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EFFECT OF FINANCIAL TECHNOLOGY ON THE PROFITABILITY OF DEPOSIT MONEY BANKS IN NIGERIA

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ABSTRACT

This study evaluates the effect of financial technology on the profitability of Deposit Money Banks in Nigeria from 2010 to 2021. The secondary data covering the period of the study were sourced from the CBN statistical Bulletin (2021) and CBN Financial stability Report (2010-2021). The research design adopted in this study is ex -post facto. The Granger Causality Test was utilized to investigate the causal flow between the independent and dependent variables. Rombust Least Square (RLS) regression model was applied in estimating the regression coefficients. This research work is anchored on Technology Acceptance Model. The finding reveals Internet banking has a positive and significant effect on the profitability of DMBs in Nigeria, Automated teller machine has a positive but non-significant effect on the profitability of DMBs in Nigeria, Mobile banking has a negative but non-significant effect on the profitability of DMBs in Nigeria, POS operations have a negative but non-significant effect on the profitability of DMBs in Nigeria. The study's findings suggest that DMBs in Nigeria can significantly have better returns from the adoption of internet banking. This electronic banking channel can reduce operating costs, attract tech-savvy customers, and increase revenue for DMBs. The findings also suggest that while ATMs can provide benefits to DMBs, their effect on profitability may not be statistically significant. Finally, the study found that the adoption of mobile banking and POS operations may not provide significant benefits to DMBs in terms of increased revenue and reduced costs. Generally, the study's findings have important implications for policymakers, bankers, Bank managers, and stakeholders in the Nigerian banking industry. The findings suggest that policymakers can encourage the adoption of internet banking by DMBs in Nigeria to increase the sector's profitability.

***Key words:** Deposit Money Banks, Financial technology, Financial Innovation, Profitability.*

1. INTRODUCTION

Banking system has been growing with technological developments and innovative productions. Developing technology and changing macroeconomic guidelines improved the Nigeria financial service system and many reforms have been set about in the system. The banking industry in Nigeria has gone through phenomenal growth over the years and the same is notable as innovations in banking and financial sectors, these include; the emergence of Point of Sale (POS), Automated Teller Machine (ATM), Mobility of Payment (MOP), Retail Banking, free warning administrations, usage of standing directions of clients, instalments of service charges, web

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keeping money, phone managing an account, portable saving money, and numerous value added activities (CBN report, 2013).

Financial technology, also called FinTech, is the "marriage" between technology and finance. When combining both technology and finance, they create a multiplier effect, which is more substantial than the different use of the two. Zetzsche, Buckley, Arner, and Barberis, (2017) pointed out that the current FinTech stands out from two significant trends. The first trend is the pace of change driven by Big Data, machine learning, commoditization of technology and Artificial Intelligence (AI). The second trend is the fact that more new non-financial firms have entered and invested in financial services businesses. Fintech is a key area in the development of the banking Industry, since it requires the use and integration of different technologies, such as AI and Data Science, and it also provides a platform as a service and software as a service for Industry (Dhanabalan, & Sathish, 2018; Mashelkar, 2018). The DMBs (commercial banks) in the Nigerian banking industry invested heavily in IT products and services. DMBs FINTECH investment accounts for about 70% of the industry's total investment cost and expenditure of 46% organizational information technology in Nigeria (CBN, 2009).

Financial innovation strategies in deposit money banks over the years have faced numerous challenges amongst which are, slow infrastructural development, lack of technical know-how, poverty and insecurity. Moreover, Financial Innovation is stirred by excessive competition among banks, overly risky loans and the stock market crash that caused the default on many bank loans. Performance of commercial banks has been influenced by some of the forces which include mainly innovations and adoption. Goh (2011) observed that there are a number of things affecting innovation in developing nations like Nigeria. Lack of enough licensed innovation rights assurance (intellectual property rights) frequently cause impediments for banks to get engaged with advancements and improvements through innovative research and development, as the monetary turn offs related with their development endeavours diminish rapidly once made accessible to the general population. Attesting to this, Aladwani (2011) also observed that the greatest challenges and issues experienced in the financial institutions include; internet security and customer related issues. This brings about the importance of managing the costs and risks associated with financial innovation.

Despite these difficulties, electronic banking transactions have received positive reviews in Nigeria. Financial technology in banking has led to revolution in payments systems, improved the automated clearing and truncation of cheques and deepened foreign remittance services. FINTECH facilitates reduction in cash transactions and inherent risk. Technology driven FINSERV is imminent globally in development finance (Okoye, Adetiloye, Erin & Modebe, 2016). DMBs performance in Nigeria from 2005 to 2021 showed encouraging growth (NDIC reports for 2005-2021). For instance, the industry records revealed that the Return on Asset (ROA) was 1.85% in 2005 and grew to 3.95% in 2008 representing a tremendous increase of 113.5%. It however declined steadily until 2019 and 2020 when it rose to 2.3 and 2.66 respectively, representing an increase of 15.65 %. Return on equity as a performance measure of DMBs witnessed an increase from 22.01 to 57.65 from 2005 to 2010 representing an exponential

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increase of 162%. It did not show any serious decline throughout the period under review. Interest income also experienced over 100% increase within the period and maintained momentum throughout the period under study. Also, non-interest income of deposit money banks increased by a huge 275.6% from 2005 to 2010 (NDIC reports for 2005-2021).

In comparison to other developed countries, Nigeria has been slow to adopt electronic banking. In 1986, the Society General Bank of Nigeria (SGBN), now Heritage Bank Plc, launched online, real-time banking in its five locations. However, many of the Nigerian banks adopted an electronic banking system in the early 2000s. The rapid growth of e-banking was made possible with the proliferation of the internet, coupled with the world's increasing addiction to e-business, the trend of cash transactions is now giving way to electronic payment systems.

1.1 Objective

The objective of this study therefore is to assess the effect of globalization on human capital development in Nigeria from 1980-2021.

1.2 Hypotheses

H_o: There is no significant effect of internet banking on the profitability of DMBs in Nigeria.

H_o: There is no significant effect of automated teller machine on the profitability of DMBs in Nigeria.

H_o: There is no significant effect of mobile banking on the profitability of DMBs in Nigeria.

H_o: There is no significant effect of PoS operations on the profitability of DMBs in Nigeria.

2. LITERATYRE REVIEW

2.1 Conceptual Review

2.1.1 Financial Innovation

Financial innovation is an area of financial economics that has attracted significant research interest in academic as well as corporate circles Lerner (2016), Lopez & Roberts (2012) defined financial innovation in broad terms as the act of creating and then popularising new financial instruments as well as new financial technologies, institutions and markets. According to Joseph Schumpeter, innovations can be categorised into process innovations and product innovations.

2.1.2 Financial Technology (FinTech)

FinTech refers to firms that premise their financial services on a sound technology platform in a bid to invent new financial products and services which can reach a wider variety of entities, corporate and individual customers alike Mlanga (2019). One remarkable feature of FinTech is its ability to ensure efficiency within the market and at same time keep transaction costs very low. Also, Kim, Park, Choi and Yeon (2015) described Fintech as a platform which provides for the intersection of technology and finance. Simply put a combination of information technology and provision of financial services (Lee & Kim, 2015 in Erman, 2017).

2.1.3 Internet Banking

Internet banking involves the conduct of conventional banking activities on the Internet, that is, the global network of computer which does not depend on any "brick and mortar" office building; it offers financial services that are accessed through the Internet's World Wide Web By reducing the overhead expenses of traditional bank. Banks often rely on the

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Internet to convey information about financial products to the general public, replace business conducted at the branch offices, which do away with the need to put up new branches, and to serve clients more efficiently.

2.1.4 Telephone Banking

Telephone banking is a bank innovation that enables the clients of a bank to undertake banking activities through the telephone. It can be considered as a form of remote or virtual banking, which is basically the performance of bank financial activities through telecommunication devices whereby bank clients can undertake retail banking business by calling on the telephone or mobile communication unit which is connected to a system of the bank by Automated Voice Response (AVR) technology,. For the assurance of the system's security, the client must be first authenticated via a numeric or verbal password or by means of security questions being asked by a live representative at a centre or branch.

2.1.5 Automatic Teller Machine

ATMs are the most commonly used bank innovation in recent times. Almost all the universal banks in Nigeria have this facility available for their customers. On most contemporary ATM, the clients is identified after 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 data, such as cessation date and personal identification number (PIN), join computer terminals accounting records and the cash vault in one unit, allowing clients to go into the bank's record keeping system with a plastic card containing a personal identification number (PIN) or by punching a special code number into the computer terminal linked to the bank's computerized records 24 hours a day. Once entrance is attained, it grants a lot of retail banking services to clients.

2.1.6 Mobile Banking

This is a wireless internet application of banking generally referred to as m-banking. This involves the working together of the internet and mobile phone communication for banking activities. This innovation offers customer services such as SMS Banking that provides instant notification about transactions which helps to keep a watch on account with round the clock services and to ups of mobile phone credits. The customer is able to perform other services such as account enquiries, request for cheque book.

2.1.7 Electronic Fund Transfer at Point Of Sale

An EFTPOS is an on-line arrangement that enables clients to transfer funds directly from their bank accounts to a merchant's accounts after making purchases (at purchase points). An EFTPOS employs a debit card to start an electronic fund transfer process, (Chorafas, 2018), improved banking efficiency resulting from the use of EFTPOS to service clients shopping payment conditions as an alternative to the bookkeeping duties in handling cheques and cash withdrawals for purchases.

2.1.8 Profitability

Lin (2018) defines profitability as the measure of outcomes in meeting an organization's goals. (Bessler, Kruizenga & Westerman 2018) measures how an organization uses its resources to generate income. To this end, financial performance is the expression of the revenues with respect to the resources. Total sales revenue, profits and return on assets are some financial measures. Performance may

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be measured in terms of financial and non-financial terms (Bahar and Ahmad, 2010). To this end, financial performance may involve such measures as profits after tax and market share and customer satisfaction. Kabira (2013) notes that agency banking ensures that banks save on the floor for banking halls and saves on salaries since the agency outlets are run by independent agents. Further, agency banking hours may be more and hence more transactions. Thus, agency banking may increase the profits of the banks while keeping the costs at minimum.

2.1.9 Performance of Deposit Money Banks

Bank performance generally implies whether a bank has fared well within a trading period to realize its objectives. The only document that explains this is presumably the published financial statements. According to Rose, (2001), a fair evaluation of any bank's performance should start by evaluating whether it has been able to achieve the objectives set by management and stockholders. Certainly, many banks have their own unique objectives. Some wish to grow faster and achieve some long-range growth objective, others seem to prefer quiet life, minimising risk and conveying the image of a sound bank, but with modest rewards to their shareholders (Salehi & Alipour, 2014). Ordinarily, stock prices and its behaviour are deemed to reflect the performance of a firm. This is a market indicator and may not always be reliable. However, the size of the bank, the volume of deposit and its profitability could be deemed as more reliable performance indicators. For the purpose of this study, profitability indicators, precisely the Return on Equity Capital (ROE) and the returns on Assets (ROA) are used to assess bank performance.

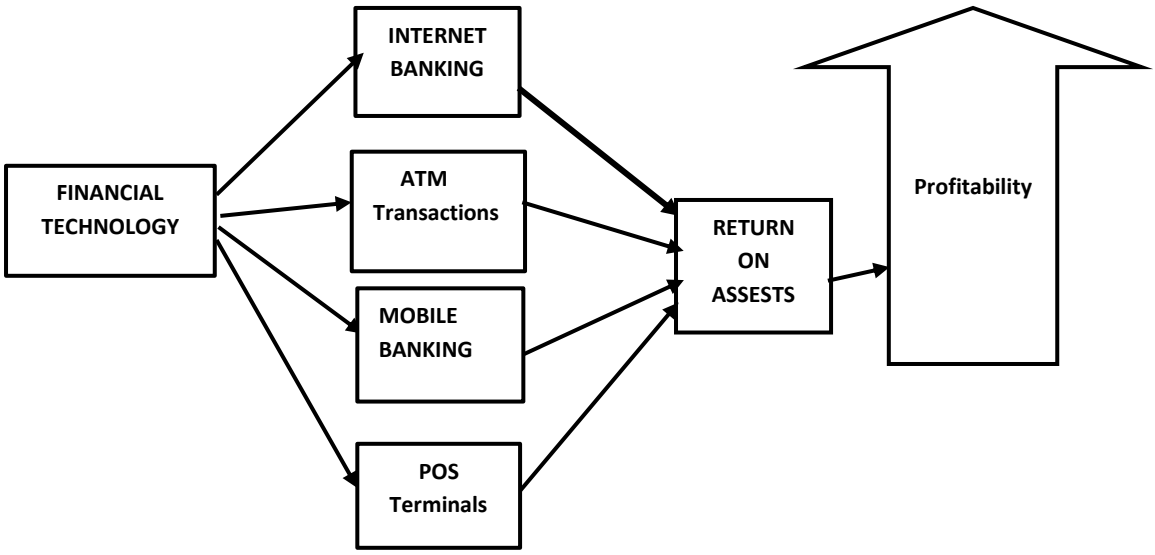


Figure 1: Conceptual framework

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2.2 Theoretical Review

2.2.1 Technology Acceptance Model

The technology Acceptance Model (TAM) developed in 1989 by Fred Davis. The model was originally designed to predict user's acceptance of Information Technology and usage in an organisational context. The model posits that user acceptance is determined by two key beliefs, namely perceived usefulness and perceived ease of use. Perceived usefulness (U) is defined as the extent to which a person believes that using a particular technology will enhance her/his job performance, while perceived ease of use (EOU) is defined as the degree to which a person believes that using a technology will be free from effort (Asidok & Micheal, 2018). The theory argues that the consumers' attitude towards using new technology is influenced by perceived usefulness and perceived ease of use. The theory uses psychometric scales to measure usefulness and ease of use. Perceived usefulness is measured on scales of whether work is done more quickly, job performance, increased productivity, effectiveness and usefulness. Perceived ease of use scales included whether the technology is easy to learn, clear and understandable, easy to become skilful easy to use, controllable and easy to remember.

TAM has been criticized for its failure to take to account the costs involved in acquiring a new technology. The organization may be willing to adopt a new technology but may not have the necessary resources (financial or human) to do so. Despite this short coming, TAM is still one of the most useful models in explaining the adoption of technology in the organizational context. This theory informed on the process and motivation of e-banking amongst commercial bank (Asidok & Micheal, 2018). This research work is anchored on Technology Acceptance Model. This is because all Deposit Money Banks have the same production technology and the only difference in performance is due to the level of economies of scale of each Deposit Money Banks

2.3 Empirical Review

Omoruyi and Orabator (2022) Studied the effect of electronic banking on the financial performance of banks have produced divergent results. In other words, there are mixed findings regarding the effect of electronic banking on banks financial performance. Hence, in this study, the effect of electronic banking on financial performance of deposit money banks in Nigeria was investigated and the period of study was from 2009 – 2018. The multivariate panel estimation and the dynamic panel data regression were employed in the data analysis. The results obtained from the GMM estimate reveal that total value of Automated Teller Machine transaction positively and significantly impact on financial performance of deposit money banks while total value of point of sale transactions exert negative influence on deposit money banks financial performance. Also, the relationship between total value of mobile payment transactions and financial performance was also negative but fail the significant test. The study recommends that deposit money banks should increase the number of ATM machines to reduce the queue usually observe in most ATM to encourage their continuous usage. Also, deposit money banks should collaborate with Telecommunication network providers and security agents to checkmate and prosecute hackers in order to reverse the negative effect of mobile payment on deposit money banks' financial performance.

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Furthermore, deposit money banks should collaborate with Telecommunication network providers to resolve the problem of poor network service that has mar the progress in Point of Sales adoption rate in Nigeria.

Ashiru, Balogun and Paseda (2023) investigated the impact of mobile, internet, and automated teller machines (ATMs) on banks' financial performance. Utilizing data for the 2012 to 2021 period because of data availability, this study considers the causal effect of innovation on commercial bank performance via Granger causality test. The entire 24 deposit money banks in Nigeria constitute the study's population. Secondary data were gathered over the study period from NDIC annual reports, the Nigeria Inter-Bank Settlement System (NIBSS), and the Central Bank of Nigeria statistical bulletins (2012–2021). Based on the ARDL model analysis, POS banking service has the greatest impact on deposit money bank performance because of large volume and value of transaction witnessed in the banking sector. Thus, more mobile and e-banking services should be made available. The usage of ATMs, mobile banking, credit and debit cards, online banking, and agency banking have a positive short run and long run substantial effect on deposit money bank performance in Nigeria, except National Electronic Fund Transfer (NEFT) and NIBSS Instant Payments (NIP) according to empirical results.

Medyawati, Yunanto and Hegarini (2021) analyzed the influence of financial technology on the financial performance of banks listed on the Indonesia Stock Exchange (IDX) during the 2014-2020 period. Financial technology was measured by the number of Automated Teller Machine (ATM) transactions and internet and mobile banking while bank profitability was measured by Return on Assets (ROA). Furthermore, this study used the panel data regression analysis with Automated Teller Machine (ATM) transactions as well as internet and mobile banking as the independent variables and ROA as the dependent variable. Purposive sampling was used to select six banks as samples. The results showed the fixed effect as the most suitable model, where ROA is affected by the internet and mobile banking while the TM technology has no effect.

Akhisar, Tunay and Necla (2015) investigated the effects of the bank's profitability performance of electronic-based banking services. The effects of ROA and ROE performance were analyzed the data, which are 23 developed and developing countries' electronic banking services through 2005 to 2013, by dynamic panel data methods. Due to the innovative nature of electronic banking services will show the bank performance significantly. Both the analyzing method and involving of developed and developing countries' banking data are the most obvious differences of the study from similar studies in the literature. Result show that bank profitability of developed and developing countries affected from the ratio of the number of branches to the number of ATMs is highly significant and electronic banking services in significant. Results show that some variables were found to be in contrast to the expected negative relationship, because of diversity in the level of development of the countries, the socio-cultural structure and electronic banking infrastructure.

Abaenewe, Ogbulu and Ndugbu (2013) investigated the profitability performance of Nigerian banks following the full adoption of electronic banking system. The study became necessary as a result of

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increased penetration of electronic banking which has redefined the banking operations in Nigeria and around the world. Judgmental sampling method was adopted by utilizing data collected from four Nigerian banks. These four banks are the only banks in Nigeria that have consistently retained their brand names and remain quoted in the Nigerian Stock Exchange since 1997. The profitability performance of these banks was measured in terms of returns on equity (ROE) and returns on assets (ROA). With the data collected, we tested the pre- and post-adoption of e-banking performance difference between means using a standard statistical technique for independent sample at 5 percent level of significance for performance factors such as ROE and ROA. The study revealed that the adoption of electronic banking has positively and significantly improved the returns on equity (ROE) of Nigerian banks. On the other hand and on the contrary, it also revealed that e-banking has not significantly improved the returns on assets (ROA) of Nigerian banks. The findings of this study have motivated new recommendations for bank customers, bank management and shareholders with regard to electronic banking adoption for banking operations.

Akani and Obiosa (2020) examined the effects of financial innovation on the profitability of deposit money banks in Nigeria. the general purpose of the study was to examine the effect of financial innovation on the profitability while the specific objectives was to examine the effect of automated teller machine, electronic fund transfer, internet banking, mobile banking and investment on information communication technology on return on equity of deposit money banks. The study formulated four hypotheses and used panel data regression to analyze the secondary data extracted from the annual reports and accounts of the fourteen firms for the period 2009 to 2017. Return on equity was the dependent variables while automated teller machine, electronic fund transfer, internet banking, mobile banking and investment on information communication technology on return were the independent variables. Findings of the study revealed that automated teller machine and electronic fund transfer have negative relationship with return on equity while internet banking, mobile banking and investment on information communication technology have positive relationship with return on equity.

Orji, Ogbuabor, Okon and Anothony-Orji (2018) studied the impact of e-banking innovations (ATM transactions, mobile banking transactions, and point of sales transactions) on the performance of six selected banks in Nigeria. The study adopts a SURE model in the quantitative analysis of six selected old and new generation banks. The results indicate that automated teller machine transactions, point of sale transactions, mobile banking transactions are major e-banking innovations that contribute to old and new banks' performance in Nigeria. The study therefore concludes that the selected banks and other banks should intensify efforts to increase their asset base and continue to invest in e-banking innovations in order keep preforming well and also remain profitable. The study also calls for efficient management and utilization of funds to train and educate bank workers and general public regularly on how to deploy and use e-banking channels and other related technological innovations respectively.

Ola-Olatinwo, Uwaleke and Ibrahim (2022) examined the influence of digital financial services (DFS) on the financial performance of Nigeria's publicly traded commercial banks. The study aims to see if

there is a link between the dependent variable, which is financial performance as assessed by banks' earnings-per-share (EPS), and the main independent variables, which are the volume of ATM and POS transactions as a proxy for digital financial services (DFS). Secondary data was employed in the study. The data was collected from the annual report of target banks and the Central Bank of Nigeria from 2012 to 2020. The study used both descriptive and inferential statistics in analyzing the data. In general, the study revealed that digital financial services (DFS) have substantial and significant marginal effects on earnings per share in Nigeria's banking sector. Thus, there exists a positive relationship between digital financial services (DFS) and bank financial performance. In conclusion, electronic banking has made banking transactions to be more accessible by bringing services closer to its customers hence improving banking industry performance. Thus, the study recommends that bank management should enhance digital banking to improve financial performance in commercial banks.

Madugba, Egbide, Jossy, Agburuga and Chibunna (2021) examined the impact of electronic banking on the financial performance of Nigerian deposit money banks. The data for the study was obtained from the Central Bank of Nigeria's Statistical Bulletin and the National Bureau of Statistics' Statistical Bulletin for various years, as well as from published financial statements of the banks under study. An ex-post facto research design was used and a normality test was carried out to establish the goodness of the data; descriptive statistics and a multicollinearity test were conducted in which the independent variables were found good. Regression was adopted to test two hypotheses. It was found that ATM has a positive and significant association with Earning EPS and ROA; POS and NEFT significantly affect ROA only, while WEB has an insignificant impact on both EPS and ROA. It is concluded that electronic banking significantly affects financial performance of deposit money banks in Nigeria.

Adiga, Adigwe, Okonkwo and Ogbonna (2022) examined financial technology and banking sector performance in Nigeria. The specific objectives are to examine the effect of financial technology on return on assets (ROA), return on equity (ROE), interest income (II) and noninterest income (NII) of Deposit Money Banks (DMBs) in Nigeria. The study was anchored on Technology Acceptance Model (TAM) and Central Bank of Nigeria (CBN) statistical bulletin and Nigeria Deposit Insurance Corporation (NDIC) report of various years form the data source which were subjected to Auto Regressive Distributed Lag (ARDL) technique to test the interaction between independent variables namely payment system, automated clearing services and remittance services with the dependent components in return on asset, return on equity, interest income and non-interest income at 5% level of significance. Financial technology significantly explained the variation in ROA, ROE and noninterest income DMBs in Nigeria except the variation in interest income. The study concludes that financial technology significantly explained the variation in banking sector performance components in ROA, ROE, and non-interest income. The effect of financial technology on performance of the banking sector is inconclusive thus financial technology could not be said to improve and exert the required impact on the banking sector performance within the period studied.

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3. METHODOLOGY

The study's data was presented in a tabular format and analysed using Robust Least Square (RLS) regression and the Granger Causality Test. RLS was selected because it was deemed suitable for the data since the data are not normally distributed. In addition, RLS equally allowed for the determination of the direction and strength of prediction between the dependent and independent variables. The main advantage of robust regression is that it can produce more reliable estimates of the coefficients when the assumptions of OLS regression are violated, such as when the data contain outliers or influential observations. Meanwhile, the Granger Causality Test was utilized to investigate the causal flow between the independent and dependent variables. The E-views 10 Statistical Software was employed to conduct the statistical computations. The *a priori* expectations of the study is that the independent variables will have significant effect on the dependent variable.

3.1 Model Specification

In line with objectives of this study, the effect of financial innovation on the performance of deposit money banks is represented in equations below. The functional model indicates that the performance of deposit money banks in Nigeria is a function of the explanatory variables of the study. The functional model for this study was adapted from the study by Shehu, Aliyu and Musa (2013). The model is stated as follows:

ROA = ∫ (ATM, POS, MPAY and WEB)

Where:

ROA = Return on assets

MPAY = Mobile payment transactions

WEB = Internet (online) payment transactions

POS = POS payment transactions

ATM = ATM payment transactions

The modified model is stated below in equation ii.

$ROA=\beta_0+\beta_1ATM+\beta_2POS+\beta_3IB+\beta_4MB+\mu$ …….equation 1

Where:

ROA = Return of Asset

ATM= Value of Automated Teller Machine transactions

POS = Value of Point of Sales transactions

MB= Mobile Banking

IB= Internet Banking

f = Functional Notation

$\beta 0$ = Autonomous or intercept

β_1 = Coefficient of regression for POS

β_2 = Coefficient of regression for MB

β_3 = Coefficient of regression for ATM

β_4 = Coefficient of regression for IB

μ = Stochastic variable or error term

3.2 Description of Variables

ROA = Return on Asset measured as earnings after tax divided by total assets

ATM= Automated Teller Machine measured as natural log of value of ATM transactions

MB= Mobile Banking measured as natural log of value of mobile banking transactions

POS=Point of Sales measured as natural log of value of POS transactions

IB= Internet Banking measured as natural log of value of WebPay transactions

3.3 Decision

The decision rule was: accept the null hypothesis if the t-statistic is less than 2.0 or p-value greater than 0.05. Null

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hypothesis was rejected if the t-statistic is greater than 2.0 or p-value is less than 0.05.

4. ANALYSIS AND DISCUSSION OF RESULTS

From the trend analysis of the human capital growth in Nigeria from (1980-2021), it can be observed that from 1980 to 1990, there was an upward shift in the growth of human capital in Nigeria. From 2000 to 2015, the graph indicates a fluctuating trend in the growth during the period under review.

Table 1: Input Data for the Study: 2010-2021

Year	IB	POS	ATM	MB	ROA
2010	25050	12720	399710	6650	3.90
2011	59610	31020	1561740	18980	.20
2012	31570	48010	1984660	31510	2.40
2013	47320	161020	2828940	142800	2.30
2014	74040	312070	3679880	119470	2.50
2015	91580	448513	3971651	442354	2.50
2016	132360	758997	3988133	756897	1.29
2017	184600	1409813	6437592	1101999	2.42
2018	675920	2383109	6480086	1830701	2.03
2019	478140	3204750	6512612	5080962	.28
2020	235617811	2806304	12004068	19377841	3.33
2021	545039685	24455416	21230935	53208272	2.31

Source: CBN Statistical Bulletin (2021) and CBN Financial Stability Report (2010 - 2021)

4.1.2 Descriptive Analysis

Table 2: Descriptive Statistics

	IB	ATM	MB	POS	ROA
Mean	65204807	5923334.	6843203.	3002645.	2.121667
Median	111970.0	3979892.	599625.5	603755.0	2.355000
Maximum	545,000,000	21230935	53208272	24455416	3.900000
Minimum	25050.00	399710.0	6650.000	12720.00	0.200000
Std. Dev.	166,000,000	5716238.	15596778	6852958.	1.084065
Skewness	2.356982	1.750821	2.484482	2.867582	-0.474153
Kurtosis	7.129869	5.383128	7.812060	9.543116	2.715023
Jarque-Bera	19.63863	8.970398	23.92326	37.85224	0.490248
Probability	0.000054	0.011275	0.000006	0.000000	0.782607

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Sum	7.82E+08	71080006	82118436	36031742	25.46000
Sum Sq. Dev.	3.02E+17	3.59E+14	2.68E+15	5.17E+14	12.92717
Observations	12	12	12	12	12

Source: *Eviews 10 Descriptive Statistics Output, 2023*

The Table 2 above provides summary statistics for each of the variables included in the study on the effect of financial technology on the profitability of Deposit Money Banks (DMBs) in Nigeria between 2010 and 2021. It is worthy to note that the mean value for IB is 65,204,807, with a maximum value of 545,000,000 and the standard deviation of 166,000,000, indicating a high degree of variability in the use of IB among the DMBs banks.

Table 3: Granger Causality Test Result

Granger Causality Test was utilized to investigate the causal flow between the independent and dependent variables.

Granger Causality Test for IB and ROA

Pairwise Granger Causality Tests

Date: 04/29/23 Time: 12:18

Sample: 2010 2021

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
IB does not Granger Cause ROA	10	0.09759	0.9087
ROA does not Granger Cause IB		0.47273	0.6486

Eviews 10 Descriptive Statistics Output, 2023

The above table presents the results of the Granger causality test between internet banking (IB) and return on assets (ROA) for deposit money banks in Nigeria. The null hypothesis being tested is that IB does not Granger cause ROA, meaning that changes in IB do not have a significant effect on changes in ROA. The test was conducted with 10 observations, and the F-statistic is 0.09759 with a probability of 0.9087, indicating that the null hypothesis was accepted at a significance level of 0.05. On the other hand, the table also shows the test results for the reverse hypothesis that ROA does not Granger cause IB. The F-statistic for this hypothesis is 0.47273, and the probability is 0.6486, which suggests that there is no evidence to reject the null hypothesis that ROA does not Granger cause IB. Generally, the results of the Granger causality test suggest that there is no significant causal relationship between IB and ROA for deposit money banks in Nigeria during the study period.

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Table 4 Granger Causality Test for ATM and ROA

Pairwise Granger Causality Tests

Date: 04/29/23 Time: 12:18

Sample: 2010 2021

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
ATM does not Granger Cause ROA	10	0.77338	0.5098
ROA does not Granger Cause ATM		1.59995	0.2903

Eviews 10 Descriptive Statistics Output, 2023

Based on the results presented in the above table the null hypothesis that "ATM does not Granger Cause ROA" was accepted at the 5% significance level, as the probability value (0.5098) is greater than 0.05. This implies that there is no evidence to suggest that changes in the use of ATM technology cause changes in the profitability of deposit money banks in Nigeria as measured by the return on assets. Similarly, the null hypothesis that "ROA does not Granger Cause ATM" was accepted at the 5% significance level, as the probability (0.2903) is greater than 0.05. This implies that there is no evidence to suggest that changes in the profitability of deposit money banks in Nigeria as measured by the return on assets cause changes in the use of ATM technology.

Table 5: Granger Causality Test for MB and ROA

Pairwise Granger Causality Tests

Date: 04/29/23 Time: 12:18

Sample: 2010 2021

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
MB does not Granger Cause ROA	10	1.18101	0.3801
ROA does not Granger Cause MB		2.16406	0.2103

Eviews 10 Descriptive Statistics Output, 2023

The above table presents the results of the Granger Causality Test for the relationship between Mobile Banking (MB) and Return on Assets (ROA) of Deposit Money Banks (DMBs) in Nigeria. The null hypothesis tested is that MB does not Granger cause ROA. The table shows that the F-Statistic for MB is 1.18101 with a corresponding p-value of 0.3801, indicating that there is no significant Granger causality between MB and ROA. This means that the past values of MB do not significantly predict the current and future values of ROA. Similarly, the F-Statistic for ROA is 2.16406 with a corresponding p-value of 0.2103, indicating that there is no significant Granger causality between ROA and MB. This means that the past values of ROA do not significantly predict the current

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and future values of MB. In conclusion, the Granger Causality Test results suggest that there is no causality between Mobile Banking and Return on Assets of DMBs in Nigeria.

Table 6: Granger Causality Test for POS and ROA

Pairwise Granger Causality Tests

Date: 04/29/23 Time: 12:18

Sample: 2010 2021

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
POS does not Granger Cause ROA	10	1.15287	0.3875
ROA does not Granger Cause POS		2.30862	0.1949

Eviews 10 Descriptive Statistics Output, 2023

The above table presents the results of the Granger Causality Test for POS and ROA. The null hypothesis for the first row is "POS does not Granger Cause ROA," meaning that POS operations do not have a causal relationship with the return on assets (ROA) of DMBs in Nigeria. The null hypothesis for the second row is "ROA does not Granger Cause POS," meaning that the ROA of DMBs in Nigeria does not have a causal relationship with POS operations. The table shows that the F-statistic for the null hypothesis in the first row is 1.15287, with a corresponding probability value of 0.3875. Similarly, the F-statistic for the null hypothesis in the second row is 2.30862, with a corresponding probability value of 0.1949. Since the probability values for both null hypotheses are greater than the commonly used significance level of 0.05, we accept the null hypothesis and conclude that there is no evidence of a causal relationship between POS operations and the ROA of DMBs in Nigeria.

4.1.6 Robust Least Square Regression

Robust regression was applied in estimating the regression coefficients since it is an alternative to ordinary least squares (OLS) regression to account for potential outliers or influential observations that could bias the results. In robust regression, the researcher used a different method for estimating the coefficients that is less sensitive to outliers and can provide more reliable estimates.

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Table 7: Robust Least Square Regression Estimates

Dependent Variable: ROA
Method: Robust Least Squares
Date: 04/29/23 Time: 12:01
Sample: 2010 2021
Included observations: 12
Method: M-estimation
M settings: weight=Bisquare, tuning=4.685, scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
LOGIB	0.981488	0.386883	2.536911	0.0112
LOGATM	0.637019	1.878170	0.339170	0.7345
LOGMB	-1.290930	1.353971	-0.953440	0.3404
LOGPOS	-0.439906	1.483132	-0.296606	0.7668
C	2.578099	8.160359	0.315930	0.7521
	Robust Statistics			
R-squared	0.401408	Adjusted R-squared		0.059356
Rw-squared	0.743451	Adjust Rw-squared		0.743451
Akaike info criterion	26.03013	Schwarz criterion		29.57491
Deviance	3.980072	Scale		0.481735
Rn-squared statistic	13.78717	Prob(Rn-squared stat.)		0.008006
	Non-robust Statistics			
Mean dependent var	2.121667	S.D. dependent var		1.084065
S.E. of regression	1.456168	Sum squared resid		14.84298

Source: *Eviews 10.0 Regression Output, 2023*

The above table presents the results of the robust least square regression analysis on the effect of financial technology on the return on assets (ROA) of deposit money banks (DMBs) in Nigeria. The variables of interest are internet banking (IB), automated teller machine (ATM), mobile banking (MB), and point of sale (POS) operations.

The R-squared value of the regression model is 0.401408, which indicates that the model explains 40.14% of the variation in ROA. The adjusted R-squared value is 0.059356, indicating that the addition of the independent variables to the model did not contribute much to the explanation of the variation in ROA.

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Finally, the robust statistics show an Rn-squared statistic of 13.78717 and a probability of 0.008006. This suggests that the regression model is statistically significant in explaining the variation in ROA.

4.2 Test of Hypotheses

To test the study's hypotheses, the z-statistic probability values obtained from the RLS regression analysis are utilized. The decision rule is based on the significance level of 5% (0.05), where the null hypothesis of an insignificant effect is accepted if the calculated p-value (z-statistic) is greater than 0.05. Conversely, if the calculated p-value (z-statistic) is less than 0.05, the alternate hypothesis of a significant relationship is accepted.

4.2.1 Hypothesis One

H_o: There is no significant effect of internet banking on the profitability of DMBs in Nigeria.

The coefficient for internet banking (IB) is 0.981488 with a z-statistic of 2.536911 and a probability of 0.0112 > 0.05. This indicates a significant positive relationship between internet banking and ROA, holding other variables constant. This means that an increase in internet banking operations is likely to lead to an increase in the profitability of DMBs in Nigeria. Thus, internet banking has a positive and significant effect on the profitability of DMBs in Nigeria (*p*-value = 0.0112).

The adoption of internet banking allows customers to access their accounts and perform banking transactions online, which can reduce the need for physical branches and staff. This, in turn, can lower operating costs for DMBs, leading to increased profitability. This finding is in line with the study by Medyawati, Yunanto and Hegarini (2021) and Akhisar, Tunay and Necla (2015).

4.2.2 Hypothesis Two

H_o: There is no significant effect of automated teller machine on the profitability of DMBs in Nigeria.

The coefficient for automated teller machine (ATM) is 0.637019 with a z-statistic of 0.339170 and a probability of 0.7345. This implies that there is no statistically significant relationship between ATM operations and ROA, holding other variables constant. Thus, automated teller machine has a positive but non-significant effect on the profitability of DMBs in Nigeria (*p*-value = 0.7345).

ATMs allow customers to perform basic banking transactions, such as withdrawing cash or checking their account balances, without visiting a physical branch. This can reduce the need for physical branches and staff, leading to lower operating costs for DMBs. While the study did not find a statistically significant effect of ATM adoption on profitability, the positive effect suggests that ATMs can still provide benefits to DMBs in Nigeria. This finding supports the results by Ashiru, Balogun and Paseda (2023) and Omoruyi and Orabator (2022).

4.2.3 Hypothesis Three

H_o: There is no significant effect of mobile banking on the profitability of DMBs in Nigeria.

The coefficient for mobile banking (MB) is -1.290930 with a z-statistic of -0.953440 and a probability of 0.3404. This suggests that there is no statistically significant relationship between mobile banking operations and ROA, holding other variables constant. Thus, mobile banking has a negative but non-significant effect on

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the profitability of DMBs in Nigeria (*p*-value = 0.3404).

The study suggests that the adoption of mobile banking by DMBs in Nigeria does not lead to a statistically significant increase or decrease in profitability. This suggests that while mobile banking is convenient for customers, it may not provide significant benefits to DMBs in terms of increased revenue or reduced costs. Omoruyi and Orabator (2022) found similar result of a negative effect but Ashiru, Balogun and Paseda (2023) found an opposite result.

4.2.4 Hypothesis Four

H_o: There is no significant effect of PoS operations on the profitability of DMBs in Nigeria.

The coefficient for point of sale (POS) operations is -0.439906 with a z-statistic of -0.296606 and a probability of 0.7668. This indicates that there is no statistically significant relationship between POS operations and ROA, holding other variables constant. Thus, PoS operations have a negative but non-significant effect on the profitability of DMBs in Nigeria (*p*-value = 0.7668).

While the adoption of PoS operations by DMBs in Nigeria may be convenient for customers, the study suggests that it does not lead to a statistically significant increase or decrease in profitability for DMBs. This suggests that while PoS operations can provide convenience for customers, they may not provide significant benefits to DMBs in terms of increased revenue or reduced costs. The same result was realised by the studies by Omoruyi and Orabator (2022); and Deekor (2021).

5. CONCLUSION AND RECOMMENDATIONS

The study found that the adoption of internet banking has a positive and significant effect on the profitability of DMBs in Nigeria. On the other hand, the adoption of ATMs has a positive but non-significant effect on profitability, while the adoption of mobile banking and POS operations has a negative but non-significant effect on profitability.

Generally, the study's findings have important implications for policymakers, bank managers, and stakeholders in the Nigerian banking industry. The findings suggest that policymakers can encourage the adoption of internet banking by DMBs in Nigeria to increase the sector's profitability. Bank managers can also consider these findings when making strategic decisions regarding the adoption of electronic banking channels. Finally, stakeholders in the Nigerian banking industry can use these findings to make informed investment decisions.

Based on the findings, the following recommendations were made:

Given the positive and significant effect of internet banking on the profitability of DMBs in Nigeria, it is recommended that DMBs increase their investment in internet banking infrastructure and provide incentives for their customers to adopt this channel. This can help to increase revenue and reduce operating costs, leading to improved profitability.

To increase the effectiveness of ATM services, DMBs can consider optimizing the placement and accessibility of their ATM machines. For example, they can locate them in areas with high foot traffic or where there are few other ATM options,

and ensure that they are well-maintained and operational at all times.

DMBs should improve their mobile banking services while integrating them into their overall digital banking strategy in order to help attract tech-savvy customers and increase convenience, which may lead to improved profitability in the long run.

DMBs can work to increase the usage of POS terminals by incentivizing merchants to accept card payments and promoting the benefits of cashless transactions to consumers. Additionally, DMBs can explore the use of newer and more advanced POS technologies, such as contactless payments, to provide more convenience and security to customers.

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