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Original Article

Financial Technology and Commercial Bank Profitability in Nigeria

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Abstract

This study investigates the impact of financial technology on the profitability of commercial banks in Nigeria, covering the period 2009 to 2024. Profitability was measured using Net Interest Margin (NIM), while financial technology adoption was proxied by Automated Teller Machine (ATM) transactions, Point-of-Sale (POS) transactions, mobile banking applications (MBA), and internet banking (INB). An ex-post facto research design was adopted, relying on quarterly secondary data sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin. The population comprised all 24 licensed commercial banks in Nigeria, ensuring comprehensive sectoral coverage. Data analysis employed the Autoregressive Distributed Lag (ARDL) model, which allowed the estimation of both short-run and long-run relationships between fintech channels and bank profitability. Descriptive statistics were first used to summarize the data, followed by stationarity and co-integration tests to confirm the appropriateness of the ARDL framework. The results revealed that mobile banking exerts a positive and significant influence on bank profitability, underscoring its role as the most profitable fintech channel in Nigeria. Conversely, POS transactions and internet banking had negative significant effects, suggesting that while these channels enhance financial inclusion, they impose costs that reduce bank margins. ATM usage was found to have no significant effect on profitability, reflecting its role as a service infrastructure rather than a profit driver. The findings highlight the differential impact of financial technology adoption on commercial bank profitability. The study concludes that mobile banking remains the strongest driver of profitability, while POS and internet banking require strategic review to minimize margin erosion. Based on these insights, it recommends that banks deepen investment in mobile banking platforms, restructure POS and internet banking pricing models, optimize ATM operations, and pursue innovative strategies that balance customer satisfaction with profitability.

Keywords

Financial technology, Bank profitability, Mobile banking, Internet banking, Nigeria.

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1. Introduction

Profitability remains a key indicator of financial performance, sustainability, and competitive advantage of commercial banking firms, as it reflects how efficiently banks utilize their resources to generate income and meet financial obligations. Common measures of bank profitability include Return on Assets (ROA), Return on Equity (ROE), Net Interest Margin (NIM), and Net Profit Margin (NPM), which collectively provide insight into operational efficiency, financial health, and the ability of banks to transform deposits into earnings. In the Nigerian banking industry, profitability has attracted renewed attention due to increased competition, rapid technological change, and evolving regulatory frameworks (Adewoye & Olaoye, 2022). The commercial banking sector plays a critical role in Nigeria's financial system and economic development, and recent data from the Central Bank of Nigeria (CBN) indicate that the sector recorded over a 20% increase in profit-before-tax (PBT) in 2022 compared to 2021. For example, Zenith Bank Plc reported a PBT of ₦280.4 billion in 2022, representing a 5% growth from the previous year, largely driven by non-interest income from digital banking channels (Zenith Bank Annual Report, 2022). These developments highlight the growing relevance of financial technology (FinTech) in shaping bank profitability. Financial technology refers to the application of digital tools and platforms to deliver financial services in innovative, efficient, and

customer-centric ways. In Nigeria, FinTech adoption encompasses mobile banking, internet banking, automated teller machines (ATMs), point-of-sale (POS) terminals, electronic fund transfers, USSD platforms, and digital wallets. The rapid expansion of FinTech in Nigeria has been driven by increased smartphone penetration, improved internet access, and policy initiatives by the Central Bank of Nigeria aimed at promoting financial inclusion and a cashless economy (CBN, 2021; Iwedi et al., 2023). Empirical evidence shows that between 2018 and 2022, the value of mobile banking transactions increased from ₦1.9 trillion to ₦37.6 trillion, while POS transactions rose from ₦1.5 trillion to ₦8.4 trillion (NIBSS, 2022). This growth underscores the increasing reliance on digital platforms for banking service delivery and revenue generation.

FinTech adoption influences bank profitability by reducing operational costs, improving service efficiency, expanding market reach, and increasing fee-based income. Digital banking platforms automate core banking processes, reduce dependence on physical branches, and enhance transaction speed without proportional increases in operating expenses (Olajide & Akinniyi, 2021). In addition, FinTech enables banks to reach previously unbanked and underbanked populations, particularly in rural areas, thereby increasing transaction volumes and non-interest income. Advanced technologies such as big data analytics and artificial intelligence further enhance risk management, credit assessment, fraud detection, and customer profiling, leading to improved decision-making and operational efficiency (Okoye et al., 2023). Several empirical studies support a positive relationship between FinTech adoption and bank profitability. Olaniyi and Arewa (2020) and Iwedi, Wachukwu, and Amadi (2023) found that mobile banking significantly improves ROA and ROE of Nigerian commercial banks, while Yusuf and Danjuma (2021) and Iwedi (2024) reported that electronic payment platforms exert a positive and significant effect on net profit margins.

Industry data further reinforce this relationship. The Nigerian Inter-Bank Settlement System (NIBSS) reported that electronic payment transactions reached ₦387 trillion in 2022, representing a 42% increase from the previous year. During the same period, Guaranty Trust Holding Company (GTCO) recorded a 3.3% increase in profit-after-tax, partly attributed to its strong digital banking infrastructure (GTCO Annual Report, 2022), while Access Bank reported a 31.2% growth in income from digital channels. On average, Nigerian banks experienced an annual increase of about 15% in fee and commission income between 2020 and 2022, largely driven by digital transaction charges (CBN, 2023). These trends suggest that FinTech has become a major driver of non-interest income, particularly in an environment of shrinking interest margins. Despite these gains, the relationship between FinTech adoption and bank profitability in Nigeria remains inconsistent. High costs associated with deploying and maintaining digital infrastructure, cybersecurity threats, digital fraud, system downtimes, and integration challenges with legacy systems have continued to erode profitability, especially for mid-sized and smaller banks (Akinwunmi & Ogunyemi, 2022). Furthermore, customer complaints related to failed transactions, poor user interface, and inadequate real-time support have negatively affected customer loyalty and fee-based income. Existing empirical studies also present mixed findings, with some reporting strong positive effects of FinTech on profitability and others finding weak or insignificant relationships. Many of these studies are outdated or fail to capture recent developments in digital payment systems and evolving customer behavior. This lack of clear and consistent evidence limits informed decision-making by bank managers and policymakers, thereby necessitating a comprehensive and up-to-date examination of how financial technology adoption influences the profitability of commercial banks in Nigeria.

2. Literature Review

A. Theoretical Framework

This study is grounded in the Technology Acceptance Model (TAM), the Diffusion of Innovation Theory (DOI), and the Resource-Based View (RBV) to explain the relationship between financial technology (FinTech) adoption and the profitability of commercial banks in Nigeria. The Technology Acceptance Model, proposed by Davis (1989), posits that technology adoption is driven by perceived usefulness and perceived ease of use. In the banking context, FinTech tools such as mobile banking, POS terminals, ATMs, and internet banking are more likely to be adopted when they are user-friendly and enhance transaction speed, convenience, and security. Increased adoption of these digital platforms improves operational efficiency, reduces costs, and increases transaction volumes, which positively influence bank profitability, particularly Net Interest Margin (NIM). The Diffusion of Innovation Theory by Rogers (2003) explains how FinTech innovations spread within the banking sector based on their relative advantage, compatibility, simplicity, trialability, and observability. In Nigeria, the visible benefits of digital banking, including

faster transactions, reduced queues, and 24-hour access, have accelerated the adoption of FinTech across commercial banks. Early adopters have gained efficiency advantages and increased digital income, encouraging wider industry adoption. This diffusion process enables banks to process higher transaction volumes at lower marginal costs, thereby improving efficiency and profitability. The Resource-Based View (Barney, 1991) conceptualizes FinTech infrastructure as a strategic resource that provides competitive advantage when it is valuable, rare, and difficult to imitate. Digital platforms such as mobile banking applications and POS systems enhance scalability, customer engagement, and cost efficiency while reducing reliance on physical branches (Iwedi, 2024). By effectively deploying these resources, banks improve income generation and operational efficiency, leading to higher profitability and improved Net Interest Margins.

B. Conceptual Review

(a) Financial Technology

Financial technology (FinTech) refers to the application of digital innovations to improve the delivery, efficiency, and accessibility of financial services. It encompasses technologies such as mobile banking, Point-of-Sale (POS) systems, Automated Teller Machines (ATMs), internet banking, digital wallets, and other electronic payment platforms (Zhao, 2021). FinTech has transformed traditional banking operations by reducing transaction costs, enhancing service convenience, and expanding access to financial services, particularly in developing economies like Nigeria. Scholars emphasize that FinTech plays a critical role in promoting financial inclusion by providing affordable and accessible banking services to unbanked and underbanked populations (Akinola, 2020; Opara, 2022). The rapid growth of mobile and internet penetration in Nigeria has further accelerated FinTech adoption, making digital banking services central to modern financial intermediation (NCC, 2021).

i. Mobile Banking Application

Mobile banking applications enable customers to perform banking transactions such as fund transfers, bill payments, balance inquiries, and loan applications through smartphones at any time (Liao et al., 2018). In Nigeria, mobile banking adoption has increased significantly due to widespread mobile phone usage and internet access (World Bank, 2020). Mobile banking enhances customer convenience, reduces the need for physical bank visits, and improves service efficiency. Studies show that mobile banking contributes positively to bank profitability by lowering operating costs and increasing transaction volumes, thereby improving Net Interest Margin (NIM) (Oyedokun & Akinboade, 2019).

ii. Point-of-Sale (POS) Machine

Point-of-Sale (POS) machines facilitate electronic payments using debit or credit cards and are central to Nigeria's cashless policy. POS systems improve transaction efficiency, reduce cash handling risks, and enhance payment security (Folawewo & Olanrewaju, 2020). The expansion of POS networks has significantly improved financial inclusion by enabling small businesses and rural enterprises to access formal payment systems (Adebayo & Adeyemi, 2021). According to the Central Bank of Nigeria (CBN, 2022), the rapid growth in POS terminals has increased transaction volumes and fee-based income for banks, contributing positively to profitability and Net Interest Margin.

iii. Automated Teller Machine (ATM)

Automated Teller Machines (ATMs) provide customers with convenient 24-hour access to banking services such as cash withdrawals, balance inquiries, and fund transfers. The widespread deployment of ATMs in Nigeria has improved banking accessibility, reduced congestion in banking halls, and enhanced operational efficiency (Olowokere & Adebayo, 2021). Advances in ATM functionality, including deposit and bill payment services, have further increased their relevance in modern banking (Eze et al., 2021). By reducing reliance on manual banking processes, ATMs help banks lower operating costs and improve service delivery.

iv. Internet Banking

Internet banking refers to the use of online platforms to manage bank accounts, transfer funds, pay bills, and access financial services without visiting physical branches. Internet banking enhances convenience, flexibility, and cost efficiency in banking operations (Abiola & Olaniran, 2020). In Nigeria, increased internet penetration has driven the adoption of internet banking, especially among tech-savvy customers. Empirical studies indicate that internet

banking improves operational efficiency, reduces service delivery costs, and enhances customer satisfaction, thereby contributing positively to bank profitability (Adepoju & Onwumere, 2020).

(b) Profitability

Profitability refers to the ability of banks to generate earnings relative to their assets, equity, and revenue and is a key indicator of financial performance and stability. It is influenced by operational efficiency, market conditions, regulation, and technological innovation. The adoption of financial technology enhances profitability by reducing operating costs, improving service delivery, and increasing transaction volumes, thereby improving banks' financial outcomes (Akinola, 2020).

i. Net Interest Margin (NIM)

Net Interest Margin (NIM) measures the difference between interest income and interest expense relative to interest-earning assets and is a widely used indicator of bank profitability (Bourke, 2021). FinTech tools such as mobile banking, POS systems, and ATMs improve NIM by increasing customer reach, deposits, and lending activities while lowering operational costs through automation (Olubiyi, 2020). Empirical evidence suggests that greater FinTech adoption enhances transaction volumes and cost efficiency, leading to improved NIM and overall bank profitability (Akinola, 2020; Adepoju & Onwumere, 2020).

C. Empirical Review

Empirical evidence indicates that financial technology (FinTech) significantly influences banking performance, internal control efficiency, risk-taking behaviour, and profitability, though results vary across contexts. Recent studies from Jordan and China show that FinTech adoption enhances internal control systems, profitability, and investment efficiency through automation, data analytics, and improved risk management (Al-Amro et al., 2025; Tong, 2025; Wang et al., 2025). However, FinTech also exhibits a dual effect, as increased adoption may elevate banks' risk-taking, particularly among smaller institutions and less developed markets (Li et al., 2025). Evidence from Nigeria and other developing economies presents mixed findings. While some studies report positive and significant effects of ATM, POS, internet, and mobile banking on bank performance and profitability (Okoro et al., 2024; Adiga et al., 2022; Ibekwe, 2021; Iwedi et al, 2023), others find weak or insignificant impacts, especially in earlier periods of FinTech diffusion (Nwayen et al., 2024; Nwankwo & Okoli, 2023). International evidence from Indonesia and India similarly suggests that digital channels such as internet and mobile banking enhance profitability, though outcomes depend on bank size, technology integration, and market structure (Medyawati et al., 2021; Kshitika et al., 2019).

3. Methodology

This study adopts an ex-post facto research design to examine the effect of financial technology on the profitability of commercial banks in Nigeria using historical data. The design is appropriate as the study relies on existing secondary data and does not involve manipulation of the study variables. The population comprises all 24 licensed commercial banks operating in Nigeria, and given the aggregate nature of the analysis, the entire population is covered without sampling. Quarterly data spanning 2009–2024 are employed to ensure adequate time-series depth and capture both short- and long-term dynamics in fintech adoption and bank performance. Secondary data are sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin. Bank profitability is proxied by Net Interest Margin (NIM), while financial technology adoption is measured using the volume of Automated Teller Machine (ATM) transactions, Point of Sale (POS) transactions, mobile banking transactions, and internet banking transactions. Data analysis is conducted using the Autoregressive Distributed Lag (ARDL) modelling technique, chosen for its suitability in handling variables integrated of mixed orders, I(0) and I(1). Preliminary analyses include descriptive statistics to summarise the data and Augmented Dickey-Fuller (ADF) unit root tests to assess stationarity. The ARDL framework is then applied to estimate both the short-run and long-run relationships between financial technology indicators and bank profitability, ensuring robust inference and avoiding spurious regression outcomes. The functional model is specified as:

$$\mathrm{PROF}_t = f(\mathrm{ATM}_t, \mathrm{POS}_t, \mathrm{MBA}_t, \mathrm{INB}_t)$$

The general form of the ARDL model can be specified as follows:

$$\Delta NIM_t = \alpha + \sum_{i=1}^{p} \beta_1 \Delta NIM_{t-1} + \sum_{j=0}^{q} \beta_2 \Delta ATM_{t-j} + \sum_{k=0}^{q} \beta_3 \Delta POS_{t-k} + \sum_{l=0}^{q} \beta_4 \Delta MBA_{t-l} + \sum_{m=0}^{q} \beta_5 \Delta INB_{t-m} + \gamma_1 \Delta NIM_{t-1} + \gamma_2 \Delta ATM_{t-1} + \gamma_3 \Delta POS_{t-1} + \gamma_4 \Delta MBA_{t-1} + \gamma_5 \Delta INB_{t-1} + \epsilon_t$$

Were,

Δ represents the first difference of the variable (to ensure stationarity).

- PROF: Bank profitability, measured by Net Interest Margin (NIM).
- ATM: Automated Teller Machine usage, measured by the volume or value of ATM transactions.
- POS: Point of Sale transactions, measured by the volume or value of POS transactions.
- MBA: Mobile banking usage, measured by the value of mobile banking transactions.
- INB: Internet banking usage, measured by the volume or value of internet banking transactions.

$\boldsymbol{\alpha}$ is the constant term, γ are the long-run coefficients, $\boldsymbol{\beta}$ are the short-run coefficients, and $\boldsymbol{\epsilon t}$ is the error term.

p and **q** are the maximum lags for the dependent and independent variables, respectively, chosen based on model selection criteria such as the Akaike Information Criterion (AIC).

Table 1: Description of Variables

Variable	Description	Measurement	Expected Sign
PROF	Bank profitability	Net Interest Margin (NIM)	Dependent
ATM	Automated Teller Machine usage	Volume or value of ATM transactions	+
POS	Point of Sale transactions	Volume or value of POS transactions	+
MBA	Mobile banking usage	Value of mobile banking transactions	+
INB	Internet banking usage	Volume or value of internet banking transactions	+/–

4. Results and Discussion

Table 2: Descriptive Statistics Analysis

	NIM	ATM	POS	MBA	INB
Mean	3.959688	266.3125	200.0156	467.4219	149.8750
Median	3.910000	251.0000	203.0000	519.0000	144.5000
Maximum	5.970000	497.0000	395.0000	793.0000	290.0000
Minimum	2.080000	57.00000	40.00000	119.0000	10.00000
Std. Dev.	1.065410	136.2521	107.1838	195.6960	79.17421
Skewness	0.117464	0.207352	0.107005	-0.170865	0.105280
Kurtosis	1.950344	1.771399	1.728221	1.825225	1.941643
Jarque-Bera	3.085247	4.483838	4.435255	3.991671	3.105216
Probability	0.213819	0.106254	0.108867	0.135900	0.211695
Sum	253.4200	17044.00	12801.00	29915.00	9592.000
Sum Sq. Dev.	71.51119	1169572.	723767.0	2412706.	394919.0
Observations	64	64	64	64	64

Source: E-view 10 Output

The descriptive statistics in Table 2 summarize the behavior of the study variables: Net Interest Margin (NIM), Automated Teller Machine (ATM), Point-of-Sale (POS), Mobile Banking Applications (MBA), and Internet Banking (INB) over 64 quarterly observations. The average NIM of commercial banks during the period is 3.96%, with a minimum of 2.08% and a maximum of 5.97%. The standard deviation of 1.07 shows moderate variability around the mean. The distribution is nearly symmetric (skewness = 0.117), and kurtosis (1.95) indicates a slightly flatter distribution compared to normal. This suggests that bank profitability measured by NIM remained relatively stable with no extreme outliers during the study period. ATM transactions recorded a mean value of 266.31 million Naira,

ranging between 57 million and 497 million. The standard deviation of 136.25 reveals a high degree of variability across the period. The positive skewness (0.207) indicates that values are tilted slightly towards the higher end, though not extreme, while the kurtosis (1.77) suggests a flat distribution. This shows that ATM usage varied significantly over time, reflecting expansion in banking access points and customer reliance on ATM services.

POS transactions averaged 200.02 million Naira, with a minimum of 40 million and a maximum of 395 million. A standard deviation of 107.18 highlights substantial fluctuations. The distribution is almost symmetric (skewness = 0.107), with low kurtosis (1.73), implying flatness relative to normal. This pattern reflects the rapid but uneven growth of POS adoption in Nigeria, particularly as cashless policy measures expanded. Mobile banking transactions had the highest average among fintech channels, at 467.42 million Naira, with values ranging from 119 million to 793 million. The standard deviation of 195.70 suggests high variability, consistent with the rapid adoption of mobile banking over the years. The distribution is slightly negatively skewed (-0.171), indicating more concentration of values at the upper end. Kurtosis (1.83) again reflects a relatively flat distribution. This underscores mobile banking's strong and expanding role in digital banking profitability. Internet banking transactions averaged 149.88 million Naira, with a minimum of 10 million and a maximum of 290 million. The standard deviation of 79.17 indicates considerable variability. The distribution is slightly positively skewed (0.105), while kurtosis (1.94) is below normal, suggesting flatness. This shows that while internet banking expanded, its adoption remained uneven, with wide differences across quarters.

For all variables, the Jarque-Bera probabilities exceed the 5% significance level, meaning the null hypothesis of normality cannot be rejected. This implies that the variables are approximately normally distributed, making them suitable for regression analysis and inferential testing. The descriptive analysis shows that fintech channels in Nigeria particularly mobile banking have experienced rapid growth, though with high variability over time. POS and ATM transactions also reflect expansion but with uneven adoption, while internet banking shows moderate penetration. Profitability (NIM) remained relatively stable, with no extreme deviations. These statistics suggest that fintech adoption has been dynamic, with mobile banking emerging as the dominant and most consistent driver of transaction volume in Nigerian commercial banks.

Table 3: ADRL Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
NIM (-1)	0.136096	0.132060	1.030558	0.3076
ATM	0.001152	0.000979	1.177226	0.2446
POS	-0.002174	0.001289	-1.686362	0.0978
POS (-1)	0.000252	0.001190	0.211532	0.8333
POS (-2)	-0.000924	0.001170	-0.790004	0.4332
POS (-3)	-0.003181	0.001208	-2.633758	0.0112
MBA	0.002187	0.000721	3.031632	0.0038
MBA (-1)	-0.001124	0.000752	-1.495278	0.1410
INB	-0.003480	0.001721	-2.022514	0.0484
C	4.327077	0.950163	4.554037	0.0000
R-squared	0.288773	Mean dependent var		3.921148
Adjusted R-squared	0.163263	S.D. dependent var		1.055786
S.E. of regression	0.965763	Akaike info criterion		2.917023
Sum squared resid	47.56758	Schwarz criterion		3.263068
Log likelihood	-78.96921	Hannan-Quinn criter.		3.052642
F-statistic	2.300787	Durbin-Watson stat		1.986450
Prob(F-statistic)	0.029621			

Source: E-view 10 Output

The ARDL result shows how financial technology indicators (ATM, POS, MBA, and INB) affect the Net Interest Margin (NIM) of commercial banks in Nigeria between 2009Q4 and 2024Q4. ATM transactions have a positive coefficient (0.001152), but the effect is not statistically significant (p = 0.245). This suggests that ATM usage, though

widely adopted, does not significantly improve banks' interest margins. This may be because ATM services are often cost-intensive to maintain and generate limited fee-based income relative to their operational expenses. POS transactions reveal mixed effects. The contemporaneous coefficient is negative (-0.002174, p = 0.098), indicating that increased POS transactions in the short run may reduce profitability. Interestingly, the third lag of POS (-0.003181, p = 0.011) is also significantly negative, reinforcing that over time, higher POS activity might pressure banks' margins. This could be linked to transaction costs, merchant service fees, and competitive pricing, which reduce net income from POS services.

Mobile Banking Application (MBA) transactions have a strong positive and significant relationship with NIM (0.002187, p = 0.004). This indicates that mobile banking adoption enhances profitability, likely due to its scalability, lower operational costs compared to physical banking, and the ability to drive higher transaction volumes. Even though the lagged MBA coefficient is negative (-0.001124, p = 0.141), the overall evidence suggests mobile banking contributes meaningfully to banks' margins in Nigeria. Internet Banking (INB) shows a negative and significant impact on NIM (-0.003480, p = 0.048). This implies that while internet banking provides convenience, its direct contribution to bank profitability is limited. High initial setup costs, cybersecurity risks, and customer service infrastructure may outweigh the short-term gains from internet banking services. The lagged dependent variable (NIM (-1)) is positive but insignificant (p = 0.308), showing weak persistence of profitability over time in this model. The constant term (4.327077, p < 0.001) indicates that other unobserved factors, aside from fintech adoption, play a significant role in sustaining banks' profitability.

The model fit is moderate ($R^2 = 0.289$; Adjusted $R^2 = 0.163$), suggesting fintech explains about 16% of the variation in banks' profitability. The overall model is statistically significant (Prob(F) = 0.0296), indicating fintech channels jointly influence profitability. The Durbin-Watson statistic (1.986) is close to 2, showing no evidence of serial correlation, which validates the model reliability. The findings reveal that mobile banking is the most profitable fintech channel, underscoring its central role in shaping the future of banking in Nigeria. It offers scalability, reduces operational costs, and drives higher transaction volumes, making it a sustainable source of profitability. In contrast, both POS and internet banking tend to reduce margins, which suggests that banks may need to revisit their pricing models, transaction fee structures, and operational strategies to make these channels more efficient and profitable. ATM usage, on the other hand, shows little effect on profitability, indicating that while it enhances customer accessibility, it does not significantly drive bank earnings. Overall, the results confirm that fintech adoption has a differential impact on bank profitability, with some channels strengthening margins while others erode them.

A. Discussion of Findings

(a) Mobile Banking Applications and Net Interest Margin of Commercial Banks in Nigeria

The results indicate that mobile banking has a positive and significant effect on the Net Interest Margin of commercial banks in Nigeria. This finding suggests that mobile banking serves as a driver of profitability, providing banks with a cost-effective platform to deliver services, expand customer reach, and increase transaction volumes. The scalability and efficiency of mobile applications lower transaction costs and enhance revenue from service charges, which in turn improves banks' margins. This result is consistent with studies such as Oyewole et al. (2013), who found that mobile banking adoption improved bank performance in Nigeria, and Babajide et al. (2020), who reported that mobile payment systems significantly enhance profitability through increased financial inclusion. It also aligns with the Technology Acceptance Model (TAM), which emphasizes that perceived usefulness drives adoption, ultimately yielding business value for banks. From the perspective of the Resource-Based View (RBV), mobile banking represents a strategic resource that strengthens banks' competitive advantage and profitability.

(b) Point-of-Sale (POS) Machine and the Net Interest Margin of Commercial Banks in Nigeria

The findings show that POS transactions have a significant but negative effect on profitability. In the short run, POS usage reduces Net Interest Margin, and the lagged effects further confirm its negative influence. This suggests that while POS promotes cashless transactions and financial deepening, it also imposes costs on banks, such as infrastructure maintenance, merchant service fees, and security management, which can erode profitability. This outcome supports the findings of Acha et al. (2021), who noted that POS services often increase operational costs for Nigerian banks without a corresponding increase in income. However, it contrasts with Adeoti and Oshotimehin (2012), who argued that POS promotes financial intermediation and could enhance profitability in the long run. The

result is in line with Disruptive Innovation Theory, which suggests that new technologies may initially undermine profitability until institutions adapt their business models to capture long-term value.

(c) Automated Teller Machines (ATMs) and the Net Interest Margin of Commercial Banks in Nigeria

The analysis reveals that ATMs have no significant impact on banks' profitability. Although ATMs enhance customer convenience and accessibility, they contribute little to margins, possibly due to high maintenance costs, regulatory charges, and rising cases of fraud or machine downtime. This indicates that ATMs function more as service enhancers than revenue generators for Nigerian banks. This finding supports the work of Adesina and Ayo (2010), who observed that ATMs were critical to service delivery but did not significantly affect profitability. It also aligns with Oginni et al. (2013), who reported that ATMs increase customer satisfaction without corresponding improvement in bank margins. The result can be interpreted through the lens of the Service Profit Chain Theory, which posits that customer satisfaction does not automatically translate into financial performance if operational costs outweigh revenue gains.

(d) Internet banking and the Net Interest Margin of commercial banks in Nigeria

The study shows that internet banking has a significant negative effect on profitability. This suggests that although internet banking promotes efficiency, convenience, and digital access, it comes with heavy setup costs, cybersecurity risks, and compliance expenditures that reduce banks' margins in Nigeria. In addition, stiff competition among banks offering similar internet banking platforms may reduce the ability to generate meaningful revenue from this channel. Empirical evidence from Oladejo (2016) supports this finding, showing that internet banking adoption in Nigeria increased costs and reduced short-term profitability. Similarly, Onaolapo and Odetayo (2012) observed that while internet banking enhances service delivery, it does not immediately translate into higher margins. The finding resonates with Innovation Diffusion Theory, which suggests that the economic benefits of innovations like internet banking may only materialize in the long run, after banks overcome the initial adoption and infrastructure costs.

5. Conclusion

This study provides empirical evidence on the heterogeneous effects of financial technology channels on the profitability of Nigerian commercial banks, proxied by Net Interest Margin, over the period 2009–2024. The findings reveal that fintech adoption does not uniformly enhance bank profitability. Mobile banking emerges as the most effective fintech channel, significantly improving net interest margins through cost efficiency, wider customer reach, and increased transaction volumes. In contrast, point-of-sale and internet banking channels exert negative effects on profitability, largely reflecting high infrastructural, operational, and security-related costs that outweigh their revenue contributions. Automated teller machine usage shows no significant impact on profitability, indicating its diminishing role as a margin-enhancing channel in the evolving digital banking sector. Overall, the study concludes that while fintech has become integral to modern banking operations, its profitability implications depend on the specific channel and the efficiency with which it is deployed. Strategic alignment, cost management, and channel-specific optimization are therefore critical for translating fintech adoption into sustainable profitability gains. Based on the empirical findings, the following recommendations are proposed:

- Commercial banks should prioritize investment and innovation in mobile banking platforms, as this channel demonstrates the strongest and most consistent positive impact on profitability.
- Banks should reassess transaction pricing, fee structures, and operational processes associated with POS and internet banking to mitigate cost pressures and reduce their negative effect on margins.
- While ATMs remain important for customer access and service delivery, banks should limit further expansion and focus on efficiency improvements, recognizing their limited contribution to profitability.
- Regulators should promote policies that enhance digital efficiency and reduce the cost burden of fintech deployment, including shared infrastructure and standardized cybersecurity frameworks.
- Banks should intensify digital literacy and customer awareness initiatives to deepen usage of profitable fintech channels, particularly mobile banking, thereby strengthening revenue sustainability.

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