

TECHNOLOGICAL DISRUPTIVE INNOVATIONS (TDIS) AND FINANCIAL PERFORMANCE (FP) OF DEPOSIT MONEY BANKS (DMBS) IN NIGERIA

Victor Chukwunweike EHIEDU, Anastasia Chi-Chi ONUORAH & Chinyere Nkeiruka CHIGBO

*Banking and Finance Department,
Faculty of Management Sciences,
Delta State University,
Abraka*

Corresponding Author: ehieduvc@gmail.com

Abstract

This study examined the relationship between Technological Disruptive Innovations (TDIs) and Financial Performance (FP) of Deposit Money Banks (DMBs) in Nigeria from the period of 1992 to 2021 (30years). In order to evaluate the effect of TDIs on FP of DMBs in Nigeria, the following measures TDIs, namely; Automated Teller Machine (ATM), Point of Sale (POS), Internet Banking (INTB), Nigeria Interbank Settlement System (NIBSS) and Nigeria Electronic Fund Transfer (NEFT) in relation to FP proxied with Return on Equity (ROE) in Nigeria. The CBN Statistical Bulletin, CBN Annual Report, CBN Bank Supervisory Annual Report, and Nigeria Deposit Insurance Corporation (NDIC) Annual Reports from 1992-2021 were used to acquire data for the research. Descriptive statistics, correlation analysis, diagnostics tests, unit root test, and multiple regression analysis were used to assess the research hypotheses. Based on the results of the previous chapter, ATM has a negative significant effect on ROE, POS has a positive significant effect, INTB has a negative insignificant effect, and MOB has a positive significant effect. NIBSS has a positive significant effect on ROE with a p-value (sig. value) of 0.0000, while NEFT has a negative significant effect with 0.0540. Managers of DMBs should periodically train customers about ATMs, their benefits, risk exposure, physical and electronic security, and how to avoid financial loss from hackers. They should also train bank staff in short periods to familiarise them with modern developments in sophisticated technology to improve DMBs' FP in Nigeria.

Key Words: *Technological, Disruptive Innovations, Settlement System, Performance and Banks*

Introduction

Prior to the COVID-19 pandemic, individuals, businesses, and governments increasingly relied on disruptive technologies, especially financial disruptive innovations (FDIs) platforms, for a variety of activities including financial transactions, commerce, logistics, education, and health care (Shofawati, 2019; Ehiedu, Onuorah, , and Owonye, (2022) and Meteke, Ehiedu, Ndah, and

Onuorah, (2022), Obaro, Onuorah, Evesi and Ehiedu (2022), Omojefe, and Ehiedu, (2017) and Onuorah, Ehiedu and Okoh, (2021). Mobile internet traffic per user, a proxy for the use of FDI platforms, grew at a quarterly rate of 12 percent in high-income nations and 10% in middle-income countries in 2019. Financial disruptive technologies (FDTs) were deployed in emerging markets during the COVID-19 pandemic. This article explores market dynamics that may enhance their involvement in emerging markets post-pandemic, as well as the risks and benefits of rapid adoption (IFC, 2020).

FDTs like Automated Teller Machines (ATM), Point of Sales (POS), mobile banking, internet banking, Nigeria Interbank Settlement System, Electronic Fund Transfer (NEFT), and Nigeria Interbank Settlement System Instant Payment (NIP) transfers were used in emerging markets during the COVID-19 pandemic (Akpokerere & Obonofiemro, 2022). This article discusses market trends that may increase the role of disruptive technologies in emerging markets post-pandemic and reviews risks and (Bernard, 2018). According to IMF growth predictions, post-COVID-19 is the era after 2021 when the economy starts to recover. However, new virus waves and changes in individual preferences for reopening will impact this time horizon, necessitating FDTs in banking services to clients (IFC, 2020).

FDTs emerge when new products or services are introduced to a market, targeting a small customer segment. With a growth of popularity, they gain wider acceptance and start to jeopardize the existing market participants (Obunike & Udu, 2018). Likewise, disrupting innovations create the new market and/or values, by violating the existing ones, by gradually squeezing out the established competitors and alliances. The major benefit coming from FDI is that they offer less expensive, faster and simplified products and services than the traditional ones (Vives, 2019; Ighoroje & Akpokerere, 2022).

Nowadays, an increasing number of FDTs are appearing in the financial sector. These innovations are frequently created by technologically superior alternative financial services providers, who aim to position themselves as intermediaries in the area of payments, cards, consumer and small business lending, and deposits (Ighoroje & Akpokerere, 2021). At the same time, traditional banks around the globe are struggling with economic instability, stagnating revenues and stricter regulations (Bamidele, 2017). Following the crisis of confidence in the financial system in 2008, banks were protected from FDI through very strict regulations,

introduced to prevent further shocks to the system. However, global and national regulators have started to realize that overregulated banking systems pose a limiting factor towards changes and innovations (Bett & Bogonko, 2017). Consequently, strict rules are being softened with the aim of creating opportunities for new players, supposed to increase competition in the area of financial services. In the Nigeria market, we can see the decreasing trend in the number of bank employees and branches due to the combined effects of insolvent banks' closures, economic crisis and growth in online transactions, leading to a stable increase of online and mobile banking quarter by quarter (NBS, 2017).

FDIs have the ability to significantly improve deposit money bank (DMBs) performance through innovation, increased supplier diversity, and a more competitive financial system that results in market extension and financial inclusion. These FDTs developments will put pressure on incumbents' margins, thereby encouraging higher risk-taking, and spark a race to seize the sector's rents (Vives, 2019). For the efficiency potential to be fulfilled, incumbents must be restructured at the same time as new competitors enter the market, and new dominant positions must not become established. Instead of circumventing regulation or monopolizing the consumer interface, new entrants (FinTech and BigTech) should win market share based on performance gains. Regulators must also work to identify emerging vulnerabilities to financial stability posed by new types of systemic risk (Philippon, 2018; Bayem, Ehiedu, , Agbogun, and Onuorah, (2022); Ehiedu, Onuorah, and Owonye, (2022); Ehiedu and Brume-Ezewu, (2022); Ehiedu and Okorie,. (2022) and Ehiedu, (2022).

Disruptive dig-tech models transform value chains, replace legacy platforms and shift core competencies from customer service to tech-driven omni-channels (Dhar & Stein, 2017; Marjanovic and Murthy, 2017; Pousttchi & Dehnert, 2018). This, according to Alt and Puschmann (2017) & Omarini (2018) accelerates growth in high-speed process automation, open collaborative banking and faster networking spurring reduced loyalty and threatening customer retention strategies. Hence, this study will attempts to review how technological disruptive innovations as related to DMBs financial performance (FP) in Nigeria.

Statement of the Problem

The introduction of the cashless policy by the Apex bank, Central Bank of Nigeria brought FDTs products like the use of Automated Teller Machines (ATM), Point of Sales (POS), mobile banking, internet banking, Nigeria Interbank Settlement System, Electronic Fund Transfer

(NEFT), Nigeria Interbank Settlement System Instant Payment (NIP) transfers, and others to the fore. This became possible as a result of the rise in technological disruption globally, and the rise of covid-19 pandemic. The DMBs invested a lot in technological disruption in order to face the challenges posed by cashless policy so as to remain relevant and competitive.

FDTs in Nigeria banks is still plagued with some challenges such as long queue in some banking halls, network failure, lack or inadequate awareness of available e-banking products and services, lack of understanding of e-banking products and services, frustration of customers at ATM centers, wrong debiting of accounts, fraudulent practices, loss of jobs because of technological advancement occasioned by electronic banking, among others. This thus makes FDTs in banking more participatory and broad-based as it is a complete departure from the traditional/old media of the use of print materials or hard copies, particularly in the banking industry.

Although there have been a lot of scholarly works and studies on FDTs which voyage around its benefits, implications of the technological innovation on employment as well as its significance to the growth of the economy, most of these works do not hint on how specific banks deliver their electronic banking services and service delivery to their customers. Besides, there is shortage of literature that has examines the relationship between technological disruption and financial performance, most dwell on technological disruptive innovations in relation to service delivery among banks in Nigeria; examples are the studies are; Oluyi and Abioye (2020), Nyiranzabamwita and Harelimana (2019) while Nwekpa, Djobissie, Chukwuma and Ezezue, 2020; Chimaobi, Akujor and Mbah, 2020, Ehiedu, (2022), Ehiedu, Odita, and Kifordu, (2020) and Ehiedu and Odita, (2014), etc, examines FDIs in relation is customer satisfaction. To this end, this study will examine the relationship between FDTs [measured with Automated Teller Machine (ATM), Internet Banking (INTB), Point of Sales (POS) and Mobile Transactions (MTs), Nigeria Electronic Fund Transfer (NEFT) and Nigeria Interbank Settlement System (NIBSS)] and DMBs FP in Nigeria. Hence, previous research yielded mixed results, and none of the studies included more than three financial disruptive innovation variables. Thus, the purpose of this study is to fill in the gaps by examining the effective use of FDIs on DMBs FP in Nigeria from 1992 to 2021 (30years).

Review of Related Literature

Conceptual Framework

Technological Disruptive Innovations

Electronic money, mobile financial services, online financial services, i-teller, and branchless banking, whether through banks or non-banks, are technologically disruptive advances, according to the OECD (2018). Michelle (2017) defines financial disruptive innovations as "a pre-arrangement of some combination of money-related and payment benefits that are conveyed and monitored by portable or online improvements and a system of specialists." E-money, mobile money, card payments, and electronic funds transfers allow more suppliers to offer financial services to more consumers (Durai & Stella, 2019).

Financial disruptive innovations (FDIs) were employed in emerging economies during the COVID-19 crisis. After the crisis, market dynamics may expand the use of disruptive technology in emerging markets (IFC, 2020). Financial disruptive technologies (FDTs) include mobile phone, mobile wallet, computer, internet, or debit or credit card services linked to a secure digital payment system (Durai & Stella, 2019; Shofawati, 2019).

This has seen traditional banking disintermediated, its worth chain cracked and plan of action drastically upset. Thus, Fin-Tech joint effort and burrow tech reception are high, unremitting and inescapably changing plans of action than at any other time (Omarini, 2017; PWC, 2017). Practically 90% of banks dread losing business to Fin-Tech, which have subbed traditional worth chains with more limited multi-modular and multi-directional hubs (KPMG, 2017). This has brought forth extraordinary rivalry, with 33% of clients depending on somewhere around two burrow tech-bank administrations as open-banking sets in, taking advantage of computerized stages and information investigation for upgraded client assumptions and experience (Omarini, 2018).

Bastid and Rao (2017) note bank model disturbance and trait this to ceaseless advancement joined by troublesome dangers, with the danger of lost piece of the pie to Fin-Techs inescapable, as more than 73% of clients devour items from numerous stages. Portable burrow specialists and

online media are digitizing bank esteem chains, simultaneously reacting to and molding client needs and assumptions (Dedu and Nitescu, 2017) cited in (Omarini, 2018). Versatile models flourish, as advanced banks take on suffering worth chain. Such human-machine collective models are abruptly decoupling clients and the financial corridor, with block-chain, progressed examination, enormous information and applications interfaces, being the most problematic.

Mechanical disturbance breeds transportability, portability, proficiency and monetary development, with changing banking into a virtual computerized finance field and Fin-Tech's problematic advantages by a long shot counterbalancing chances by re-evaluating the cutthroat territory. This outcome in quicker cycles, more online action, extraordinary contest, cheaper tech-based banking, more modest branches, more modest labor forces, consolidation driven combination, expanded revaluating and a more client situated worth chain (Arner et al., 2017). Troublesome burrow tech models change esteem chains, supplant heritage stages and shift center abilities from client care to tech-driven omni-channels (Dhar and Stein, 2017; Gomber et al., 2018; Marjanovic and Murthy, 2017; Pousttchi and Dehnert, 2018). This, as indicated by Omarini (2018) speeds up development in rapid cycle computerization, open shared banking and quicker systems administration prodding diminished unwaveringness and undermining client maintenance methodologies.

This has seen classical banking disintermediated, its value chain fractured and business model radically disrupted. Thus, Fin-Tech collaboration and dig-tech adoption are high, constant, and reshaping business models more than ever (Omarini, 2018; PwC, 2017). Almost 90% of banks fear losing business to Fin-Tech, which have substituted conventional value chains with shorter multi-modal and multi-directional nodes (KPMG, 2017). This has spawned intense competition, with a third of customers relying on at least two dig-tech-bank services as open-banking sets in, exploiting digital platforms and data analytics for enhanced customer expectations and experience (Omarini, 2018).

Bastid and Rao (2016) note bank model disruption and attribute this to incessant innovation accompanied by disruptive threats, with the risk of lost market share to Fin-Techs omnipresent, as over 73% of customers consume products from multiple platforms. Mobile and social media are digitising bank value chains and altering client wants and expectations (Dedu and Nitescu,

2016). Digital banks use enduring value chain models. Block-chain, advanced analytics, big data, and app interfaces are disrupting customer-banking relationships the most.

Many banks have embraced technological disruptive innovation as a powerful strategic variable to outperform deposit money institutions and preserve their market effectiveness (Kamau & Oluoch, 2016). Thus, bank financial success is judged by rapid and uncomplicated measurements of resource-to-revenue conversion. The commonly used efficiency measurements are return on assets, return on equity and interest margin. The developments in the banking sub sector have not only led to the increase in the number of banking institutions but, also the development in level of sophistication with new payment systems and asset alternatives to holding money. This has resulted mainly from technological advancement and increase in competition as the number of institutions increase. Developments in payment systems have started to create close substitutes for hard currency, thus affecting a core part of banking operations (Okonkwo, Obinozie & Echekeba, 2016)

Technological disruption and banking industry financial performance (FP) have been studied in developed and emerging economies. These studies prove financial innovation improves bank satisfaction. Financial innovation (FI) and bank efficiency in Nigeria, an emerging country, are uneven. Due to the high rate of ATM fraud in Nigeria, Jegede (2016) found that ATM terminals have enhanced bank performance. Okonkwo, Obinozie & Echekeba (2016) found that FDIs does not boost banks' return on equity in Nigeria.

Deposits money banks' (DMBs) Performance

DMBs' performance is how well they achieved their goals in trading over a year. Such banks' financial statements explain this well. DMBs in Nigeria have recorded a consistent increase in profit during the decade, albeit in certain years the profit has increased at a declining rate, making them Africa's second most profitable banking sector (Omotunde, Sunday & John-Dewole, 2017).

FP, which measures a firm's financial goals, has long fascinated managerial researchers. Firm FP refers to the different subjective assessments of how well a firm can utilise its key assets to create profits. Oluyi and Abioye (2020) defined firm value as the existing cost of anticipated future coin flows after correcting for chance at the desired rate of return. According to Eyenubo

(2017), referenced in Nyiranzabamwita and Harelimana (2019), it's meeting pre-defined goals, objectives, and purposes within a specific timeframe. Qureshi (2017), referenced in Nyiranzabamwita and Harelimana (2019), suggested four ways business finance literature has assessed a firm's cost. These are: the economic management method, which evaluates cash flows and investment levels before identifying and assessing the effect of financing assets on company price; the capital shape method, which studies the effect of capital shape adjustments on company price and how different factors affect the debt and equity factor of the company capital shape; and the resource-based approach, which is why the cost.

Profitability ratios evaluate banks. These ratios show a bank's overall FP. Profitability ratios help determines the bank's bottom line. Margin profitability ratios reflect the firm's capacity to convert sales into profits at multiple stages. However, profitability ratios that show returns indicate the firm's ability to measure efficiency and effectiveness to generate returns for shareholders. Ratios assess bank profitability (Moody, 2017). These ratios measure management efficiency and return, according to Joseph (2017). These profitability criteria fluctuate greatly over time and between banking markets. Today's ROE/ROA is popular. Saheed (2018) suggests that net income relative to total assets indicates a company's economic resource efficiency. They added that financial leverage is good when ROE is larger than ROA.

Theoretical Framework

Schumpeterian Theory of Creative Destruction

Ikpefan, Akpan, Osuma, Evbuomwan, and Ndigwe (2018) cited Schumpeter (1928, 1939), who saw technical upheavals as constant gales of creative destruction that drove capitalism progress. Some academics have contrasted Schumpeter's early theory, which focused on entrepreneurs taking risks as "an act of will," from his later thinking, which acknowledged major businesses as orchestrating and encouraging technological upheavals. He concentrated on oligopolies and innovation, which was misconstrued as his key contribution (Freeman, 2017) citing Ikpefan, et al (2018). Ikpefan, et al. (2018), quoting Schumpeter (1928), stressed the discontinuous and disruptive nature of technical progress under capitalism, which leads to an inextricable combination of short-term instability and long-term growth. He was conscious of social and organisational forces in his cyclical industrial transformation process but not a technological determinist.

Schumpeter believed that entrepreneurs—whether solitary inventors or R&D engineers in large companies—created new profit opportunities with their ideas. Thus, imitators tempted by super-profits would invest, diminishing the innovation's profit margin. Schumpeter's Kondratiev cycles would restart the business cycle before the economy could rebalance (Ikpefan, et al, 2018).

TDI, as referenced by Ikpefan, et al. (2018), showed how little neoclassical economics could explain. Solow analysed US economic data from 1909 to 1949 to show that higher capital utilisation accounted for only 12.5% of per capita output growth. Solow attributed the massive 87.5 percent residual to technical change. Romer (1986, 1994), mentioned by Ikpefan, et al. (2018), agrees with Solow and urges technological disruption theorists to include TDI in their models. Schumpeter's foundation's study on TDI concentrated on its emergence and spread throughout firms, industries, and regions.

The Schumpeterian theory is relevant to this study because new technology has replaced old technology, which is better because new technology increases efficiency, leading to better FP of DMBs.

Empirical Reviews

Abdulmalik and Lamino (2021) examined how financial innovation (FI) affects Nigerian DMBs. The study was retrospective. Since the population is tiny, the sample size is 13 listed DMBs in Nigeria. Financial statements and the 2019 CBN statistical bulletin provided data (6-12months). Analysis included descriptive statistics, correlation, unit root tests, and regression. Data envelopment analysis (DEA) estimates DMBs efficiency non-parametrically. The study used multiple regressions to examine the efficiency ratio and found that financial innovation (Unstructured Supplementary Service Data–USSD) improves DMBs efficiency in Nigeria. Board size affects DMBs efficiency in Nigeria negatively and insignificantly.

Nigerian DMBs were investigated by Ibekwe (2021). ATM, mobile banking, internet banking, and POS are examined to determine their influence on DMBs in Nigeria. The CBN Statistical Bulletin, CBN Annual Report, and Statement of Accounts from 2006 to 2019 were analysed using OLS regression. ATM, mobile banking, and POS showed positive ROA, however internet banking had negative and modest returns. Thus, financial innovation boosts Nigerian DMBs' ROI.

Akwam and Yua (2021) examined how financial goods affected selected Nigerian deposit money institutions. The study explored whether banks' products launched in response to severe rivalry influenced performance. 2010–2019 Nigerian Stock Exchange fact books and annual reports incorporated secondary data. Multiple regressions analysed data. Mobile banking, point of sale, and ATMs improved ROA, ROE, and EPS.

Nwakoby, Chukwu, and Okoh (2020) examined how cashless policy affected DMBs profitability in Nigeria from 2009 to 2019. The Auto-regressive Distributed lag (ARDL) model was used to analyse secondary data from the CBN Statistical Bulletin. POS Terminal, ATM, Mobile Banking, and Web Payment explain Profit before Tax. Cashless policy negatively and insignificantly affected DMBs' profit before tax in Nigeria during the study period.

Muotolu and Nwadiolor (2019) examined how the CBN Cashless Policy affected Nigerian DMBs' FP. Panel data were collected from 14 banks from 2012, when the policy was established in Nigeria, through 2017. The study used ATM, POS, Internet Banking, NIP, and NEFT value transactions to proxy cashless policy and ROA to mimic bank performance. We used Descriptive Statistic Analysis, Multicollinearity, Correlation, and Herteroskadaticity tests to validate and verify our data. The study concluded that ATMV has a positive and substantial influence on ROA of Nigerian banks, while, POSV, WEBV, NIPV, and NEFV had a positive but negligible effect. The study found that E-banking products as a proxy for cashless policy improve Nigerian DMBs' FP.

Research Methodology

The research design for this study was based on the ex-post facto research design. Ex-post facto research design involves the ascertaining of the impact of past factors on the present happening or event. It is also used because it is structured to find, describe and interpret a social phenomenon which this study is aimed at.

The method of data collection used in this study is the secondary source of data (time series data), from the CBN Statistical Bulletin, CBN Annual Report, CBN Bank Supervisory Annual Report and Nigeria Deposit Insurance Corporation (NDIC) Annual Reports for the period 1992-2021. These sources of data were selected as a source of data collection because it is the most reliable and accurate source of data for the study.

The statistical technique of data analysis was adopted in this study. The study conducts a unit roots test for the time series data in order to ascertain if they are stationary or not. After which, the descriptive statistics and the correlation analysis was used to determine the nature of relationship between the independent and dependent variables. The method of data analysis chosen was the multiple regression analysis which will be use through the Regression model, using the computer software, E-VIEWS 9.0. This is the appropriate measures taken to analyze data as regards the study in question. The model for this study was adopted from the work of Muotolu and Nwadiolor, (2019), and was modified to suit the variables of this study. The model which specifies that DMBs FP is significantly influenced by the technological disruptive innovations channels is formulated as follows,

$$\text{ROE} = f(\text{ATM}, \text{POS}, \text{INTB}, \text{MOB}, \text{NIBSS}, \text{NEFT})$$

$$\text{ROE} = \beta_0 + \beta_1\text{ATM} + \beta_2\text{POS} + \beta_3\text{INTB} + \beta_4\text{MOB} + \beta_5\text{NIBSS} + \beta_6\text{NEFT} + U$$

Where:

ROA = Return on Equity

β_0 = Constant Term

β_1 = Coefficient of Automatic Teller Machine Transactions

ATM = Automatic Teller Machine Transactions

β_2 = Coefficient of Point of Sale Transactions

POS = Point of Sale Transactions

β_3 = Coefficient of Internet Banking Transactions

INTB = Internet Banking Transactions

β_4 = Coefficient of Mobile Banking Transactions

MOB = Mobile Banking Transactions

β_5 = Coefficient of Nigeria Interbank Settlement System (NIBSS) Transactions

NIBSS = Nigeria Interbank Settlement System (NIBSS) Transactions

β_6 = Coefficient of Nigeria Electronic Fund Transfer Transactions

NEFT = Nigeria Electronic Fund Transfer Transactions

U = Disturbance Term (other variable not mentions in the model)

The a priori expectation is $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6 > 0$

Result and Discussions

Table 4.2: Descriptive Statistics

	ROE	ATM	POS	INTB	MOB	NIBSS	NEFT
Mean	30.15200	1651.647	635.2960	79.75033	440.7650	14948.31	20132.11
Median	22.10500	95.84000	9.140000	24.14000	1.190000	190.3000	8782.070
Maximum	106.7100	7900.140	9400.160	675.9200	5080.960	72879.83	195785.2
Minimum	-60.07000	2.030000	1.010000	5.120000	1.010000	15.89000	552.7800
Std. Dev.	32.49869	2478.709	1816.958	145.2853	1046.275	24167.63	45757.85
Skewness	0.449031	1.302374	4.039035	3.103706	3.265502	1.318338	3.372925
Kurtosis	3.816572	3.253445	19.50164	12.17008	14.19805	3.179596	12.59448
Observations	30	30	30	30	30	30	29

Source: EVIEW, 9.0 Outputs, 2022.

Table 4.2 above is the presentation of the summary statistics. The mean value for the ROE recorded a mean value of 30.1520 with a Std. Dev. of 32.4987. Also, ATM, recorded a mean of 1651.65 and Std. Dev. of 2478.71, POS recorded that a mean of 635.30 with a Std. Dev. of 1816.96, INTB recorded that a mean of 79.7503 with a Std. Dev. of 145.2853, MOB recorded an average value of 440.7650 with a Std. Dev. of 1046.375, NIBSS recorded an average of 14948.31 with standard deviation of 24167.63 and NEFT recorded an average of 20132.11 and Std. Dev. of 45757.85. Since the standard deviations for all the variables are greater than respectively means, it shows that the data are widely dispersed.

The normal distribution has a kurtosis of three, which indicates that the distribution has neither fat nor thin tails. Consequently, if an observed distribution has a kurtosis greater than three, the distribution has heavy tails when compared to the normal distribution. Since some the kurtosis coefficients in Table 4.2 are lesser than 3, this shows that ROE, ATM and NIBSS have thin tails while POS, INTB, MOB and NEFT thick tails because the kurtosis is greater than 3 when compared to the normal distribution.

Table 4.3: Correlation Matrix

	ROE	ATM	POS	INTB	MOB	NIBSS	NEFT
ROE	1.000000						
ATM	-0.200770	1.000000					
POS	-0.074228	0.740401	1.000000				
INTB	-0.158503	0.727692	0.440898	1.000000			
MOB	-0.079182	0.750264	0.635740	0.794510	1.000000		
NIBSS	-0.148624	0.918991	0.732104	0.736206	0.801271	1.000000	
NEFT	-0.100715	0.415811	0.719635	0.119810	0.345841	0.622895	1.000000

Source: EVIEW, 9.0 Outputs, 2022.

The correlation test is presented in Table 4.3 and it shows the absence of multi-co linearity among the variables since the correlation values are less than 0.7. Furthermore, the result shows the explanatory variables namely; ATM, POS, INTB, MOB, NIBSS and NEFT has negative strong correlation with ROE of DMBs in Nigeria.

Table 4.4: Variance Inflation Factors Multicollinearity Test

Variance Inflation Factors

Date: 09/15/22 Time: 01:29

Sample: 1992 2021

Included observations: 29

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	76.47617	2.297524	NA
ATM	0.000129	34.85651	3.250911
POS	8.50E-05	9.501951	8.398498
INTB	0.007643	6.356742	4.803544
MOB	0.000156	6.079915	5.104478
NIBSS	2.32E-06	56.72571	4.108785
NEFT	1.90E-07	13.82719	1.151798

Source: EVIEW, 9.0 Outputs, 2022.

Since the data for the study are annual time series, the multicollinearity test was conducted to ascertain if the data contained multicollinearity, this is presented in table 4.4 above. Multicollinearity occurs in a data set when two or more independent variables in multiple regression models are highly correlated. In order to ensure that the results of this study are valid, the variance inflation factor (VIF) computed as shown in Table 4.4. Furthermore, the Centered Variance Inflation Factor (CVIF) statistics for all the independent variables consistently lies between 3.2509, 8.3985, 4.8035, 5.1045, 4.1088 and 1.1518 for ATM, POS, INTB, MOB, NIBSS and NEFT respectively. This indicates the absence of multicollinearity problems among the variables under investigation because the cut off value of VIF is 10. Values of VIF that exceed 10 are often regarded as indicating multicollinearity.

Table 4.5a: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.333244	Prob. F(2,20)	0.7205
Obs*R-squared	0.935241	Prob. Chi-Square(2)	0.6265

Source: E-VIEW, 9.0 Outputs, 2022.

Prior to estimating the models, residuals of the variables were ascertained to check for the presence of serial correlation. This was done using the serial correlation LM test. The serial correlation LM test in Table 4.5a details that there is no element of serial correlation in the models owing to the fact that the p-values of the f-statistics are insignificant at 5% level of significance.

Table 4.5b: Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.427927	Prob. F(6,22)	0.8524
Obs*R-squared	3.030796	Prob. Chi-Square(6)	0.8050
Scaled explained SS	2.722576	Prob. Chi-Square(6)	0.8428

Source: E-VIEW, 9.0 Outputs, 2022.

The situation in which the variability of a variable is unequal across the range of values of a second variable that predicts it leads to problem of heteroskedasticity. To ensure that there is homoscedasticity in the model estimation, the heteroskedasticity test via the Breusch-Pagan-Godfrey was performed. With the result there is no problem of heteroskedasticity in the models as the p-values of the f-statistics are insignificant at 5% significance level.

Table 4.5c: Ramsey RESET Test

Equation: UNTITLED

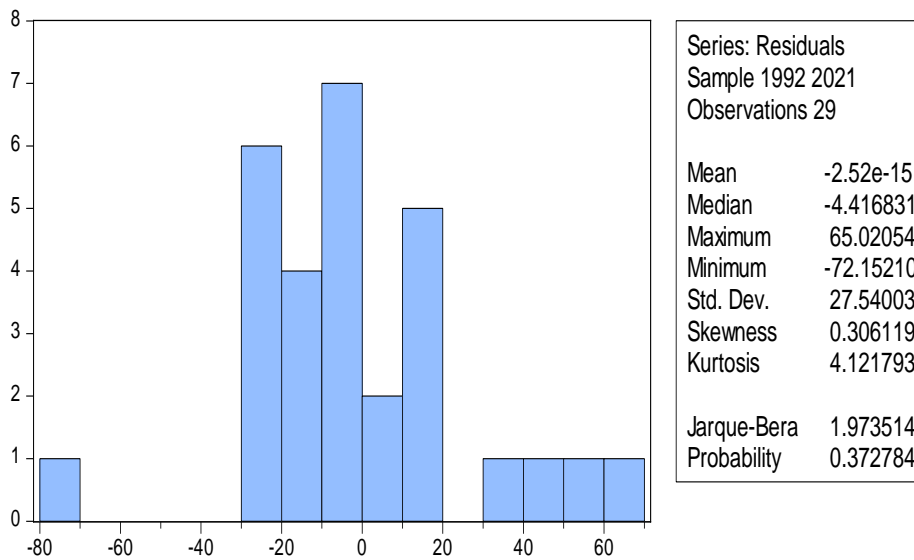
Specification: ROE C ATM POS INTB MOB NIBSS NEFT

Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.179840	21	0.2513
F-statistic	1.392022	(1, 21)	0.2513
Likelihood ratio	1.861287	1	0.1725

Source: E-VIEW, 9.0 Outputs, 2022

From the Table 4.5.1c above, it confirms that the Durbin Watson stat that our data has no traits of autocorrelation. Indicates that the model is homoskendastic since the probability values of three parameters are greater than 0.05 level of significance. Ramsey test result reveals that our model is correctly specified and is stable for regression analysis.

Table 4.5d: Normality Histogram Test

Source: E-VIEW 9.0 Output, 2022.

The test of residuals for normality was conducted to assess the distribution normality of the model residuals. When residuals are not normally distributed, it denotes the presence of significant outliers in the data which affects the standard errors and then the significance levels of the coefficients. From the test result, it indicates that the residuals are normally distributed as the histogram assumes a bell-shape and the J-B statistic probability value is 0.3728 which is greater than 0.05(5%), this forms the premise to reject the null hypotheses that the residuals are not normally distributed.

Augmented Dickey-Fuller (ADF) Unit Root Test

Testing for the existence of unit roots is a principal concern in the study of time series models and co-integration. The rationale behind this test is to avoid the problem of spurious regression which is commonly associated with time series data. The presence of a unit root implies that the time-series data under investigation is non-stationary; while the absence of a unit root shows that the stochastic process is stationary. The unit root test was conducted using the Augmented Dickey-Fuller (ADF) Unit root test as presented in table 4.6 below:

Table 4.6: Augmented Dickey-Fuller Unit root Test

Test Variables	ADF Test Statistic Value	Mackinnon Critical Value @ 5%	Order of Integration	P-Value	Decision
@Level					
ROE	-3.548069	-3.967767	1(0)	0.0737	Non-Stationary
ATM	-3.832469	-3.998064	1(0)	0.0984	Non-Stationary
POS	4.001880	-5.004861	1(0)	0.1231	Non-Stationary
INTB	-2.400930	-2.967767	1(0)	0.1502	Non-Stationary
MOB	-2.400930	-3.679322	1(0)	0.1702	Non-Stationary
NIBSS	1.646180	-2.967767	1(0)	0.9993	Non-Stationary
NEFT	0.414901	-3.029970	1(0)	0.9780	Non-Stationary
@1st Difference					
ROE	-5.181379	-2.976263	1(1)	0.0003	Stationary
ATM	-3.395119	-3.004861	1(1)	0.0544	Stationary
POS	3.645139	-3.012363	1(1)	0.0375	Stationary
INTB	-3.894809	-3.012363	1(1)	0.0528	Stationary
MOB	8.578086	-3.012363	1(1)	0.0000	Stationary
NIBSS	-3.949972	-2.971853	1(1)	0.0053	Stationary
NEFT	-3.892374	-3.040391	1(1)	0.0093	Stationary

Source: E-VIEW, 9.0 Outputs, 2022.

The summary of the ADF unit root test output in table 4.6, above revealed that all the variables under investigation i.e. ROE, ATM, POS, INTB and MOB are not stationary at level but contain unit root test at their first difference 1(1). Evidence of this could be seen from the value of their respective ADF statistics which is more than the critical value at 5%. Moreover, additional evidence of stationary series could also be seen from the p-value for all variables which is less than 5% level of significance greater than 95% confidence level. They all attained stationarity at first difference i.e. at order one, hence, the data are suitable for regression.

Table 4.7: Multiple Regression Analysis

Dependent Variable: ROE

Method: Least Squares

Date: 09/15/22 Time: 01:16

Sample: 1992 2021

Included observations: 29

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	43.41754	8.745065	4.964804	0.0001
ATM	-0.024253	0.011376	-2.131983	0.0444
POS	0.026820	0.009222	2.908263	0.0518
INTB	-0.115378	0.087423	-1.319770	0.2005
MOB	-0.005605	0.012498	-0.448502	0.6582
NIBSS	0.012897	0.001522	8.473719	0.0000
NEFT	-0.000879	0.000435	-2.017604	0.0540
R-squared	0.912017	Mean dependent var		28.09586
Adjusted R-squared	0.831775	S.D. dependent var		31.02457
S.E. of regression	31.06934	Akaike info criterion		9.916825
Sum squared resid	21236.69	Schwarz criterion		10.24686
Log likelihood	-136.7940	Hannan-Quinn criter.		10.02019
F-statistic	0.986561	Durbin-Watson stat		1.904056
Prob(F-statistic)	0.048096			

Source: EVIEW, 9.0 Outputs, 2022.

The multiple regression results in Table 4.7 above, the coefficient of ATM is -0.0243 with a t-value of -2.1320 and an associated p-value (sig. value) is 0.0444. This suggests that ATM have a negative significant effect on ROE. This relationship is significant given the fact that the p-value of 0.0444 is lesser than 0.05 (5%) level significance, hence, the alternate hypothesis is accepted and null hypothesis is rejected; which says that ATM does not have significant effect on ROE of DMBs in Nigeria. The coefficient of ATM is -0.0243, which imply that ATM has a negative trend with ROE. One percent (1%) movement in ATM would lead to 2.43% decrease in ROE of DMBs in Nigeria. This finding is in tandem with the findings of Muotolu and Nwadiolor (2019) but contradicts the findings of Ibekwe (2021).

Also, the multiple regression results in Table 4.7 above, the POS coefficient of 0.0268 with a t-value of 2.9083 and an associated p-value (sig. value) of 0.0518. This suggests that POS have a positive significant effect on ROE. This relationship is significant given the fact that the p-value of 0.0518 is equal to 0.05 (5%) level significance, thus, the null hypothesis which says that POS does not have significant effect on ROE of DMBs is rejected and alternate hypothesis is accepted. The coefficient of POS is 0.0268 which imply that POS has a positive trend with ROE.

One percent (1%) movement in POS would lead to 2.68% increases in ROE of DMBs in Nigeria. The finding is in agreement with the findings of Obiekwe and Anyanwaokoro (2017), Akwam and Yua (2021) and Ibekwe (2021) but contradicts the findings of Esan, Ananwude and Okeke (2020).

More also, the multiple regression results in Table 4.7 above, the coefficient of INTB is -0.1154 with a t-value of -1.3198 and an associated p-value (sig. value) is 0.2005. This suggests that INTB have a negative insignificant effect on ROE. This relationship is not significant given the fact that the p-value of 0.2005 is greater than 0.05 (5%) level significance, hence, the null hypothesis which says that INTB does not have significant effect on ROE of DMBs is accepted while the alternate hypothesis is rejected. The coefficient of INTB is -0.1154, which imply that INTB has a negative trend with ROE. One percent (1%) movement in INTB would lead to 11.54% decrease in ROE of DMBs in Nigeria. The finding is in agreement to the findings of Muotolu and Nwadiolor (2019) and Ibekwe (2021) but contradicts the findings of Morufu (2017) and Akwam and Yua (2021).

Similar, the multiple regression results in Table 4.7 above, the coefficient of MOB is -0.0056 with a t-value of -0.4485 and an associated p-value (sig. value) is 0.6582. This suggests that MOB have a negative insignificant effect on ROE. This relationship is not significant given the fact that the p-value of 0.6582 is greater than 0.05 (5%) level significance, the null hypothesis which says that there is no significant relationship between MOB and ROE of DMBs is accepted and the alternate hypothesis is rejected. The coefficient of MOB is -0.0056 which imply that MOB has a negative trend with ROE. One percent (1%) movement in MOB would lead to 0.56% decrease in ROE of DMBs in Nigeria. This finding is in tandem with the findings of Muotolu and Nwadiolor (2019) but contrary to the findings of Akwam and Yua (2021).

Furthermore, the multiple regression results in Table 4.7 above, the NIBSS coefficient of 0.0129 with a t-value of 8.4737 and an associated p-value (sig. value) of 0.000. This suggests that NIBSS have a positive significant effect on ROE. This relationship is significant given the fact that the p-value of 0.000 is lesser than 0.05 (5%) level significance, thus, the null hypothesis which says that NIBSS does not have significant effect on ROE of DMBs is rejected and alternate hypothesis is accepted. The coefficient of NIBSS is 0.0129 which imply that NIBSS has

a positive trend with ROE. One percent (1%) movement in NIBSS would lead to 1.29% increases in ROE of DMBs in Nigeria. The finding is in agreement with the findings of Muotolu and Nwadiolor (2019) but contradicts the findings of Esan, Ananwude and Okeke (2020).

Finally, the multiple regression results in Table 4.7 above, the coefficient of NEFT is -0.0009 with a t-value of -2.0176 and an associated p-value (sig. value) is 0.0540. This suggests that NEFT have a negative significant effect on ROE. This relationship is significant given the fact that the p-value of 0.0540 is greater than 0.05(5%) level significance, hence, the alternate hypothesis is accepted and null hypothesis is rejected; which says that NEFT does not have significant effect on ROE of DMBs in Nigeria. The coefficient of NEFT is -0.0009, which imply that NEFT has a negative trend with ROE. One percent (1%) movement in NEFT would lead to 0.09% decrease in ROE of DMBs in Nigeria. This finding is in tandem with the findings of Muotolu and Nwadiolor (2019) but contradicts the findings of Esan, Ananwude and Okeke (2020).

Conclusion and Recommendations

In the light of the findings, it evident that measures of Technological Disruptive Innovations used has mixed effects on ROE of DMBs in Nigeria. However, majority of the independent variables such ATM, POS, NIBSS and NEFT has significant effects on ROE of DMBs while INTB and MOB established an insignificant effects on ROE of DMBs in Nigeria. Hence, the study concluded that a Technological Disruptive Innovations has significant effects on FP of DMBs in Nigeria. In line with the findings, we recommend that:

1. Managers of DMBs should from time to time train customers with regard to ATM, its benefits, risk exposure, physical and electronic security to avoid financial loss in the hands of hackers, trainings should be held for bank staff in short periods to acquaint them with modern developments of the sophisticated technology in changing times to improve the FP of DMBs in Nigeria
2. Managers of DMBs should improve service quality and customer responsiveness in cases of lost or stolen cards, frauds, and other customer complaints in relation to point of sale to enhance the FP of DMBs in Nigeria

3. There is additional need for managers of DMBs in Nigeria to ensuring ease of use, and customer interactive features in mobile and on-line shopping systems, to accelerate to FP of the DMBs in Nigeria
4. Managers of DMBs should improve service quality and customer responsiveness in cases of lost or stolen cards, frauds, and other customer complaints in relation to point of sale, USSD and mobile apps to enhance the FP of DMBs in Nigeria
5. Financial products are the engine of sustainable economic growth. Faster and more secure payment systems such as NIBSS spur development of businesses and economic growth in all other sectors in addition to facilitating financial deepening. Government should work toward these because this is one of the keys to attainment economic independence objectives in Nigeria.
6. Banks as well as the regulatory bodies should strive to innovate for better and cheaper ways of serving customers. With shorter transaction turnaround times, transactions volumes can be significantly increased with the aid of an improved NEFT.

References

- Abdulmalik, M. & Lamino, A. H. (2021). Effect of financial innovation on performance of deposit money banks in Nigeria. *Nile Journal of Business and Economics*, 19, 71-87.
- Akpokerere, O. E. & Obonofiemro, G. (2022). Board characteristics: Implications on financial performance of deposit money banks in Nigeria. *Journal of Finance & Accounting Research*, 4(4), 144-161.
- Akwam, P. O. & Yua, H. (2021). Effect of financial products on the performance of selected deposit money banks in Nigeria. *European Journal of Accounting, Auditing and Finance Research*, 9(1), 124-143.
- Alt, R. & Puschmann, T. (2017). *Digitalisierung der Finanzindustrie-Grundlagen der FinTech-Evolution*, Springer, Berlin/Heidelberg.
- Arner, D.W., Barberis, J.N. & Buckley, R.P. (2017) 'FinTech, RegTech and the reconceptualization of financial regulation (October 1, 2016), *Northwestern Journal of International Law and Business*, Forthcoming, University of Hong Kong Faculty of Law Research Paper No. 2016/035 [online] <https://ssrn.com/abstract=2847806> (accessed 26 October 2017).
- Bamidele, W. (2017). Exploring the presence of family culture of influence , commitment and values in family businesses : The gender factor. *Covenant Journal of Entrepreneurship*, 1(2), 50–66.

- Bastid, V. and Rao, S. (2017). Innovation in retail banking: the emergence of new banking business models. 8th Annual Edition, *2016 EFMA and EdgeVerve Systems Limited*, October [online] <https://www.efma.com/study/detail/21891> (accessed 21 November 2017).
- Bayem S.A, Ehiedu, V.C, Agbogun, E.O and Onuorah, A.C, (2022). Exchange rate volatility and oil price shocks in Nigeria. *IOSR Journal of Business and Management (IOSR-JBM)* e-ISSN: 2278-487X, p-ISSN: 2319-7668. DOI: 10.9790/487X-2410030111
- Bernard, M. (2018). Why Everyone Must Get Ready For The 4th Industrial Revolution. *Forbes*.
- Bett, F. C. & Bogonko, J. B. (2017). Relationship between digital finance technologies and profitability of banking industry in Kenya. *International Academic Journal of Economics and Finance*, 2(3), 34-56.
- Chimaobi, I., Akujor, C. J. & Mbah, C. J. (2020). Electronic banking and customer satisfaction in Imo State: A study of selected commercial banks in Imo State. *EJBMR, European Journal of Business and Management Research*, 5(6), 1-9.
- Dedu, V. and Nițescu, D.C. (2017). Banking relationship management – a new paradigm? *Theoretical and Applied Economics*, 21(4), 7–22.
- Dhar, V. & Stein, R.M. (2017). FinTech platforms and strategy–integrating trust and automation in finance. *Communications of the ACM*, 60(10), 32–35.
- Durai, T., & Stella, G. (2019). Digital finance and its impact on financial inclusion. Retrieved from: <https://www.researchgate.net/publication/330933079>
- Ehiedu Victor C.' Onuorah, Anastasia C. and Owonye, Benedicta (2022). Financial Inclusion and Inclusive Growth in Nigeria. *Indian Journal of Economics and Business*. /Ashwin Anokha Publications and Distributions. India. Pp. 441-455
- Ehiedu Victor C. and Brume-Ezewu, Christiana (2022). Corporate Attributes and Environmental Social And Governance (Esg) Reporting Among Listed Nigerian Firms: A Sector-Based Evaluation. *International Journal of Management (IJM)* Article ID: IJM_13_14_041 ISSN Print: 0976-6502 and ISSN Online: 0976-6510 © IAEME Publication. Pp.430-440, 11(1).
- Ehiedu Victor C. and Okorie, S. (2022). Exchange Rate Fluctuations and Inflation Rate in Nigeria: (1978 to 2019). *Journal of Finance, Governance and Strategic Studies/ Collaborative Research (CORE) Associates*. Faculty of Humanities, Management and Social Sciences Office Complex. Federal University Wukari. Taraba State. Pp.27-34. Vol. 5(1)
- Ehiedu, V. C. (2022). Analysis of micro prudential determinants of capital adequacy in deposit

- money banks. *International Journal of Management & Entrepreneurship Research*, 4(11), 398-415.
- Ehiedu, Victor C, (2022). Deficit financing (df) and sustainable growth (sg) in a small open economy. *International Journal of Academic Accounting, Finance & Management/ Research (IJAAFMR)*. *International Journal of Academic Research World (IJARW)*. Pp. 1-96(7)
- Ehiedu, Victor Chukwunweike; Odit, Anthony Ogormegbunam and Kifordu, Anthony Anibuofu (2020). Cashless Policy Model and Nigeria Economic Growth. *Journal of Advanced Research in Dynamic and Control Systems (JARDCS)/ Institute of Advanced Scientific Research*. Pp. 1975-1982
- EHIEDU, Victor Chukwunweike¹; ODITA, Anthony Ogormegbunam² (2014). Application of Budgeting Techniques in Fiscal Institutions in Nigeria. *Journal of Developing Country Studies*. The International Institute for Science, Technology & Education. Vol.4(6). Pp. 20-27
- Ehiedu Victor C.' Onuorah, Anastasia C. and Owonye, Benedicta (2022). Effect of revenues leakages on economic development in Nigeria. *Journal of Economics and Finance (JEF)*. Publishers:/ International Organization Of Scientific Research (IOSR). Pp. 39-48
- Gomber, P., Kauffman, R.J., Parker, C. and Weber, B.W. (2017) 'On the FinTech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services', *Journal of Management Information Systems*, 35(1), 220–265.
- Ibekwe, A. O. (2021). Financial innovation and performance of deposit money banks in Nigeria. *International Journal of Business & Law Research*, 9(1), 162-173.
- Ighoroje, E. J. & Akpokerere, O. E. (2021). Liquidity management and the performance of deposit money banks in Nigeria. *IOSR Journals of Economics and Finance*, 12(I), 20-34.
- Ighoroje, E. J. & Akpokerere, O. E.(2022). Bank Credit Facilities and SMEs' Performance in Nigeria: *European Modern Studies Journal*, 6(3), 236-244
- Ikpefan, O. A., Akpan, E., Osuma, O. G., Evbuomwan, G. & Ndigwe, C. (2018). Electronic Banking and Cashless Policy in Nigeria, *International Journal of Civil Engineering and Technology (IJCIET)*, 9(10), 718–731.
- International Finance Corporation, IFC (2020). The Impact of COVID-19 on Disruptive Technology Adoption in Emerging Markets. *IFC Insights*. https://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/insights/matching-workers-with-jobs-amid-covid-19?deliveryName=DM65744.
- Jegade C. A. (2014). Effects of automated teller machine on the performance of Nigerian banks. *American Journal of Applied Mathematics and Statistics*, 2(1), 40-46.

- Kamau D. M. & Oluoch J. (2016). Relationship between financial innovation and commercial banks performance in Kenya. *International Journal of Social Sciences and Information Technology*, 2(4), 34-47.
- KPMG (2017). Technologies unlocking massive market opportunity part 2: innovation convergence unlocks new paradigms', *KPMG Technnovation* [online] <https://assets.kpmg/content/dam/kpmg/lv/pdf/disruptive-tech-2017-part2.pdf> (accessed 23rd March, 2022)
- Marjanovic, O. & Murthy, V. (2017). From product-centric to customer-centric services in a financial institution – exploring the organizational challenges of the transition process. *Information Systems Frontiers*, 18(3), 479–497.
- Meteke S, Ehiedu V.C, Ndah, F and Onuorah, A.C, (2022). Banks' gearing options and operating performance in Nigeria: A Panel Approach *International Journal of Innovative Finance and Economics Research* 10(4):123-133.
- Michelle, A. M. (2017). The effects of digital fiancé on financial inclusion in the banking industry in Kenya. Unpublished M.Sc. dissertation, University of Nairobi.
- Morufu, O. (2017). E-payments adoption and profitability performance of deposits money banks in Nigeria. *IPASJ International Journal of Information Technology*, 4(3), 47-67.
- Muotolu, P. C. & Nwadiolor, E. O. (2019). Cashless Policy and Financial Performance of Deposit Money Banks in Nigeria. *International Journal of Trend in Scientific Research and Development*, 3(4), 465-476.
- Nwakoby, C.,Chukwu, O.K. & Okoh, E. O. (2020). Effect of cashless policy on deposit money banks profitability in Nigeria. *Asian Journal of Economics, Business and Accounting*, 19(4), 48-63.
- Nwekpa, C. K., Djobissie, C. I., Chukwuma, N. N. & Ezezue, O. B. (2020). Influence of electronic banking on customer satisfaction in a Fidelity Bank Plc in Nigeria. *IOSR Journal of Business and Management (IOSR-JBM)*, 22(4), 49-58.
- Nyiranzabamwita, R. & Harelimana, B. J. (2019). The effect of electronic banking on customer services delivery in commercial banks in Rwanda. *Enterprise Risk Management Journal*, 5(1), 33-45.
- Obaro V.C, Onuorah, A.C, Evesi H.O and Ehiedu V.C., (2022). Diversification and the performance of quoted banks in Nigeria. *Quest Journal of Research in Business and Management*. pp: 46-54, 10(10)
- Obunike, F. C. & Udu, A. A. (2018). Technological innovativeness and growth: a study of small scale manufacturing firms in Lagos State. *Economics of Development*, 17, 39-53.
- OECD (2018). Financial markets, insurance and pensions: digitalization and finance. Report, OECD, Paris. <https://www.oecd.org/finance/private-pensions/Financial-markets-insurance-pensions-digitalisation-and-finance.pdf>

- Okonkwo V. I., Obinozie H. E. & Echekeba F. N. (2016). The effect of information communication technology and financial innovation on performance on Nigerian commercial banks (2001 – 2013). *European Journal of Business and Management*, 7(22), 162-171.
- Oluyi, A. I. & Abioye, A. L. (2020). A comparative study of electronic banking service delivery in First Bank of Nigeria Plc and Guaranty Trust Bank Plc. *International Journal of Media, Journalism and Mass Communications (IJMJMC)*, 6(3), 21-39.
- Omarini, A.E. (2018) 'Banks and Fintechs: how to develop a digital open banking approach for the bank's future', *International Business Research, Canadian Centre of Science and Education*, September, 11(9), 23–36, Technology Industry Outlook.
- Omojefe, and EHIEDU, (2017). Investment Financing and Dividend Policy of Banks in Nigeria. *Hezekiah University Journal of Management and Social Sciences/ Faculty of Mgt & Social Sciences, Umudi. Imo State. Pp. 121-127. Vol. Vol. 6(1)*
- Omotunde, M., Sunday, T. & John-Dewole, A. T. (2017). Impact of cashless economy in Nigeria. *Greener Journal of Internet, Information and Communication Systems*, 1(2), 40-43.
- Onuorah, Anastasia C, Ehiedu Victor C. and Okoh, Ezekiel. (2021). Covid-19 Crisis and Stock Market Volatility in Nigeria: A Garch Model Approach. *International Journal of Management, IT, & Social Sciences (IJMISS)*. /Scientific & Literature Open Access Publishing. Pp. 317-327
- Philippon, T. (2018). The Fintech opportunity. Wharton School of the University of Pennsylvania Pension Research Council WP 2018-21.
- Pousttchi, K. & Dehnert, M. (2018). Exploring the digitalization impact on consumer decision making in retail banking. *Electronic Markets*, 28(3), 265–286.
- PwC (2017). A decade of digital keeping pace with transformation, *2017 Global Digital IQ® Survey: 10th Anniversary Edition*, pp.1–30, PricewaterhouseCoopers [online] <https://www.pwc.com/ee/et/publications/pub/pwc-digital-iq-report.pdf> (accessed 23rd May 2018).
- Shofawati, A. (2019). The role of digital finance to strengthen financial inclusion and the growth of SME in Indonesia. Paper presented at the 2nd International Conference on Islamic Economics, Business and Philanthropy (ICIEBP), 389–407.
- Vives, X. (2019). Competition and stability in modern banking: a post-crisis perspective. *International Journal of Industrial Organization*, 64, 55-69.