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Research Article

Effect of Digital Payment Channels on the Profitability of Nigerian Financial Institutions: A Panel Data Approach

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Abstract

This study examines the effect of digital payment channels on the profitability of Nigerian financial institutions using a panel dataset covering the period 2014–2024. Profitability was proxied by Return on Assets (ROA), while digital payment channels were measured through transaction values from Point of Sale (POS), mobile banking, internet banking, Automated Teller Machine (ATM), and USSD platforms. An ex-post facto research design was employed, and panel data from 5 financial institutions which include Zenith Bank Plc, Fidelity Bank Plc, Sterling Bank Plc, Wema Bank Plc and United Bank for Africa Plc were analyzed using panel least squares regression. The empirical results reveal that mobile banking ($\beta = 0.000113$, $p < 0.01$) exerts a positive and statistically significant effect on ROA, underscoring its strong contribution to institutional profitability. POS transactions ($\beta = 6.57E\text{-}05$, $p > 0.05$) also show a positive, though statistically insignificant, effect. In contrast, USSD transactions ($\beta = -0.000105$, $p < 0.01$) exhibit a negative and statistically significant impact on ROA, suggesting potential operational inefficiencies within this channel. Furthermore, internet banking ($\beta = -2.38E\text{-}05$, $p > 0.05$) and ATM transactions ($\beta = -1.01E\text{-}05$, $p > 0.05$) display negative and statistically insignificant effects on profitability. The overall model demonstrates strong explanatory power, with an R^2 of 0.9732 and a highly significant F-statistic (355.60; $p < 0.001$), indicating that digital payment channels collectively account for a substantial proportion of profitability variations among the sampled institutions. The study concludes that digital payment channels do not contribute uniformly to financial performance, with mobile banking emerging as the most influential driver of profitability. It recommends that financial institutions optimize and strategically realign their digital payment infrastructures to enhance operational efficiency and improve overall financial performance.

Keywords: Digital Payment Channels; Profitability; Nigerian Financial Institutions; Panel Regression

Introduction

The global financial landscape has undergone profound transformation driven by rapid advancements in digital technologies. Across both developed and emerging economies, digital payment systems have become central to financial service delivery, operational efficiency, and competitive strategy. In Nigeria, this evolution has been accelerated by the Central Bank of Nigeria's (CBN) cashless policy initiative, which seeks to reduce reliance on physical cash, enhance financial inclusion, and modernize the financial system (CBN, 2023). As a result, digital payment channels such as Point of Sale (POS) terminals, mobile banking applications, internet banking platforms, Automated Teller Machines (ATMs), and Unstructured Supplementary Service Data (USSD) have become deeply embedded in the operations of financial institutions.

The diffusion of these technologies has reshaped service delivery models, improved customer experience, and redefined revenue structures within Nigeria's financial sector. Empirical evidence suggests that digital

banking infrastructure plays a pivotal role in strengthening financial institutions' performance. For instance, Adeniran and Jayeoba (2023) find that digital platform adoption contributes positively to profitability indicators such as Return on Assets (ROA) and Return on Equity (ROE). Similarly, Salam and Adegbite (2024) argue that digital technologies enhance cost efficiency, reduce transaction time, and bolster customer satisfaction—all of which are critical determinants of bank performance. Digital payment innovations have also expanded financial inclusion by enabling institutions to serve under banked populations at lower operational costs (Afolabi, 2024).

On a global scale, evidence shows that digital financial development enhances institutional performance and stability. Zhang, Zhang, and Lu (2025) report that digital transformation improves operational efficiency and reduces risks associated with manual processing, thereby strengthening profitability and system resilience. In a related study, Nkegbe and Moffatt (2023) demonstrate that digital channels diversify income streams and improve service delivery without proportionately increasing overhead expenses, highlighting their relevance to sustainable financial performance.

Despite the documented benefits, the profitability outcomes of digital payment channels vary considerably across financial institutions and across specific digital platforms. Moreover, empirical studies in Nigeria have primarily focused on the broad effects of digital banking or financial technology adoption, with limited evidence on the disaggregated effects of individual digital payment channels. The heterogeneity in transaction characteristics—ranging from mobile banking's real-time capabilities to USSD's low-cost accessibility—suggests the need for channel-specific analysis.

Accordingly, this study investigates the effect of key digital payment channels—including POS, mobile banking, internet banking, ATM, and USSD transactions—on the profitability of Nigerian financial institutions using panel data spanning 2014 to 2024. By employing a panel data approach, the study provides evidence on the distinct contribution of each digital payment channel to financial performance, thereby offering insights for policymakers, regulators, and financial institutions seeking to optimize digital service strategies.

Statement of the Problem

Digital payment systems are expected to enhance operational efficiency, expand customer reach, and improve the overall profitability of financial institutions. Technologies such as mobile banking, internet banking, POS terminals, USSD platforms, and ATMs are designed to reduce transaction costs, facilitate seamless service delivery, and strengthen the financial performance of institutions operating within a modernized payment ecosystem. In principle, these innovations should enable Nigerian financial institutions to achieve higher revenue growth, improved cost efficiency, and enhanced service competitiveness.

However, empirical outcomes within Nigeria suggest that the anticipated profitability gains from digital payment adoption have not been uniformly realized. Many financial institutions continue to experience persistent operational challenges including frequent network disruptions, cyber-security vulnerabilities, high digital infrastructure costs, regulatory constraints, and slow customer adoption that may erode the expected benefits of digital payment channels. Despite substantial investments in digital technologies, some institutions report sluggish profitability growth, inconsistent channel performance, or inefficiencies that question the cost–benefit value of these platforms.

Moreover, existing studies provide limited evidence on the *differential* effects of individual digital payment channels on profitability. While mobile banking, POS transactions, internet banking, ATMs, and USSD platforms each exhibit unique operational characteristics, their specific contributions to financial performance within the Nigerian context remain unclear. This lack of channel-specific insight presents a critical knowledge gap, particularly in an environment where financial institutions increasingly rely on digital services to maintain competitiveness.

If these issues remain unaddressed, Nigerian financial institutions risk underutilizing the strategic potential of digital payment systems, leading to suboptimal revenue generation, inefficient cost structures, and declining market competitiveness. Ineffective deployment of digital channels may also

impede financial inclusion, diminish customer trust, and ultimately threaten the long-term sustainability of financial institutions in an era of accelerating digital transformation.

Objectives of the Study

The primary objective of this study is to examine the effect of digital payment channels on the profitability of Nigerian financial institutions. The specific objectives are to:

i. Assess the effect of POS transaction value on the profitability of Nigerian financial institutions.
ii. Evaluate the effect of mobile banking transaction value on the profitability of Nigerian financial institutions.
iii. Determine the effect of internet banking transaction value on the profitability of Nigerian financial institutions.
iv. Examine the effect of ATM transaction value on the profitability of Nigerian financial institutions.
v. Analyze the effect of USSD transaction value on the profitability of Nigerian financial institutions.

Research Questions

This study seeks to provide answers to the following research questions:

i. What is the effect of POS transaction value on the profitability of Nigerian financial institutions?
ii. How do mobile banking transactions influence the profitability of Nigerian financial institutions?
iii. To what extent does internet banking transaction value impact the profitability of Nigerian financial institutions?
iv. What is the relationship between ATM transaction value and the profitability of Nigerian financial institutions?
v. How do USSD transaction values affect the profitability of Nigerian financial institutions?

Statement of Hypotheses

The study was guided by the following null hypotheses:

i. **H_{01}:** POS transaction value has no significant effect on the profitability (ROA) of Nigerian financial institutions.
ii. **H_{02}:** Mobile banking transaction value has no significant effect on the profitability (ROA) of Nigerian financial institutions.
iii. **H_{03}:** Internet banking transaction value has no significant effect on the profitability (ROA) of Nigerian financial institutions.
iv. **H_{04}:** ATM transaction value has no significant effect on the profitability (ROA) of Nigerian financial institutions.
v. **H_{05}:** USSD transaction value has no significant effect on the profitability (ROA) of Nigerian financial institutions.

Review of Related Literature

Conceptual Review

Digital Payment Channels

Digital payment channels constitute an essential component of contemporary financial systems, offering mechanisms through which financial institutions deliver services, process transactions, and engage with customers electronically. These channels encompass a range of technologies, including Point of Sale (POS) terminals, mobile banking applications, internet banking platforms, Automated Teller Machines (ATMs), and Unstructured Supplementary Service Data (USSD) platforms (Adeniran & Jayeoba, 2023; Alagbe & Yinus, 2025). The adoption of digital payment channels is driven by the need to enhance operational efficiency, reduce transaction costs, improve customer experience, and expand financial inclusion (Afolabi, 2024; Busari & Jayeoba, 2024).

Point of Sale (POS) Transactions

POS transactions refer to payments made electronically through card-based or mobile-enabled terminals at merchant locations, facilitating real-time financial exchanges between consumers and businesses. In the Nigerian context, POS systems have become a major driver of cashless transactions under the Central Bank of Nigeria's cashless policy (CBN, 2023). They not only improve transaction efficiency but also reduce dependency on cash handling, which is prone to theft, fraud, and operational delays.

Empirical studies indicate that POS adoption has a direct impact on transaction volumes and revenue generation for financial institutions. Afolabi and Adeoye (2020) highlight that higher POS transaction volumes in emerging markets correlate with increased retail activity and enhanced bank profitability. Similarly, Chukwu and Nwankwo (2021) emphasize that POS systems serve as a bridge between banks and their customers, improving service accessibility and customer satisfaction. POS terminals also provide critical data on consumer spending behavior, which banks can leverage for strategic decision-making and targeted financial products (Fernandez, López, & García, 2019).

Despite these benefits, POS adoption is influenced by factors such as network reliability, merchant acceptance, and customer awareness. Inefficiencies in any of these areas may limit the potential contribution of POS transactions to profitability (Mbeche & Ouma, 2022). Thus, understanding the operational and economic implications of POS usage is essential for evaluating its role in enhancing financial performance in Nigerian financial institutions.

Mobile Banking

Mobile banking refers to the provision of banking services through mobile devices, enabling customers to perform financial transactions such as fund transfers, bill payments, account management, and balance inquiries without physically visiting bank branches. This channel has become increasingly important in Nigeria due to the widespread adoption of smartphones and mobile network penetration, particularly in areas with limited access to traditional banking infrastructure (Busari & Jayeoba, 2024; Chatterjee & Kar, 2023).

Empirical evidence suggests that mobile banking significantly enhances the profitability of financial institutions by increasing transaction efficiency, reducing operational costs, and expanding customer reach. For instance, Busari and Jayeoba (2024) found that banks with higher mobile banking adoption reported improved Return on Assets (ROA) and better financial performance overall. The convenience and accessibility of mobile banking also promote customer loyalty and retention, as clients are able to access services at any time and from any location (Munyaka, Gichira, & Kagiri, 2021).

Moreover, mobile banking facilitates financial inclusion by bringing unbanked and underbanked populations into the formal financial system, thereby increasing deposit mobilization and potential revenue streams for banks (Afolabi, 2024; Chatterjee & Kar, 2023). However, the profitability impact of mobile banking is moderated by challenges such as cybersecurity risks, network reliability, and user trust (Biswas & Roy, 2019). Studies have also highlighted that the degree of mobile banking adoption among different customer segments influences its contribution to financial performance, with higher engagement among tech-savvy and urban users yielding more substantial benefits (Busari & Jayeoba, 2024; Munyaka, Gichira, & Kagiri, 2021).

Internet Banking

Internet banking, also known as online banking, involves the provision of banking services over the internet through secure web portals, allowing customers to perform a wide range of financial activities such as funds transfer, bill payments, loan applications, and account management from any location with internet access (Agyapong & Eshun, 2023; Okoye & Ejim, 2019). Unlike mobile banking, internet banking typically relies on computers or mobile devices with internet connectivity, offering a broader interface and more complex services for both individual and corporate clients.

Research indicates that internet banking contributes positively to the profitability of financial institutions by improving operational efficiency, reducing the need for physical branch services, and increasing transaction volume (Agyapong & Eshun, 2023). Okoye and Ejim (2019) emphasize that internet banking enhances customer experience through convenient, 24/7 access to banking services, which in turn strengthens customer loyalty and long-term engagement. This platform also generates valuable transaction data that banks can leverage for predictive analytics, risk assessment, and targeted product offerings, ultimately supporting revenue growth (Mensah & Boateng, 2021).

Despite these advantages, the adoption and profitability impact of internet banking are influenced by factors such as cybersecurity, user trust, and digital literacy (Kibira & Mutuku, 2020). Banks must invest in secure and user-friendly interfaces to encourage adoption and reduce operational risks. Additionally, while internet banking enhances profitability, its effect may vary across different customer segments, with urban and tech-savvy clients contributing more significantly to transaction volume and bank income (Amponsah & Owusu, 2022).

Automated Teller Machines (ATMs)

Automated Teller Machines (ATMs) are electronic banking outlets that enable customers to perform basic financial transactions, including cash withdrawals, deposits, balance inquiries, and fund transfers, without direct interaction with bank staff (Gulati & Kumar, 2021; Mohamed & Alharthi, 2018). ATMs serve as a critical digital payment channel by providing round-the-clock access to banking services, thereby improving convenience for customers and reducing the operational burden on physical branches.

Studies indicate that ATM usage positively influences the profitability of financial institutions by increasing transaction efficiency and expanding customer access to financial services (Ojo & Adebayo, 2022). For example, Gulati and Kumar (2021) demonstrate that banks with higher ATM penetration experience greater transaction volumes, which translate into higher service fees and revenue streams. ATMs also support financial inclusion by reaching underserved populations in areas with limited banking infrastructure, particularly in semi-urban and rural regions (Mohamed & Alharthi, 2018; Ojo & Adebayo, 2022).

Technological innovations such as integration with AI, IoT, and advanced security protocols have further enhanced the efficiency, reliability, and customer experience associated with ATMs (Singh & Rai, 2023). However, challenges such as security breaches, maintenance costs, and network downtimes can affect their profitability impact (Zafar, Anwar, & Mahmood, 2019). Additionally, the location of ATMs, customer transaction patterns, and demographic factors play a role in determining their contribution to bank performance.

USSD Platforms

Unstructured Supplementary Service Data (USSD) platforms enable mobile phone users to access banking services without requiring internet connectivity, making them particularly valuable in regions with limited broadband infrastructure or low smartphone penetration (Atieno & Nyambura, 2023; Mwangi & Kamau, 2020). USSD banking allows customers to perform transactions such as fund transfers, balance inquiries, airtime purchases, and bill payments using simple codes on basic mobile phones, thereby promoting financial inclusion and extending banking services to underbanked populations.

Empirical studies indicate that USSD adoption positively affects transaction volumes and financial accessibility, which can indirectly enhance bank profitability (Kibira & Kibet, 2019; Omondi & Wanjiku, 2021). By reducing the reliance on branch-based banking, USSD platforms help banks lower operational costs while expanding their customer base. Additionally, the simplicity and immediacy of USSD transactions make them attractive to low-income and rural users, who might otherwise remain outside the formal financial system (Atieno & Nyambura, 2023; Mwangi & Kamau, 2020).

However, the profitability impact of USSD platforms is moderated by challenges such as security vulnerabilities, transaction limits, network reliability, and user trust (Suleiman & Abubakar, 2018). Despite these constraints, USSD remains a cost-effective digital payment channel with high adoption potential in developing economies. Its strategic integration with other digital banking channels, such as mobile and

internet banking, can enhance overall service delivery and contribute to sustainable financial performance.

Profitability (Return on Assets - ROA)

Profitability in banking is a critical performance metric that reflects the ability of financial institutions to generate earnings relative to their assets, operational efficiency, and risk management practices. In this study, profitability is proxied using Return on Assets (ROA), which measures the net income generated per unit of total assets, offering insights into how effectively a bank utilizes its resources to create value (Adeniran & Jayeoba, 2023; Salam & Adegbite, 2024).

ROA is widely used in empirical banking research because it captures both operational efficiency and management effectiveness, allowing comparisons across banks of different sizes and structures (Alagbe & Yinus, 2025; Nwankwo & Okoli, 2023). Digital payment channels, such as POS, mobile banking, internet banking, ATMs, and USSD, can influence ROA by increasing transaction volumes, reducing operational costs, enhancing customer engagement, and expanding financial inclusion (Salam & Adegbite, 2024; Madugba et al., 2021). For instance, higher adoption of mobile and internet banking often translates into more cost-efficient transactions, which can improve net income relative to assets (Busari & Jayeoba, 2024; Nwankwo, Odekina & Eze, 2022).

However, the impact of digital payment channels on ROA is not uniform. Some channels, like USSD, may involve higher operational risks or lower transaction fees, potentially limiting their effect on profitability (Suleiman & Abubakar, 2018; Kibira & Kibet, 2019). Similarly, factors such as network reliability, cybersecurity, and user trust influence how effectively banks can translate digital transaction growth into enhanced ROA (Biswas & Roy, 2019; Zafar, Anwar, & Mahmood, 2019).

Therefore, ROA serves as a robust and widely accepted proxy for bank profitability, offering a quantitative measure to assess the efficiency and effectiveness of resource utilization. Understanding how different digital payment channels contribute to ROA provides crucial insights for strategic planning, financial performance improvement and sustainable growth in Nigerian financial institutions.

Theoretical Review

This study is anchored on the Technology Acceptance Model (TAM).

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Davis (1989), provides a framework for understanding how individuals adopt and use new technologies. TAM posits that technology adoption is primarily influenced by two factors: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Perceived usefulness refers to the degree to which a user believes that employing a particular technology will enhance their performance, while perceived ease of use refers to the degree to which a user believes the technology can be utilized with minimal effort (Davis, 1989).

In the context of this study, TAM is relevant for explaining the adoption and usage of digital payment channels including mobile banking, Point of Sale (POS) systems, internet banking, USSD, and Automated Teller Machines (ATMs) and their influence on the profitability of Nigerian deposit money banks. When customers perceive these platforms as useful and easy to use, adoption rates increase, resulting in higher transaction volumes, reduced operational costs, and improved financial performance (Adeniran & Jayeoba, 2023; Chatterjee & Kar, 2023). Furthermore, banks' strategic decisions to invest in digital infrastructure are guided by anticipated user acceptance, highlighting the behavioral and organizational implications of TAM.

Thus, TAM provides a robust theoretical foundation for understanding both the behavioral dynamics of customers and the strategic considerations of banks in leveraging digital payment systems to enhance profitability in the Nigerian banking sector.

Empirical Review

Madugba et al. (2021) examined the impact of electronic banking on the financial performance of deposit money banks in Nigeria. Using regression analysis on secondary data from regulatory institutions, they assessed ATM, POS, NEFT, and web transactions against ROA and EPS. ATM showed significant positive effects, while web transactions were insignificant. Electronic banking overall improved profitability.

Nwankwo, Odekina, and Eze (2022) investigated the relationship between e-transaction channels and profitability in Nigerian commercial banks. Employing ARDL models and time-series data (2010–2020), they analyzed e-cheques, ATM, POS, mobile money, and web payments against ROE. All channels except e-cheques significantly influenced ROE. The model explained 83% of ROE variation, indicating digital channels are strong predictors of bank profitability.

Alagbe & Yinus (2025) evaluated how financial technology affects profitability in Nigerian deposit money banks. Using survey data from 132 staff across six banks and regression analysis, they measured the effect of ATM and internet banking on ROA. The results showed a significant positive relationship between fintech adoption and profitability. They recommended greater digital investment to sustain performance improvements.

Nwankwo & Okoli (2023) assessed the influence of financial technology on profitability among Nigerian deposit money banks from 2010 to 2021. Applying Robust Least Squares regression and Granger causality tests, they analyzed internet banking, ATM, POS, and mobile transactions. Only internet banking significantly improved profitability. POS and mobile banking had negative, insignificant effects, suggesting selective digital investments are necessary.

Busari & Jayeoba (2024) analyzed how mobile money services influence financial inclusion and profitability in Nigerian banks using panel data (2013–2022) from ten banks. Through a Random Effects model, they examined mobile, POS, and ATM transaction volumes against ROA. Mobile banking had a significant positive effect, POS had a negative effect, while ATM usage was not statistically significant.

Methodology

Research Design

This study adopts an *ex-post-facto* research design, utilizing historical secondary data from selected Nigerian deposit money banks. The research covers a ten-year period (2014–2024), allowing for trend analysis and comparability while capturing recent developments in digital payment adoption and banking profitability in Nigeria. The *ex-post-facto* design is appropriate because the study examines relationships between digital payment channels and bank profitability without manipulating the variables.

Area of Study

The study focuses on five prominent deposit money banks listed on the Nigerian Exchange Group (NGX): Zenith Bank Plc, Fidelity Bank Plc, Sterling Bank Plc, Wema Bank Plc, and United Bank for Africa Plc. This selection enables an in-depth analysis of how digital payment channels influence the financial performance of leading banks in Nigeria.

Sources of Data

The study relies exclusively on secondary data collected from the audited annual reports and financial statements of the sampled banks for the period 2014–2024. These sources provide comprehensive information on transaction volumes or values across different digital payment channels and key financial performance metrics, including Return on Assets (ROA), which is employed as the measure of profitability.

Population of the Study

The population comprises all deposit money banks listed on the Nigerian Exchange Group (NGX) as of 2024.

Sample Size and Sampling Technique

A purposive sampling technique was employed to select five banks based on data availability, consistency in reporting, and prominence within the Nigerian banking sector. The selected banks are Zenith Bank Plc, Fidelity Bank Plc, Sterling Bank Plc, Wema Bank Plc, and United Bank for Africa Plc.

Model Specification

A. General Functional Form

$ROA_{it} = f(POS_{it}, MB_{it}, IB_{it}, ATM_{it}, USSD_{it})$

Where ROA is the profitability of bank *i* in year *t*, and the independent variables are the digital payment channels considered in this study.

B. Econometric Form

$ROA_{it} = \beta_0 + \beta_1 POS_{it} + \beta_2 MB_{it} + \beta_3 IB_{it} + \beta_4 ATM_{it} + \beta_5 USSD_{it} + ci + \epsilon it$

C. Variable Definitions

ROA_{it} = Return on Assets of bank *i* in year *t* (proxy for profitability)
POS_{it} = Point of Sale transaction value or volume of bank *i* in year *t*
MB_{it} = Mobile Banking transaction value or volume of bank *i* in year *t*
IB_{it} = Internet Banking transaction value or volume of bank *i* in year *t*
ATM_{it} = Automated Teller Machine transaction value or volume of bank *i* in year *t*
$USSD_{it}$ = USSD transaction value or volume of bank *i* in year *t*
β_0 = Intercept term
$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ = Coefficients to be estimated
c_i = Bank-specific effects that are unobserved
ϵ_{it} = Error term

Method of Data Analysis

The study first employed descriptive statistics to summarize and analyze the characteristics of the dataset, including trends in digital payment adoption and profitability over time. For the inferential analysis, panel data regression techniques particularly the Panel Least Squares (PLS) method were used to estimate the effect of various digital payment channels on the profitability of the sampled banks, measured by ROA.

Data Presentation and Analysis

Descriptive Statistics

Table 1: Descriptive Statistics of the variables

	POS_TV	MB_TV	IB_TV	ATM_TV	USSD_TV	ROA
Mean	237.9618	818.6236	638.5418	480.7182	316.1218	0.045251
Median	240.3000	825.3000	645.7000	485.9000	312.9000	0.045200
Maximum	360.7000	1085.100	830.2000	630.1000	439.2000	0.066700
Minimum	130.3000	510.4000	420.2000	310.1000	190.4000	0.024100
Std. Dev.	59.41483	152.1138	110.8364	82.00411	58.14846	0.012001
Skewness	0.163190	-0.145226	-0.177647	-0.129738	-0.054739	0.027287
Kurtosis	2.191728	2.082314	2.063871	2.339286	2.549404	1.755680
Jarque-Bera	1.741272	2.123253	2.297561	1.154704	0.492759	3.555085
Probability	0.418685	0.345893	0.317023	0.561383	0.781626	0.169053
Sum	13087.90	45024.30	35119.80	26439.50	17386.70	2.488800
Sum Sq. Dev.	190626.6	1249485.	663373.9	363132.4	182587.1	0.007778
Observations	55	55	55	55	55	55

Source: E-view 11.0 Statistical Output, 2025

Table 1 presents the descriptive statistics for the variables used in examining the effect of digital payments on profitability, proxied by Return on Assets (ROA), for a sample of 55 observations from deposit money banks in Nigeria. The mean value of Point of Sale transaction value (POS_TV) is ₦237.96 billion, indicating that, on average, banks handle a significant volume of card-based physical transactions, which reflects the growing acceptance of POS terminals in Nigeria's payment ecosystem. The mean Mobile Banking transaction value (MB_TV) is higher at ₦818.62 billion, which suggests that mobile banking has become a primary channel for financial transactions, likely due to its convenience, smartphone penetration, and fintech growth.

Internet banking transaction value (IB_TV) averages ₦638.54 billion, showing strong usage particularly by corporate and high-net-worth individuals who utilize web platforms for bulk transfers and business payments. The Automated Teller Machine transaction value (ATM_TV) has a mean of ₦480.72 billion, indicating that while ATM usage remains relevant, it is gradually being surpassed by mobile and online banking options. USSD transaction value (USSD_TV) has a mean of ₦316.12 billion, reflecting strong adoption in areas with low internet access, making it a key digital inclusion tool among unbanked and rural populations. Profitability, measured by Return on Assets (ROA), averages 4.53%, indicating that on average, the banks earn ₦0.0453 for every ₦1 of total assets deployed. The median values for all variables are closely aligned with their respective means, suggesting that the distributions are approximately symmetrical and that the data is not significantly distorted by outliers. For instance, the median Mobile Banking value is ₦825.30 billion, close to the mean of ₦818.62 billion, and ROA has a median of 4.52% compared to its mean of 4.53%.

The range between the minimum and maximum values reveals notable variability across banks and years. POS_TV ranges from ₦130.30 billion to ₦360.70 billion, while MB_TV spans from ₦510.40 billion to ₦1,085.10 billion. ROA ranges from a minimum of 2.41% to a maximum of 6.67%, reflecting different levels of profitability across banks and periods. Standard deviations further highlight this dispersion: Mobile Banking (₦152.11 billion) and Internet Banking (₦110.84 billion) exhibit the highest variability, which may indicate uneven adoption rates or transaction volumes across the institutions. ROA has a standard deviation of 1.20%, suggesting relatively stable profitability among the sampled banks. Skewness values are all close to zero (between -0.18 and 0.16), indicating that the distributions are nearly symmetric. Likewise, kurtosis values for all variables are below 3, indicating platykurtic distributions that are relatively flat with fewer extreme values than the normal distribution. The Jarque-Bera statistics support the

assumption of normality, as all p-values are above the 0.05 threshold. This implies that none of the variables significantly deviate from normality at the 5% significance level.

Table 2: Panel Regression Analysis Result of the Time Series Data

Dependent Variable: ROA
Method: Panel Least Squares
Date: 09/20/25 Time: 13:48
Sample: 2014 2024
Periods included: 11
Cross-sections included: 5
Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
POS_TV	6.57E-05	3.75E-05	1.752948	0.0859
MB_TV	0.000113	2.06E-05	5.489879	0.0000
IB_TV	-2.38E-05	2.74E-05	-0.868247	0.3895
ATM_TV	-1.01E-05	2.65E-05	-0.379349	0.7061
USSD_TV	-0.000105	2.84E-05	-3.710735	0.0005
C	-0.009535	0.003851	-2.475850	0.0168

R-squared	0.973180	Mean dependent var	0.045251
Adjusted R-squared	0.970443	S.D. dependent var	0.012001
S.E. of regression	0.002063	Akaike info criterion	-9.426337
Sum squared resid	0.000209	Schwarz criterion	-9.207355
Log likelihood	265.2243	Hannan-Quinn criter.	-9.341655
F-statistic	355.5958	Durbin-Watson stat	0.891321
Prob(F-statistic)	0.000000		

Source: *E-view 11.0 Statistical Output, 2025*

Table 2 presents the results of a panel least squares regression estimating the effect of various digital payment channels on Return on Assets (ROA) for five deposit money banks in Nigeria over the 2014–2024 period. The analysis reveals that Mobile Banking transaction value (MB_TV) has a positive and statistically significant effect on ROA (coefficient = 0.000113, p = 0.0000). This suggests that increased mobile banking activity contributes substantially to bank profitability. In practical terms, a ₦1 billion increase in mobile banking transactions is associated with an approximate 0.0113 percentage point increase in ROA, holding other variables constant. This underscores the growing importance of mobile platforms as both a revenue and cost-efficiency driver in the banking sector. Similarly, Point of Sale transaction value (POS_TV) has a positive but marginally significant effect on ROA (coefficient = 0.0000657, p = 0.0859). This implies that greater usage of POS terminals may enhance profitability, possibly due to increased customer reach and reduced cash-handling costs. However, the statistical significance is at the 10% level, suggesting a need for cautious interpretation.

Conversely, USSD transaction value (USSD_TV) exhibits a negative and statistically significant effect on ROA (coefficient = -0.000105, p = 0.0005). This indicates that increased USSD usage is associated with a decline in profitability. While USSD is a low-cost access channel, this result may reflect lower revenue generation per transaction, or higher maintenance and security costs related to the platform. Both Internet Banking transaction value (IB_TV) and ATM transaction value (ATM_TV) show negative but statistically insignificant effects on ROA (coefficients = -0.0000238 and -0.0000101, p = 0.3895 and 0.7061 respectively). These results imply that, within the sample and time frame, these channels do not significantly influence profitability. Their insignificance may be attributed to operational saturation, infrastructure costs, or user migration to more modern platforms like mobile apps.

The intercept (C) is negative and statistically significant (coefficient = -0.009535, p = 0.0168), suggesting that in the absence of the digital payment variables, the baseline ROA would be negative. This may indicate the centrality of digital payment services in sustaining bank profitability in the current era. From a model performance standpoint, the regression is highly explanatory, with an R-squared of 0.9732 and adjusted R-squared of 0.9704, indicating that approximately 97% of the variation in ROA is accounted for by the included digital payment variables. The F-statistic (355.60) and its associated p-value (0.0000) confirm the

overall statistical significance of the model. However, the Durbin-Watson statistic of 0.8913 is below the acceptable threshold (typically around 2), suggesting the possible presence of positive autocorrelation, which may warrant further diagnostic tests or model adjustments.

Test of Hypotheses

Test of Hypothesis One

Restatement of Hypothesis:

H_{01}: Point of Sale (POS) transactions have no significant effect on the profitability (ROA) of deposit money banks in Nigeria.
H_{a1}: Point of Sale (POS) transactions have a significant effect on the profitability (ROA) of deposit money banks in Nigeria.
Decision Rule:
Reject H_{01} if the p-value is less than 0.05; otherwise, do not reject H_{01}.
Decision:
The regression coefficient of POS_TV is 0.0000657, with a t-statistic of 1.7529 and a p-value of 0.0859, which is greater than 0.05. Therefore, the null hypothesis (H_{01}) is not rejected. This implies that POS transaction values do not have a statistically significant effect on the profitability (ROA) of deposit money banks in Nigeria during the study period.

Test of Hypothesis Two

Restatement of Hypothesis:
H_{02}: Mobile banking transactions have no significant effect on the profitability (ROA) of deposit money banks in Nigeria.
H_{a2}: Mobile banking transactions have a significant effect on the profitability (ROA) of deposit money banks in Nigeria.

Decision Rule:
Reject H_{02} if the p-value is less than 0.05; otherwise, do not reject H_{02}.
Decision:
The coefficient of MB_TV is 0.000113, with a t-statistic of 5.4899 and a p-value of 0.0000, which is less than 0.05.
Thus, the null hypothesis (H_{02}) is rejected, and the alternative hypothesis is accepted. This indicates that mobile banking transaction value has a statistically significant positive effect on the profitability (ROA) of deposit money banks in Nigeria.

Test of Hypothesis Three
Restatement of Hypothesis:
H_{03}: Internet banking usage has no significant effect on the profitability (ROA) of deposit money banks in Nigeria.
H_{a3}: Internet banking usage has a significant effect on the profitability (ROA) of deposit money banks in Nigeria.
Decision Rule:
Reject H_{03} if the p-value is less than 0.05; otherwise, do not reject H_{03}.
Decision:
The coefficient of IB_TV is -0.0000238, with a t-statistic of -0.8682 and a p-value of 0.3895, which is greater than 0.05. Therefore, the null hypothesis (H_{03}) is not rejected. This suggests that internet banking usage does not have a statistically significant effect on the profitability (ROA) of deposit money banks in Nigeria during the study period.

Test of Hypothesis Four

Restatement of Hypothesis:

H_{04}: ATM transactions have no significant effect on the profitability (ROA) of deposit money banks in Nigeria.

H_{a4}: ATM transactions have a significant effect on the profitability (ROA) of deposit money banks in Nigeria.

Decision Rule:

Reject H_{04} if the p-value is less than 0.05; otherwise, do not reject H_{04}.

Decision:

The coefficient of ATM_TV is -0.0000101, with a t-statistic of -0.3793 and a p-value of 0.7061, which is greater than 0.05. Hence, the null hypothesis (H_{04}) is not rejected. This indicates that ATM transactions do not have a statistically significant effect on the profitability (ROA) of deposit money banks in Nigeria.

Test of Hypothesis Five

Restatement of Hypothesis:

H_{05}: USSD transaction volumes have no significant effect on the profitability (ROA) of deposit money banks in Nigeria.

H_{a5}: USSD transaction volumes have a significant effect on the profitability (ROA) of deposit money banks in Nigeria.

Decision Rule:

Reject H_{05} if the p-value is less than 0.05; otherwise, do not reject H_{05}.

Decision:

The coefficient of USSD_TV is -0.000105, with a t-statistic of -3.7107 and a p-value of 0.0005, which is less than 0.05.

Therefore, the null hypothesis (H_{05}) is rejected, and the alternative hypothesis is accepted.

This implies that USSD transaction volume has a statistically significant negative effect on the profitability (ROA) of deposit money banks in Nigeria.

Summary of Findings

The following summarizes the key findings:

i. Point of Sale (POS) transaction value had a positive but statistically insignificant effect on ROA (coefficient = 0.0000657; p-value = 0.0859). This indicates that while POS transactions may contribute to improved profitability by expanding customer access and convenience, the effect is not strong enough to be statistically validated within the study period.

ii. Mobile Banking transaction value exhibited a positive and statistically significant effect on ROA (coefficient = 0.000113; p-value = 0.0000). This implies that increased usage of mobile banking significantly enhances bank profitability, likely due to cost efficiency, user convenience, and broader service reach.

iii. Internet Banking transaction value showed a negative and statistically insignificant effect on ROA (coefficient = -0.0000238; p-value = 0.3895). This suggests that internet banking usage does not have a meaningful impact on profitability during the period under review, potentially due to operational saturation or customer preference for alternative channels.

iv. ATM transaction value had a negative and statistically insignificant effect on ROA (coefficient = -0.0000101; p-value = 0.7061). This indicates that while ATMs are an essential part of digital infrastructure, their contribution to profitability is limited, possibly due to high maintenance costs and declining user engagement in favor of mobile platforms.

v. USSD transaction value showed a negative and statistically significant effect on ROA (coefficient = -0.000105; p-value = 0.0005). This finding suggests that increased reliance on USSD transactions may reduce profitability, potentially due to lower revenue per transaction or higher associated service costs despite its accessibility and popularity among unbanked populations.

Conclusion

This study examined the effect of digital payment channels on the profitability of deposit money banks in Nigeria, using Return on Assets (ROA) as a proxy for profitability. The analysis was based on panel data from five selected banks: Zenith Bank Plc, Fidelity Bank Plc, Sterling Bank Plc, Wema Bank Plc, and United Bank for Africa Plc covering the period from 2014 to 2024. The digital payment channels considered were

Point of Sale (POS), Mobile Banking, Internet Banking, Automated Teller Machines (ATMs), and Unstructured Supplementary Service Data (USSD).

The findings reveal that mobile banking transactions significantly and positively influence bank profitability, suggesting that investments in mobile platforms yield measurable returns due to their widespread adoption, low operating cost, and convenience to users. In contrast, USSD transactions, despite being a widely accessible digital payment method, were found to have a significant negative effect on profitability, likely due to operational costs or lower margins per transaction. POS transactions exhibited a positive but statistically insignificant impact, while internet banking and ATM transactions both showed negative and insignificant effects, highlighting potential inefficiencies or reduced customer preference for these channels.

Therefore, the study concludes that not all digital payment channels contribute equally to bank profitability. The nature, cost structure and customer adoption of each channel play critical roles in determining their financial impact. As such, deposit money banks in Nigeria must prioritize strategic investments in digital platforms particularly mobile banking, while reevaluating the cost-effectiveness and user engagement of other channels. This will ensure that the adoption of financial technologies aligns with profitability goals and long-term sustainability in the rapidly evolving digital banking landscape.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

i. Since mobile banking transactions had a positive and statistically significant effect on profitability (ROA), deposit money banks should prioritize the expansion and enhancement of mobile banking platforms. This includes investing in user-friendly interfaces, security features, and marketing to increase adoption rates and transaction volumes.
ii. Given that USSD transactions showed a significant negative effect on profitability, banks are advised to review the cost structure and operational efficiency of USSD services. Banks should explore ways to reduce transaction costs, improve service reliability, or gradually shift users towards more profitable digital channels like mobile banking apps.
iii. The insignificant positive effect of POS transactions on profitability suggests that banks should promote POS usage among customers and merchants through incentives, partnerships, and awareness campaigns. Enhancing POS infrastructure and customer experience may help convert this channel into a more profitable digital payment method.
iv. Since internet banking and ATM transactions had negative but statistically insignificant effects, banks need to assess the relevance and cost-effectiveness of these channels. Banks might consider upgrading ATM networks and internet banking platforms to better meet customer needs, or reallocate resources toward higher-impact digital channels.
v. Overall, banks should adopt an integrated digital payments strategy that aligns product offerings with customer preferences and cost management. Continuous monitoring of transaction data and profitability metrics for each channel will enable banks to optimize their digital payment mix and maximize returns on investment in technology.

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