

## FINANCIAL TECHNOLOGY AND PERFORMANCE OF DEPOSIT MONEY BANKS IN NIGERIA (2010-2023)

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### ABSTRACT

*This study examines the effects of financial technology (fin-tech) on the performance of deposit money banks in Nigeria. Ex-post facto research design is employed with a scope that spanned between 2010-2023. Various pre and post estimation tests were conducted. ARDL was used as the main estimation technique. Findings revealed that web payment has positive (1.954213) and significant (0.0528) effect on ROA of DMBs in Nigeria. The study also found that point of sales has positive (2.800475) and significant (0.0059) effect on ROA of DMBs in Nigeria. The study concluded that financial technology impact performance of deposit money banks in Nigeria. Based on the findings and conclusion, the study therefore recommended banks should invest in improving the security, speed, and reliability of web payment systems to enhance customer confidence and adoption. Banks should introduce incentives such as lower transaction fees and value-added services to encourage more businesses and individuals to utilize POS for transactions.*

**Keywords:** Financial Technology, DMB Performance, Return on Assets, Web Payment and Point of Sales.

### INTRODUCTION

The performance of DMBs in Nigeria is a pivotal factor in the nation's financial stability and economic growth. These banks serve as intermediaries, facilitating the mobilization of savings, allocation of credit, and execution of financial transactions. Key performance indicators for DMBs include profitability, operational efficiency, asset quality, liquidity, and customer satisfaction. Profitability metrics, such as ROA and ROE, assess a bank's effectiveness in generating earnings relative to its assets and equity (Nteegah & Oladosu, 2022).

The role of fin-tech in transforming the banking sector has gained significant attention globally, with its impact on the performance of DMBs being a key area of interest. Financial technology encompasses innovative tools and platforms that enhance banking operations and customer experiences, such as web payments and point-of-sale (POS) terminals. Globally, fin-tech has driven efficiency, reduced operational costs, and expanded financial inclusion, yet challenges persist, including cybersecurity threats and regulatory compliance.

FinTech encompasses the integration of digital innovations into financial services to streamline operations, reduce transaction costs, and enhance service delivery. In Nigeria, FinTech solutions have proliferated through various channels. These technological advancements have enabled banks to broaden their customer base, optimize operations, and offer more convenient financial services (Osakwe et al. 2024).

Web payments, a major component of fin-tech, enable seamless online transactions, significantly reducing the reliance on physical banking. According to Statista (2023), global digital payments reached over \$8 trillion

in 2022, underscoring the transformative role of technology. However, scholars argue that the increased reliance on digital platforms introduces vulnerabilities to cyberattacks (Chakravarty et al., 2021). Similarly, POS terminals facilitate retail payments, promoting financial inclusion and cashless economies. Nigeria experienced a 22% increase in POS transactions between 2021 and 2022 (Central Bank of Nigeria, 2022). Despite their success, POS systems face issues like network failures and fraud risks (Eze & Nnaji, 2021).

The integration of web payment systems, although intended to enhance operational efficiency, has been marred by cybersecurity vulnerabilities. Studies indicate that Nigerian banks lost over ₦15 billion to cyberattacks in 2022 alone (Okeke & Nnaji, 2022). This not only undermines customer trust but also increases operational risks.

Point-of-sale (POS) systems have similarly faced challenges. While the CBN reported a 22% increase in POS transactions between 2021 and 2022, this growth is hindered by frequent network failures and fraud-related incidents (CBN, 2022). These issues create operational inefficiencies and affect customer satisfaction, which are crucial performance indicators for deposit money banks.

Adewole and Taiwo (2021) found that fin-tech significantly improved Nigerian banks' profitability and customer retention. Conversely, Olajide et al. (2020) emphasized challenges like technological adaptation costs and workforce redundancy. Globally, Zhou and Wang (2021) observed that while fin-tech enhances operational efficiency, it necessitates stringent regulatory frameworks to mitigate associated risks.

This study aims to bridge these gaps by accessing the effect of web payments and POS on the performance of deposit money banks in Nigeria.

In ascertaining the objectives of this study, the following questions are formulated to be answered by this paper.

- i. Does web payment have significant effect on ROA of DMBs in Nigeria?
- ii. How does point of sales have significant effect on ROA of DMBs in Nigeria?

This study envisioned to examined the effects of financial technology (fin-tech) on the performance of deposit money banks in Nigeria. Other specific objectives are;

- i. To investigate whether web payment have significant effect on ROA of DMBs in Nigeria.
- ii. To ascertain whether point of sales have significant effect on ROA of DMBs in Nigeria.

To address the research questions designed for this study, the following hypotheses was formulated and tested in null form;

**H<sub>01</sub>:** Web payment does not have significant effect on ROA of DMBs in Nigeria.

**H<sub>02</sub>:** Point of sales does not have significant effect on ROA of DMBs in Nigeria.

## REVIEW OF RELATED LITERATURE

### Conceptual Review

## **Concept of Financial Technology (Fin-Tech)**

FinTech represents the use of digital solutions and progressive operational frameworks grounded in information technology to enhance financial service delivery, as conceptualized by Nicoletti (2017) and cited in Olulu-Briggs and Sunday-Goya's (2023) research. This characterization underscores how technological innovations combine with unconventional business approaches to transform financial systems.

In their analysis, Knewtson and Rosenbaum (2020) delineate FinTech as market-oriented technological applications that supply financial instruments or services, differentiated by their enhanced technical capabilities relative to prevailing solutions. This framework underscores the progressive nature of technology adoption in financial service provision.

This study adopts Nicoletti's (2017) conceptualization of financial technology, as it effectively encapsulates the fundamental nature of FinTech by highlighting the synergistic combination of technological innovations and progressive business frameworks in financial service delivery.

## **Point of Sales**

A concept of Point of Sale (POS) system is fundamentally defined as the point at which a retail transaction is finalized, typically involving the calculation of the total amount owed by the customer, the provision of payment options, and the issuance of a receipt upon completion of payment (Adeoti, 2013). This system facilitates electronic payments, thereby reducing the reliance on cash transactions.

In this study, we adopt Adeoti's (2013) definition of POS as the point at which a retail transaction is finalized, encompassing the calculation of the total amount owed, provision of payment options, and issuance of a receipt upon payment completion. This definition encapsulates the fundamental components of POS systems and aligns with the operational realities within the Nigerian financial sector.

## **Web Payment**

Web payment, a subset of electronic payment systems, refers to the process of conducting financial transactions over the internet, enabling consumers and businesses to exchange monetary value digitally. According to the CBN, the payment landscape in Nigeria has evolved significantly, with a notable shift towards digital methods for making payments, reflecting a move away from traditional cash-based transactions (CBN, 2024).

The Central Bank of Nigeria's definition of web payment as transactions completed using electronic communications technology, encompassing a range of payment instruments. This definition aligns with the technological infrastructure that facilitates web payments and reflects the Nigerian financial system's emphasis on electronic communications in executing financial transactions.

## **Performance of Deposit Money Banks**

(NDIC, 2022) identifies profitability as the primary benchmark for assessing bank performance in Nigeria, typically measured through key financial ratios like ROA and ROE. These metrics evaluate a financial

institution's efficiency in converting its asset base and equity investments into net earnings, serving as critical indicators of financial health and operational success.

Another perspective focuses on the quality of a bank's assets and its credit risk management. A study by Adeusi et al. (2013) highlights that effective risk management practices, particularly in credit risk, are vital for maintaining bank performance. The study suggests that banks with robust risk management frameworks tend to exhibit better financial performance, as measured by profitability ratios.

For the purpose of this study, we adopt the definition provided by the NDIC (2022), which emphasizes profitability as the primary measure of bank performance, utilizing indicators such as return on assets and return on equity. This definition aligns with the focus on financial metrics prevalent in the Nigerian banking sector and provides a clear framework for assessing bank performance.

## **Theoretical Review**

### **Transaction Cost Theory**

The theory was developed by Ronald Coase in 1937 in his seminal work, *The Nature of the Firm*. The theory was later expanded by Oliver Williamson in 1975, who formalized its principles and provided a more detailed framework for understanding how transaction costs influence organizational structures and decision-making. Transaction costs refer to the costs associated with economic exchanges, including search costs, bargaining costs, enforcement costs, and monitoring costs (Coase, 1937; Williamson, 1975). The theory posits that organizations, including banks, seek to minimize transaction costs by structuring their operations in ways that enhance efficiency and reduce uncertainty.

Transaction Cost Theory is rooted in the idea that markets and hierarchies are alternative mechanisms for coordinating economic activities (Williamson, 1981). In markets, transactions occur through contractual agreements between independent entities, whereas hierarchies represent internal governance structures within organizations. Firms exist because they can sometimes perform transactions more efficiently than markets by reducing costs associated with contracting and enforcement (Coase, 1937). The choice between using external markets and internalizing transactions depends on factors such as uncertainty, frequency of transactions, and asset specificity (Williamson, 1979).

The theory assumed that economic actors are boundedly rational and opportunistic (Williamson, 1985). Bounded rationality implies that individuals have cognitive limitations in processing information, making it necessary to establish governance structures that reduce uncertainty.

Despite its applicability, Transaction Cost Theory has several limitations. Firstly, it assumes that firms always seek to minimize costs, often overlooking strategic factors such as innovation, customer satisfaction, and regulatory compliance (Ekezie & Uchenna, 2020).

### **Adoption of Theory**

This study is anchored on Transaction Cost Theory (TCT). This theory is adopted because the theory posits that organizations, including banks, seek to minimize transaction costs by structuring their operations in ways

that enhance efficiency and reduce uncertainty. Transaction Cost Theory explain how digital innovations reduce costs and improve efficiency. FinTech solutions have significantly lowered transaction costs for banks and customers. Digital payment systems, for instance, eliminate the need for physical visits to banks, reduce the cost of processing transactions, and minimize fraud risks through automated verification processes.

### **Empirical Review**

Ahmed and Adeoye (2024) investigated online banking and financial performance of listed DMBs in Nigeria. Focusing on data from 2015 to 2022, the study adopted a panel data research design and employed regression analysis using STATA software. The study found that online web transactions had significant effect on profit after-tax growth, while mobile money operations had insignificant effect. The study concludes that online banking enhances the financial performance of DMBs and recommended that banks invest more in online banking infrastructure to boost profitability.

Chukwuekwu (2024) assessed electronic banking and performance of DMBs listed in Nigeria between 2011 and 2020. Utilizing an ex-post facto research design, the study applied OLS. The findings ATM, POS, IB, MB had significant effect on ROE. The study concluded that e-banking positively influences bank performance and recommended that banks enhance their electronic banking services to improve financial outcomes.

Mainoma et al. (2024) examined ATMs and POS services on the stability of DMBs in Nigeria from 2014 to 2023. Using an ex-post facto research design and regression analysis. The study found that ATMs had insignificant effect on bank stability. The study concluded that while ATMs contribute positively to stability, their impact is not statistically significant, and they recommended diversifying ATM services to enhance utility and customer convenience.

Nwankwo and Eze (2023) analyzed electronic payment systems and financial performance of DMBs in Nigeria from 2012 to 2021. The study employed a descriptive research design and utilized OLS estimation technique. The results showed that had significant effect on net interest margin, while ATM transactions had insignificant effect. The study concluded that web payments enhance bank performance and recommended that banks promote web payment adoption among customers.

Ezie et al. (2023) assessed electronic banking, including POS transactions, on the performance of DMBs in Nigeria from 2009Q1 to 2023Q1. Employing the Dynamic Ordinary Least Squares (DOLS) technique. The study found that POS transactions had significant effect on ROA. The study concluded that electronic banking channels, particularly POS, enhance bank performance and recommended that banks invest in secure and efficient POS systems to improve profitability.

### **Gap in Literature**

From the reviewed works above, it was discovered that some of the studies such as Zhang and Li (2021), Mensah and Adjei (2021), Kimani and Mwangi (2020) and Abdullai and Micheni (2020) where carried out in other climes of which findings cannot be generalized due to environmental differences. Also, studies such as Kimani and Mwangi (2020), Osakwe et al (2024) and Nwankwo and Okoli (2023) made used of old time series data which does not reflect current happenings. Furthermore, the reviewed works showed that there

is inconsistency in result in the study such as Ahmed and Adeoye (2024), Mainoma et al. (2024), Nwankwo and Okoli (2023), Nteegah and Oladosu, Nwankwo and Agbo (2021). In terms of methodology, some of the reviewed works made use of OLS, Dynamic Ordinary Least Squares, GMM, Panel Data failing to account for the short and long run effect. This is the gap this study would fill.

**METHODOLOGY**

Ex-post-facto design is employed by this study to examine the relationships that exist between one or more variables without any direct manipulation by the researcher. The data for this study were sourced from CBN Bulletin covering (2010-2023). Various pre and post estimation test were carried out ranging from descriptive statistics, correlational matrix, stationarity test, normality test, Multicollinearity Test, heteroscedastic test and ARDL Model was used as the main estimation technique.

**Model Specification**

The model of financial technology (fin-tech) and performance of DMBs is consistent with the purchasing power parity theory reviewed in chapter two. Transaction Cost Theory (TCT) explains how digital innovations reduce costs and improve efficiency. The theory posited that organizations, including banks, seek to minimize transaction costs by structuring their operations in ways that enhance efficiency and reduce uncertainty.

The models summarised the effect of web payment and point of sales on performance of DMBs in Nigeria. The model was adopted and modified from studies such as Chukwuekwu (2024), Nwankwo and Eze (2023) and Maurie and Ukachukwu (2022).

The structural form of the model is stated as equation 1 below;

$$Y = f(x) \dots\dots\dots (1)$$

Where Y is the dependent variables, f is the functional and X represents independent variables.

The model was further expressed in mathematical equation (i) below;

$$ROA_t = f(WBP_t, POS_t) \dots\dots\dots (ii)$$

To make the mathematical expression estimable, it is transformed as equation (iii) below:

$$ROA_t = \beta_0 + \beta_1 WBP_t + \beta_2 POS_t + \mu \dots\dots\dots (iii)$$

Where:

ROA= Return on Asset (Dependent Variable)

WBP= Web Payment Value of Transactions (Independent Variable)

POS= Point of Sales Value of Transactions (Independent Variable)

$\beta_0$  = intercept

t = Time

$\beta_1 - \beta_2$  = Coefficient

$U_i$  = error terms

The study employed ARDL model in order to examine both the short and long-run relationships. E-views 10.0 econometric software was used for the analysis. Some preliminaries tests were conducted. This test includes both pre and post estimation test explained below;

**Pre Estimation Test**

Pre-estimation tests refer to the preliminary statistical procedures or diagnostics conducted before running the main estimation or analysis in a study. This includes;

**Basic Descriptive Statistics:** Basic Descriptive Statistics refer to the summary statistics that describe the main features of data in a panel dataset. They include Mean, Median, Standard Deviation, Minimum and Maximum.

**Correlational Matrix:** Correlational Analysis refers to the process of examining the relationship between two or more variables within a panel dataset. It shows whether they exist positive and significant relationship between the variables. Also, it shows the direction (positive) and magnitude (significance) between the variables. The outcome may be positive correlation, negative correlation or zero correlation.

**Unit Root Test:** Unit root test is conducted to ascertain the stationarity level of the variables. The rule of Unit Root Test is that, when it is 1(0) that is at level, OLS would be used to test the hypotheses, when it is at first difference 1(1), the study would use either Co-integration or Vector Error Correction Model (VECM) and when it has both 1(0) and 1(1), ARDL would be used.

**Normality Test:** A normality test in regression analysis is used to determine whether the residuals (errors) of the regression model are normally distributed.

**Post Estimation Test**

To establish whether the model is best, linear and unbiased (BLUE), the following post estimation test was conducted

**ARDL:** The Autoregressive Distributed Lag model is a technique used to analyze the short-run and long-run relationships between variables, particularly when dealing with time series data.

**DATA ANALYSIS AND DISCUSSION OF FINDINGS**

**Data Analysis**

**Table 1: Descriptive Statistics**

Variable	OBS	Mean	Std. Dev.	Max	Min
ROA	14	2.445000	0.592696	3.900000	1.410000
WBP	14	3.095827	1.830816	6.040259	1.398808
POS	14	3.018684	1.183240	5.042761	1.104487

**Source:** E-View 10.0 Output, (2025).

Table 1 shows the results the mean value of Return on Assets (ROA) is 2.445000, maximum and minimum values of 3.900000 and 1.410000 implied that the Return on Assets (ROA) had very good performance. The S.D of 0.592696 shows that the Return on Assets (ROA) indicator deviates from the mean by 0.592696.

Table 1 also reveal the mean value of Web Payment (WBP) is 3.095827, maximum and minimum values of 6.040259 and 1.398808 implied that the Web Payment (WBP) had very good performance. The S.D of 1.830816 specifies that the Web Payment (WBP) indicator deviates from the mean by 1.830816.

Table 1 also reveal the mean value of Point of Sales (POS) is 3.018684, maximum and minimum values of 5.042761 and 1.104487 implied that the Point of Sales (POS) had very good performance levels during the study period. The S.D. of 1.183240 specifies that the Point of Sales (POS) indicator deviates from the mean by 1.183240.

**Table 2 Correlation Matrix**

Covariance Analysis: Ordinary  
 Date: 03/21/25 Time: 21:27  
 Sample: 2010M01 2023M01  
 Included observations: 157

Balanced sample (listwise missing value deletion)

Covariance t-Statistic Probability	LROA	LWBP	LPOS	LATM
LROA	0.036332 ----- -----			
LWBP	-0.438049 -8.788260 0.0000	15.88094 ----- -----		
LPOS	-0.290720 -10.08457 0.0000	8.626183 24.74358 0.0000	5.871781 ----- -----	
LATM	-0.135843 -11.86065 0.0000	3.753833 27.62370 0.0000	2.458400 64.57553 0.0000	1.067542 ----- -----

Source: E-VIEW 10.0 Output, (2025).

**Web Payment vs Return on Assets**

Given that the correlation “R” is (-0.438049) and the t-stat (-8.788260) which is lower than 2.5 and with an associate p-value of (0.0000) it therefore concludes that web payment and return on assets shows a negative and significant linear association. By this, we reject the null hypotheses and accept the alternate hypotheses.

**Point of Sales vs Return on Assets**

Given that the correlation “R” is (-0.290720) and the t-stat (-10.08457) which is lower than 2.5 and with an associate p-value of (0.0000) it therefore concludes that point of sales and return on assets shows a negative and significant linear association. By this, we reject the null hypotheses and accept the alternate hypotheses.

**Table 3: Summary of Unit Root Results (ADF Test)**

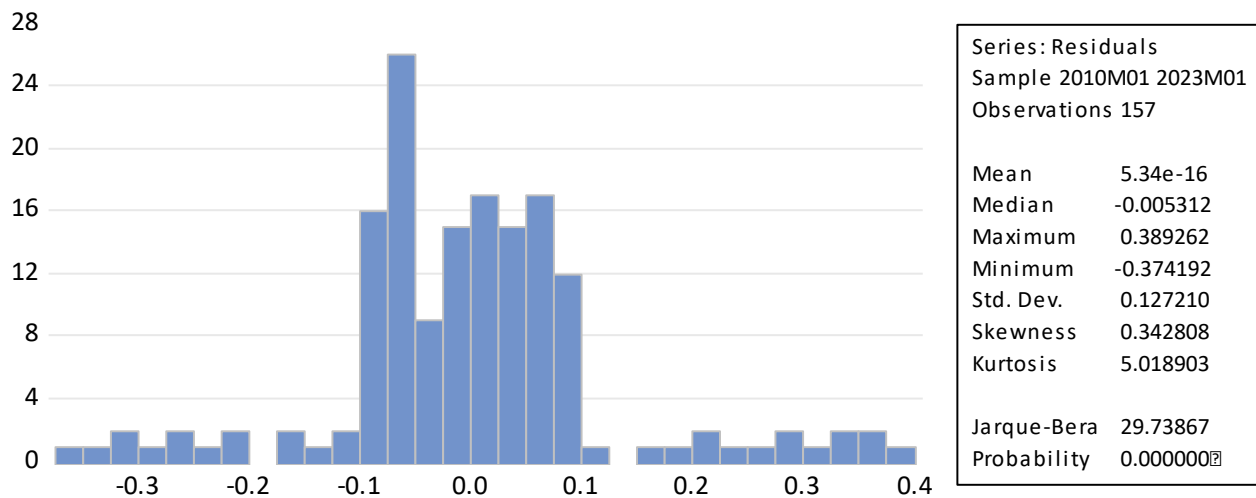
Variables	t-statistics	Critical Values @5%	Order of Integration	Prob.	Remarks
ROA	6.760109	3.212696	I(0)	0.0004	Stationary
WBP	3.932018	3.144920	I(1)	0.0137	Stationary
POS	4.023271	3.144920	I(1)	0.0118	Stationary

Source: E-view computation, (2025).

As shown in table 3, the result revealed that the variables under study are stationary at both levels and 1<sup>st</sup> order of integration. The study would adopt ARDL method as the main estimation technique.

**Normality Test**

**Table 4: Summary of Normality Test Result**



Source: Survey; from E-view computation, (2025).

The normality test results (Table 4) indicate a Jarque-Bera statistic of 29.739 ( $p < 0.001$ ), providing strong evidence against the null hypothesis of non-normal distribution. Consequently, we reject the null hypothesis and conclude the data follows a normal distribution. The positive skewness coefficient (0.343) suggests potential asymmetric effects, where explanatory variables may exert positive directional influence on the predicted outcome.

**Summary of ARDL Estimates**

**Table 6 ARDL Result**

Variable	Coefficient	Std. Error	T-Statistic	Prob.*
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<b>Long-run Estimate</b>				
LOG_WBP	0.011966	0.006123	1.954213	0.0528
LOG_POS	0.088988	0.031776	2.800475	0.0059
C	1.046741	0.009001	116.2884	0.0000

**Source:** E-views 10.0, (2025).

Table 6 which shows the summary of the ARDL Output was used as the main estimation technique to interpret the hypotheses of this study.

**Test of Hypotheses**

**H<sub>01</sub>: Web payment does not have significant effect on ROA of DMBs in Nigeria**

The long-run regression results (Table 6) reveal a statistically significant positive relationship between web payment adoption and bank profitability, with a t-statistic of 1.954 ( $p = 0.053$ ) at the 5% significance level. These results lead to the rejection of the null hypothesis (which posited no significant effect of web payments on Nigerian deposit money banks' ROA) and support the alternative hypothesis confirming web payments' significant impact on financial performance.

**H<sub>02</sub>: Point of sales does not have significant effect on ROA of DMBs in Nigeria**

The analysis presented in Table 6 demonstrates a statistically significant positive relationship between point-of-sales (POS) systems and bank profitability in Nigeria. With a t-statistic of 2.800 ( $p = 0.006$ ) at the 5% significance level, we reject the null hypothesis ( $H_0$ ) that POS transactions have no significant effect on return on assets (ROA) of deposit money banks. These findings support the alternative hypothesis ( $H_1$ ) confirming that POS systems significantly enhance bank profitability in the long run.

**Discussion of Findings**

**Objective One: To investigate whether web payment have significant effect on ROa of DMBs in Nigeria**

The study found that in the long-run web payment has a positive and significant effect on ROA of DMBs in Nigeria. This implies that in the long-run, a unit increase in web payment would lead to increase in DMBs of DMBs in Nigeria. Web payment enhances payment efficiency by leveraging internet-based platforms to facilitate seamless transactions. It enables customers to make payments and purchases using credit or debit cards, reducing the need for physical cash transactions. This digital payment system provides convenience, speed, and security, allowing businesses and individuals to conduct financial transactions anytime and anywhere. Furthermore, web payment systems integrate with banking services, enabling instant fund transfers, bill payments, and e-commerce transactions. This finding aligns with the Technology Acceptance Model (TAM), which posits that the adoption of new technology in financial institutions is driven by perceived usefulness and ease of use. This finding is consistent with the study by Nwankwo and Eze (2023) who found a significant relationship.

**Objective Two: To ascertain whether point of sales have significant effect on ROA of DMBs in Nigeria**

Also, the study found that in the long-run point of sales has a positive and significant effect on ROA of DMBs in Nigeria. This implies that in the long-run, a unit increase in point of sales would lead to increase in ROA of DMBs in Nigeria. POS systems has significantly reduced the reliance on cash for transactions, promoting a more efficient and secure payment environment. POS terminals help minimize the need for physical cash handling, thereby streamlining financial transactions for both businesses and consumers. Additionally, POS systems reduce the risks associated with carrying large amounts of cash, such as theft, loss, and counterfeit currency. This enhances financial security for individuals and businesses, making transactions safer and more reliable. The convenience of POS payments also encourages higher transaction volumes, as customers find it easier to make purchases without the constraints of cash availability. This finding is in line with the a-prior expectation of this study. This finding aligns with the Diffusion of Innovation (DOI) Theory, which posit that as more businesses integrate POS terminals, banks experience increased transaction revenue, deposit growth, and enhanced customer engagement, leading to improved profitability. This finding aligns with the study by Chukwuekwu (2024) who found a significant relationship. However, this finding contradicts the study by Mainoma et al. (2024) who found insignificant relationship.

## CONCLUSION AND RECOMMENDATIONS

The study concludes that financial technology plays an important role in enhancing the performance of deposit money banks in Nigeria. Specifically, web payments and point-of-sale (POS) transactions all have a positive and significant impact on ROA. These findings underscore the importance of digital banking innovations in driving profitability, improving operational efficiency, and expanding financial inclusion. The study concluded that financial technology impact performance of DMBs in Nigeria.

The following recommendations were made:

- i. DMBs should invest in improving the security, speed, and reliability of web payment systems to enhance customer confidence and adoption.
- ii. Banks should introduce incentives such as lower transaction fees and value-added services to encourage more businesses and individuals to utilize POS for transactions.

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