

Electronic Businesses, Services and Profitability of Banking Sector in Nigeria (Bank-Focused Theory, Bank-Led Theory, Non-Bank Led Theory)

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Abstract

The introduction of e-banking has indeed had a positive effect on the profitability of the bank since it was introduced. It has also improved the banks customer relationship by rendering effective services. Network failure from internet connection and the break-down of ATMs, fraud and general infrastructure are major challenge facing customers using e-banking products in Africa. However, banks' profitability has been enhanced due to the streamlining of operations brought about by technology mainly driven by electronic banking platforms. This research examined between E-Banking services and Commercial Bank Profitability in Nigeria using A Cointegration and Causality Approach. Electronic banking was proxied by value of Point-of-Sale, USSD, Internet Banking, Mobile Banking, ATM transactions while commercial banking performance was proxied by net profit from electronic banking transfer/processing. Engle-Granger cointegration model was used to analyse data for the sample period January 2008 to December 2022. The study's findings revealed that ATM (Automated Teller Machine) and POS (Point of Sale) long-run relationship with bank performance. The result of the short-run indicates that an ATM (Automated Teller Machine), USSD services and POS (Point of Sale) have a positive significant effect on NP (Net Profit). Internet banking services (IBS) and Mobile banking Services (MBS) have a negative and positive insignificant effect on NP (Net Profit). The value of the adjusted R² (0.508994) indicates that POS (Point of Sales), USSD services (USS), ATM (Automated Teller Machine), Internet Banking Services (IBS) and Mobile Banking Services (MBS) explain 50.89% of the variation in NP (Net Profit margin from the electronic businesses), while the remaining 49.11% is captured outside the model. The findings of the study are consistent with Amu and Nathaniel (2016); Gichungu and Oloko (2015), but inconsistent with Kiragu (2017); Obiekwe and Anyanwaokoro (2017). It is recommended that the monetary authorities and commercial banks should embark on an all inclusive enlightenment campaign for the banking public on the benefits, convenience and importance of adopting e-banking channels in completing their transactions. The study recommends commercial banks to expand their electronic services in a planned and well-articulated strategy for the long run; this will increase clients' satisfaction and also increase the institutions profits.

The banks are also requested to carry out awareness and promotional campaigns to ensure that their customers are aware of the benefits of using e-banking. The study revealed that the use of e-banking leads to an increase in performance of the bank.

Keywords: *Automated teller machine (ATM), Point of Sale (POS), Internet Banking Services (IBS), Mobile Banking Services (MBS), USSD banking services, electronic services, electronic businesses, profitability of banking sector in Nigeria, bank-focused theory, bank-led theory, non-bank led theory.*

JEL Codes: *E51, E58, E59*

1.0 Introduction

Banks are the most important contributors to financial system development in a country. They play an important role by providing financial intermediation through deposit mobilization, money transfer, settlement and lending to firms and households; thereby, stimulating economic growth and development (Levine, 1997; Guiso et al., 2004). When banks are profitable, they can invest in, or acquire, financial technology and sophisticated payment systems to help improve the financial intermediation process, thereby leading to high levels of financial development. In the absence of banks, there are few non-bank financial institutions that can perform significant financial intermediation activities, and the limited supply of non-bank funds may further reinforce the importance of banks in fostering financial development; therefore, the banking sector is crucial for the economic well-being of a country.

The evolution of electronic banking began with ATMs and later evolved through telephone banking, direct bill payment, electronic funds transfer and the world-shattering online banking which has been elected to be the future of financial electronic transaction. Electronic banking is often defined as the adoption and use of telecommunication networks and internet to offer a broad array of products that value-laddered to commercial bank customers. This also include internet banking.

This change has been the adoption of electronic banking technology and other forms of information technology (Angioha et al., 2020; Eukoha & Angioha, 2020). Before adopting electronic banking, the banking process was tedious and took a lot of time (Lin, Wang & Hung, 2020; Attah & Angioha, 2018). The adoption of electronic banking platforms has changed the way that banks deliver their products and services globally. Electronic banking has moved banking into a menu-driven era where robust banking applications are applied to banking services. These banking applications provide virtually all banking functions relying heavily on stored and collected information (Magboul & Abbad, 2018). In Nigeria, the introduction of electronic banking technology to banking operations has brought about a reaction characterised by a fundamental change in the content and quality of services and banking business (Attah & Angioha, 2019; Eukoha & Angioha, 2020). As a result, banking services have been carried out in the simplest form through automated teller machines (ATM), point of sales (POS), internet banking platforms, USSD. This has allowed bank customers to carry out banking transactions even after banking hours (Eukoha & Angioha; Angioha et al., 2020).

1.1 Types of E-Banking Services

1) Automatic Teller Machine (ATM) service: An ATM is a banking machine that provides cash withdrawal, transfer and deposit operations in a highly secure system thus achieving the principles of auto systems. It is linked to a bank computer network in a way that ensures the rights of the banking operation parties.

Banks ATMs offer a wide range of banking services around the clock. These ATMs provide clients with cash withdrawal, balance inquiries, Changing PIN number, ordering a mini account statement and many other services. There is a commission when using ATM services deducted either monthly for the bank clients or instantly if the client is using other bank is ATM. That process positively influences ATM and eventually the bank profitability.

There are many cards that can be used for ATM services, among which are: credit cards, VISA cards, MASTER cards etc.

2) SMS short text messaging: is a service offered by banks to their clients to obtain all information/ notifications related to account transactions as soon as they occur and to view accounts' balances, most recent transactions, or to transfer funds between personal accounts or to third party accounts.

3) Mobile Banking: is a banking service available through mobile phones that enables customers to use their smart devices to access their account information by inputting a pin code to perform banking transactions at their convenience.

4) e-Billing service: an electronic system for viewing and paying bills. This service is presented and monitored by Central Bank of Nigeria.it facilitates the process on citizens by saving them time and effort. It is flexible in using the different banking channels to conduct viewing and paying for bills by the private and public sectors. The central bank, in cooperation with company has specified a commission that is deducted from those who use the billing service. The commission is divided among the central bank 10%, the collecting bank gets 40% and bill's company gets 50%. These commissions are paid instantly at the time of bills payments. At the end of the day, ratios are calculated to determine profitability by accumulating all commissions in bank account and added at the end of the year to the general revenues. you will be able to pick the time and place you want to pay your bills through versatile list of payment channels that include ATMs, Tellers, Mobile and Online Banking services, along with a number of trusted centers in Carrefour, Safeway and others. Besides that, you will be able to use pay your bills 24/7 via credit cards.

This quick-witted system has been developed to improve the transactions processing performance of the financial operations from the date service was launched. Different services, we're in front of distinguished service that is to lead the market in the digital era.

Benefits for using e-billing, you will have the benefits of: No time, money or effort consumed on traditional or impractical payment options; Ability to avoid service interruption due to delayed payment; A fast, reliable and secure process to pay and review your bills whenever and wherever you are and Flexible and versatile payment channels that meet your needs; Internet service: the service allows a client to conduct financial transactions by logging in to the bank's website. It is a convenient and secure service through which a client can make online money withdrawal and view and edit his/ her bank account information at any time and from any place, that has

internet connection. It provides supervisory standards and flexibility and maintains security of information; Call center (customer care service): banks operate communication centers and customer care centers that permit banking service over the phone by using a pin number. These centers operate around the clock, Thus making the service available 24/7; Western Union Money Transfers: Western Union money transfer is an exceptional service provided by bank at all its branches. It is designed to send and receive money transfers from more than 470,000 locations in more than 200 countries worldwide. It is the fastest and most secure channel of sending and receiving money within a short period, not exceeding 10 minutes. The commission of this service depends on the amount of the transfer and the recipient country and Payment Options: The bank offers some services of paying bills and fees as following; Electricity and water: this service is available for Bank clients and Tuition Fees: the bank offers its clients the ability to pay their tuitions fees.

E-banking is the adoption of telecommunication networks and internet to offer a wide variety of products that are value laddered to commercial bank clients. Internet banking may also involve importation of data to personal accounting software (Ogutu & Fatoki, 2019). Some of the e-banking makes it possible for bank clients to monitor their own accounts from the bank or from other places. Banking using the internet is regarded as a complementary channel used in service delivery. Based on ATMs being introduced, phone banking, PC banking that is the building blocks of initial electronic finance, the improved usage and diffusion of online banking has introduced a new channel of distribution to retail banking. Online banking has increased acceptance in the entire world as a new channel of delivery to perform a number of banking transactions (Ogutu & Fatoki, 2019).

Today's banking environment is very dynamic and undergoes rapid changes as a result of innovations in information and communication technology (ICT), increased awareness and demand from customers. Banking industry of the 21st century operates in a complex and competitive environment characterized by these changing conditions and highly unpredictable economic climate. ICT is at the centre of this global change curve. ICT has changed the dimensions of competition in the retail banking sector. Ref. [1] for example, concludes that the automated teller machine (ATM), Point of Sale (POS) terminals and Internet services are the major instruments used by the customers of the deposit money banks in Nigeria. Following the introduction of electronic banking and internet automated teller machines (ATMs) which are the initial cornerstones of electronic finance, the increased adoption and penetration of mobile banking and Internet banking has added a new distribution channel to retail banking: Internet/Online-banking. The quest for banks in Nigeria to have efficient customer service delivery and maintain global relevance in the system has led to the exploitation of the many advantages of ICT through the use of automated devices imperative in the industry. Many studies have also been conducted to establish the relevance of ICT to commercial bank performance.

1.2 Statement of the Problem

According to Isack (2014), electronic banking is when bank clients access bank information and

Investigation by Ogare (2013) showed that, despite information technology has been identified to improve banks financial performance, high costs are incurred in its implementation and there is

the obstacle of financial insecurity in e-banking due to fraud that is downsizing the number of users which may reduce the bank profit. Several challenges have been associated with e-banking such as: increased costs, insecurity and inadequate skills that may have a negative effect on bank profitability. Bank customers can carry out bank transactions without visiting the bank premises. This may be through telephone, mobile phone, digital television and the computer. According to Ogare (2013), electronic banking is an innovation in the banking industry that involves the use of the internet and telecommunication networks bank services and products.

In the study done by Gichungu (2015), it was found that financial performance shows the level to which a firm generates its revenue by the use of its assets over a given period of time. The different measures used to measure financial performance should be taken in aggregation. In their study Ngango et al. (2015) claimed profitability to be one of the major measures of financial performance. Return on assets (ROA) reflects the level of profitability. Among the other ratios used is return on equity (ROE) which compares the amount of profit earned to the amount invested by shareholders, and the number of ATMs (Asia, 2015).

With the rising cost of doing business in general, and banking business in particular, most banks find themselves grappling with high costs and wastages or inefficient use of resources. The problem is even made worse with increased competition in banking industry as banks scramble for customers. Thus, Nigerian banks today are seriously into new electronic delivery channels for banking products and services with a view to delivering better services and satisfying customers the more. Banks that cannot offer these services are increasingly losing their customers. Furthermore, existing literature shows that e-banking has been adopted by the Nigerian banks at a slow pace.

Prior to the advancement of the e-banking, there were 89 commercial banks in Nigeria. The number of banks, however, reduced to 24 banks due to the consolidation (i.e., mergers and acquisition) program. After the consolidation, many banks have started to adopt the e-banking system IT facilities, such as global system for mobile communication (GSM) phones, ATM, Internet facilities, optical character recognition (OCR), smart cards, funds transfer, e-banking, electronic mail, and bankers automated clearing services, are now being used as a means of banking transactions (Nwankwo & Agbo (2021).

According to Nwankwo and Agbo (2021), Despite the significant role electronic banking has demonstrated so far, its maintenance and cost are too high for some banks and customers. For instance, the use of point of sale (POS) terminals in the cashless system attracts special charges that do not go with cash transactions. Regardless of the importance of e-banking in explaining banking performance, the impact of e-banking on banks performance, is still misunderstood for two main reasons; first, there is a lack of understanding about the drivers of innovation and secondly innovation's impact on bank's performance remains untested. Previous researchers have produced mixed results regarding the impact of innovations on bank performance. It is at the center of such mixed conclusions that creates and necessitates the need to carry out a study from a Nigerian context to establish the effect of electronic banking on commercial bank performance in Nigeria

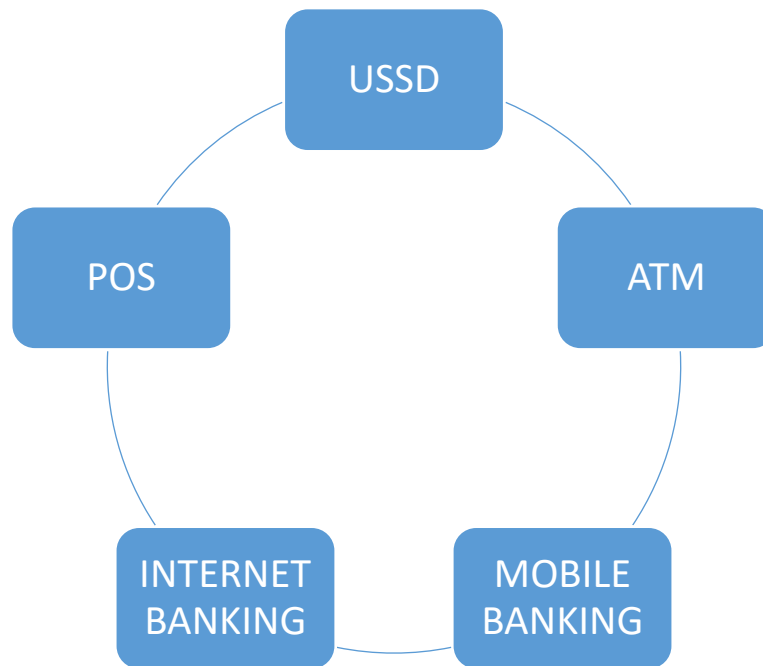


Fig. 1: Electronic Banking structure in Nigeria
Source: Author, 2023

1.3 Electronic Banking structure in Nigeria

Electronic banking basically refers to performing banking functions or transactions using a smart technologically inclined device or the internet. Information Technology has recently influenced banking operations, transactions and service delivery. It has provided a channel through which banking is done in convenience, thereby, reducing customer queues in banking halls, administrative expenses and the complexities associated with traditional banking (Kawimbe et al., 2020).

1.31 Internet Banking

The Internet, much like the ATM that came before it, is fundamentally a new distribution channel through which banks can deliver traditional banking products and services. Initially, banks promoted their core capabilities, namely, products, channels and advice, through the Internet. Then, they entered the Internet commerce market as providers/distributors of their own products and services. Internet banking by its nature offers more convenience and flexibility to customers coupled with a virtually absolute control over their banking. Service delivery is informational (informing customers on bank's products, etc) and transactional (conducting retail banking services). As an alternative delivery conduit for retail banking, it has all the impact on productivity imputed to Telebanking and PC-Banking.

1.32 Point of Sale (POS)

POS terminals handle cheque verifications, credit authorization, cash deposit and withdrawal, and cash payment. This enhances electronic fund transfer at the point of sale (EFTPOS). EFTPOS enables a customer's account to be debited immediately with the cost

of purchase in an outlet such as a supermarket or petrol station. It consists of the accumulation of electronic payment messages by the retailer, which are subsequently passed on to appropriate institutions for processing. The purchase price is debited on the buyer's account and credited on the seller's account.

1.33 Mobile Banking

A more current e-banking development is wireless internet applications of banking mostly called m-banking. With the combination of internet and mobile phone, a new service (mobile data service) is enabled and the first such wireless internet commercial transaction was performed by the banking industry (Kawimbe et al., 2020).

1.34 Automated Teller Machine (ATMs)

ATMs are generally situated outside of the bank's halls, and could also be located at filling stations, airports mall, supermarkets and places far from the branches of a bank. They were established initially to work as cash generating, transferring, depositing and or dispensing devices. because of advancement in technology ATMs are capable of offering a variety of banking services, for example withdrawing cash, cash transfers from one account to another and bill payments, checking account balances, making deposit and printing account statement. ATMs are electronic terminals that enable one to engage in banking transactions almost any time. To withdraw cash, make deposits, or transfer funds between accounts, one would generally insert an ATM card and enter ones PIN. Some financial institutions and ATM owners charge a fee, particularly if one does not have ac-counts with them or if one engages in transactions at remote locations. Generally, ATMs must inform one that they charge a fee and its amount on or at the terminal screen before you complete the transaction. Direct Deposit enables one to authorize specific deposits, (like paychecks and Social Security check and other benefits) to your account on a regular basis. One may also pre-authorize direct withdrawals so that recurring bills (like insurance premiums, mortgages, utility bills, for Consumers) are paid automatically

1.4 Profitability of Bank

The profit is important for all participants in the economy and depends on such factors as received and paid interest on bank transactions, the share of non-interest income, current expenditures and the structure of assets and liabilities (Myktybekovich, 2013). The main aim of the analysis on profitability is to uncover the main center of bank performance and factors that affect the increase in profits and profitability of the bank based on the effective management of revenues and expenditures. Moreover, in countries with no strong financial markets or with a weak financial system the banking sector constitutes the key to the economic growth.

1.41 Return on Asset

A financial ratio known as return on assets (ROA) measures a company's profitability in relation to its total assets. ROA can be used by corporate management, analysts, and investors to assess how effectively a company uses its resources to make a profit. The metric is frequently represented as a percentage using the average assets and net income of a corporation. A

company's ability to manage its balance sheet to produce profits is more effective and efficient when its ROA is higher; on the other hand, a lower ROA suggests there is potential for improvement. This ratio examines the degree to which the invested money can generate the anticipated return on investment. The return on investment, also known as return on assets, is influenced by net profit margins and total asset turnover since low return on assets is a result of low profit margins that are a result of low net profit margin because of low total asset rotation. There are two variables that affect the amount of return on assets: a) turnover from operating assets (asset turnover rate utilized for operating profit); and b) profit margin, which is the operating profit represented as a percentage of total net sales. Profit Margin measures the level of profit that can be achieved by the company in relation to its sales.

Return on Assets is measured in ratio units using the following equation:

$$\text{Return on Assets (ROA)} = \frac{\text{Earning After Tax (EAT)}}{\text{Total Assets}}$$

The key factors of bank profitability performance are as following: Bank-Specific Factors: In view to understanding bank performance in the global context, studies on profitability have largely used returns on bank assets (ROA), net interest margin (NIM) and return on equity (ROE), as common measures. Bank-specific determinants include financial statement ratios in four areas: (1) capital; (2) earnings, profitability, and efficiency; (3) liquidity; and (4) asset quality. Industry-Specific Determinants: Bank industry determinants are external factors that may relate to bank profitability, such as the extent of industry concentration and the size of the banking system in relation to the size of the economy as a whole. Industry concentration is the degree to which the industry in a market is served by just a few or by many banks. When a banking market is more concentrated, customers have fewer choices, competition is less, and the market power of individual banks is greater. The common variables include Market concentration, Stock market capitalization, bank assets, Herfindahl-Hirschman index and others; Macroeconomic Determinants: The last group of profitability determinants deals with macroeconomic control variables. Economic growth is thought to impact bank profitability favorably, by increasing loan demand, decreasing loan default rates, and allowing banks to charge more for their services. This may be offset by increasing the supply of banking services, as expansions and new entrants are encouraged by perceived favorable conditions. This variable is assessed by the year's real change in gross domestic product (GDP) for the nation the bank is located in, sometimes on a per capita basis. The common variables include inflation rate, the long-term interest rate, rate of economic growth (Panayiotis et al., 2005) other variables.

1.5 Research Questions

The following research questions will be answered in this study:

- i. What is the causal effect of point of sales services on profitability of banking sector in Nigeria?
- ii. How does USSD services affect profitability of banking sector in Nigeria?
- iii. What is the effect of automated teller machine (ATM) services on profitability of banking sector in Nigeria?
- iv. What is the influence of internet banking services on profitability of banking sector in Nigeria?
- v. What is the causal effect of mobile banking services on profitability of banking sector in Nigeria?

1.6 Objectives of the Study

The broad objective of the study is to investigate the effect of electronic banking services and businesses on profitability of banking sector in Nigeria, while the specific objectives are to:

- i. investigate the effect of point of sales services on profitability of banking sector in Nigeria;
- ii. examine the relationship between USSD services and profitability of banking sector in Nigeria;
- iii. evaluate the effect of automated teller machine (ATM) services on profitability of banking sector in Nigeria; and
- iv. assess the influence of internet banking services on profitability of banking sector in Nigeria.
- v. investigate the effect of mobile banking services on profitability of banking sector in Nigeria;

1.7 Research Hypotheses

This study is designed to test the following null hypotheses:

H₀₁- Point of sales services has no significant effect on profitability of banking sector in Nigeria;

H₀₂- USSD services has no significant relationship with profitability of banking sector in Nigeria;

H₀₃- Automated teller machine (ATM) services has no significant effect on profitability of banking sector in Nigeria;

H₀₄- Internet banking services have no significant influence on profitability of banking sector in Nigeria.

H₀₅- Mobile banking services has no significant effect on profitability of banking sector in Nigeria;

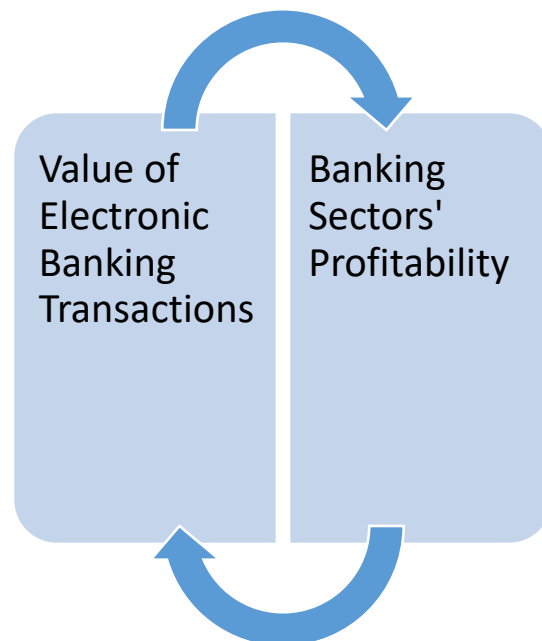


Fig 2: Value of Electronic Banking Transactions and Banking Sectors' Profitability Conceptual Framework

Source: Author, 2023

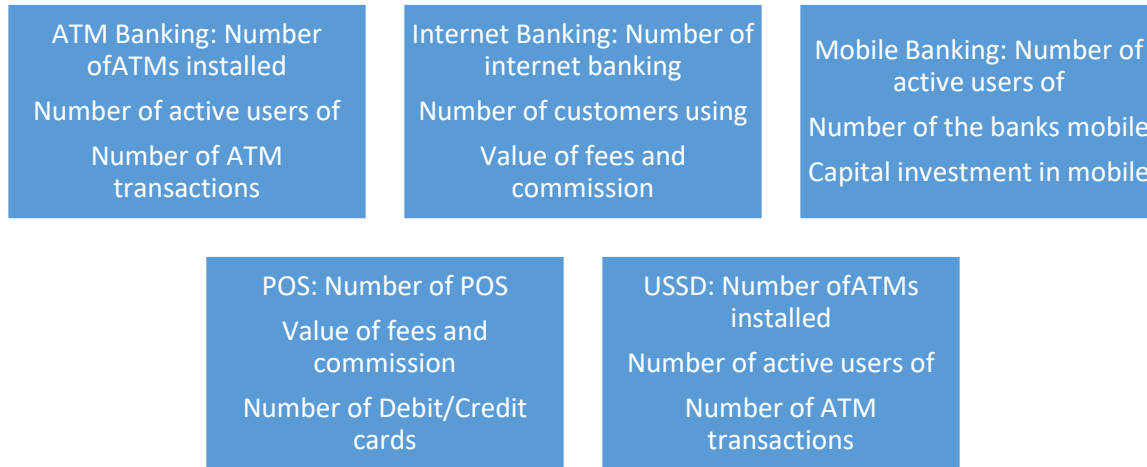


Fig. 3: Value of Electronic Banking Transactions Conceptual Framework

Source: Author, 2023



Fig 4: Banking Sectors' Profitability Conceptual Framework
Source: Author, 2023

2.1 Theoretical Review

Bank-Focused Theory: This theory was popularized by Kapoor (2010) and anchors on the

premise that banks use non-traditional but conventional low-cost delivery channels to offer services to its customers. Such channels include the automated teller machines (ATMs), mobile phone banking, Point of Sale (POS) among others. In using these channels, the bank offers a wide range of services to its customers regardless of location and branch attachments. All that is required is to enter the needed information into the system and the transaction is done.

Bank-Led Theory: The bank-led theory of branchless banking was postulated by Lyman, Ivatury and Stachen (2006) and emphasizes the role of an agent who acts as a link between the banks and the customers. In this case, the retail agents have direct interaction with the banks' customers and perform the role expected of the bank by either paying cash or collecting deposits. Finally, this agent is expected to transmit all his dealings with the bank's customers to the bank he is representing through electronic means (such as phones, internet, etc).

Nonbank-Led Theory: This theory was popularized by Hogan (1991). Here customers do not deal with any bank and they do not maintain any bank account. All that the customers have to deal with is a non-bank firm such as mobile network operator or prepaid card issuer who they exchange their cash with for e-money account. The e-money account is then stored in the server of this non-bank agent. This tends to represent the most risky platform in the electronic payment methods because of lack of existing regulatory framework upon which these e-agents operate.

2.2 Empirical review

Obiekwe and Anyanwaokoro (2017) explored the effect of Electronic payment Methods (EPM) on the profitability of commercial banks in Nigeria for the period 2009 to 2015. Findings revealed that Automated Teller Machine (ATM) and Mobile Phone payment have significant effect on the profitability of commercial banks in Nigeria. However, Point of Sale (POS) has an insignificant effect on commercial banks' profitability in Nigeria. Also, Kiragu (2017) explored the effect of electronic banking on the financial performance of Kenya banks. Questionnaires were administered to the respondents in selected banks. The result reveals that bank profits have gone up tremendously after the introduction of electronic banking. Also, Chukwukaelo, Onyeiwu, Amah (2018) examined the relationship between different e-banking channels and the profitability of organizations in Nigeria and found that the impact of electronic banking on profitability of Deposit Money Banks operating in Nigeria was significant and positive.

Furthermore, Siddik et al. (2019) studied the effect of E-banking on the performance of Bangladeshi banks using panel data of 13 banks over the period of 2003–2013. Performance was measured in terms of Return on Equity, Return on Assets and Net Interest Margin. Results from pooled ordinary least square analysis show that e-banking begins to contribute positively to banks' Return on Equity with a time lag of two years while a negative impact was found in first year of adoption. In another study, Ogutu and Fatokio (2019) investigated examined the effect of electronic banking on financial performance of listed commercial banks in Kenya and found a strong positive relationship between mobile banking, agency banking, ATM banking and online banking and financial performance of listed commercial banks in Kenya.

Ogutu and Fatoki (2019) examined the effect of electronic banking on financial performance of listed commercial banks in Kenya. This study was guided by four objectives, establishing the effect of mobile banking, agency banking, ATM banking and online banking on financial performance of listed commercial banks in Kenya. The study employed quantitative research design using panel data analysis. The targeted population of the study was the 11 listed commercial banks in Kenya. Secondary data was extracted from CBK banking supervisory reports and published annual reports of banks. The data was recorded on data collection sheets. Both descriptive and inferential statistics were used. The findings were presented using tables with associated explanations. The study found that there was strong positive relationship between mobile banking, agency banking, ATM banking and online banking and financial performance of listed commercial banks in Kenya. Financial performance of commercial banks and m-banking were strongly and positively correlated. There was a strong positive correlation between financials performance of individual commercial bank and agency banking. There was a strong positive correlation between financials performance of individual commercial bank and agency banking. There was a weak positive correlation between financial performance of individual commercial bank and online banking.

Nwankwo and Agbo (2021) examined the effect of electronic banking on the performance of Nigerian commercial banks. Specifically, it sought to determine the effect of automated teller machine transactions, point of sale terminals transactions and mobile banking transactions on the performance of commercial banks in Nigeria. The study adopted the ex post facto research design and covered the period from 2013 to 2017. -views statistical tool was used for the analysis of the data obtained. The results of the study reveal that automated teller machine

transactions have positive and significant effect on the performance of commercial banks in Nigeria while both point of sale terminal transaction and mobile banking transactions have negative and weak effects on the performance of the commercial banks in Nigeria. The study recommends that the management of banks should adopt such innovations in their operations as would shore up their profitability

Amu and Nathaniel (2016) carried out a study on the relationship between electronic banking and the performance of Nigerian commercial banks. Electronic banking was proxied by value of Point-of-Sale transactions while commercial banking performance was proxied by customers' deposits. Engle-Granger cointegration model was used to analyse data for the sample period January 2009 to December 2013. The results show that POS is not cointegrated with both the savings and time deposits but are cointegrated with demand deposits. It is recommended that the monetary authorities and commercial banks should embark on an all inclusive enlightenment campaign for the banking public on the benefits, convenience and importance of adopting e-banking channels in completing their transactions.

Mutisya and Atheru (2019) examined the effect of electronic banking on the financial performance of commercial banks in Kenya. The specific objectives were to determine the extent of internet, mobile, automated teller machine and debit/credit card banking adoption and its effect on financial performance. The study covered a period of five years that is from the year 2011 to the year 2015 and adopted descriptive research design. The data collected was analyzed by the use of both descriptive and inferential statistics procedures. Primary and secondary data was collected from the 34 commercial banks that responded leading to a response rate of 79.04% out of the 43 commercial banks. The trade analysis showed that internet banking was recognized and accepted by the Kenyan commercial banks and the Kenyans as a way of transacting. Electronic banking was found to be positive and significantly related to the financial performance of the commercial banks in Kenya. This was attributed by an R Square of 0.688 for Return On Assets, 0.63 for Net Profit and 0.277 for Return On Equity indicating that the independent variables in the study were able to give information of up to 68.8%, 63% and 27.7% respectively while the remaining 31.2%, 27% and 72.3% could not be explained in the study but could be explained using other variables outside the study. All the independent variables were (internet banking, Mobile banking, Automated Teller Machine banking and Debit/Credit banking) found to be positively and significantly related to the Return On Assets.

Das et al. (2022) evaluate the impact of electronic banking services on bank transaction in state-owned commercial banks in Bangladesh and to examine the relationship between the electronic banking services and bank transaction. In the banking world, Electronic banking has added a new dimension. In this study, quantitative research method was followed and required data were collected through questionnaire. This study was conducted on clients of state-owned commercial banks in Bangladesh and 100 samples were taken conveniently to conduct this study. Different statements about electronic banking services such as ATM service, online banking, and mobile banking were given in the questionnaire. Linear regression and Pearson correlation were used for data analysis. The study found that ATM service, online banking, and mobile banking have positive impact on bank transaction and there is a positive relationship among ATM service, online banking, mobile banking, and

bank transaction. To increase both the financial activity of the bank as well as number of its clients, electronic services have contributed continuously.

Awolusi and Aduaka (2020) assessed the impact of electronic banking on profitability in the Nigeria banking industry. An inferential survey research design was adopted. Primary data were collected through questionnaires from both staff and customers of the surveyed bank. It was complemented with secondary data sourced from the company's audited financial statements for the period 2010 to 2017. Data collected were analyzed using both descriptive and inferential statistics while testing of the hypotheses was done using multiple regression analysis. The study revealed that cards play a significant role more than other channels and immediately followed by ATM. Also, it was observed that E-Banking channels contributed to Bank's profitability, that E-banking services (EBS) had an influence on the retention and loyalty of bank's customers and that the quality of service, security, reliability and efficiency have a definite impact on the usage of the services of e-banking. It was recommended that the Nigerian banking industry should invest more in card products, followed by ATM amongst other electronic channels; as they generate more revenues for the bank. The study also recommended further development of other channels (Mobile, Corporate Payments, POS and internet banking) to further enhance their contribution to the bank's profitability. Nigerian banks should also create a business strategy that is customer-centric by being continuously innovative in identifying the needs of their customers and improving on their products offering while developing new ones, to retain and keep the loyalty of their existing customers while attracting new ones.

Alomari et al. (2018) estimated the effect of technological progress on banks performance measured by return on equity (ROE) in 13 Jordanian commercial banks over the period 2011 - 2016 using panel data. Results reveal that ATMs ratio, ratio of a bank's branches number, the ratio of visa cards number of each bank out of the total number of visa cards issued by all banks, and the ratio of total credit facilities granted by each bank affect profitability positively as proxied by ROE. On the other hand, the ratio of master cards number of each bank out of the total number of master cards issued by all banks is not significant. The study examines six dummy variables and found that cash withdrawals in foreign currencies and cash transfer within the same bank are the most important services (dummies) that affect bank's profitability.

Sundas, Farhat, & Ummara (2017) examine empirically the contribution of IT to financial performance as measured by net profit, ROA and ROE. Results reveal that IT does not directly improve financial performance in terms of ROA and ROE. Instead, it enhances financial performance as measured by net profit

3.0 Methodology

This study adopted was the ex-post facto research design using secondary data from the Nigeria Bureau of Statistics for the period of 2008 to 2022. The unit root property of the data was examined using Augmented Dickey Fuller test. Ordinary Least Square Regression analysis was used to determine the relationship between the variables of the study as the data are integrated of order zero. The data was analyzed using E-views 9.0. The hypotheses of the study was analyzed using the probability value of the regression estimate. The model specification for the analysis is as follows:

$$NP = f(\text{POS, USS, ATM, IBS, MBS}) \dots \dots \dots (2)$$

Where, NP = Net Profit (a proxy for profitability of banking sector in Nigeria)

POS= Volume of transaction on point of sales services

USSD= Volume of transaction on USSD banking services

ATM=Volume of transaction on automated teller machines services

IBS= Volume of transaction on internet banking services

MBS= Volume of transaction on mobile banking services

The model is written in explicit form and it reflects the dependent variable and the independent variables for the study with the error term.

$$NP_{it} = \beta_0 + \beta_1 POS_{it} + \beta_2 USS_{it} + \beta_3 ATM_{it} + \beta_4 IBS_{it} + \beta_5 MBS_{it} + \mu_{it} \dots (3)$$

Where:

β_0 = the intercept term

$\beta_1 - \beta_5$ = Regression coefficients

Where, NP_{it} = Net Profit in period t (a proxy for profitability of banking sector in Nigeria)

POS_{it} = Volume of transaction on point of sales services in period t

$USSD_{it}$ = Volume of transaction on USSD banking services in period t

ATM_{it} = Volume of transaction on automated teller machines services in period t

IBS_{it} = Volume of transaction on internet banking services in period t

MBS_{it} = Volume of transaction on mobile banking services in period t

μ_{it} = Stochastic error terms

t = The time unit (t= 1, 2 ... 15 years)

3.1 A-priori Expectation

$\frac{dPOS}{dNP} > 0$: connote that Point of sales services is expected to exert positive effect on profitability of banking sector in Nigeria.

$\frac{dUSS}{dNP} > 0$: connote that USSD services is expected to exert positive effect on profitability of banking sector in Nigeria

$\frac{dATM}{dNP} > 0$: connote that Automated teller machine (ATM) services is expected to exert positive effect on profitability of banking sector in Nigeria.

$\frac{dIBS}{dNP} > 0$: connote that Internet banking services is expected to exert positive effect on profitability of banking sector in Nigeria.

$\frac{dMBS}{dNP} > 0$: connote that Mobile banking services is expected to exert positive effect on profitability of banking sector in Nigeria.

4.0 Data analysis and summary of finding

However, testing of correlation among variables of estimates would make the researchers detect whether the variables have high multicollinearity among themselves. As a result, the parameter estimates may contradict the theory's conclusions due to the unexpected effect of

multicollinearity among the independent variables. Augmented Dickey Test (ADF) was employed for this study to determine the order of integration of the time series data. The unit root test helps to determine the nature of data used to prevent spurious results and will aid the technique appropriate for analysis. The Augmented Dickey-Fuller test (ADF) unit root result showed that variable USSD and IBS are stationary at level, but ATM, MBS, and POS are all non-stationary at levels, but after first differencing, they become stationary at the first difference I(1) and none of the variables is integrated at the order I(2).

This suggests that the ordinary least square technique will not be applicable, as it will generate spurious and unreliable regression results (Gujarati & Porter, 2009). Therefore the co-integration technique of analysis is applied to examine the long-run dynamics of the variables, and (VECM) Vector error correction model will be used to examine short-run relationships among the variables. This will help to nullify spurious results.

The results mean that there is a long-run relationship between NP, POS, USSD, MBS, IBS and ATM payment. This warrants the determination of the short-term relationship. The long-run result revealed that ATM (Automated Teller Machine) has an insignificant positive effect on NP (Net Profit Margin). Mobilepay has a significant negative effect on NP (Net profit Margin). POS (Point of Sale) significantly and negatively affects NP (Net Profit Margin). IBS has an insignificant positive effect on NP (Net Profit Margin). The study investigated the short-run relationship using an error-correction mechanism (ECM). ECM shows the speed of adjustment of variables towards equilibrium. The ECM co-efficient result showed a correct sign at 18%, which measures the speed of adjustment between NP and MBS, POS (Point of Sale), IBS, and ATM at the equilibrium level. The coefficient of ECM is negatively significant. This implies that an 18% speed of adjustment towards equilibrium exists and that the relationship between NP and MBS, POS, IBS, and ATM has an automatic mechanism.

The study's findings revealed that ATM (Automated Teller Machine) and POS (Point of Sale) long-run relationship with bank performance. The result of the short-run indicates that an ATM (Automated Teller Machine), USSD and POS (Point of Sale) have a positive significant effect on NP (Net Profit). IBS and MBS have a negative and positive insignificant effect on NP (Net Profit). The value of the adjusted R² 0.508994 indicates that POS (Point of Sales), USSD services (USS), ATM (Automated Teller Machine), Internet Banking Services (IBS) and Mobile Banking Services (MBS) explain 50.89% of the variation in NP (Net Profit), while the remaining 49.11% is captured outside the model. The findings of the study are consistent with Amu and Nathaniel (2016); Gichungu and Oloko (2015), but inconsistent with Kiragu (2017); Obiekwe and Anyanwaokoro (2017).

Table 1: Error Correction Mechanism (ECM) Test Results

Dependent Variable: D(NP)

Method: Least Squares

Date: 06/17/23 Time: 14:36

Sample (adjusted): 2008- 2022

Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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C	-0.859098	0.858973	-	1.000145	0.3292
D(NP)	0.001077	0.005361	0.200831	0.8429	
D(POS)	0.000229	0.001761	0.129777	0.898	
D(USS)	0.012274	0.017106	0.717495	0.4814	
D(ATM)	-0.001241	0.003564	-	0.348133	0.7314
D(IBS)	0.001077	0.005361	0.200831	0.8429	
D(MBS)	0.607195	Mean dependent var	-	0.910000	
R-squared	0.508994	S.D. dependent var	4.850282		
Adjusted R-squared	3.398681	Akaike info criterion	5.483826		
S.E. of regression	231.0207	Schwarz criterion	5.774156		
Sum squared resid	-65.28974	Hannan-Quinn criter.	5.567431		
Log likelihood	6.183176	Durbin-Watson stat	1.984081		
F-statistic	0.00128				
Prob(F-statistic)					

Source: E-view 9 output

5.0 Conclusion and recommendations

The introduction of e-banking has indeed had a positive effect on the profitability of the bank since it was introduced. It has also improved the banks customer relationship by rendering effective services. Network failure from internet connection and the break-down of ATMs, fraud and general infrastructure are major challenge facing customers using e-banking products in Africa. However, banks' profitability has been enhanced due to the streamlining of operations brought about by technology mainly driven by electronic banking platforms.

This research examined between E-Banking services and Commercial Bank Profitability in Nigeria using A Cointegration and Causality Approach. Electronic banking was proxied by value of Point-of-Sale, USSD, Internet Banking, Mobile Banking, ATM transactions while commercial banking performance was proxied by electronic banking transfer/processing fees. Engle-Granger cointegration model was used to analyse data for the sample period January 2008 to December 2022. The results show that POS is not cointegrated with the electronic banking fees. It is recommended that the monetary authorities and commercial banks should embark on an all inclusive enlightenment campaign for the banking public on the benefits, convenience and importance of adopting e-banking channels in completing their transactions. The study recommends commercial banks to expand their electronic services in a planned and well-articulated strategy for the long run; this will increase clients' satisfaction and also increase the institutions profits. The banks are also requested to carry out awareness and promotional campaigns to ensure that their customers are aware of the benefits of using e-

banking. The study revealed that the use of e-banking leads to an increase in performance of the bank.

The introduction and usage of point of sale by the deposit money banks have improved banks' financial gain and reduced the level of financial exclusion in the economy. The banking industry can invest in the innovative prowess of electronic banking in the following forms above because it will enhance all components of performance that the deposit money measured in the long run. It is therefore recommended that the banking institutions should create more ATMs (Automated Teller Machine) and POS (Point of Sale) in the country because it can improve the net interest income of the deposit money in Nigeria and is advantageous to the fact that the country is the largest African country in the world so charges on ATM (Automated Teller Machine) and POS (Point of Sale) will enhance the financial performance of the entity. The study recommends that the banks must be focused in terms of their needs and using the right technology to achieve goals, rather, than acquiring technology of internet banking because other banks have it; this will help the bank to steer its vision in the right direction which is growing the trends of ICT.

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