that electronic channel products (ATM, POS, Mobile Pay) are positively and significantly related to bank performance. The current finding however disagrees with Amos, et al (2020) who found that each of the e-banking proxies (ATM, POS and MB)

5. There is positive but insignificant relationship between each of ATM, POS or M-Pay and ALR. This finding is consistent with Muotolu and Nwadiolor (2019) to the extent of their finding that ATM exerts positive and significant impact on bank performance but disagrees with them to the extent that other electronic banking instruments like POS and M-pay that such positive impact is insignificant.

### Conclusion

Based on the findings, the study concludes that the electronic banking instruments have only influenced positive and significantly the earnings ability of deposit money banks in Nigeria. Other aspects of banks' performance (apart from earning ability of banks) have not been influenced positively by the adoption of e-banking channels. It is therefore informative to note that evaluating e-banking influence on banks' performance with sole focus on earnings generations as in the case of many existing studies could be misleading. Indeed, Nigerian banks have not fared better with the introduction of electronic banking system in their operation, with respect to their capital adequacy, assets quality, management efficiency and liquidity.

### Recommendations

In the light of the finding and conclusion, the following recommendations are made:

- i. Banks' should step up awareness creation on the benefits of using the several e-

- banking products in other to gain more patronage.
- ii. The federal government of Nigeria should create a more enabling environment for improved banking operations via electronic platforms by investing more on power infrastructure which will improve operations of such e-banking services like the ATM, POS, et cetera.
  - iii. Banks should step-up their internet facilities to enable improved operations of the e-banking instruments.

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**APPENDIX 1: DATA FOR THE VARIABLES OF STUDY**

YEAR	ATM	POS	M-PAY	CAR	NPL	NIM	ROA	ALR
2010	399.71	12.72	6.65	14.54	1,060	1.26	0.37	45.45
2011	1,561.74	31.02	18.98	15.26	1,790	1.85	0.88	51.87
2012	1,984.66	48.01	31.51	10.23	2,360	1.43	0.48	45.56
2013	2,828.94	161.02	142.80	14.78	2,080	1.96	1.48	43.93
2014	3,679.88	312.07	346.47	17.66	650	7.40	2.34	48.63
2015	3,970.25	448.51	442.35	15.92	355	7.16	2.29	53.65
2016	4,988.13	759.00	756.90	17.18	322	8.11	2.33	50.63
2017	6,437.59	1,409.81	1,102.00	18.07	286	0.00	2.62	68.01
2018	6,480.09	2,383.11	1,974.25	17.71	360	0.00	-0.04	69.29
2019	6,512.61	3,204.75	5,080.96	4.32	1,078	0.00	3.91	51.77

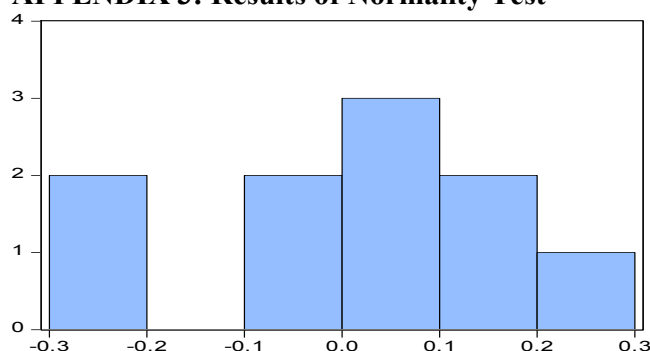
*Source: CBN Statistical Bulletin & NDIC Reports for Various Years*

**APPENDIX 2: LOGGED DATA FOR THE VARIABLES OF STUDY**

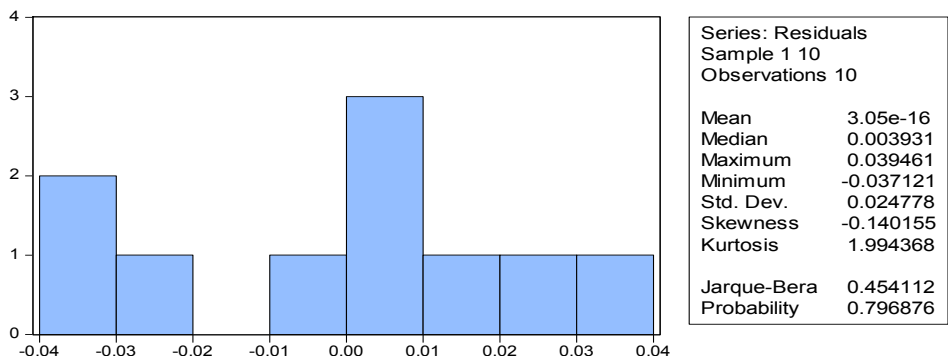
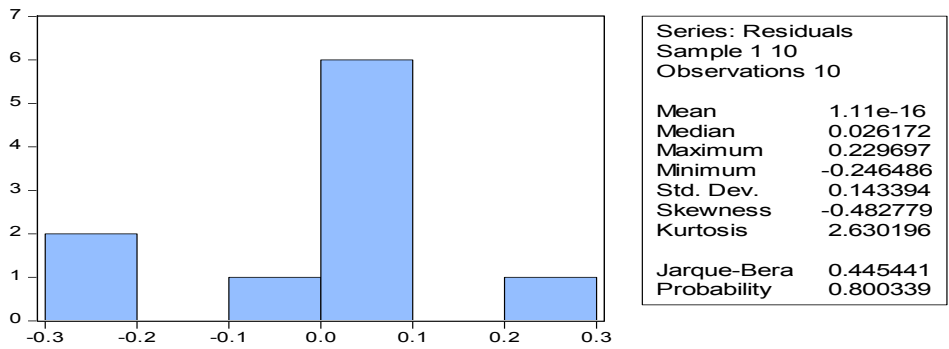
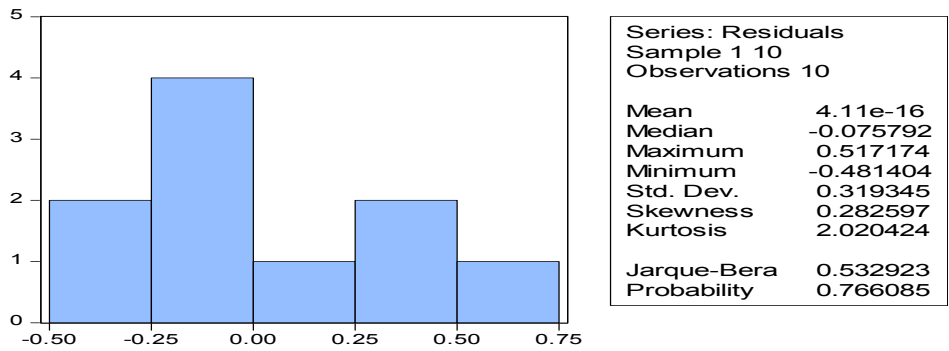
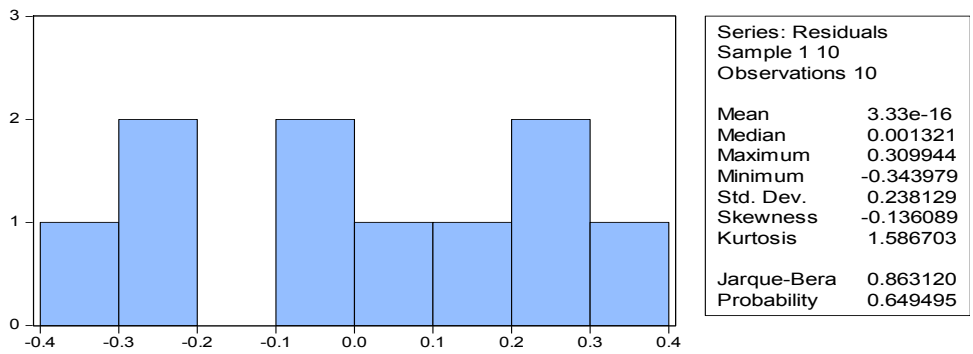
YEAR	LogAT M	LogPO S	LogM-PAY	LogCA R	LogNP L	LogNI M	LogRO A	LogAL R
2010	2.60	1.10	0.82	1.16	3.03	0.10	-0.43	1.66
2011	3.19	1.49	1.28	1.18	3.25	0.27	-0.06	1.71
2012	3.30	1.68	1.50	1.01	3.37	0.16	-0.32	1.66
2013	3.45	2.21	2.15	1.17	3.32	0.29	0.17	1.64
2014	3.57	2.49	2.54	1.25	2.81	0.87	0.37	1.69
2015	3.60	2.65	2.65	1.20	2.55	0.85	0.36	1.73
2016	3.70	2.88	2.88	1.24	2.51	0.91	0.37	1.70
2017	3.81	3.15	3.04	1.26	2.46	0.00	0.42	1.83
2018	3.81	3.38	3.30	1.25	2.56	0.00	0.00	1.84
2019	3.81	3.51	3.71	0.64	3.03	0.00	0.59	1.71

*Source: MS-Excel Computations from Appendix 1*

**APPENDIX 3: Results of Normality Test**



Series: Residuals	
Sample 1 10	
Observations 10	
Mean	7.99e-16
Median	0.030657
Maximum	0.217253
Minimum	-0.251657
Std. Dev.	0.148671
Skewness	-0.539299
Kurtosis	2.391393
Jarque-Bera	0.639074
Probability	0.726485



Source: E-Views 8.0 Statistical Output, 2021.

**APPENDIX 4: RESULTS OF THE PEARSON CORRELATION ANALYSIS**

**Correlations**

	LogCAR	LogATM	LogPOS	LogMPA Y
Pearson Correlation	1	-.088	-.183	-.231
LogCAR Sig. (2-tailed)		.809	.612	.520
N	10	10	10	10

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

**Correlations**

	LogATM	LogPOS	LogMPA Y	LogNPL
Pearson Correlation	-.546	-.644*	-.610	1
LogNPL Sig. (2-tailed)	.103	.044	.061	
N	10	10	10	10

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

**Correlations**

	LogATM	LogPOS	LogMPA Y	LogNIM
Pearson Correlation	.125	-.002	.043	1
LogNIM Sig. (2-tailed)	.730	.996	.905	
N	10	10	10	10

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

**Correlations**

	LogATM	LogPOS	LogMPA Y	LogROA
Pearson Correlation	.810**	.799**	.833**	1
LogROA Sig. (2-tailed)	.004	.005	.003	
N	10	10	10	10

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

**Correlations**

	LogATM	LogPOS	LogMPA Y	LogALR
Pearson Correlation	.586	.648*	.583	1
LogALR Sig. (2-tailed)	.075	.043	.077	
N	10	10	10	10

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

*Source: E-Views 8.0 Statistical Output, 2021.*