# EFFECT OF ELECTRONIC PAYMENT SYSTEMS ON THE PERFORMANCE OF MICROFINANCE BANKS IN NIGERIA

**ADEGOKE  Kolawole Asimiyu[a*], AFOLABI David Olusola[b*], *ADEMOLA Abimbola Oluwaseyi[c*]**

[a] Department of Banking and Finance, Achievers University, Owo, Ondo State, Nigeria
[b] Department of Accounting and Finance, Ajayi Crowther University, Oyo, Oyo State, Nigeria
[c] Department of Banking and Finance, Osun State University, Okuku, Osun State, Nigeria

## ABSTRACT

This study investigated the effect of electronic payment channels, namely Automated Teller Machines (ATMs), Point of Sale (POS) devices, and Mobile Banking Services (MBB) on the performance of microfinance banks in the South West region of Nigeria. Return on Assets (ROA) and Return on Equity (ROE) were employed as proxies for measuring the performance of twelve microfinance banks in Nigeria. Secondary data from annual reports of the selected microfinance were obtained from 2007 to 2021. Descriptive statistics, correlation analysis, and fixed effect regression model were employed for the analysis. Results indicated that ATMs (0.0003, $p<0.05$) and POS channels (0.0116, $p<0.05$) have positive and significant effect on the performance of microfinance banks, as measured by ROA and ROE. However, findings revealed that MBB (0.226, $p<0.05$) had positive but insignificant effect on the performance of microfinance banks in Nigeria. The study suggested that the adoption and effectiveness of MBB in this specific context may be hindered by barriers such as limited technological literacy, lack of access to smartphones, and insufficient awareness and trust in digital financial services. Therefore, microfinance banks should continue to invest in expanding their ATM and POS networks, as these channels have demonstrated a significant positive impact on their profitability.

**Keywords**: automated teller machine, point of sale, mobile banking, microfinance banks

*Corresponding  jegede.abimbola@yahoo.com*

## 1. Introduction

Microfinance banks (MFBs) play a vital role in Nigeria's financial landscape by offering access to financial services to individuals and businesses who are typically excluded from the formal banking sector. These institutions specialize in providing micro-credit, savings accounts, insurance, and other tailored financial products to meet the specific needs of low-income individuals and small enterprises (Ademola, 2023). Furthermore, MFBs contribute significantly to economic growth and inclusive development, particularly in developing countries (Ademola et al., 2022; Ochonogor, 2020; Akinadewo et al., 2020). Traditionally, MFBs have relied on manual and cash-based transactions, requiring customers to physically visit bank branches to complete their transactions. This approach has several drawbacks, including high cash handling costs, service delays, limited service offerings, and increased workload for employees. However, with the remarkable progress and advancement in Nigeria's financial sector, particularly in the realm of electronic

payment (e-payments) systems, financial services are increasingly being digitized, leading to enhanced service provision by banks (Gbanador, 2021).

The e-payment system is a mechanism that enables individuals, businesses, and organizations to conduct electronic transactions without the need for physical currency or checks. Recent financial innovations have led to the emergence of various e-payment channels and the establishment of financial technology companies. In Nigeria, commonly used e-payment technologies include Automatic Teller Machines (ATMs), Point of Sale (POS) systems, Mobile Money Transfer (MMT), and Online Money Payment (WEB) platforms. These technologies have significantly transformed the way financial transactions are carried out. The adoption of e-payment systems in Nigeria has simplified operations, increased competitiveness, and improved the range and quality of services provided by banks (Salehi & Alipour, 2014). This technology-driven payment system greatly enhances convenience for customers, staff, and the general public. It is widely acknowledged that a well-functioning payment infrastructure is crucial for the performance of the banking sector, financial markets, and the overall financial system. Additionally, it enhances consumer confidence, facilitates economic cooperation, and promotes trade (Bank for International Settlement (BIS, 2006).

Furthermore, the Covid-19 pandemic has significantly accelerated the adoption of digital payment systems worldwide and had a notable impact on e-payments (BIS, 2021). Notably, the total value of e-payments or digital credit payments has experienced remarkable growth in developed economies, emerging markets, and developing countries. The pandemic has also spurred the efforts of many central banks to develop central bank digital currencies (BIS, 2021). In Nigeria, the recent Naira redesign policy implemented by the Central Bank of Nigeria (CBN) has contributed to a shortage of cash in the country, leading many Nigerians to increasingly rely on mobile transactions through e-payment channels. Analysis of e-payment data from the Nigerian Interbank Settlement System (NIBSS,2023) during a period of currency shortage revealed significant growth in electronic payment metrics. Specifically, the value of e-payment transactions witnessed a substantial increase of 298 percent, soaring from N34.04 trillion in the first quarter of 2022 to N135.52 trillion in the same period of 2023.

Furthermore, the volume of Point of Sale (POS) transactions rose by approximately 56.69 percent from 113.53 million in February 2023 to 177.93 million in March 2023. In terms of transaction value, POS transactions experienced a 30.41 percent increase, climbing from N883.4 billion in February to N1.152 trillion in March. Additionally, mobile transactions also saw significant growth; the volume increased by 106.88 percent from 183,687.1 transactions in February to 380,110.94 transactions in March, while the value of these transactions jumped by 61.72 percent, from N2.56 trillion to N4.14 trillion over the same period (NIBSS, 2023). It is evident that in Nigeria, the usage of e-payment systems is on the rise while non-electronic payment methods continue to decline.

In Nigeria, the implementation of e-payment systems is not without its challenges, including infrastructure deficiencies, a high level of financial illiteracy, expensive internet access, and the risk of fraudsters cloning ATM cards and hacking into bank accounts (Nwakoby et al., 2020). These challenges instill fear and concern among users and banks, discouraging adoption and contributing to increased fraudulent activities that negatively impact banks. The impact of e-payment systems on banks' performance has yielded conflicting results. Some scholars such as Dong et al. (2020) and Okafor (2020) have found positive effects on banks' performance, while others like Shanmugam & Nigam (2020) and Bingilar & Bariweni (2019) have reported mixed results. On the other hand, Onay & Ozsor (2013), and Saeed & Bampton (2013) asserted that e-payments have a detrimental impact on banks' performance. This lack of consensus complicates decision-making for stakeholders. Thus, conducting a study from a Nigerian context to investigate the effect of e-payments on the performance of Microfinance Banks (MFBs) is crucial, as existing research primarily focuses on commercial banks. Moreover, research on the effect of e-payments on MFBs' performance in Nigeria is

scarce. Given that MFBs serve customers with distinct needs, preferences, and varying levels of technology adoption, this study aims to fill the knowledge gap and contribute to existing research by examining the impact of mobile banking, point of sale systems, and automated teller machines on MFBs' performance in Nigeria.

## 2. Literature Review

**Theoretical Framework**

The relationship between electronic payment systems and bank performance can be analyzed through various theoretical frameworks. Two pertinent theories that help in understanding this relationship are the Technology Acceptance Model (TAM) and the Diffusion of Innovations Theory. Here's how each theory discusses this relationship:

### Technology Acceptance Model (TAM)

The Technology Acceptance Model, developed by Davis in 1989, is a widely used model in information systems that deals with how users come to accept and use a technology. The model suggests that there are two primary factors that influence technology acceptance: perceived usefulness (PU) and perceived ease of use (PEOU). In the context of banks, if electronic payment systems are seen as improving the efficiency of transactions, increasing security, and enhancing customer satisfaction, they are likely to be perceived as useful. This perception can lead to higher adoption rates among customers, which directly affects the volume of transactions processed through electronic systems, thereby potentially improving bank performance in terms of higher transaction volumes and revenues. If electronic payment systems are user-friendly, customers are more likely to use them frequently. Ease of use reduces the effort needed to engage with banking services, thereby encouraging more frequent and sustained use. This increased engagement can lead to better customer retention and more stable revenue streams for banks.

### Diffusion of Innovation Theory

The theory was developed by Everett Rogers in 1962, it explains how, over time, an idea or product gains momentum and spreads through a specific population or social system. The outcome of this diffusion is that people, as part of a social system, adopt a new idea, behavior, or product. Adoption depends on factors such as the innovation's perceived advantage over existing solutions, its compatibility with existing values and practices, its simplicity or complexity, trialability, and observable results. If banks offer electronic payment systems that are superior to traditional methods (e.g., faster transactions, lower fees, accessibility), these systems are likely to be adopted more quickly by both new and existing customers. This can enhance overall bank performance by attracting more customers and fostering higher transaction volumes. Moreover, electronic payment systems need to integrate seamlessly with existing financial habits and the technical infrastructure of users. Systems that align well with current practices are more likely to be adopted, thus improving customer satisfaction and operational efficiency. The simpler the electronic payment system is to understand and use, the more likely it is to be adopted by a broader audience. Simplified user interaction can lead to increased use and more transactions, directly benefiting bank performance. Furthermore, if potential users can experiment with the electronic payment systems and observe the benefits, the likelihood of widespread adoption increases. Successful trials and visible benefits can persuade more customers to transition to electronic payments, thus boosting usage rates and enhancing the performance metrics of banks.

Each of these theories offers valuable insights into how electronic payment systems can influence bank performance by focusing on user adoption dynamics. The Technology Acceptance Model emphasizes the importance of user perceptions regarding usefulness and ease of use, while the Diffusion of Innovations Theory highlights the broader context of innovation adoption across a social system. Together, these perspectives provide a comprehensive view of the factors that drive the adoption and effectiveness of electronic payment systems in enhancing bank performance.

**Empirical Review**

Gbanador (2023) conducted a study to explore the impact of electronic banking systems on the performance of deposit money banks (DMBs) in Nigeria. The research design used was ex-post facto, and secondary data were collected from the statistical bulletin of the Central Bank of Nigeria. The findings indicated that ATM and POS had a positive influence on the performance of DMBs in Nigeria, but the influence was not statistically significant. On the other hand, mobile banking had a positive and significant impact on the performance of DMBs. In a separate study by Arilesere et al., (2021), the effect of electronic payment systems on the performance of Nigerian deposit money banks was examined. The study revealed that automated teller machines and internet banking had a significant and positive influence on the financial performance of banks. However, Point of Sale had a negative and significant influence on bank performance.

Nwadialor & Emiezi (2020) investigated the effect of e-Payment systems on the business efficiency of quoted banks in Nigeria. The results showed that only automated teller machines and mobile transactions had a positive and significant effect on the efficiency of banks' business operations. On the other hand, Point of Sale and internet transactions had a negative and insignificant effect on the efficiency of business operations of quoted banks in Nigeria. Nwakoby et al., (2020) conducted a study to examine the relationship between electronic banking and the profitability of deposit money banks in Nigeria, focusing on the period from 2009 to 2018. The research design employed was ex post facto, and regression analysis using E-View 9.0 was used to test the hypotheses. The findings indicated that the ATM payment method had a negative effect on the return on equity of deposit money banks in Nigeria, but this effect was not statistically significant. Similarly, the POS payment method had a positive effect on the return on equity of deposit money banks in Nigeria, but this effect was not statistically significant. Additionally, the Mobile Banking Payment method had a positive effect on the return on equity in Nigeria, but again, this effect was not statistically significant.

Enoruwa et al., (2019) conducted a study using data from the Central Bank of Nigeria (CBN) bulletin to investigate the association between electronic banking and bank performance in Nigeria, covering the period from 2009 to 2017. The study employed regression and findings indicated that electronic channel products such as ATMs and Mobile Pay were positively and strongly associated with bank performance. Bingilar & Bariweni (2019) conducted a study to examine the impact of electronic payment systems on the performance of commercial banks in Nigeria. The researchers collected data from secondary sources, specifically from the Central Bank of Nigeria (CBN) statistical bulletin. The data included information on the assets base of commercial banks and internet banking transactions, covering the period from 2009 to 2019. The findings of the study revealed a positive relationship between online banking transactions and ROA of commercial banks. Agu & Nwankwo (2019) conducted a study to investigate the impact of the electronic banking system on the financial performance of selected Nigerian deposit money banks. The research utilized an ex post facto research design and analyzed secondary data from 2008 to 2017. The effects of ATM, MMT, and POS on the chosen deposit money banks were determined using the ordinary least square regression technique. The analysis revealed that ATM and MMT had a positive effect on Return on Equity (ROE), but the effect was not statistically significant. On the other hand, POS had a negative effect on ROE, but it was also not statistically significant for the selected Nigerian deposit money institutions.

In a separate study by Ugbede et al., (2019), the effects of electronic payment on the financial performance of deposit money banks in Nigeria were examined. Data were collected from secondary sources, including annual reports and the statistical bulletin of the Central Bank of Nigeria. The study employed multiple regression analysis. The findings indicated that ATMs did not contribute to bank profitability and was not statistically significant in relation to bank profitability. However, POS had a positive contribution to bank profitability and was statistically significant. Additionally, internet banking also had a positive contribution to bank profitability and was statistically significant.

## 2.3 Conceptual Framework
### Electronic Payments in Nigeria

Payment systems encompass the network of legal, regulatory, and standard-based connections that facilitate monetary exchange using bank deposits. They involve a range of institutions, organizations, instruments, regulations, standards, procedures, and technical processes, enabling the transfer of monetary value between parties with agreed-upon responsibilities (Massimo & Gracia, 2008; Summers, 2012). Electronic payment systems, as described by Harelimana (2018), are inter-organizational information systems that facilitate monetary transactions among multiple organizations and individual consumers. This often requires complex relationships among stakeholders, technology, and the operating environment. Payment systems can take physical (traditional) or electronic (virtual) forms, with information and communication systems serving as the backbone for delivering the necessary services.

Electronic payment systems, specifically, are designed to enhance the convenience of monetary transactions between parties using bank-based platforms. They leverage information and communication technology to streamline processes. In Nigeria, these systems include Automated Teller Machines (ATMs), Point of Sale (POS) machines, Mobile Banking, and Internet (Online) Banking Platforms, all of which function as efficient electronic payment systems.

### Mobile Banking

Mobile banking is considered as a significant technological advancement within the banking industry. It refers to the use of a mobile device, such as a mobile phone or Personal Digital Assistant (PDA), for various banking transactions including balance checks, account transactions, payments, and credit applications (Ndunga et al., 2016). According to Rose (1999), mobile banking is a service provided by financial institutions in collaboration with mobile phone operators. Monyoncho (2015) highlights that mobile banking enables customers with busy lifestyles to conveniently conduct their transactions through their phones at their preferred time.

### Automated Teller Machine (ATM)

Automated Teller Machine (ATM), also known as an automated banking machine (ABM) or Cash Machine, is another technological innovation within the banking industry. ATMs are computerized telecommunication devices that provide customers of financial institutions with access to various financial transactions in a public space without the need for a cashier or bank teller. The use of ATMs as a banking mechanism has gained wide acceptance. It offers convenience, particularly for low-income individuals who no longer need to spend their valuable time and financial resources traveling to distant bank branches. Additionally, ATM transactions incur lower costs compared to transactions conducted through bank tellers, enabling banks to generate profits even from small money transfers and payments.

### Point of Sales (POS)

Point of Sale (POS) technology has become widely adopted in the banking industry as a significant technological advancement. POS devices are used for retail payments and capture customer bank information when a bank or credit card is swiped through a magnetic stripe reader. Banks consider POS systems to be cost-effective and more practical compared to traditional retail payment methods. The introduction of retail payment innovations has had a significant impact on bank performance, particularly in countries with high acceptance rates of retail payment transaction. Nguma (2013) observed in their study that the relationship between retail payment transactions and banking performance is stronger in countries where there is a greater presence of retail payment infrastructure, such as POS terminals. Additionally, increased usage of electronic retail payment instruments appears to stimulate banking activities.

**Performance of Banks**

Performance refers to the evaluation of a firm's health based on its business programs and activities, either in comparison to stated objectives or in comparison to competing firms (Ateke & Akani, 2018). It serves as a measure of how effectively the firm is able to accomplish its designated objectives. Within the banking industry, bank performance is viewed as the degree to which a bank achieves its objectives in terms of overall performance, standards, and costs (Sacristan-Navarro et al., 2011). Fauzi et al., (2010) defined bank performance as the bank's ability to accomplish its goals by efficiently utilizing available resources. The performance of a bank is influenced by the strategies and tactics it employs to attain its goals and objectives (Harash et al., 2014a). Performance evaluation involves assessing an organization's policies and outcomes in monetary terms, utilizing objective, subjective, or operational measures. The goal approach to performance measurement employs a combination of quantitative (objective) and qualitative (subjective) means (Olaleye et al., 2020; Thrikawala, 2011).

Various measures of performance are commonly used in research, including business performance, operational performance, financial and non-financial performance, innovation performance, and quality performance (Olaleye et al., 2020; Aribaba et al., 2019; Mwai et al., 2018). Return on Assets (ROA) and Return on Equity (ROE) are two critical financial performance indicators used to assess the profitability and efficiency of a company, including banks. Understanding how these metrics relate to electronic payment systems can provide insights into the operational and financial impacts of adopting such technologies. ROA measures how effectively a company uses its assets to generate earnings. It is calculated by dividing the net income by the total assets. This ratio indicates how efficient a company is at using its assets to produce profit. ROE on the other hand measures a company's ability to generate profits from its shareholders' equity. It is also an indicator of how well the company uses shareholder capital to produce earnings. The link between these performance indicators (ROA and ROE) and electronic payment systems lies in the ability of digital payment technologies to drive efficiencies, reduce costs, increase revenues, and improve asset and equity utilization. As banks integrate more advanced electronic payment systems into their operations, they can potentially see marked improvements in these key performance indicators, reflecting stronger financial health and operational efficiency.

**Fig 1: Conceptual framework**
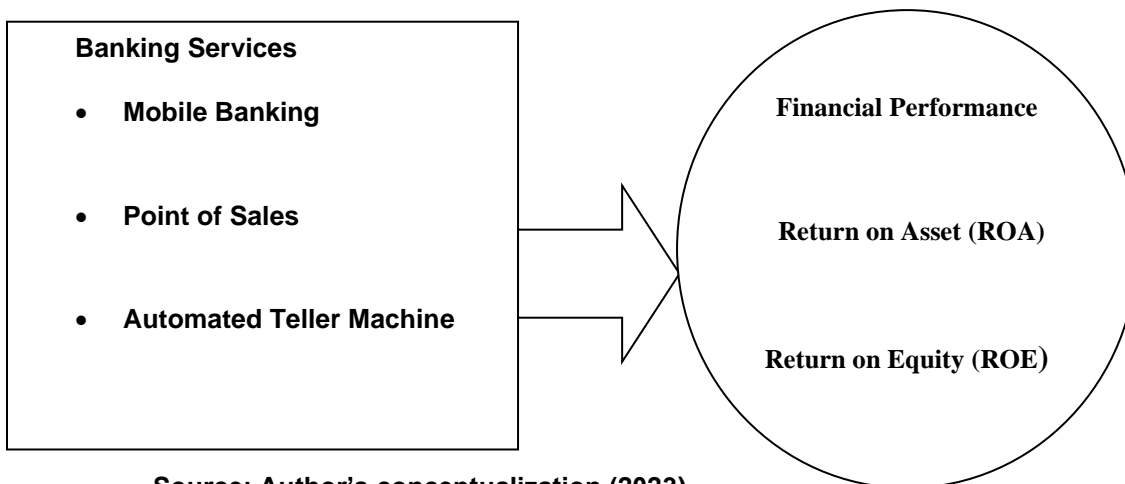


**Source: Author's conceptualization (2023)**

## 3. Research Methodology

The research design employed by the study is explanatory research design in order to examine the effect of electronic banking on the performance of MFBs in Nigeria. All regulated microfinance banks functioning in Nigeria as of December 31, 2021, made up the study's population. 12 MFBs from the states of Oyo, Osun, Lagos, Ondo, and Ogun in the South West of Nigeria were selected for the study using purposive sampling. Data was gathered from the CBN Bulletin and the annual reports of the selected MFBs from 2007 -2021 and then assembled into a robust, balanced panel type that included both cross-sectional and time-series dimensions. Descriptive statistics, panel data regression techniques with diagnostic tests like Hausman tests were employed for the analysis.

**Model Specification**
The existing literature offers various models, and for this study, the model proposed by Olawande and Ngaba (2019) was adopted to align with the study's objectives. Thus, the first model is as follows:

$ROEit = \alpha it + \beta_1 MBBit + \beta_2 POSit + \beta_3 ATMit + \varepsilon it$ ..........................................Eqn 1
Where: ROE = Performance of MFBs, MBB= Mobile Banking, POS= Point of sales and ATM = Automated Teller Machine, $\beta_1 - \beta_3$ are the slope coefficients of the regressors, $\alpha$ Is coefficient of intercept, $\varepsilon it$ Is Stochastic error term of firm i at time t, uit: error term of firm i at time t

$ROAit = \alpha it + \beta_1 MBBit + \beta_2 POSit + \beta_3 ATMit + \varepsilon it$..........................................Eqn 2
Where: ROA = Performance of MFBs, MBB= Mobile Banking, POS= Point of sales and ATM = Automated Teller Machine, $\beta_1 - \beta_3$ are the slope coefficients of the regressors,  Is coefficient of intercept, $\varepsilon it$ Is Stochastic error term of firm i at time t, uit: error term of firm i at time t

Table 1 displays the variables used in this study.

### Table 1: Measurements of variables

| N. | Variables | Abbrev. | Measurement |
|---|---|---|---|
| 1. | Profitability (ROE) | ROE | Net profit / Equity |
| 2. | Profitability (ROA) | ROA | Profit before tax divided by total asset |
| 3. | Mobile Banking | MBB | total value of mobile banking transactions in a particular period of time |
| 4. | Point of Sales | POS | total value of POS transactions in a particular period of time |
| 5. | Automated Teller Machine | ATM | total value of ATM transactions in a particular period of time |

**Source: Author's compilation (2023)**

## 4. Data Analysis and Discussion

### Table 2: Descriptive Statistics

|  | ROA | ROE | ATM | POS | MBB |
|---|---|---|---|---|---|
| Mean | 3.263000 | 8.27933 | 4439.433 | 456.5667 | 9919.867 |
| Maximum | 5.600000 | 15.98000 | 7643.000 | 798.0000 | 11987.00 |
| Minimum | 1.580000 | 6.44000 | 1763.000 | 123.0000 | 8021.000 |
| Std. Dev. | 4.145682 | 9.23180 | 4753.969 | 468.5160 | 1082.934 |
| Skewness | 0.338382 | 0.495551 | 0.051837 | -0.244222 | 0.130377 |
| Kurtosis | 2.214518 | 2.247013 | 1.948200 | 2.461323 | 2.346048 |
| Jarque-Bera | 1.343738 | 1.936589 | 1.396289 | 0.660939 | 0.619556 |
| Probability | 0.510753 | 0.379730 | 0.497507 | 0.718586 | 0.733610 |

ROA = Return on Asset; ROE = Return on equity; MBB= Mobile Banking; POS= Point of sales;
ATM = Automated Teller Machine

**Source: Author's computation (2023)**

Table 2 presents the outcome of the descriptive analysis. Findings showed that the average ROE was 8.27%, ranging from 6.44% to 15.98%, while the ROA of the selected MFBs ranges from 1.58% to 5.60% with a mean value of 3.26%. The average value of the ATM was 4439.43 billion, ranging from 1763.00 billion to 7643.00 billion, and had a standard deviation of 4753.96 billion. The mean POS was 456.56 billion, with the lowest and highest values being 123.00 billion and 798.00 billion respectively. The average MBB was 9919.86 billion, ranging from 8021.00 billion to 11987.00 billion. The standard deviation values were higher than the average values, indicating a significant dispersion of the data. The data showed skewness between -1 and +1, suggesting that it was right-skewed. Moreover, all kurtosis values were below three. The Jarque-Bera statistics values surpassed the critical values of 0.05, indicating that the variables followed a normal distribution.

**Table 3: Correlation Matrix**

|       | ROA       | ROE       | ATM       | POS       | MBB |
|-------|-----------|-----------|-----------|-----------|-----|
| ROA   | 1         |           |           |           |     |
| ROE   | 0.6809925 | 1         |           |           |     |
| ATM   | 0.6953614 | 0.6232091 | 1         |           |     |
| POS   | 0.6018301 | 0.5061519 | 0.4553104 | 1         |     |
| MBB   | 0.1422989 | 0.2306732 | 0.1026183 | 0.2842955 | 1   |

ROA = Return on Asset; ROE = Return on equity; MBB= Mobile Banking; POS= Point of sales;
ATM = Automated Teller Machine
**Source: Author's Computation (2023)**

The relationship between e-payment channels and performance of MFBs (ROE and ROA) is displayed in Table 3.The matrix revealed that the correlation coefficients between ROA, ROE and ATM are 0.695 and 0.623 which indicates that ATM has a moderate and positive relationship with banks' performance. Similarly, POS with values of 0.601 and 0.506 correlated favorably with ROA and ROE respectively .The interpretation of this result is that higher usage of ATM and POS by MFBs customers results in higher ROA and ROE of MFBs. Furthermore, MBB exhibited positive but weak correlation with ROA and ROE. This shows that increased usage of these channels boost MFBs profitability in Nigeria.

**Table 4:  Correlated Random Effects – Hausman Specification Test**

| Equation: Untitled :Test cross-section random effects | | | |
|---|---|---|---|
| Test Summary | Chi-Sq. Statistic | Chi-Sq. df. | Prob. |
| Cross-section random | 14.238 | 4 | 0.0332 |

**Source: Author's Computation (2023)**

The results of the Hausman Test, which evaluated the model's suitability, are shown in Table 4. Findings show that the corresponding p-value was 0.033 and the Chi-Square statistics value was 14.238. Since the p-value obtained is less than the 0.05 significant level. This imply that the analysis is well-suited to the fixed effect model. The outcome shows that:

$$ROA = 1.0847 + 1.4258ATM + 1.171POS + 0.5903MBB + e_0.$$

Table 6 displays the results of the regression analysis. The model estimated that the predictors accounted for 73.2% of total variation in ROA, The adjusted $R^2$, which measures the model's goodness of fit, was 0.655, indicating that the model was a good fit. Consequently, all the explanatory variables under investigation were

excellent predictors. The F-stat was 12.732, with a value of 0.0026, indicating that the model was significant. As a result, the explanatory variables had joint influence on ROA of Nigerian MFBs during the period studied.

**Table 5: Summary of fixed effect regression model**

| Variable | Coefficient | Std.Error | t-statistics | Prob |
|---|---|---|---|---|
| C | 1.0847 | 2.0542 | 0.00703 | 0.9945 |
| LOG (ATM) | 1.4258 | 0.2888 | 4.93560 | 0.0003*** |
| LOG (POS) | 1.1718 | 1.1096 | 1.05609 | 0.0116** |
| LOG (MBB) | 0.5903 | 0.2504 | 2.35728 | 0.2262 |

| | | | | |
|---|---|---|---|---|
| R-squared | 0.73205 | Mean dependent var | | 3.263000 |
| Adjusted R-squared | 0.65544 | S.D. dependent var | | 1.145682 |
| S.E. of regression | 0.58522 | Akaike info criterion | | 1.989539 |
| F-statistic | 12.7322 | Durbin-Watson stat | | 1.53280 |
| Prob(F-statistic) | 0.00265 | | | |
| Dependent Variable: ROA | | | | |

ROA = Return on Asset; MBB= Mobile Banking; POS= Point of sales;

ATM = Automated Teller Machine; ** denotes 5% significance level; *** denotes 1% significance level

**Source: Author's Computation (2023)**

Results demonstrated that ATM substantially and positively affected ROA, This implies that ROA increases as the volume of ATM transaction rises. Higher ATM usage result in increased transaction fee revenue for the bank, thereby positively impacting its profitability. Moreover, if customers utilize ATMS for routine transactions such as cash withdrawals, balance inquiries or account transfer, it reduces the workload on bank branches and tellers which result in cost savings for the bank and also enhance banks' performances. This finding is in consonance with the reports of Arilesere et al, (2021) and Nwadialor & Emiezi (2020) who asserted that ATMs positively and significantly affect banks performance.

According to the results, the POS coefficient had a significant positive influence on the ROA of Nigerian MFBs. This suggests that higher POS usage increases banks' ROA. This is logical because banks typically charge transaction fees for each sale made through their POS systems. These fees contribute to the bank's revenue and can be a significant source of income, especially if the volume of transactions is high. Increased usage of POS systems can lead to higher transaction fee revenue, positively impacting profitability. POS systems can help banks reduce costs associated with cash handling and manual transaction processing. This aligns with the findings of Ugbede et al, (2019)

Furthermore, the MBB with coefficient of 0.59 though positive was not significant. This may be due to the peculiarities of MFBs customers particularly their low income and illiteracy levels which impact the usage of MBB and potentially affect MFBs profitability. Majority of MFBs customers have limited access to smartphones therefore they cannot utilize mobile banking effectively. Lower usage of MBB may result in reduced transaction volumes therefore affecting MFBs profitability  This finding corroborates the report of Gbanador (2023), Enoruwa et al, (2019) and Agu & Nwankwor (2019).

**Table 6: Correlated Random Effects – Hausman Specification Test**

| Equation: Untitled :Test cross-section random effects | | | |
|---|---|---|---|
| Test Summary | Chi-Sq. Statistic | Chi-Sq. df. | Prob. |
| Cross-section random | 10.762 | 4 | 0.0131 |

**Source: Author's Computation (2023)**

The results of the Hausman Test, which evaluated the model's suitability, are shown in Table 4. Findings show that the corresponding p-value was 0.0131 and the Chi-Square statistics value was 10.762. Since the p-value obtained is less than the 0.05 significant level. This imply that the analysis is well-suited to the fixed effect model

**Table 7: Summary of fixed effect regression model**

| Variable | Coefficient | Std.Error | t-statistics | Prob |
|---|---|---|---|---|
| C | 2.0601 | 5.0680 | 0.3287 | 0.7455 |
| LOG (ATM) | 1.2044 | 4.0959 | 2.4354 | 0.0121** |
| LOG (POS) | 1.0932 | 2.7544 | 1.8752 | 0.0161** |
| LOG (MBB) | 0.9273 | 4.1366 | 1.6892 | 0.1208 |

| | | | |
|---|---|---|---|
| R-squared | 0.72088 | Mean dependent var | 23.2793 |
| Adjusted R-squared | 0.68110 | S.D. dependent var | 6.2318 |
| S.E. of regression | 3.11046 | Akaike info criterion | 5.3305 |
| F-statistic | 13.4865 | Durbin-Watson stat | 2.0789 |
| Prob(F-statistic) | 0.00001 | | |
| Dependent Variable: ROE | | | |

ROE = Return on equity; MBB= Mobile Banking; POS= Point of sales;

ATM = Automated Teller Machine ** denotes 5% significance level; *** denotes 1% significance level

**Source: Author's Computation (2023)**

The outcome shows that:

ROE = 2.0601 + 1.2044 ATM + 1.0932 POS + 0.9273 MBB + $e_0$.

According to the R-squared value, the examined variables account for 72% of the variation in ROE, with other factors accounting for the remaining 28%. The value of 2.07 for the Durbin-Watson stats is acceptable.

Findings indicate that both ATM and POS channels influence ROE of MFBs substantially. ROE which is a financial measure of profitability based on the bank's ability to generate profits from investments made by shareholders. Specifically, the study reveals that ATMs have considerable and substantial influence on the ROE of MFBs. This phenomenon may be traceable to the service charges associated with ATM usage in Nigeria. Banks typically deduct maintenance fees or SMS alert fees from users' accounts, and these charges tend to increase with higher usage of ATMs. Consequently, increased usage of ATMs leads to cost savings and improved efficiency, ultimately boosting a bank's profitability and, subsequently, its ROE. These findings align with a previous study by Obiekwe & Anyanwaokoro (2017), but differ from the findings of Agu & Nwankwor (2019), who observed a positive but statistically insignificant effect of ATMs on ROE.

The results also showed that POS favorably and substantially affected ROE, indicating that the volume of POS usage enhances ROE. This finding is in line with economic expectation because the more the patronages associated with POS payment method, the higher the volume of transactions and ultimately the higher the profits recorded by the banks. POS systems streamline payment processing and reduces cash handling costs. Cost reduction helps increase profitability and subsequently improves ROE. Though, Nwakoby et al., (2020) found that POS exhibited positive but insignificant effect on ROE of banks; nevertheless, the findings indicate that higher usage of POS positively stimulate ROE of MFBs in Nigeria.

Additionally, MBB with coefficient of 0.927 exhibited positive but insignificant effect on ROE of MFBs in Nigeria. Although MBB offer convenience and accessibility, their impact on MFBs performance was not significant. This insignificance may be attributed to the unique characteristics of microfinance bank customers such as limited technological literacy, lack of access to smartphones, and insufficient awareness and trust in digital financial services. This finding is in agreement with Nwakoby et al., (2020) and Agu & Nwankwor (2019) who also found that MMB exhibited positive but insignificant influence on ROE of banks.

## 5. Conclusion

The advent of electronic payment systems has revolutionized the financial industry, offering numerous benefits to various stakeholders. This study examined the effect of e-payment channels, namely Automated Teller Machines (ATMs), Point of Sale (POS) devices, and Mobile banking services (MBB), on the performance of microfinance banks (MFBs) in South West region of Nigeria. The proxies for measuring the performance of MFBs are the return on assets (ROA) and return on equity (ROE). Data from a sample of 12 microfinance banks operating in South West Nigeria from 2007 to 2021 were collected for analysis. Descriptive statistics, correlation analysis, and fixed effect regression models were employed for the analysis. The results indicated that both ATMs and POS devices have positive and significant influence on the performance of MFBs, as measured by ROA and ROE. The increased accessibility and convenience provided by these e-payment channels have contributed to improved profitability for the selected banks in South West Nigeria. However, the study found that MBB had a positive but insignificant effect on MFBs performance. Although mobile banking services also offer convenience and accessibility, however their impact on banks performance remains insignificant. This insignificance may be attributed to the unique characteristics of MFBs customers, majority of whom are poor and illiterate. This suggest that the adoption and effectiveness of mobile banking services in this specific context may be hindered by barriers such as limited technological literacy, lack of access to smartphones, and insufficient awareness and trust in digital financial services.

Based on the findings, several recommendations are proposed to enhance the performance of microfinance banks through electronic payment systems. First, MFBs should continue to invest in expanding their ATM and POS networks, as these channels have demonstrated significant positive impact on profitability. Also, in order to address the limitations of mobile banking services, efforts should be made to improve financial literacy among bank customers and provide affordable access to smartphones or alternative devices. Additionally, awareness campaigns and trust-building initiatives should be implemented to promote the adoption of mobile banking services among bank customers. The research contributed to the existing literature by exploring how electronic payment systems affects MFBs performance in Nigeria, which had not previously been widely researched. The findings of this study can serve as a valuable tool for bank management, shareholders and other stakeholders of MFBs to guide them in effectively leveraging electronic payment systems to improve their overall performance and better serve their clientele.

## References

Ademola, A.O (2023), "What factors drive microfinance banks profitability in Nigeria"*? Gomal University Journal of Research*, 39(1), 31-46   https://doi.org/10.51380/gujr-39-01-04

Ademola, A.O., Kazeem, B.L.O., and Ajayi, E.O. (2022), "Effect of corporate governance on performance of microfinance banks in Nigeria", *Kardan Journal of Economics and Management Sciences*, 5 (2), 1-26.DOI: 10.31841/KJEMS.2022.120

Agu, B. O., and Nwankwo, S.N.P. (2019),  "Effect of electronic banking system on financial performance of selected deposit money banks in Nigeria". *Journal of Accounting Information and Innovation* 5(9) ISSN (4243-406x

Akinadewo, I., Akinkoye E,  and Olasanmi,  O. (2020), "Appraisal of the problems affecting microfinance banks in emerging economies and the mitigating factors: Nigeria's experience". *Business and Management Review* 11(02):89-96DOI: 10.24052/BMR/V11NU02/ART-11

Aribaba, F. O., Oladimeji, M. S., Ahmodu, O. A., Yusuff, S. A., and Olaleye, B. R. (2019),  "Fraud

occurrence and financial performance of listed deposit money banks in Nigeria". *POLAC International Journal of Contemporary Accounting and Security Studies*, 4(1). ISSN: 2636-7076

Arilesere, M.S., Olaleye, B.R., Asaolu, A.A., and Akienabor, E. (2021), "Digital electronic payment and bank performance in Nigeria*." Annals of Spiru Haret University. Economic Series*, 21(4), 327340, doi: https://doi.org/10.26458/21419

Ateke, B. W., and Akani, G. H. (2018), "Brand positioning and marketing wellness of deposit money banks". *International Journal of Innovations in Social Science, Arts and Managemen*t, 8(1), 140-151

Bingilar, P.F.,  and  Bariweni, B. (2019), "Electronic payment systems implementation and the performance of commercial banks in Nigeria". *European Journal of Business and Management Research* 4(5).

BIS (Bank for International Settlement) (2006), "Committee of payment and settlement systems, General guidance for national payments system development".

BIS (Bank for International Settlement) (2021), "Covid-19 accelerated the digitalization of payments". *CPMI Red Book Statistics*; OECD main economic indicators and national accounts.5(9) ISSN (4243-406x

Davis, F. D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology". *MIS Quarterly*, 13(3), 319-340.

Dong, J., Yin, L., Liu, X., Hu, M., Li, X., and Liu, L. (2020), "Impact of Internet Finance on the Performance of Commercial Banks in China". *International Review of Financial Analysis*, 72(1). https://doi.org/10.1016/j.irfa.2020.101579

Enoruwa, K. O., Ezuem, D. M., and  Nwan, C. O. (2019), "Electronic channels and bank performance: Empirical evidence from Nigeria". *SSRG International Journal of Economics and Management Studies*, 6(5), ISSN: 2393 - 9125 www.internationaljournalssrg.org

Fauzi, H., Svensson, G., and  Rahman, A. (2010), "Triple bottom line as sustainable corporate performance: a proposition for the future'*. Sustainability*, 2(5), 1345-1360.

Gbanador, M.A.(2023),  "Electronic banking systems and the performance of deposit money banks in Nigeria".  *Nigerian Journal of Management Sciences* Vol. 24 (1).

Harash, E., Al-Tamimi, K., and Al-Timimi, S. (2014a), "The relationship between government policy and financial performance: A study on the SMEs in Iraq". *China-USA Business Review*, 13(4), 290-295.

Harelimana, (2018), "The impact of mobile banking on financial performance of Unguka microfinance bank Ltd, Rwanda". *Global Journal of Management and Business Research*: Finance, 17(I), 1-13.

Massimo, C., and Gracia, J.A. (2008), "Measuring payment system development". *The world bank research centre*

Monyoncho, L.N. (2015), "Relationship between banking technologies and financial performance of commercial banks in Kenya". *International Journal of Economics, Commerce and Management*, United Kingdom, 1-23.

Mwai, A., Memba, F.S., and Njeru, A. (2018), "The relationship between ATM banking and financial deepening of commercial banks in Kenya". *International Journal of Economics, Commerce and Management,* 4(12), 1-19

Ndunga, R.M., Njati, I.C., and Rukangu, S. (2016), "Influence of technological innovation on bank performance in Meru town, Kenya". *International Journal of Economics, Commerce and Management*, United Kingdom, 4(11), 1-15

Ngumi, P.M. (2013), "Effect of bank innovations on financial performance of commercial banks in Kenya". A thesis submitted in partial fulfilment for the degree of Doctor of Philosophy in Business Administration in the Jomo Kenyatta University of Agriculture and Technology,1-142

Nigeria Interbank Settlement System (NIBSS) (2023) Report: "Nigeria recorded N600 Trillion e-payment transactionsin 2023".https://nibss-plc.com.ng/nigeria-recorded-n600-trillion-e-payment-transactions-in-2023/

Nwadialor, E.O., and Emiezi O.F. (2020), "Effect of E -payment transaction system on business efficiency of banks in Nigeria" *Journal of Accounting, Business and Social Sciences*, Volume 3 number 3,; ISSN 2672-4235

Nwakoby, N. P., Okoye, J.A., Ezejiofor, R. A., Anukwu, C. C., and Ihediwa, A. (2020), "Electronic banking and profitability: An empirical study on selected banks in Nigeria". *The Asian Institute of Research Journal of Economics and Business* .3(2): 637-649 ISSN 2615-3726

Obiekwe, C. J., and Anyanwaokoro, M (2017), "Electronic payment methods and profitability of banking firms in Nigeria: A panel data analysis". *International Journal of Finance and Accounting*, 6(3): 67-74 DOI: 10.5923/j.ijfa.20170603.01

Ochonogor, M.H (2020), "Microfinance institutions and economic development in Nigeria" *NDIC quarterly*, 35, Nos. 3 & 4

Okafor, C. A. (2020), "Cashless Policy for Business Purpose and the Performance of Deposit Money Banks in Nigeria". *International Journal of Innovative Finance and Economics Research*, 8, 1-13

Olaleye, B. R., M., Akkaya, O. L., Emeagwali, R. I., and Hamdane, S. (2020), "Strategic thinking and innovation performance; The mediating role of absorptive capabilities". *Revista Argentina de Clínica Psicológica*, 29(5), 2030- 2043

Onay, C., and Ozsoz, E. (2013), "The Impact of Internet-Banking on Brick and Mortar Branches: The Case of Turkey". *Journal of Financial Services Research*, 44, 187-204. https://doi.org/10.1007/s10693-011-0124-9

Rogers, E.M. (1962), "Diffusion of Innovation", New York: Free Press of Glencoe.

Rose, P. S. (1999), "Commercial bank management". Boston, Irwin/McGraw-Hill.

Sacristan-Navarro, M., Gomez-Ansón, S., and Cabeza-García, L. (2011), "Family ownership and control, the presence of other large shareholders, and firm performance: Further evidence". *Family Business Review*, 24(1), 71-93

Saeed, K. A., and Bampton, R. (2013), "The impact of information and communication technology on the performance of Libyan banks". *Journal of WEI Business and Economics* 2(1), 21-26.

Salehi, M., and Alipour, M. (2014), "E-banking in emerging economy: Empirical evidence of Iran". *Internnational Journal of Economic Finance*, 2(1), 201-209

Shanmugam, K. R., and Nigam, R. (2020), "Impact of technology on the financial performance of Indian commercial banks: A clustering based approach". *Innovation and Development,* 10, 433-449. https://doi.org/10.1080/2157930X.2019.1685792 S

Summers, B.J. (2012), "Payment systems-design, governance and oversight", London: Central banking publications

Thrikawala, S. S. (2011)," Impact of strategic networks for the success of SMEs in Sri Lanka".*World Journal of Social Sciences,* 1(2), 108-119

Ugbede, J. T., Yahaya, A., and Edicha, M. J. (2019), "Effect of electronic payment on financial performance of deposit money banks in Nigeria". *Lafia Journal of Economics and Management Sciences* 4(1). ISSN: 2550 -732X 114