FINANCIAL TECHNOLOGY AND DEPOSIT MONEY BANKS PERFORMANCE IN NIGERIA

BY

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A PROJECT SUBMITTED TO THE DEPARTMENT OF FINANCE, FACULTY OF MANAGEMENT SCIENCES, UNIVERSITY OF BENIN, BENIN CITY FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE BACHELOR OF SCIENCE (B.SC) DEGREE IN FINANCE, UNIVERSITY OF BENIN

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DECLARATION

I, the undersigned solemnly declare that the project is based on my own work carried out during the course of my study. I affirmed that the statement made and conclusions drawn are corollary of my research work. I further authenticate that the work contained in the report is original and has been done by me under the general supervision of my supervisor. The work has not been submitted to any institution for any other degree or diploma certificate programme in this university or any other university.

Philip Osilama Azegbeobor
(Project Student)

CERTIFICATION

We certify that this work was carried out by **Philip Osilama Azegbeobor** with Matriculation Number: **MGS2104727** of the Department of Finance, Faculty of Management Sciences, University of Benin, Benin City.

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DEDICATION

I dedicate this work to God Almighty, the Alpha and Omega who saw me through my journey as an undergraduate in the University of Benin and also to my supporting family especially my father, Sir. Peter Azegbeobor.

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ABSTRACT

The study empirically examined the impact of financial technology on performance of deposit money banks in Nigeria over the period 2009Q1 to 2024Q4. The specific objectives of the study were to find out whether automated teller machine (ATM), point of sales terminal (POS), internet banking (INTB) and mobile banking (MOB) have significant relationship with deposit money banks performance. The fully modified least squares method was used for the analysis of data, and the results obtained revealed that automated teller machine (ATM) had significant negative relationship with deposit money banks performance; point of sales terminal (POS) had a weak negative relationship with DMBP; internet banking (INTB) had a significant positive impact on performance, and while mobile banking (MOB) has a weak positive relationship with deposit money banks performance in Nigeria. The study conclude that in the determination of deposit money banks performance in Nigeria, ATM, POS and INTB are relevant financial technology factors to be considered because of their critical role in ensuring high level of performance of deposit money banks in Nigeria. The study recommends among others that, management should continue to ensure that more ATM stands or points where customers can easily withdraw money, especially those who in-hard-to reach areas should be provided. Regular and routine servicing and monitoring of these ATM machines must be carried out. These will go a long way to enhance overall banks' performance in the country.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The performance of deposit money banks (DMBs) remains central to the stability and growth of Nigeria's financial system, given their critical role in financial intermediation, monetary policy transmission, and economic development (Ogbuji & Lawal, 2024). Bank performance, typically assessed through indicators such as return on assets (ROA), return on equity (ROE), and net interest margin (NIM), reflects the efficiency, profitability, and stability of financial institutions (Gwatiringa, 2020). In recent years, the Nigerian banking sector has undergone regulatory reforms, recapitalization, and digital restructuring, all aimed at improving competitiveness and operational efficiency (Abdul-Maliq, Henry & Oje, 2024). Nonetheless, the persistent challenges of low financial inclusion, high operational costs, and systemic inefficiencies have necessitated the adoption of innovative tools, particularly financial technology, as a pathway to improved bank performance (Siano et al., 2020).

Financial technology (FinTech) refers to the integration of digital innovation with financial services to enhance service delivery, improve customer experience, and streamline banking operations (Barbu et al., 2021). In the Nigerian context, FinTech has evolved rapidly, particularly since the early 2010s, driven by increased smartphone penetration, regulatory support, and the rise of mobile money platforms (Ifechukwu, 2022). The Central Bank of Nigeria (CBN) has promoted various FinTech initiatives including sandbox regulations, digital banking licenses, and real-time settlement systems (Olatunji, 2020). These policies have spurred a wave of collaboration and competition between traditional banks and FinTech startups, prompting banks to adopt more agile, customer-centric technologies in their core operations (Ogwu, 2022). Such transformations are not merely technological but strategic, as DMBs increasingly view FinTech as both an opportunity and a necessity for sustaining long-term profitability.

Among the most prominent FinTech tools employed by DMBs in Nigeria are Automated Teller Machines (ATMs), Point-of-Sale (POS) terminals, Web Payment platforms (Web Pay), and Mobile Payments (Mobile Pay). These technologies have collectively transformed the delivery of financial services, enabling 24/7 access to banking, improving payment efficiency, and reducing transaction costs (George, 2024). For instance, the value of POS transactions in Nigeria surged from ₦10.7 trillion in 2023 to ₦18 trillion in 2024, indicating an exponential shift towards cashless and digital banking (Aimuengheuwa, 2025). Likewise, mobile payments recorded over ₦600 trillion in transaction value in 2023 alone, driven by increased smartphone adoption and enhanced user interfaces (Olalekan, 2024). These technologies not only influence operational efficiency but also directly affect customer retention, transaction speed, and overall service delivery, all of which are critical to bank performance metrics.

Given the increasing penetration of FinTech services and their operational significance, it becomes imperative to examine the potential relationship between FinTech adoption and DMB performance. While some studies suggest that the integration of FinTech can enhance profitability, reduce costs, and improve service delivery (Singh, Malik & Jain, 2021; Wang, Xiuping & Zhang, 2021), others warn of possible threats such as cybersecurity risks, disintermediation, and regulatory challenges (Oladinni & Odumuwagun, 2025). The relationship between FinTech and bank performance, therefore, remains complex and multifaceted. It is in this evolving and dynamic environment, marked by digital innovation, regulatory shifts, and consumer behaviour transformation, that the present study seeks to examine the effect of financial technology on the performance of deposit money banks in Nigeria.

1.2 Statement of the Research Problem

The effect of financial technology (FinTech) on the performance of deposit money banks has been a subject of considerable academic interest, yet empirical findings remain mixed and, at times, inconclusive. Several studies in both emerging and advanced economies have reported positive and significant relationships between FinTech adoption and key bank performance metrics such as return on assets (ROA) and return on equity (ROE) (Singh, Malik & Jain, 2021; Almashhadani & Almashhadani, 2022; Al-Shouha et al., 2024). For instance, Singh et al. (2021) found that the integration of FinTech applications, including payment technologies and robotic process automation, significantly enhances profitability in Indian banks. Likewise, Al-Shouha et al. (2024) demonstrated that FinTech adoption improved ROA and ROE in 21 Arabian banks, even during adverse periods such as the COVID-19 pandemic. However, contrasting views exist. Yudaruddin (2023), in a study of Indonesian banks, found that while FinTech startups had a positive impact on Islamic banks during crises, they had an overall detrimental effect on conventional banks. Similarly, Osigbemhe, Nwoha, and Okwo (2023) revealed that common digital channels like ATMs and mobile pay had a negative or insignificant effect on the return on assets of Nigerian banks between 2009 and 2021. These contradictory findings suggest the need for more contextualized and methodologically rigorous research, particularly in Nigeria, to clarify the nature and magnitude of the FinTech–bank performance nexus.

In addition to the inconsistency in findings, methodological limitations are apparent in the existing literature. While several studies have relied on conventional Ordinary Least Squares (OLS) and panel regression techniques (Ashiru, Balogun & Paseda, 2023; Madugba et al., 2021; Isa-Olatinwo, Uwaleke & Ibrahim, 2022), relatively few have employed advanced econometric models that account for potential endogeneity and the dynamic nature of relationships between financial technology and bank performance. The Autoregressive Distributed Lag (ARDL) approach, which accommodates variables integrated at different levels (I(0) and I(1)) and allows for the estimation of both short-run and long-run effects within a single-equation framework, has been underutilized, particularly in African-based studies. The absence of such rigorous techniques in Nigerian studies limits the reliability of previous empirical conclusions and necessitates the application of more robust estimation frameworks like ARDL to obtain statistically valid and policy-relevant results.

Moreover, there exists a conspicuous temporal gap in the literature, particularly regarding recent developments in Nigeria's FinTech landscape from 2019 to 2024—a period marked by the accelerated adoption of digital banking services, regulatory reforms by the Central Bank of Nigeria, and rapid consumer uptake of mobile and electronic payments. Most Nigerian studies, including those by Ibekwe (2021) and Isa-Olatinwo et al. (2022), restrict their analyses to data ending in 2020 or 2021, failing to capture the substantial shifts in consumer behavior and institutional investment in FinTech infrastructure during and after the COVID-19 pandemic. Given the substantial growth in mobile payments, POS transactions, and Web-based banking platforms in this period (Aimuengheuwa, 2025; Olalekan, 2024), the exclusion of recent data undermines the currency and completeness of existing studies. Therefore, a timely investigation covering the extended period up to 2022 or beyond, using advanced econometric methods like ARDL, is necessary to bridge these temporal and methodological gaps. This study thus seeks to offer an empirical contribution by exploring the effect of financial technology on the performance of deposit money banks in Nigeria using a more current dataset and a more rigorous methodological approach.

1.3 Research Questions

The following research questions are raised to guide the study:

i. How does the use of Automated Teller Machines (ATM) influence the performance of deposit money banks in Nigeria?
ii. What is the effect of Point of Sale (POS) transactions on the performance of deposit money banks in Nigeria?
iii. How does the adoption of web-based payment systems (Web Pay) impact the performance of deposit money banks in Nigeria?
iv. To what extent does mobile payment (Mobile Pay) contribute to the performance of deposit money banks in Nigeria?

1.4 Objectives of the Study

The broad objective of this study is to examine the effect of financial technology on the performance of deposit money banks in Nigeria. Specifically, the study seeks to:

i. examine the influence of Automated Teller Machines (ATM) on the performance of deposit money banks in Nigeria;
ii. evaluate the effect of Point of Sale (POS) transactions on the performance of deposit money banks in Nigeria;
iii. assess the impact of web-based payment systems (Web Pay) on the performance of deposit money banks in Nigeria; and
iv. determine the contribution of mobile payment (Mobile Pay) to the performance of deposit money banks in Nigeria.

1.5 Hypotheses of the Study

The study will test the following null hypotheses:

i. The use of Automated Teller Machines (ATM) has no significant influence on the performance of deposit money banks in Nigeria.
ii. Point of Sale (POS) transactions have no significant effect on the performance of deposit money banks in Nigeria.
iii. The adoption of web-based payment systems (Web Pay) has no significant impact on the performance of deposit money banks in Nigeria.
iv. Mobile payment (Mobile Pay) does not significantly contribute to the performance of deposit money banks in Nigeria.

1.6 Significance of the Study

The significance of this research is both extensive and multifaceted, with potential benefits to various stakeholders across the Nigerian financial ecosystem.

Policy Makers and Regulators: For policymakers and regulatory institutions such as the Central Bank of Nigeria (CBN) and the Nigerian Deposit Insurance Corporation (NDIC), this study offers critical insights into the implications of financial technology on the performance of deposit money banks. Understanding the influence of digital platforms such as ATMs, POS systems, Web Pay, and Mobile Pay on bank performance will aid in formulating evidence-based policies that support financial innovation while ensuring systemic stability. Regulators can also utilize the findings to design frameworks that enhance digital banking security, promote financial inclusion, and strengthen the resilience of the banking sector amid rapid technological transformation.

Financial Institutions and Banking Executives: For deposit money banks, FinTech firms, and other financial service providers, the study provides a deeper understanding of how digital financial technologies affect operational performance and profitability. This insight can inform strategic decisions on technology investments, service delivery models, and competitive positioning within the industry. Financial institutions can also identify which FinTech channels most significantly drive performance outcomes such as customer satisfaction, cost efficiency, and revenue growth, thereby enabling more targeted and impactful innovation.

Investors and Economic Analysts: For both local and international investors as well as financial analysts, the study provides empirical evidence on how technology-driven changes in banking operations influence financial performance metrics. This information is essential for investment decision-making, particularly in evaluating the financial health and strategic outlook of Nigerian banks. In addition, analysts and investment advisors can leverage the findings to assess the viability of FinTech partnerships or acquisitions by traditional banks and project their potential return on investment.

Academia and Researchers: For scholars and researchers, the study contributes to the growing body of literature on financial technology and banking performance in emerging economies. It offers a contextualized and data-driven exploration of how digital finance interacts with institutional performance, opening pathways for further investigation into topics such as digital transformation, banking efficiency, and financial innovation. This research can also serve as a reference for comparative studies in other African countries or across different segments of the financial services industry.

1.7 Scope of the Study

This research focuses on examining the relationship between financial technology and the performance of deposit money banks in Nigeria. Specifically, the study investigates how key FinTech channels—Automated Teller Machines (ATM), Point of Sale (POS) transactions, web-based payment systems (Web Pay), and mobile payment platforms (Mobile Pay)—affect the performance of these banks. The analysis will cover the period from 2010 to 2024, a 15-year timeframe that captures the evolution and integration of financial technology within the Nigerian banking sector. The choice of 2010 as the base year is informed by the increasing institutionalization of digital payment infrastructure and policy reforms initiated by the Central Bank of Nigeria to promote cashless banking. This time frame is considered adequate to reflect both the developmental trends in financial technology and their implications for bank performance. The study will rely on secondary data, primarily sourced from the Central Bank of Nigeria's Statistical Bulletins and other reputable financial databases.

1.8 Limitation of the Study

One notable limitation of this study lies in the exclusive reliance on secondary time series data sourced from the Central Bank of Nigeria (CBN) and the Nigeria Inter-Bank Settlement System (NIBSS), which may be subject to data reporting delays, measurement inconsistencies, or missing entries. Additionally, the use of aggregate national data does not account for bank-specific heterogeneity, which might influence performance outcomes across institutions. Methodologically, the study employed the Fully Modified Ordinary Least Squares (FMOLS) estimation technique to correct for serial correlation and endogeneity in the presence of cointegrated variables. While FMOLS provides robust long-run estimates, it is sensitive to the quality and stationarity of the data. To mitigate these limitations, the study conducted unit root and cointegration tests to ensure the validity of the model, used data spanning a sufficiently long period (2010–2024) to enhance result reliability, and applied robust standard errors to correct for any potential heteroskedasticity and autocorrelation. Despite these efforts, the generalizability of the findings remains limited to macro-level trends and may not fully capture micro-level variations across individual banks.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter is organized into three primary sections: the conceptual review, the theoretical review, and the empirical review. The conceptual review offers an in-depth analysis and clarification of the central concepts and constructs pertinent to the study's subject matter. The theoretical review examines key theories that provide foundational insights and explanatory frameworks relevant to the research theme. The empirical review assesses existing scholarly studies and findings that relate directly to the current investigation. The chapter concludes by identifying the gaps present in the extant literature.

2.2 Conceptual Review

2.2.1 Bank Performance

Bank performance refers to the overall capacity of a banking institution to achieve its strategic and operational objectives within a competitive and regulated financial environment. It reflects the institution's ability to effectively mobilize and allocate resources to generate sustainable value for stakeholders, including shareholders, depositors, regulators, and the broader economy (Choudhry, 2022). From a strategic perspective, performance in banking embodies the extent to which a bank maintains financial stability, enhances shareholder wealth, and adapts to market dynamics, while adhering to prudential regulations and risk management principles (Nayak, 2021). It is not merely the outcome of profit-making activities but also a manifestation of operational resilience, institutional adaptability, and the capacity to innovate in product offerings, service delivery, and customer engagement (Nicoletti, 2021). In this context, performance encompasses both tangible financial results and intangible attributes such as customer trust, market positioning, and technological integration that underpin the institution's long-term viability.

The conceptualization of bank performance has also been linked to its ability to efficiently transform inputs such as capital, labor, and technology into outputs that meet the demands of customers and markets in a sustainable manner (Quoc Trung, 2021). This transformation process is influenced by external factors including macroeconomic conditions, regulatory frameworks, and competitive pressures, as well as internal capabilities like managerial competence and technological adoption (Ferilli, 2025). Modern scholarship emphasizes that bank performance is inherently dynamic, shaped by structural changes in the financial system, digital transformation, and evolving customer preferences (Zhao et al., 2022). Therefore, a comprehensive definition of bank performance extends beyond traditional accounting-based profitability to encompass strategic adaptability, operational efficiency, and the ability to leverage innovations such as financial technology to maintain competitive advantage and fulfill the intermediary role between savers and borrowers in an increasingly complex financial ecosystem (Akbar, 2021; Marikyan & Papagiannidis, 2021).

2.2.2 Measures of Bank Performance

Bank performance is commonly assessed through a variety of financial indicators that capture different dimensions of profitability, efficiency, and value creation. Among these, Return on Assets (ROA), Return on Equity (ROE), Net Interest Margin (NIM), and Profit Before and After Tax (PBT and PAT) are widely adopted in academic and professional banking analyses to provide a multi-faceted evaluation of institutional effectiveness and financial sustainability.

2.2.2.1 Return on Assets (ROA)

Return on Assets (ROA) reflects a bank's ability to utilize its total assets to generate net income, serving as an indicator of overall efficiency in resource deployment. In essence, ROA expresses how well management converts the bank's asset base comprising loans, investments, and other earning assets into profits, regardless of the institution's capital structure (Basnet, 2024). A higher ROA suggests more effective operational performance, as it demonstrates that the bank is generating more income per unit of assets under its control (Ibekwe, 2021). ROA is particularly relevant in comparative studies across banks of varying sizes because it neutralizes the effects of leverage, thereby focusing on operational proficiency rather than capital intensity (Madugba et al., 2021). In modern banking environments where digital channels and fintech-driven efficiencies are increasingly significant, ROA also signals how effectively a bank adapts its asset utilization strategies to evolving market conditions and technological advancements (Alagbe & Yinus, 2025).

2.2.2.2 Return on Equity (ROE)

Return on Equity (ROE) measures the profitability generated relative to shareholders' equity, thus capturing the rate of return earned on the owners' invested capital. It is often regarded as a key metric of shareholder value creation, as it reveals how effectively a bank's management employs equity capital to produce earnings (Chukwuekwu, 2024). ROE is influenced by both operational efficiency and financial leverage, making it sensitive to changes in capital structure, dividend policy, and earnings management strategies (Agarwal, Malik, & Gautam, 2024). In competitive and innovation-driven banking markets, a strong ROE signals not only profitability but also the institution's ability to maintain investor confidence and attract additional capital for growth (Nwankwo & Agbo, 2021). For this reason, ROE remains a central benchmark for performance evaluation in both academic research and strategic decision-making in the banking sector (Singh, Malik, & Jain, 2021).

2.2.2.3 Net Interest Margin (NIM)

Net Interest Margin (NIM) is a profitability ratio that assesses the difference between interest income generated from earning assets such as loans and investments and the interest paid on deposits and other borrowed funds, expressed as a percentage of average earning assets. It serves as a critical measure of a bank's core intermediation function and pricing efficiency (Ahmed, Naala, & Gambo, 2025). A healthy NIM indicates that the bank is managing its funding costs effectively while optimizing the yield on its interest-earning portfolio, reflecting robust asset-liability management practices (Ashiru et al., 2023). However, NIM is sensitive to interest rate environments, competition, and regulatory constraints, meaning that banks must balance aggressive lending strategies with prudent risk management to sustain it (Taiwo, Akande, & Adekunle, 2024). In contexts where non-interest income is growing in importance due to fintech-driven diversification, NIM still remains a cornerstone metric for evaluating traditional banking profitability (Muttai, Njoka, & Muchira, 2023).

2.2.2.4 Profit Before and After Tax (PBT and PAT)

Profit Before and After Tax (PBT and PAT) represent absolute measures of a bank's profitability, with PBT reflecting earnings generated from all activities before taxation, and PAT capturing the net earnings available to shareholders after tax obligations have been settled. PBT provides insight into the operational strength and efficiency of a bank without the distortion of tax effects, while PAT is the ultimate measure of financial success from the perspective of equity holders (Aduku et al., 2025). Both measures are influenced by interest and non-interest income streams, operational costs, loan loss provisions, and extraordinary items (Salawudeen & Suleiman, 2025). In performance assessment, sustained growth in PBT and PAT signals robust revenue generation capacity, effective cost control, and resilience in navigating macroeconomic and regulatory challenges (Chelangat, Kiprop, & Mutai, 2022). They are therefore essential in evaluating the absolute scale of profitability and in determining dividend distribution capacity, retained earnings for reinvestment, and long-term shareholder value creation.

2.2.3 Financial Technology

Financial technology, or FinTech, is broadly understood as the application of innovative digital tools, systems, and processes aimed at enhancing the efficiency, accessibility, and quality of financial services. It encompasses the use of modern technological capabilities to design, deliver, and improve banking and financial solutions, integrating advanced computing, data analytics, and connectivity to transform traditional financial operations into more adaptive, customer-centric, and cost-efficient models (Nicoletti, 2021). At its core, FinTech represents the intersection of finance and technology, where emerging innovations are deployed to improve financial intermediation, risk assessment, transaction processing, and service delivery in ways that transcend the limitations of conventional banking infrastructures (Choudhry, 2022). It is not merely about digitising existing services but also about redefining the underlying business models of financial institutions to align with the evolving demands of globalised and increasingly digital economies (Ferilli, 2025).

From an academic perspective, FinTech is increasingly conceptualised as both a disruptive and enabling force in the banking sector. It disrupts by challenging established market structures, regulatory frameworks, and competitive boundaries, while enabling by fostering new value creation, operational resilience, and financial inclusion (Zhao et al., 2022). This dual nature aligns with contemporary theoretical frameworks, such as the Unified Theory of Acceptance and Use of Technology, which emphasises the interplay between perceived usefulness, ease of use, and behavioural intention in technology adoption (Marikyan & Papagiannidis, 2021). In banking, FinTech innovations alter not only the technical aspects of service delivery but also the strategic dynamics of competition, requiring institutions to integrate technological capabilities as a fundamental driver of performance and long-term sustainability (Quoc Trung, 2021; Nayak, 2021). Consequently, the definition of FinTech extends beyond a narrow operational lens to a broader institutional transformation process—one that reshapes how financial systems function, interact with markets, and contribute to economic development in the digital era

2.2.4 Various Financial Technologies in Banks

In the banking sector, various financial technologies have become integral to service delivery, operational efficiency, and customer engagement. Among these, Automated Teller Machines (ATM), Point of Sale (POS) transactions, web-based payment systems (Web Pay), and mobile payment platforms (Mobile Pay) represent core channels through which banks extend financial access, reduce transaction costs, and compete in the evolving digital finance landscape (Ibekwe, 2021; Madugba et al., 2021).

2.2.4.1 Automated Teller Machines (ATM)

The Automated Teller Machine (ATM) is one of the earliest and most transformative financial technologies in modern banking, providing customers with uninterrupted, location-independent access to cash withdrawals, deposits, account inquiries, and a range of other basic transactions. ATMs have redefined the traditional banking experience by significantly reducing the need for in-branch visits, thereby lowering operational burdens on bank staff and enabling round-the-clock service provision (Ibekwe, 2021). In addition to facilitating convenience for customers, ATMs have enhanced banks' market reach by enabling service penetration into semi-urban and rural areas where physical branch expansion might be economically prohibitive. This self-service channel has also been integrated with debit and credit card systems, allowing interoperability across bank networks and fostering greater transaction volumes. While ATMs incur installation and maintenance costs, their long-term value lies in their ability to process high transaction volumes efficiently, reducing per-unit transaction costs and increasing overall service availability (Madugba et al., 2021). The technology continues to evolve with the integration of biometric authentication, contactless card readers, and advanced fraud detection systems, aligning with global trends in secure and user-friendly financial service delivery.

Beyond their operational benefits, ATMs also play a strategic role in enhancing customer satisfaction and loyalty. Their deployment has been linked to improved perceptions of bank responsiveness and service quality, especially in competitive markets where accessibility is a critical differentiator (Muttai, Njoka, & Muchira, 2023). The availability of multilingual interfaces, support for multiple account types, and integration with bill payment and fund transfer capabilities has broadened the ATM's role from a simple cash dispenser to a multifunctional service terminal. Moreover, ATMs support a wider ecosystem of digital payments by serving as cash-in and cash-out points for mobile wallets and prepaid cards, bridging the gap between cash-based and cashless economies. This versatility ensures that ATMs remain relevant in an era of expanding digital finance, acting as a hybrid touchpoint between traditional banking infrastructure and emerging FinTech platforms.

2.2.4.2 Point of Sale (POS) Transactions

Point of Sale (POS) technology enables electronic payment for goods and services directly at merchant locations, typically through debit or credit card processing terminals linked to bank networks. POS systems have become a cornerstone of modern retail payments, allowing customers to complete transactions without the need for cash handling while simultaneously providing merchants with secure, rapid settlement of funds (Aduku et al., 2025). In banking, POS deployment extends the institution's reach into everyday commercial activity, positioning the bank as a facilitator of seamless payment flows between consumers and businesses. This integration into retail and service environments fosters higher transaction volumes, increases the usage of bank-issued payment cards, and deepens customer engagement through loyalty and rewards programs. The adoption of POS technology has been accelerated by advances in wireless connectivity and mobile POS devices, which enable transactions even in locations without fixed internet infrastructure, thereby enhancing financial inclusion and market coverage (Ibekwe, 2021).

From an operational perspective, POS transactions generate valuable data on consumer spending patterns, merchant activity, and transaction frequency, which banks can leverage for product development, targeted marketing, and credit risk assessment. This data-driven dimension positions POS not only as a payment channel but also as a strategic information asset for banks seeking to expand lending and cross-selling opportunities (Ashiru, Balogun, & Paseda, 2023). Furthermore, the proliferation of POS systems reduces the circulation of physical cash, thereby lowering the costs and security risks associated with cash handling for both banks and merchants. However, the effective deployment of POS networks requires substantial investment in infrastructure, merchant onboarding, and fraud prevention systems. Recent developments such as contactless payments, QR-code integration, and compatibility with mobile wallets have further increased the utility of POS systems, aligning them with global trends towards cashless transactions. Consequently, POS technology serves as both a revenue driver and an enabler of digital transformation in the banking industry, supporting the shift toward a more integrated, data-rich, and customer-centric payment ecosystem.

2.2.4.3 Web-Based Payment Systems (Web Pay)

Web-based payment systems, often referred to as Web Pay, constitute a vital digital channel through which banks facilitate the settlement of financial transactions over the internet. These platforms allow customers to initiate and complete payments for goods, services, and bills directly from their bank accounts using secure online interfaces, bypassing the need for physical visits to banking halls (Ilo, Soyebo, & Olaiya, 2024). Web Pay systems are typically integrated into banks' internet banking portals or corporate payment gateways, enabling both retail and institutional clients to transfer funds, pay utilities, purchase goods from e-commerce merchants, and manage recurring payments in a highly convenient, time-efficient manner. This channel not only expands the transactional capabilities of customers beyond the limitations of geography and banking hours but also enhances operational efficiency for banks by automating payment processing and reducing manual intervention in routine transactions (Ibekwe, 2021). The security architecture of Web Pay platforms has evolved significantly, incorporating encryption protocols, two-factor authentication, and real-time transaction alerts to mitigate the risks of cyber fraud, which is a persistent challenge in digital payment ecosystems. The integration of Web Pay systems with global payment networks further allows customers to transact internationally, thereby positioning banks as active players in the globalized digital economy.

Strategically, Web Pay platforms serve as a competitive differentiator in the modern banking environment, where speed, convenience, and reliability of service delivery significantly influence customer loyalty (Muttai, Njoka, & Muchira, 2023). They also provide banks with valuable transaction-level data, which can be leveraged for analytics-driven decision-making, such as detecting emerging payment trends, profiling customer segments, and identifying cross-selling opportunities for complementary banking products. By facilitating real-time settlement and detailed transaction reporting, Web Pay enhances transparency and record-keeping, thereby meeting both customer expectations and regulatory compliance requirements. Furthermore, in the era of omnichannel banking, Web Pay acts as a critical link between other digital channels such as mobile banking, POS transactions, and ATM services, creating an interconnected ecosystem of financial access points. The widespread adoption of e-commerce has amplified the strategic importance of Web Pay for banks, as these systems enable seamless merchant integration, competitive transaction fees, and scalable infrastructure to handle increasing payment volumes. Consequently, Web Pay is no longer merely an optional service but a core component of a bank's digital service strategy, central to enhancing customer experience, driving revenue from transaction fees, and reinforcing the institution's position in the digital finance landscape.

2.2.4.4 Mobile Payment Platforms (Mobile Pay)

Mobile payment platforms, commonly referred to as Mobile Pay, represent one of the fastest-growing financial technologies in the global banking sector, enabling customers to execute transactions using smartphones, tablets, and other mobile devices. These platforms allow users to transfer funds, pay bills, purchase goods and services, and manage accounts directly through mobile applications or USSD-based interfaces, offering unmatched convenience and immediacy in financial transactions (Abari-Ogunsona et al., 2025). Mobile Pay services are often integrated with banks' core banking systems, ensuring seamless synchronization of transactions across all customer touchpoints. In addition, their ability to function in both internet-enabled and offline environments (via USSD) has made them particularly impactful in emerging economies, where mobile penetration rates are high but broadband infrastructure may be limited (Ibekwe, 2021). From a service delivery perspective, mobile payment platforms reduce customer dependence on physical bank branches, extend financial services to underserved rural areas, and align banking operations with the lifestyles of increasingly mobile and digitally savvy consumers. Moreover, the integration of biometric authentication, QR code scanning, and near-field communication (NFC) capabilities has expanded the functional scope of Mobile Pay systems beyond simple money transfers to include advanced retail payments, transit ticketing, and peer-to-peer payment capabilities.

From a strategic and operational standpoint, Mobile Pay has become a critical driver of customer acquisition, engagement, and retention in modern banking (Salawudeen & Suleiman, 2025). Its high transaction frequency generates significant volumes of real-time data, enabling banks to conduct sophisticated analytics for credit scoring, targeted marketing, and fraud detection. Mobile Pay platforms also support interoperability across multiple financial service providers, enabling cross-bank transactions and integration with fintech services, which enhances customer convenience and strengthens the value proposition of the bank's digital ecosystem. Furthermore, Mobile Pay reduces operational costs by shifting transaction volumes away from cost-intensive in-branch services, thereby improving cost-to-income ratios. However, the channel's rapid growth also necessitates continuous investment in cybersecurity, system scalability, and user education to mitigate fraud risks and ensure sustained customer trust. In competitive markets, banks are leveraging Mobile Pay to roll out loyalty programs, micro-lending services, and embedded financial products, deepening their share of wallet and reinforcing customer stickiness. Overall, Mobile Pay is not merely an add-on digital service but a transformative banking channel that bridges financial inclusion gaps, fosters innovation, and redefines the speed, reach, and convenience of financial transactions in the digital era.

2.2.5 Financial Technology and Bank Performance

The integration of financial technology (FinTech) into banking operations has redefined traditional financial service delivery, altering cost structures, revenue models, and customer engagement, with significant implications for banks' operational efficiency and profitability across global markets (Nicoletti, 2021; Zhao et al., 2022).

2.2.5.1 Automated Teller Machines (ATM) and Bank Performance

The relationship between Automated Teller Machines (ATMs) and bank performance has been widely studied, with evidence showing mixed but context-dependent results. On one hand, ATMs are associated with improved operational efficiency, customer convenience, and increased transactional volumes, all of which can enhance profitability and market reach. Empirical studies in Nigeria (Ibekwe, 2021; Madugba et al., 2021; Alagbe & Yinus, 2025) and Nepal (Basnet, 2024) find a significant positive association between ATM usage and profitability indicators such as Return on Assets (ROA) and Return on Equity (ROE), suggesting that when efficiently deployed, ATMs reduce branch congestion, lower transaction costs, and expand banks' market penetration. Similar results from Kenya (Chelangat, Kiprop, & Mutai, 2022) and Nepal (Adhikari & Pradhan, 2024) reinforce the argument that ATMs enhance productivity and service quality, which in turn supports stronger financial outcomes. This positive relationship aligns with innovation diffusion theory, which posits that technology adoption can yield competitive advantage through operational streamlining and improved service delivery (Marikyan & Papagiannidis, 2021). Furthermore, studies in the Arabian Gulf (Al-Shouha et al., 2024) and Europe (Chhaidar, Abdelhedi, & Abdelkafi, 2023) suggest that ATM deployment remains a core driver of digital transformation strategies, especially when integrated with broader FinTech infrastructures.

However, other empirical investigations reveal that ATMs may have neutral or even negative short-term effects on bank performance, particularly in markets where high capital expenditure, maintenance costs, and fraud risks offset efficiency gains. Research by Money and Iyoha (2025) in Nigeria found that ATMs exerted an inverse impact on profitability measures, attributed to infrastructure costs and underutilization. Similarly, Muttai, Njoka, and Muchira (2023) in Kenya observed a negative correlation between ATM adoption and performance, arguing that technology upkeep, coupled with declining cash usage in favour of mobile transactions, diminishes ATMs' net contribution. Osigbemhe, Nwoha, and Okwo (2023) further highlight that ATM usage in Nigeria demonstrated a non-significant impact on ROA, reflecting diminishing returns when ATM expansion is not matched by transaction growth. These findings suggest that the performance impact of ATMs is contingent upon factors such as cost management, transaction volume, digital channel competition, and strategic integration with other e-banking services. Consequently, while ATMs remain relevant in extending financial access and maintaining customer service continuity, their profitability contribution depends on operational scalability, security innovation, and alignment with evolving customer preferences in increasingly cash-light economies.

2.2.5.2 Point of Sale (POS) Transactions and Bank Performance

Point of Sale (POS) transactions have emerged as a pivotal FinTech channel in linking banking services with retail and merchant ecosystems, with numerous studies demonstrating their capacity to enhance profitability, asset utilization, and customer retention. Research across Nigeria (Aduku et al., 2025; Ashiru, Balogun, & Paseda, 2023; Ibekwe, 2021) consistently shows that POS adoption positively influences both ROA and Profit After Tax (PAT), largely due to the high transaction volumes and fee income generated from merchant payments. Similar evidence from Nepal (Basnet, 2024; Adhikari & Pradhan, 2024) and the MENA region (Kharrat, Trichilli, & Abbes, 2024) indicates that POS deployment supports not only revenue growth but also operational efficiency by reducing cash-handling costs and improving transaction traceability. The Technology-Organisation-Environment (TOE) framework helps explain this performance linkage: POS technology leverages technological readiness, organizational capacity, and a conducive regulatory environment to drive adoption and profitability. Moreover, findings by Taiwo, Akande, and Adekunle (2024) highlight that POS activities exert a statistically significant positive long-run effect on ROA, reinforcing its role as a strategic digital channel in bank performance optimisation.

Nevertheless, like ATMs, the impact of POS systems is not universally positive and may vary with market maturity, infrastructure quality, and merchant adoption rates. For example, Money and Iyoha (2025) report that POS usage in Nigeria exhibited a negative relationship with profitability, primarily due to high deployment costs, transaction failures, and network reliability issues. Nwankwo and Agbo (2021) also identified weak effects of POS adoption on bank performance, underscoring the operational risks and competitive pressures that can erode expected gains. Furthermore, Mohammed, Ibrahim, and Muritala (2022) caution that while POS transactions can significantly improve ROA, the sustainability of such benefits depends on continuous system upgrades, fraud prevention, and effective merchant onboarding. In rapidly digitising economies, competition from mobile payment platforms and QR code-based systems may also cannibalise POS transaction volumes, challenging their long-term profitability. Thus, while POS systems remain a key driver of non-interest income and customer engagement, their performance impact is conditional upon strategic deployment, robust technological infrastructure, and integration within a diversified digital payments ecosystem.

2.2.5.3 Web-Based Payment Systems (Web Pay) and Bank Performance

Web-based payment systems typically embedded within internet banking platforms have become a crucial driver of operational efficiency, revenue diversification, and customer experience in contemporary banking, though their impact on performance varies across markets and implementation strategies. In many empirical contexts, the adoption of Web Pay channels has been linked to stronger financial performance, particularly in markets with high internet penetration and robust digital infrastructure. For instance, Ilo, Soyebo, and Olaiya (2024) report a positive long-run relationship between Web Pay and Nigerian banks' performance, underscoring its capacity to expand transaction volumes and reduce service delivery costs. Similarly, Adhikari and Pradhan (2024) find that e-payment systems—of which Web Pay is a central component—boost productivity and profitability in Nepalese banks, with improvements in both ROA and ROE as online transaction capabilities increase. This aligns with Nicoletti's (2021) "Banking 5.0" framework, which positions internet-based payment technologies as integral to post-pandemic competitiveness, enabling banks to meet rising consumer expectations for convenience, security, and cross-platform accessibility. Furthermore, cross-regional studies (Al-Shouha et al., 2024; Kharrat, Trichilli, & Abbes, 2024) demonstrate that digitalisation metrics often capturing the frequency of online banking and payment service terms positively correlate with ROA and

ROE, indicating that Web Pay functions as a key lever for improving efficiency ratios and shareholder returns in both conventional and Islamic banks.

However, the literature also reveals cases where Web Pay exhibits limited or insignificant direct impact on profitability, especially in early adoption phases or under infrastructural constraints. Madugba et al. (2021) observe that Web Pay had an insignificant effect on both ROA and EPS for Nigerian banks, suggesting that cost recovery periods, customer adoption lags, and cyber-security investments can dilute short-term gains. Mohammed, Ibrahim, and Muritala (2022) similarly note that while internet-based payments have a positive and significant effect on ROA, these benefits are contingent upon reliable network infrastructure and user uptake, both of which remain uneven in some developing economies. Money and Iyoha's (2025) findings reinforce this conditionality: internet banking exerts a statistically significant positive effect on profitability in Nigeria, but its contribution to long-term financial deepening is negligible, indicating that the channel's performance gains may be more operational than developmental. Furthermore, Corbet et al. (2024) caution that the effects of financial innovations, including Web Pay, are not uniformly positive—especially for older, traditional banks, which may experience cannibalisation of existing revenue streams. Thus, while Web Pay represents a potent tool for enhancing bank performance, the magnitude and sustainability of its effects depend on strategic integration, scale efficiency, cybersecurity resilience, and the alignment of service features with evolving customer preferences.

2.2.5.4 Mobile Payment Platforms (Mobile Pay) and Bank Performance

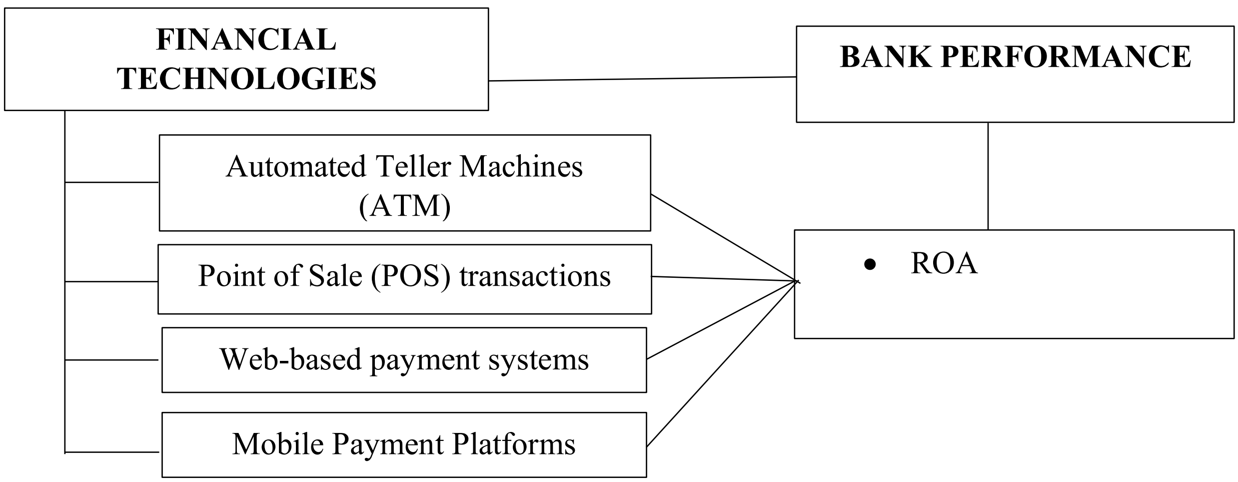
Mobile Pay platforms have emerged as one of the most transformative FinTech channels for banks, with a growing body of empirical research indicating both significant performance benefits and operational challenges. The dominant trend in the literature is a positive linkage between mobile payments and bank profitability, driven by increased transaction volumes, fee income, and improved customer reach. Studies in Nigeria (Ibekwe, 2021; Chukwuekwu, 2024) show that mobile banking significantly and positively influences ROA, while Basnet (2024) finds similar effects in Nepal, where mobile payment adoption correlates strongly with improvements in both ROA and ROE. Mohammed, Ibrahim, and Muritala (2022) likewise establish a positive and significant relationship between mobile payments and ROA for Nigerian commercial banks, emphasising their role in expanding transactional convenience and reducing branch congestion. Evidence from Jordan (Samara et al., 2025) confirms this trend, with structural equation modelling revealing that FinTech apps including mobile payments have a statistically significant positive impact on bank performance, enhancing customer engagement and service accessibility. From a strategic standpoint, these findings align with Zhao et al.'s (2022) argument that financial technology innovations drive competitiveness when integrated with banks' broader operational models, especially in environments where mobile penetration rates outpace traditional banking reach.

Nonetheless, multiple studies highlight a more nuanced picture, where the benefits of Mobile Pay are moderated by cost structures, adoption rates, and market competition. For example, Osigbemhe, Nwoha, and Okwo (2023) find that mobile payments have a positive but statistically insignificant effect on ROA in Nigerian banks, suggesting that profitability gains may not materialise without economies of scale. Similarly, Nwayen, Ukpong, and Uwah (2024) observe a negligible impact of mobile payments on profitability, even though the service retains growth potential if strategically improved. Muttai, Njoka, and Muchira (2023) note that while mobile banking correlates positively with financial performance in Kenya, the effect is not always significant, particularly when infrastructure costs and regulatory compliance erode net benefits. Money and Iyoha's (2025) ARDL analysis further demonstrates that mobile banking has a significant positive short-term effect on profitability in Nigeria, but its long-term role in financial inclusion remains limited. These mixed results suggest that Mobile Pay's performance impact hinges on sustained investment in infrastructure, robust cybersecurity, user education, and integration with complementary services such as agency banking and digital wallets. In sum, Mobile Pay can be a substantial driver of bank performance when leveraged within an efficient, scalable, and customer-centric digital ecosystem, but its profitability contribution is neither automatic nor uniform across banking markets.

2.3 Conceptual Framework

The conceptual framework illustrated in Figure 2.1 depicts the relationship among the study's independent variables (Automated Teller Machines (ATM), Point of Sale (POS) transactions, web-based payment systems (Web Pay), and mobile payment platforms (Mobile Pay)), and the dependent variable, bank performance, measured using return on assets (ROA).

Figure 2.1 Conceptual Framework



Source: Researcher's conceptual framework (2025).

2.4 Theoretical Review

2.4.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), proposed by Davis (1986, 1989), is one of the most influential frameworks in understanding technology adoption in the financial sector. Rooted in the Theory of Reasoned Action (Fishbein & Ajzen, 1975), TAM postulates that an individual's decision to use a new technology is primarily determined by two cognitive beliefs: Perceived Usefulness (PU)—the extent to which a person believes that using the technology will enhance their performance—and Perceived Ease of Use (PEOU)—the extent to which a person believes that using the technology will be free of effort. These beliefs influence the user's attitude toward the technology, which in turn shapes their behavioural intention to use it. Over the years, TAM has been extended (e.g., TAM2, TAM3, UTAUT) to incorporate additional variables such as social influence, facilitating conditions, and trust, but the core PU–PEOU structure remains highly relevant to digital banking adoption studies (Marikyan & Papagiannidis, 2021). In the context of financial technology, TAM provides a conceptual lens to explain why customers and banks adopt and integrate channels such as Automated Teller Machines (ATM), Point-of-Sale (POS) systems, Web Pay, and Mobile Pay into their operational and transactional frameworks.

When applied to banking and FinTech performance research, TAM suggests that customers' perceptions of the usefulness and ease of use of these channels directly influence adoption rates, which subsequently affect banks' financial outcomes. For example, studies such as Mohammed, Ibrahim, and Muritala (2022) and Basnet (2024) show that when mobile and internet payment systems are perceived as convenient, secure, and effective, they are more frequently used—leading to increased transaction volumes, higher fee-based income, and improved Return on Assets (ROA) and Return on Equity (ROE). Similarly, in the Nigerian context, Ilo, Soyebo, and Olaiya (2024) found that the long-run positive effect of Web Pay, mobile payments, and POS transactions on bank performance could be traced back to widespread customer adoption driven by usability and perceived benefits. Conversely, research by Osigbemhe, Nwoha, and Okwo (2023) highlights that when these technologies are not perceived as reliable due to network failures, transaction errors, or complex user interfaces, their adoption stagnates, diminishing potential profitability gains. From a TAM perspective, this indicates that bank performance benefits from FinTech adoption are mediated by customer perceptions, making user-oriented design and education critical.

Furthermore, TAM's relevance extends beyond explaining consumer adoption to informing banks' strategic implementation of FinTech innovations. Evidence from Corbet et al. (2024) in China and Kharrat, Trichilli, and Abbes (2024) in the

MENA region demonstrates that the performance impact of FinTech is not uniform traditional or long-established banks often experience slower adoption and reduced returns when technological offerings are not aligned with customer expectations of usefulness and ease of use. In contrast, Samara et al. (2025) in Jordan and Alagbe and Yinus (2025) in Nigeria show that when banks actively enhance the perceived usefulness of digital channels through value-added services, integration with lifestyle applications, and seamless cross-platform functionality adoption accelerates, strengthening performance outcomes. As Nicoletti (2021) notes in the “Banking 5.0” paradigm, technology in banking will only achieve its potential when user acceptance is fully optimised; TAM remains a robust explanatory model for the link between technology adoption and financial performance. In sum, by bridging the psychological determinants of technology use with measurable financial outcomes, TAM provides an essential theoretical foundation for understanding how ATM, POS, Web Pay, and Mobile Pay adoption translates into bank performance in both developed and emerging markets.

2.4.2 Diffusion of Innovation Theory (DOI)

The Diffusion of Innovation Theory, developed by Everett M. Rogers in 1962 and refined in subsequent editions of his seminal work *Diffusion of Innovations* (Rogers, 2003), explains how new ideas, products, and technologies spread through social systems over time. Rogers categorised adopters into five groups such as innovators, early adopters, early majority, late majority, and laggards based on their readiness to embrace change. The theory posits that the adoption process is influenced by innovation attributes (relative advantage, compatibility, complexity, trialability, and observability), communication channels, the nature of the social system, and the time frame of diffusion. In the context of financial technology (FinTech) adoption in banking, DOI provides a robust conceptual lens for understanding the sequential uptake of channels such as Automated Teller Machines (ATMs), Point of Sale (POS) terminals, Web Pay, and Mobile Pay among customers, as well as the strategic adoption decisions made by banks. It explains why certain technologies like mobile payments in emerging economies achieve rapid penetration, while others, such as Web Pay in low-internet-access regions, diffuse more slowly despite their potential benefits.

Applied to the relationship between FinTech adoption and bank performance, DOI suggests that the financial benefits of innovations are realised progressively as adoption moves from early users to the majority. Empirical studies align with this pattern. For instance, Adhikari and Pradhan (2024) in Nepal and Ilo, Soyebo, and Olaiya (2024) in Nigeria demonstrate that emerging technologies, once they cross a critical adoption threshold, lead to significant improvements in Return on Assets (ROA) and Return on Equity (ROE). Early adopters of mobile and online payment platforms tend to be urban, technologically literate customers, generating initial transaction volumes that signal viability to the wider market. As usage diffuses to the early and late majority, network effects amplify the financial impact through increased fee income, reduced transaction costs, and optimised asset utilisation. However, DOI also accommodates scenarios where innovations diffuse slowly or unevenly, leading to mixed performance effects. Studies such as Money and Iyoha (2025) and Osigbemhe, Nwoha, and Okwo (2023) reveal that ATMs and POS systems in Nigeria have not always delivered sustained profitability due to infrastructure gaps, fraud risks, and competition from faster-spreading mobile payment solutions. This supports Rogers' assertion that the rate and success of diffusion are contingent upon environmental and organisational readiness, as well as the perceived relative advantage of the innovation.

DOI also provides explanatory power for cross-country variations in FinTech–performance relationships observed in the literature. In the MENA region, Kharrat, Trichilli, and Abbes (2024) find that both Islamic and conventional banks benefit significantly from FinTech adoption, reflecting a mature stage of diffusion where digital banking is well-integrated into daily transactions. Conversely, Corbet et al. (2024) in China and Yudaruddin (2023) in Indonesia highlight that in some traditional or state-owned banks, FinTech innovations initially eroded performance due to slow cultural adaptation and organisational inertia, characteristics often seen in late adopters. Similarly, Samara et al. (2025) in Jordan show that the positive performance impact of FinTech apps emerges where user adoption has reached mass-market levels, supported by conducive infrastructure and regulatory frameworks. In sum, DOI not only explains the temporal and behavioural aspects of technology uptake but also clarifies why FinTech's effect on bank performance is heterogeneous across technologies, markets, and institutional types. By linking the stages of innovation adoption to measurable performance outcomes, DOI offers a nuanced theoretical basis for analysing how ATM, POS, Web Pay, and Mobile Pay technologies transition from novelty to profitability drivers in the banking sector.

2.4.3 Resource-Based View (RBV)

The Resource-Based View (RBV), originally advanced by Penrose (1959) in *The Theory of the Growth of the Firm* and formally articulated by Wernerfelt (1984) and Barney (1991), posits that sustainable competitive advantage and superior firm performance are derived from the possession and strategic deployment of resources that are valuable, rare, inimitable, and non-substitutable (VRIN). In the banking sector, this theoretical perspective frames financial technology (FinTech) innovations such as Automated Teller Machines (ATM), Point of Sale (POS) terminals, Web Pay systems, and Mobile Pay platforms not merely as operational tools but as strategic assets capable of differentiating institutions in competitive markets. RBV highlights that the performance impact of such technologies depends on how effectively they are integrated with organisational capabilities, processes, and culture. As noted by Nicoletti (2021) in the *Banking 5.0* framework, banks that treat digital infrastructure, data analytics, and customer trust as core resources are better positioned to derive sustained profitability from FinTech adoption. These resources enhance operational efficiency, strengthen customer loyalty, and enable innovative service delivery, all of which align with RBV's contention that internal capabilities mediate the relationship between market conditions and financial performance.

Empirical studies reinforce RBV's relevance in the FinTech–bank performance nexus. For example, Ferilli (2025) shows that mergers and acquisitions between banks and FinTech firms often yield performance improvements when the acquired technological assets are integrated with existing banking capabilities, supporting RBV's assertion that competitive advantage emerges from the synergy of resources. Similarly, Chhaidar, Abdelhedi, and Abdelkafi (2023) find that European banks' profitability is positively influenced by FinTech investments, with larger banks benefiting disproportionately due to their greater absorptive capacity an RBV-aligned concept describing the ability to assimilate and exploit new resources. In Nigeria, Alagbe and Yinus (2025) and Ahmed, Naala, and Gambo (2025) confirm that capital-intensive FinTech projects (FintechCapex) contribute more significantly to profitability (ROA and ROE) than short-term operational spending (FintechOpex), illustrating RBV's principle that sustainable performance gains stem from long-lived, strategically embedded resources. Conversely, Corbet et al. (2024) in China caution that traditional and state-owned banks may experience negative returns from FinTech adoption when they lack complementary organisational capabilities, echoing RBV's warning that resources alone do not confer advantage without the capacity to deploy them effectively.

In the specific context of ATM, POS, Web Pay, and Mobile Pay, RBV explains why performance outcomes vary widely across banks and markets. Basnet (2024) and Adhikari and Pradhan (2024) show that in Nepal, these technologies significantly improve ROA and ROE when supported by robust IT infrastructure and skilled human capital resources that fit RBV's VRIN criteria. In Nigeria, studies such as Ilo, Soyebo, and Olaiya (2024) and Taiwo, Akande, and Adekunle (2024) demonstrate that digital channels yield strong long-run performance gains when banks integrate them with broader operational strategies, including customer relationship management and service personalisation. However, findings by Money and Iyoha (2025) and Osigbemhe, Nwoha, and Okwo (2023) reveal that when these technologies are underutilised, poorly maintained, or deployed without adequate support systems, their impact on profitability is neutral or negative, reinforcing RBV's emphasis on the strategic alignment of resources with organisational competencies. Thus, in the FinTech–bank performance discourse, RBV not only underscores the importance of acquiring advanced technologies but also stresses the necessity of cultivating complementary intangible resources such as brand reputation, regulatory expertise, and adaptive organisational culture that enable banks to convert technological assets into enduring competitive advantage.

2.4.4 Financial Intermediation Theory

Financial Intermediation Theory, first formalised by Gurley and Shaw (1960) and expanded by Diamond (1984) and Diamond and Dybvig (1983), explains the role of financial institutions particularly banks as intermediaries that channel funds from surplus economic units (savers) to deficit units (borrowers) while reducing information asymmetry, mitigating transaction costs, and managing risk. At its core, FIT posits that banks enhance economic efficiency by pooling savings, providing liquidity, and allocating capital to its most productive uses. Within the context of financial technology (FinTech), innovations such as Automated Teller Machines (ATM), Point of Sale (POS) systems, Web Pay, and Mobile Pay can be viewed as modern mechanisms that extend and improve the traditional intermediation role. These technologies reduce geographic and temporal constraints, allowing banks to process transactions faster, widen their deposit base, and serve previously excluded populations. As Choudhry (2022) asserts, digitalisation in banking represents an evolution of intermediation, where technology substitutes or enhances certain intermediation functions by providing scalable, low-cost channels for payments, deposits, and credit delivery. This technological augmentation, however, also introduces competitive and operational risks that may alter the traditional bank–customer relationship, as noted in the work of Nayak (2021) on regulatory implications for bank performance.

The application of FIT to FinTech–bank performance research is evident in recent empirical findings. In Nigeria, Ilo, Soyebo, and Olaiya (2024) demonstrate that the adoption of Web Pay, Mobile Pay, ATM, and POS services significantly improves long-run bank performance, indicating that these technologies strengthen banks' ability to mobilise deposits and process payments efficiently. Similarly, Mohammed, Ibrahim, and Muritala (2022) report that mobile payments, POS transactions, and internet payments positively affect return on assets (ROA), underscoring the capacity of digital channels to lower transaction costs and facilitate liquidity transformation—a core intermediation function. In the MENA region, Kharrat, Trichilli, and Abbes (2024) find that FinTech innovation improves the profitability, stability, and efficiency of both Islamic and conventional banks, suggesting that technological tools are being integrated into the intermediation process regardless of banking model. Conversely, Corbet et al. (2024) highlight that in China, certain traditional banks experience negative performance effects from FinTech adoption, implying that without strategic integration, technological innovations can erode rather than enhance intermediation efficiency by increasing operational complexity and competitive pressure. These divergent results align with Diamond’s (1984) premise that intermediation benefits are contingent upon institutional capacity to manage monitoring and transaction functions efficiently.

From a strategic standpoint, FIT frames the performance impact of FinTech as a balance between enhancing intermediation efficiency and managing the structural shifts it creates in the financial ecosystem. In high-adoption contexts like Jordan, Samara et al. (2025) show that FinTech apps significantly improve bank performance by broadening customer engagement and accelerating transaction processing, thereby deepening the intermediary role. In Nepal, Basnet (2024) finds that mobile banking, QR payments, ATM services, digital wallets, credit cards, and POS all positively influence ROA and ROE, reinforcing the argument that electronic payment systems amplify the scale and reach of intermediation. However, studies such as Money and Iyoha (2025) and Osigbemhe, Nwoha, and Okwo (2023) reveal that some channels particularly ATMs and POS in certain markets may reduce profitability due to high operating costs, fraud risks, and limited contribution to long-term financial deepening. This indicates that while FIT supports the theoretical rationale for adopting FinTech tools as a means to enhance intermediation, real-world outcomes depend on how effectively banks integrate these tools into their liquidity provision, risk transformation, and information processing functions. Consequently, in analysing the effect of FinTech on bank performance, FIT provides both the theoretical foundation and evaluative lens to distinguish between technological adoption that genuinely strengthens intermediation and that which merely adds operational complexity without proportional financial returns.

2.5 Empirical Review

Ibekwe (2021) investigated the relationship between financial innovation and the performance of deposit money banks in Nigeria, focusing on the effects of automated teller machines (ATM), mobile banking, internet banking, and point of sale (POS) terminals on return on assets (ROA). Adopting an ex-post facto research design, the study utilised secondary data from the Central Bank of Nigeria Statistical Bulletin, CBN Annual Reports, and Statements of Accounts. Findings revealed that ATMs, mobile banking, and POS transactions had positive and significant effects on ROA, whereas internet banking exhibited a negative and statistically insignificant effect. The study concluded that financial innovations positively influence the profitability of Nigerian commercial banks and enhance asset returns.

Madugba, Egbide, Jossy, Agburuga, and Chibunna (2021) examined the effect of electronic banking on the financial performance of Nigerian deposit money banks using secondary data sourced from the Central Bank of Nigeria's Statistical Bulletin, the National Bureau of Statistics' Statistical Bulletin, and published financial statements. Employing an ex-post facto research design, normality tests, multicollinearity checks, and regression analysis, the study found that ATMs had a positive and significant relationship with both earnings per share (EPS) and ROA. POS and NEFT transactions significantly affected ROA only, while web-based banking (WEB) had an insignificant impact on both EPS and ROA. The authors concluded that electronic banking significantly influences bank performance, with variations in the effect depending on the specific e-banking channel.

Singh, Malik, and Jain (2021) evaluated the impact of FinTech adoption on the profitability of Indian banks, addressing a gap in quantitative research despite extensive theoretical literature. The study used ROA and ROE as dependent variables, with independent variables including ATM-to-branch ratio, capital equity tier 1 ratio, cost-to-income ratio, and a FinTech dummy covering blockchain, artificial intelligence, robotic process automation, payment technologies, and cloud computing. The analysis revealed a significant positive impact of FinTech adoption on profitability, demonstrating that banks capable of integrating flexibility and speed in product delivery outperform more traditional peers. The findings emphasise the role of advanced technologies in strengthening competitive advantage in the Indian banking sector.

Nwankwo and Agbo (2021) investigated the effect of electronic banking on the performance of Nigerian commercial banks between 2013 and 2017 using an ex-post facto design and E-Views statistical analysis. The study measured performance in relation to ATM transactions, POS terminal transactions, and mobile banking transactions. Results indicated that ATM transactions had a positive and significant effect on bank performance, while POS terminal and mobile banking transactions showed negative and weak effects. The authors recommended that banks strategically adopt innovations with proven profitability potential, while improving underperforming channels to strengthen overall performance.

Mohammed, Ibrahim, and Muritala (2022) examined the effect of payment system innovations on the financial performance of commercial banks in Nigeria, adopting an ex-post facto research design with quarterly time-series data from Q1 2007 to Q4 2020 obtained from Central Bank of Nigeria (CBN) reports and statistical bulletins. Using the Auto-Regressive Distributed Lags (ARDL) bounds testing approach to co-integration, the study assessed the causal relationship between payment innovations—mobile payment, POS transactions, internet payment, and Real-Time Gross Settlement (RTGS)—and bank performance measured by return on assets (ROA). The findings revealed that mobile payment, POS transactions, and internet payment had positive and significant impacts on ROA, while RTGS exhibited a negative impact. The study concluded that targeted promotion and strategic adoption of viable payment technologies could enhance Nigerian banks' profitability and operational efficiency.

Chelangat, Kiprop, and Mutai (2022) examined the effect of payment cards on the financial performance of Kenyan commercial banks, focusing on the period 2011–2020. Using a cross-sectional descriptive survey design and secondary data from 42 licensed commercial banks, the study employed descriptive statistics and panel modelling, guided by Coase Theorem, Constraint-Induced Financial Innovation Theory, Circumvention Innovation Theory, and Innovation Diffusion Theory. Results showed that debit cards on ATMs had a positive and significant relationship with ROA at the 5% level. Credit cards on ATMs and POS machines were positively but insignificantly related to ROA, while prepaid cards on ATMs were negatively but insignificantly related to ROA. The study concluded that debit card usage is the strongest payment card driver of bank profitability in the Kenyan context.

Almashhadani and Almashhadani (2022) investigated the impact of FinTech on banking performance in foreign banks operating in the UAE. Using a quantitative research design with a sample of 19 banks, the study examined the relationship between FinTech adoption—including electronic payment services, virtual currencies, funding tools, and AI-powered financial advisory systems—and bank performance measured by ROA and ROE. Results showed that FinTech adoption had a significant positive impact on both ROA and ROE, confirming its role in enhancing profitability. The findings support the view that FinTech facilitates economic development by improving banking efficiency and fostering SME growth through better access to financial services.

Isa-Olatinwo, Uwaleke, and Ibrahim (2022) investigated the effect of digital financial services (DFS) on the earnings per share (EPS) of Nigerian commercial banks from 2012 to 2020. Using ATM and POS transaction volumes as proxies for DFS, the study employed descriptive and inferential statistics to assess the relationship. Findings revealed a significant positive association between DFS and EPS, confirming that increased digital transaction volumes enhance shareholder value in Nigeria's banking sector.

Nwankwo (2022) explored the impact of emerging digital technology on the organisational performance of Fidelity Bank in Anambra State, Nigeria. Using a survey research design, data were collected via a five-point Likert scale questionnaire from a sample of 200 staff members, achieving a 94.68% response rate (183 valid responses). Analysis was conducted using ANOVA with SPSS version 23. Results indicated that email, internet technology, and e-commerce each had significant positive impacts on organisational performance. The study concluded that leveraging emerging digital technologies improves operational efficiency and competitiveness within the banking sector.

Yudaruddin (2023) analysed the impact of financial technology startups on the performance of Islamic and conventional banks in Indonesia using a two-step Generalised Method of Moments (GMM) model on panel data from 124 banks between 2004 and 2018. The study found that, overall, FinTech startups negatively affected bank performance and that Islamic banks underperformed compared to their conventional counterparts. However, interaction analysis revealed that FinTech engagement, particularly in peer-to-peer lending, positively influenced Islamic bank performance, both in normal and crisis periods. These findings suggest that while FinTech competition can be detrimental to traditional banking performance, strategic collaborations with FinTech providers can enhance operational outcomes, especially for Islamic banks.

Chhaidar, Abdelhedi, and Abdelkafi (2023) investigated the effect of FinTech investment levels on European banks' profitability from 2010 to 2019, applying the Fully Modified Ordinary Least Squares (FMOLS) model to a sample of 23 banks. The results demonstrated a significant positive relationship between FinTech investment and profitability, with larger banks benefiting more due to scale advantages and greater absorptive capacity. Sub-period analysis (2010–2014 and 2015–2019) confirmed that the profitability effect was consistent across time, highlighting that sustained digital engagement is a performance driver in Europe's banking sector.

Muttai, Njoka, and Muchira (2023) examined the influence of financial technology adoption on the financial performance of 38 commercial banks in Kenya over 2012–2021, using panel multiple regression analysis underpinned by the Technology Adoption Model and Financial Intermediation Theory. The results indicated that mobile banking, internet banking, agency banking, and ATMs were positively correlated with performance, though ATM adoption showed a significant negative relationship. Mobile and agency banking effects were negative but statistically insignificant, while internet banking and bank size were positive but insignificant. The study concluded that while FinTech channels are important for service delivery, their profitability impact depends on operational efficiency and adoption scale.

Osigbemhe, Nwoha, and Okwo (2023) assessed the impact of ATMs, mobile payments, and National Electronic Funds Transfer (NEFT) on the ROA of Nigerian commercial banks between 2009 and 2021 using OLS regression on CBN and NDIC secondary data. Findings showed that ATMs and NEFT had negative and non-significant effects, while mobile pay was positive but also non-significant. The authors concluded that FinTech adoption during the study period did not significantly enhance corporate performance, possibly due to high operational costs and inefficiencies in deployment.

Ehiedu, Onuorah, and Chienjina (2023) explored the effect of e-payment systems (EPS) on the efficiency of Nigerian banks, focusing on mobile payment, Automated Teller Machines (ATM), and Point of Sale (POS) channels using CBN data from 2012 to 2016. Employing linear regression analysis via SPSS at a 0.05 significance level, the study found a p-value of 0.333, indicating no statistically significant effect of EPS on banking efficiency. This suggests that despite technological adoption, operational or structural constraints may have hindered efficiency gains. The authors recommended intensifying the deployment of alternative e-payment channels and implementing grassroots campaigns to encourage full adoption of e-payment systems.

Ashiru, Balogun, and Paseda (2023) analysed the impact of mobile, internet, and ATM banking services on Nigerian deposit money banks' performance from 2012 to 2021, employing the ARDL model and Granger causality tests. Results indicated that POS services had the strongest positive effect due to their high transaction volume, while mobile banking, card services, online banking, and agency banking also exhibited positive short- and long-run effects. However, NEFT and NIBSS Instant Payments (NIP) were exceptions, showing no significant positive impact. The study recommended expanding mobile and e-banking infrastructure to sustain growth.

Al-Shouha et al. (2024) analysed the effect of financial technology on bank performance in 21 Arabian banks across Bahrain, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE from 2015 to 2022. FinTech adoption was proxied by the frequency of digitalisation-related terminology in annual reports, while bank performance was measured by ROA and ROE. Using ordinary least squares and two-stage least squares, results indicated that a one-unit increase in the FinTech measure led to a 0.37 increase in ROA and a 0.29 increase in ROE. Sub-period analysis before and during COVID-19 confirmed that the positive impact of FinTech on performance was stronger during the pandemic, highlighting its role in resilience and adaptation in times of crisis.

Adhikari and Pradhan (2024) explored the effect of innovation and technology on productivity and profitability in 25 Nepalese commercial banks, gathering primary data from 160 respondents via structured questionnaires. Using multiple regression analysis, the study found that internet banking, ATM services, mobile banking, POS banking, and e-payment technologies each had significant positive impacts on both productivity and profitability. The findings suggest that improving the quality and accessibility of these technological services directly enhances bank performance, emphasising the strategic importance of comprehensive digital service integration in the Nepalese banking sector.

Chukwuekwu (2024) assessed whether electronic banking influences the performance of Nigeria's deposit money banks using audited financial statements of ten listed banks from 2011 to 2020 alongside secondary data from the CBN Bulletin and other public resources. Performance was measured via ROA, ROE, and EPS, with e-banking variables including ATMs, POS, Internet Banking, and Mobile Banking. Findings revealed that e-banking had a positive and significant impact on ROA and ROE, but no significant effect on EPS. The study underscored the importance of e-banking as a driver of profitability, while suggesting that its influence on shareholder value (as measured by EPS) may require longer-term strategic investment.

Nwayen, Ukpong, and Uwah (2024) examined the relationship between financial technology and the profitability of listed deposit money banks in Nigeria over a ten-year period (2010–2019). Using an ex-post facto research design, data were obtained from annual reports of five sampled banks and the CBN Bulletin, with profitability measured by ROA. Regression and correlation analysis showed that both mobile payments and ATMs had statistically negligible effects on profitability. The authors suggested that banks should invest more in enhancing mobile payment services, highlighting untapped potential in this market segment.

Taiwo, Akande, and Adekunle (2024) investigated the causal relationship, as well as the short-term and long-term effects, of digital financial service components on the performance of quoted commercial banks in Nigeria. Using a mixed approach combining cross-sectional descriptive survey and ex-post facto research designs, the study analysed responses through descriptive statistics and employed inferential tools including the Panel Autoregressive Distributed Lag (PARDL) model and Panel Granger Causality tests. Findings from the Granger Causality analysis revealed that agency banking had a strong predictive influence on ROA, while internet and mobile banking also significantly impacted ROA, though ATMs showed a weaker effect. Long-run PARDL estimates indicated that agency banking, ATM banking, internet banking, and POS activities all had positive and significant effects on ROA. Short-term results also showed positive coefficients for all variables, with the error correction term confirming adjustments toward long-run equilibrium. The study concluded that digital financial services—particularly agency banking, ATMs, internet banking, and POS—are critical drivers of bank profitability, though mobile banking's influence remains limited.

Ilo, Soyebo, and Olaiya (2024) examined the effect of emerging technology adoption on the financial performance of deposit money banks in Nigeria using monthly data from 2012 to 2019. Applying the Fully Modified Ordinary Least Squares (FMOLS) regression method, the study assessed the long-run relationship between emerging technology variables—Web Payment, Mobile Money operators, ATMs, and POS terminals—and bank performance. The results indicated that all four technologies had positive long-run associations with performance, suggesting that strategic adoption of emerging technologies strengthens banks' profitability and operational outcomes in Nigeria's competitive banking environment.

Agarwal, Malik, and Gautam (2024) analysed the relationship between digital payment card usage and bank performance, focusing on HDFC Bank between 2015 and 2022, including the COVID-19 pandemic period. Using debit cards and credit cards as independent variables, and operating profit margin (OP), ROA, ROE, and earnings per share (EPS) as dependent variables, regression analysis via E-Views 12 software revealed that both debit and credit cards significantly influenced ROA and ROE, while neither had a significant effect on EPS. Debit cards significantly impacted operating profit margins, whereas credit cards showed no significant effect. The study concluded that digital payment card adoption contributes positively to key profitability indicators but has limited influence on shareholder returns in the short term.

Basnet (2024) analysed the effect of electronic payment systems on the profitability of eight Nepalese commercial banks, using both primary data from 130 respondents and secondary data from the Nepal Rastra Bank and annual bank reports. ROA and ROE were used as performance measures, while independent variables included mobile banking, QR code payments, ATM banking, digital wallets, credit cards, and POS transactions. Correlation and regression analyses indicated that all six channels have significant positive relationships with both ROA and ROE, suggesting that enhanced adoption and quality of electronic payment services consistently improve bank profitability. The study highlights the comprehensive benefits of diversified e-payment platforms in expanding customer convenience, transaction volumes, and revenue generation.

Kharrat, Trichilli, and Abbes (2024) examined the relationship between FinTech development and bank performance in the Middle East and North Africa (MENA) region, focusing on a comparative analysis between Islamic and conventional banks. The authors developed a novel FinTech Index using Text Mining Technology (AntConc) combined with principal component and factor analysis, applied to data from 2010 to 2020. Employing a simultaneous equation model, they found that FinTech adoption significantly improves profitability, stability, and efficiency in both banking models. The study provides empirical evidence that collaborative approaches to FinTech integration can generate substantial performance benefits, regardless of religious or operational banking frameworks, and offers insights for policymakers aiming to promote inclusive digital financial ecosystems.

Corbet, Hou, Hu, Oxley, and Tang (2024) investigated the influence of financial innovations on bank performance using evidence from the Chinese banking sector. Drawing on the methodological frameworks of Dietrich and Wanzenried (2011, 2014) and Phan et al. (2019), the study employed a regression model incorporating novel measures of FinTech innovation to assess their relationship with the profitability of listed banks. The findings revealed that FinTech innovation exerts a negative impact on bank performance, with the effect being more pronounced in state-owned, joint-stock commercial, and long-established banks compared to city and rural commercial banks and younger institutions. This outcome suggests that entrenched organisational structures and traditional service models may limit the capacity of older and larger banks to adapt efficiently to technological disruptions.

Samara et al. (2025) assessed the dynamic effect of FinTech applications on banking performance in Jordan, situating the analysis within a rapidly evolving financial environment. The study utilised a quantitative research design, gathering survey data from 322 banking customers through convenience sampling, with a response rate of 72.3%. Structural Equation Modelling (SEM) was applied to test the hypothesised relationships between FinTech app usage and bank performance. Results indicated a significant positive impact of FinTech applications on banking performance, suggesting that the integration of mobile and digital platforms enhances customer engagement, operational efficiency, and service delivery in the Jordanian banking sector. The findings underscore the transformative potential of FinTech in emerging markets with increasing digital penetration.

Money and Iyoha (2025) investigated the effect of electronic banking channels on the financial performance of Nigerian banks over the period 2000–2023 using the Autoregressive Distributed Lag (ARDL) model. The analysis considered both short-run and long-run dynamics between Automated Teller Machines (ATMs), Internet Banking, Mobile Banking, Point-of-Sale (POS) transactions, and performance indicators such as Return on Assets (ROA) and Financial Deepening Ratio. Results showed that Internet and Mobile Banking have significant positive impacts on profitability, while ATMs and POS channels negatively influence performance due to high operational and maintenance costs. Furthermore, none of the channels significantly improved financial deepening, highlighting the need for structural and policy interventions to ensure that digital banking also advances financial inclusion.

Ahmed, Naala, and Gambo (2025) explored the impact of FinTech investments on the performance of twelve Nigerian deposit money banks between 2014 and 2023, differentiating between operational expenditure (FintechOpex) and capital expenditure (FintechCapex). Using panel data analysis techniques—including Pooled OLS, Fixed Effects, and Random Effects models, with the Fixed Effects model preferred—the study revealed that FintechOpex had no significant impact on Net Interest Margin (NIM) or ROA. In contrast, FintechCapex significantly and positively influenced both measures, implying that long-term, capital-intensive FinTech investments yield more tangible financial returns than short-term spending. The results emphasise the strategic importance of prioritising sustainable technological infrastructure over recurrent operational costs in maximising bank profitability.

Sopitan et al. (2025) investigated the effect of electronic payment channels on the performance of commercial banks in Nigeria using a descriptive survey design targeting relationship officers at Stanbic IBTC Bank Plc. From a purposive sample of 120 respondents, data were collected via structured questionnaires and analysed using descriptive statistics, multiple regression, and chi-square tests. The study found a significant relationship between e-payment channels—ATMs, POS, Mobile Banking, and Internet Banking—and bank performance, with ATMs, POS, and Mobile Payments positively impacting efficiency, while Web Payment showed mixed effects. The results highlight the critical role of digital financial services in enhancing operational efficiency and customer satisfaction in Nigerian banks.

Abari-Ogunsona et al. (2025) assessed the impact of digitalisation on the performance of Nigerian commercial banks using panel data from 2012 to 2022.

Employing descriptive statistics, panel least squares, and both fixed and random effects models, the study analysed the effects of mobile banking, total assets, and non-performing loans on ROA. Results indicated that digitalisation generally improves bank performance, though the fixed effects model suggested that mobile banking may have a slight negative effect when infrastructure and cost considerations are factored in. Total assets exhibited mixed outcomes, underscoring the role of scale economies in digital banking performance.

Alagbe and Yinus (2025) examined the relationship between financial technology adoption and the financial performance of Nigerian deposit money banks through a survey of 132 respondents from six banks, selected via purposive sampling. Using descriptive statistics and multiple regression analysis, the study found a significant positive relationship between digital banking adoption and ROA, with an R^2 of 0.743, indicating that 74% of performance variation was explained by digital banking adoption. The results highlighted that ATM transaction volume, internet banking usage, and overall digital penetration are key profitability drivers, confirming that financial technology adoption significantly enhances bank performance in the Nigerian context.

Aduku, Bakare, Oyabambi, Akanni, and Isah (2025) analysed the impact of Point-of-Sale (POS) terminal adoption on the profitability of Tier-One banks in Nigeria, focusing on Profit After Tax (PAT) and Return on Assets (ROA). Using a panel data approach covering 2014–2023, the study applied the Panel Estimated Generalised Least Squares (EGLS) model with cross-sectional random effects, validated through the Hausman test. Findings indicated that POS terminal transactions had positive and statistically significant effects on both PAT and ROA, with coefficients of $\beta=0.0992$ ($p=0.0063$) and $\beta=0.1159$ ($p=0.0112$), respectively. These results highlight the potential of POS adoption to enhance bank profitability and asset utilisation. The authors concluded that POS systems, as part of broader digital transaction strategies, are key drivers of financial performance, aligning with the Technology–Organisation–Environment (TOE) framework, which underscores the interplay of technological innovation, organisational readiness, and environmental conditions.

Salawudeen and Suleiman (2025) investigated the relationship between financial evolution and firm value in Nigeria's listed deposit money banks over an 11-year period. Using multiple regression analysis in Stata, the study assessed the effects of various transaction channels—mobile banking (MBT), ATMs, online transactions (OLT), POS, electronic funds transfer (EFT), internet banking (IBT), and agent banking (ABT)—on price–earnings ratio (PER) and price-to-book value (PBV). Results revealed that MBT, ATM, OLT, and POS transactions had significant positive impacts on PER and PBV, while EFT negatively and significantly affected PER. IBT and ABT had positive but statistically insignificant effects on both measures. The study concluded that key digital transaction channels substantially contribute to enhancing firm value, whereas EFT requires strategic restructuring to improve its market value contribution.

Table 2.1 Summary of Empirical Review

S/No	Author(s)	Year	Topic	Methodology	Findings
1	Singh, R., Malik, G., & Jain, V.	2021	FinTech effect: measuring impact of FinTech adoption on banks' profitability	Quantitative analysis using ROA & ROE as dependent variables; regression with ATM ratio, capital equity tier 1 ratio, cost-to-income ratio, and FinTech dummy	Significant positive impact of FinTech adoption on banks' profitability
2	Ibekwe, A. O.	2021	Financial innovation and performance of deposit money banks in Nigeria	Ex-post facto design using CBN statistical bulletins & annual reports; regression analysis	ATM, mobile banking, POS have positive significant effect on ROA; internet banking negative and insignificant
3	Madugba, J., Egbide, B. C., Jossy, D. W., Agburuga, U. T., & Chibunna, O. O.	2021	Effect of electronic banking on financial performance of deposit money banks in	Ex-post facto design; regression analysis on CBN and NBS data	ATM positively significant for EPS & ROA; POS & NEFT significant for ROA only;

			Nigeria		WEB insignificant
4	Nwankwo, S. N., & Agbo, E. I.	2021	Effect of electronic banking on commercial bank performance in Nigeria	Ex-post facto research design (2013–2017); E-views statistical analysis	ATM transactions positive & significant; POS and mobile banking negative and weak effects
5	Mohammed, Z., Ibrahim, U. A., & Muritala, T. A.	2022	Effect of payments system innovations on the financial performance of commercial banks in Nigeria	ARDL bounds test using quarterly data (2007–2020)	Mobile pay, POS, internet payment positive & significant for ROA; RTGS negative effect
6	Chelangat, M. N., Kiprop, S., & Mutai, J. K.	2022	Effects of Payment Cards on Financial Performance of Commercial Banks in Kenya	Cross-sectional descriptive survey; panel model with secondary data (2011–2020)	Debit cards (ATM) positive & significant with ROA; credit cards positive but not significant; prepaid cards negative
7	Almashhadani, H. A., & Almashhadani, M.	2022	The impact of financial technology on banking performance: a study on foreign banks in UAE	Quantitative research on 19 banks	FinTech positively significant for ROA and ROE
8	Isa-Olatinwo, A., Uwaleke,	2022	Impact of digital	Secondary data (2012–	DFS (ATM & POS) have

	U., & Ibrahim, U. A.		financial services on financial performance of commercial banks in Nigeria	2020); descriptive and inferential statistics	substantial positive effect on EPS
9	Nwankwo, A. A.	2022	Impact of Emerging Digital Technology on Organizational Performance: A Study of Fidelity Bank in Anambra State	Survey with 183 valid responses; ANOVA analysis	E-mail, internet technology, e-commerce significantly improve performance
10	Yudaruddin, R.	2023	Financial technology and performance in Islamic and conventional banks	Two-step GMM on 124 banks (2004–2018)	FinTech startups detrimental to overall bank performance; improve Islamic bank performance in crisis periods
11	Chhaidar, A., Abdelhedi, M., & Abdelkafi, I.	2023	The effect of financial technology investment	FMOLS model on 23 European banks (2010–	FinTech investments positively and significantly

			level on European banks' profitability	2019)	related to profitability; larger banks benefit more
12	Muttai, S., Njoka, C., & Muchira, B.	2023	Effect of financial technology on the financial performance of commercial banks in Kenya	Panel longitudinal research on 38 banks (2012–2021)	Mobile banking, internet banking, agency banking, ATMs positively correlated; ATMs negative significant link with performance
13	Osigbemhe, S. O., Nwoha, C. E., & Okwo, I. M.	2023	Effect of financial technology (fintech) on corporate performance of banks in Nigeria	Ex-post facto design; OLS regression (2009–2021)	ATM negative & non-significant; mobile pay positive & non-significant; NEFT negative &

					non-significant
14	Ashiru, O., Balogun, G., & Paseda, O.	2023	Financial innovation and bank financial performance	ARDL model & Granger causality test (2012–2021)	POS services have greatest positive effect; mobile banking, ATMs, cards, online banking positive in short & long run
15	Ehiedu, V. C., Onuorah, A. C., & Chienjina, J. O.	2023	E-payment system (EPS) and efficiency of banks in Nigeria	Regression analysis on 2012–2016 CBN data	No significant effect of EPS on bank efficiency
16	Corbet, S., Hou, Y., Hu, Y., Oxley, L., & Tang, M.	2024	Do financial innovations influence bank performance? Evidence from China	Regression model using Chinese listed bank data	FinTech innovation negatively associated with performance; older/state-owned banks more affected
17	Al-Shouha, L., Khasawneh, O., et al.	2024	The impact of financial technology on bank performance in Arabian countries	OLS & 2SLS panel data (2015–2022)	FinTech positively impacts ROA & ROE; stronger effect during COVID-19
18	Basnet, S.	2024	Impact of Electronic Payment System on the Profitability of Nepalese Commercial	Mixed methods (survey + secondary data); regression analysis	Mobile banking, QR, ATM, digital wallet, credit cards, POS all positively related to

			Banks		ROA & ROE
19	Chukwuekwu, O.	2024	The Effect of Electronic Banking on the Performance of Deposit Money Banks Listed in Nigeria	Secondary data (2011–2020) from 10 banks; regression analysis	ATMs, POS, internet banking, mobile banking positively significant for ROA & ROE
20	Nwayen, A., Ukpong, E., & Uwah, U. E.	2024	Impact of Financial Technology (FINTECH) in Profitability of Listed Deposit Money Banks in Nigeria	Ex-post facto design (2010–2019)	Mobile pay & ATMs negligible effect on profitability
21	Taiwo, M. A., Akande, J. O., & Adekunle, A. O.	2024	Digital financial services and the performance of quoted commercial banks in Nigeria	Cross-sectional survey + PARDL and Granger causality	Agency banking, ATM, internet banking, POS positive and significant; mobile banking limited effect
22	Ilo, B. M., Soyebo, Y. A., & Olaiya, I. K.	2024	Emerging Technology Adoption and Financial Performance of Deposit Money Banks in Nigeria	FMOLS regression on monthly data (2012–2019)	Web payment, mobile money, ATMs, POS have positive long-run relationships with performance
23	Agarwal, S., Malik, P., & Gautam, S.	2024	Analysis of financial performance with regard to digital payment:	Regression on 2015–2022 data	Debit & credit cards significantly impact ROA & ROE; debit cards impact

			HDFC bank		operating profit
24	Adhikari, S., & Pradhan, R. S.	2024	Effect of innovation and technology on productivity and profitability in Nepalese commercial banks	Survey of 160 respondents from 25 banks; regression analysis	Internet, ATM, mobile banking, POS, e-payment all positively affect productivity & profitability
25	Abari-Ogunsona, T. A., Braimoh, E. O., et al.	2025	Digitization for performance improvement: Nigerian banks	Panel data (2012–2022); fixed/random effects	Digitalization enhances performance; mobile banking effect varies by cost
26	Alagbe, E. A., & Yinus, S. O.	2025	Financial Technology and Financial Performance: Experience from Nigeria DMBs	Survey of 150 respondents from 6 banks; regression analysis	Digital banking adoption significantly improves ROA; ATM and internet banking drive profitability
27	Aduku, A. E., Bakare, A. A., et al.	2025	Impact of POS terminal adoption on PAT of tier-one banks in Nigeria	Panel EGLS with random effects (2014–2023)	POS transactions positively & significantly affect PAT and ROA
28	Salawudeen, A., & Suleiman, U. G.	2025	Financial evolution and firm value of listed DMBs in Nigeria	Multiple regression on 11 years of data	MBT, ATM, OLT, POS significantly improve PER & PBV; EFT negative
29	Money, U., & Iyoha, A. O. I.	2025	Electronic Banking Channels and	ARDL model (2000–2023)	Internet & mobile banking

			Financial Performance in Nigeria		positive; ATM & POS negative; no effect on financial inclusion
30	Sopitan, O. O., Oyeyemi, S. T., et al.	2025	Effect of Electronic Payment Channels on Performance of Commercial Banks in Nigeria	Descriptive survey with 120 respondents; regression analysis	ATM, POS, mobile payments improve efficiency; web payment mixed
31	Ahmed, I. D., Naala, M. N. I., & Gambo, L. S.	2025	Impact of fintech investment on financial performance of Nigerian banks	Panel data (2014–2023); FEM, REM, POLS	FintechCapex positive significant for NIM & ROA; FintechOpex not significant
32	Samara, E. I. M., Haija, A. A. A., et al.	2025	FinTech apps and banking performance in Jordan	Survey of 322 customers; SEM analysis	FinTech apps have significant positive effect on performance

Author's Compilation (2025)

2.6 Literature Gaps

Despite the growing scholarly attention on the effect of financial technology (FinTech) on the performance of deposit money banks, the empirical literature remains fragmented, producing mixed and sometimes contradictory results. While a number of studies in both developed and developing economies have documented significant positive associations between FinTech adoption and core performance indicators such as return on assets (ROA) and return on equity (ROE) (Singh, Malik & Jain, 2021; Almashhadani & Almashhadani, 2022; Al-Shouha et al., 2024), other empirical investigations present a less optimistic picture. For example, Singh et al. (2021) report that the integration of FinTech tools—including payment innovations and robotic process automation—enhances bank profitability in India, and Al-Shouha et al. (2024) found that FinTech adoption strengthened ROA and ROE for Arabian banks even under pandemic-induced economic disruptions. Conversely, Yudaruddin (2023) observes that FinTech startups in Indonesia benefitted Islamic banks during crises but had an overall detrimental effect on conventional banks. Similarly, Osigbemhe, Nwoha, and Okwo (2023) revealed that widely used channels such as ATMs and mobile pay either negatively or insignificantly influenced the ROA of Nigerian banks over the period 2009–2021. These divergent results highlight the absence of a clear consensus on the FinTech–bank performance relationship, underscoring the need for more context-specific, sector-sensitive, and methodologically rigorous research, particularly in the Nigerian banking environment where digital adoption patterns differ from other economies.

In addition to the inconclusive nature of prior findings, methodological weaknesses are evident across much of the existing scholarship. Many studies employ conventional econometric techniques such as Ordinary Least Squares (OLS) and static panel regressions (Ashiru, Balogun & Paseda, 2023; Madugba et al., 2021; Isa-Olatinwo, Uwaleke & Ibrahim, 2022), which, although widely used, often fail to adequately address endogeneity concerns or capture the dynamic interrelationships between FinTech adoption and financial performance. More sophisticated estimation approaches—such as the Autoregressive Distributed Lag (ARDL) model—remain underutilised in Nigerian-focused studies, despite their ability to simultaneously estimate short-run and long-run effects and to accommodate variables with mixed integration orders. The absence of such robust techniques in prior research raises questions about the statistical validity and policy relevance of earlier conclusions, suggesting a pressing need for methodological advancement in this field.

A further gap concerns the temporal scope of existing empirical studies. Much of the Nigerian literature ends its analysis in 2020 or 2021 (e.g., Ibekwe, 2021; Isa-Olatinwo et al., 2022), omitting the recent surge in FinTech-driven banking innovations during 2019–2024—a period characterised by intensified digital transformation, far-reaching Central Bank of Nigeria regulatory reforms, and rapid consumer uptake of mobile payments, point-of-sale (POS) transactions, and web-based banking services. Excluding this transformative phase risks overlooking the structural shifts in both customer behaviour and institutional technology investment catalysed by the COVID-19 pandemic and its aftermath. Given the documented acceleration of mobile money adoption and e-payment penetration in recent years (Aimuengheuwa, 2025; Olalekan, 2024), updating the temporal frame of analysis is essential for producing policy-relevant and practically applicable insights. Addressing these empirical, methodological, and temporal gaps, the present study offers a more comprehensive and current assessment of the effect of FinTech on the performance of deposit money banks in Nigeria, leveraging a recent dataset and employing the ARDL approach to produce statistically robust and contextually relevant evidence.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

In this chapter, the method of analysis as well the various procedure involved are clearly addressed. The processes include research design, population and sample size, sampling procedure, model specification, method of data analysis, and sources of data. The software used in this analysis is Eviews 10.0.

3.2 Research Design

The research designs adopted in this study is the Ex-Post-facto or the longitudinal research design. In an Ex-Post-facto research which involves secondary data in which responses in the nature of a factor and its effects on individuals are being studied, the researcher does not have the ability or opportunity to vary or manipulate the independent variables (Agbonifoh & Yomere, 1999).

3.3 Population and Sampling Procedure

The study population comprises all the listed deposit money banks on the floor of the Nigerian Exchange Limited (NGX) as at December 31, 2024. The judgmental sampling or the purposive non-probability sampling method was utilized to arrive at the final sample size for the study. Hence, a total of 12 listed banks were used in this study for the period 2009Q1 to 2024Q4.

3.4 Model Specification

The model of analysis follows a linear combination of explanatory time series variables, and it is stated in its functional form as follows:

DMBP = f(ATM, POS, INTB, MOB)……………………………………………….(3.1)

Hence, the econometric form of the model is as follow:

$DMBP_t = \beta_0 + \beta_1 ATM_t + \beta_2 POS_t + \beta_3 INTB_t + \beta_4 MOB_t + U_t$……….……(3.2)

Where:

DMBP = Deposit Money Banks Performance (measured as ROA)

ATM = Automated Teller Machine

POS = Point of Sales Terminal

INTB = Internet Banking

MOB = Mobile Banking

Where u is the stochastic error term in the model.

The a priori of the explanatory variables are $\beta_1, \beta_2, \beta_3, \beta_4 > 0$

3.5 Method of Data Analysis

Three main methods are used in the analysis of this study. They are the unit root test, correlation coefficient and the fully modified ordinary least square technique. The Augmented Decay Fuller method was used to conduct the unit root tests in order to ascertain the stationarity of the variables used. The reason for this is to avoid spurious regression results. The Fully Modified Least Squares (FMOLS) regression model was employed in order to analyze the impact of financial technology on deposit money banks performance in Nigeria. The fully modified least squares regression was originally designed in the work of Phillips and Hansen (1990) to provide optimal estimates of cointegrating regressions.

3.6 Sources of Data

The data used in this study are quarterly data and are sourced from the Central Bank of Nigeria Statistical Bulletin (2024). The data covered the period 2009Q1 to 2024Q4. The reason for the choice of this period is based on the fact that it is the period in which electronics banking actually began in Nigeria. Thus, this will enable us to have a more realistic evaluation of the hypothesized impact of electronics banking on deposit money banks performance in Nigeria over time.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION OF RESULTS

4.1 Introduction

In this chapter, we implement the method of data analysis earlier stated in chapter three with respect to fully modified least square (FMOLS) econometric technique. First, in order to provide a rich background characterization of the data for investigating financial technology risk management and performance of deposit money banks (DMBS) in Nigeria, the correlation was employed in this regard; the unit root test was also carried out using the augmented decay fuller method.

4.2 Correlation Analysis

The initial patterns of relationships among the variables can be observed based on the correlations among the variables. In table 4.1 below, we show the correlation matrix for the impact of electronics banking on deposit money banks performance (DMBP) in Nigeria. It is seen that deposit money banks performance (DMBP) has a weak positive correlation with automated teller machine (ATM), mobile money transfer (MOB), internet banking (INTB), and point of sales terminal (POS); with respective values of 0.320570, 0.387648, 0.207732 and 0.378706. Again, automated teller machine (ATM) is seen to have strong positive correlation values of 0.922543, 0.831580, 0.770380, and 0.889138 with mobile money transfer (MOB), internet banking (INTB) and point of sales terminal (POS). Also, a strong positive correlation values of 0.856161, 0.597899 and

0.975586 exist between mobile money transfer (MOB), internet banking (INTB) and point of sales terminal (POS). Also, internet banking (INTB) has strong positive correlation with electronic funds transfer (0.642804) and point of sales terminal (0.850490). While electronic funds transfer and point of sales terminal has a positive correlation value of 0.526334 with each other. Thus, we conclude that there is a significant positive relationship between financial technology and deposit money banks performance (DMBP) in Nigeria.

Table 4.1: Pair-wise Correlation Table

	DMBP	ATM	MOB	INTB	POS
DMBP	1				
ATM	0.320570	1			
MOB	0.387648	0.922543	1		
INTB	0.207732	0.831580	0.856161	1	
POS	0.378706	0.889138	0.975586	0.850490	1

Source: Author's Compilations (2025).

4.3 Unit Root Analysis

The Augmented Dickey Fuller (ADF) test is employed in order to analyze the unit roots. The results are presented in levels and first difference in Table 4.2. In the result, the ADF test statistic for each of the variables is shown in the second and fifth column, while the 95 percent critical ADF value is shown in the third and sixth column respectively. The result indicates that all the variables are stationary at level; and even at after the first difference was taken, all the variables were also now stationary (see panel 2). This implies that the variables are actually difference-stationary, attaining stationarity after the first differences of the variables. Thus, we would accept the hypothesis that the variables possess unit roots. Indeed, the variables are integrated of order one (i.e. I[1]).

Table 4.2: Unit Root Tests

At Levels Panel 1				First Difference Panel 2		
Variable	**ADF Test Statistic**	**95% Critical ADF Value**	**Remark**	**ADF Test Statistic**	**95% Critical ADF Value**	**Remark**
ATM	-5.074235	-2.908420	Stationary	-9.138061	-2.910019	Stationary
POS	-3.875721	-2.908420	Stationary	-8.458201	-2.910019	Stationary
INTB	-5.355831	-2.908420	Stationary	-9.892577	-2.910019	Stationary
MOB	-4.094809	-2.908420	Stationary	-8.938545	-2.910019	Stationary

Source: Author's Computation (2025)

4.4 Cointegration Analysis

Having established that the series in the analysis are not stationary in their levels, we move on to determine if they are cointegrated. The Johansen system of cointegration method was employed as indicated in Table 4.3 below. The eigenvalue test (λ-max) and the trace test statistics indicate that there are about eight (8) significant cointegrating vectors between deposit money banks performance and financial technology in Nigeria. This implies that a long run relationship exists among these hypothesized variables in Nigeria.

Table 4.3: Johansen Multivariate Cointegration Tests Results

Trace Test				***Maximum Eigenvalue Test***			
Null Hypothesis	Test Statistic	Critical Value	Prob.	Null Hypothesis	Test Statistic	Critical Value	Prob.
r = 0*	98.09584	47.85613	0.0000	r = 0*	45.16466	27.58434	0.0001
r ≤ 1	52.93119	29.79707	0.0000	r ≤ 1	29.86378	21.13162	0.0023
r ≤ 2	23.06740	15.49471	0.0030	r ≤ 2	16.60429	14.26460	0.0209
r ≤ 3	6.463117	3.841466	0.0110	r ≤ 3	6.463117	3.841466	0.0110

Source: Author's Compilations (2025).

4.5 Fully Modified Least Square (FMOLS) Regression Analysis

The fully modified Least Square (FMOLS) estimates is reported in table 4.4 below. From the result, the goodness of fit is good, with the R squared value of 0.60, indicating that over 60 percent of the systematic variations in performance of the deposit money banks in Nigeria is captured by the changes in the explanatory variables. The adjusted R-squared value of 0.56 percent is equally high and it implies that the model has a good predictive ability.

A close examination of the individual coefficients in the model revealed that the coefficient of automated teller machine (ATM) has significant negative relationship with deposit money banks performance (DMBP) in Nigeria. This means that total value of the amount withdrawn through automated teller machine has significantly reduced the overall performance of deposit money banks. Indeed, it is seen that a unit increase in the volume of ATM usage reduces overall performance of deposit money banks by approximately -7706.115 percent. This further suggests that there is need for management to rethink and re-strategize on the effective way to best utilize ATM such that it have positive financial impact on its performance. Probably the activities of fraudsters and robbery might been responsible for the negative impact of ATM on performance. The coefficient of point of sales terminal (POS) is seen to have a weak negative relationship with DMBP. This simply means that POS usage had not played key role in the determination of the overall performance of deposit money banks in Nigeria overtime. Hence, there is need for better usage of POS in the country so that they can have the much needed positive impact on the overall performance of deposit money banks.

The coefficient of internet banking (INTB) has a significant positive impact on performance of deposit money banks. The variable passes the 1 per cent significance level, suggesting that it is a potent driver of banking system performance in Nigeria. Indeed, government and monetary authority should place special attention on internet banking activities because of its potential benefits on both the banking system transformation as well as enhancing the general economic activities.

Furthermore, the coefficient of mobile banking (MOB) has a weak positive relationship with deposit money banks performance in Nigeria, suggesting that the variable does not play any significant role in deposit money banks' performance. However, the positive sign is an indication of the tendency of MOB to improve the overall performance deposit money banks

Table 4.4: Financial Technology and Deposit Money Banks Performance in Nigeria

FMOLS Regression			
Variables	Coefficient	T-Ratio	Prob.
ATM	-7706.115	-6.331212	0.0000**
POS	-5088.227	-0.456013	0.6501
INTB	114120.4	2.929287	0.0049**
MOB	26705.19	1.844325	0.0704
Constant	-2948156.	-2.888379	0.005
@TREND	503716.1	6.746488	0.0000
@TREND^2	-4439.751	-4.138195	0.0001
$R^2 = 0.60$	$\bar{R}^2 = 0.56$		

Source: Author's Compilations (2025) Note: **sig at 1% level; *sig at 5% level.

CHAPTER FIVE

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1 Summary of Findings

Based on the empirical analysis in chapter four, the following specific findings are summarize as follows:

(i) That automated teller machine (ATM) has significant negative relationship with deposit money banks performance (PERF) in Nigeria in the short run. This means that total value of the amount withdrawn through automated teller machine has significantly reduced the overall performance of deposit money banks.

(ii) That point of sales terminal (POS) is seen to have a weak negative relationship with DMBP. This simply means that POS usage had not played key role in the determination of the overall performance of deposit money banks in Nigeria overtime. Hence, there is need for better usage of POS in the country so that they can have the much needed positive impact on the overall performance of deposit money banks.

(iii) That internet banking (INTB) has a significant positive impact on performance of deposit money banks. The variable passes the 1 per cent significance level, suggesting that it is a potent driver of banking system performance in Nigeria. Indeed, government and monetary authority should place special attention on internet banking activities because of its potential benefits on both the banking system transformation as well as enhancing the general economic activities.

(iv) That mobile banking (MOB) has a weak positive relationship with deposit money banks performance in Nigeria, suggesting that the variable does not play any significant role in deposit money banks' performance. However, the positive sign is an indication of the tendency of MOB to improve the overall performance deposit money banks

5.2 Conclusion

The study empirically examines the impact of financial technology on the performance of deposit money banks (DMBP) in Nigeria for the period 2009Q1 to 2024Q4. The rationale for this study was based on the fact that electronic banking significantly influences the performance of deposit money banks the world over. Therefore, in order to find out this submission in Nigeria, the fully modified least squares method was used for the analysis of data. The results from the analysis revealed that automated teller machine (ATM) had significant negative relationship with deposit money banks performance; point of sales terminal (POS) had a weak negative relationship with DMBP; internet banking (INTB) had a significant positive impact on performance, and while mobile banking (MOB) has a weak positive relationship with deposit money banks performance in Nigeria. The study conclude that in the determination of deposit money banks performance in Nigeria, ATM, POS and INTB are relevant financial technology factors to be considered because of their critical role in ensuring high level of performance of deposit money banks in Nigeria.

5.3 Recommendations

In view of the salient findings from this study, the following specific policy recommendations are raised:

Firstly, the use of automated teller machine has proven to be an effective tool for determining deposit money banks performance in Nigeria. Thus, management should continue to ensure that more ATM stands or points where customers can easily withdraw money, especially those who in-hard-to reach areas should be provided. Regular and routine servicing and monitoring of these ATM machines must be carried out. These will go a long way to enhance overall banks' performance in the country.

Secondly, management must refocus and re-strategized on new modalities that would enable the usage of automated teller machine (ATM) to have the much needed positive impact on performance. They should also ensure that the indiscriminate use ATM by unlawful users are eliminated or drastically reduced to the barest minimum. They should evolve some unique ideas and coding systems that will enable them track dawn unlawful users of ATM. By so doing it will go a long way to reducing ATM related crimes and in turn spur an interim short term financial performance of deposit money banks in Nigeria.

Lastly, management and regulators should constantly encourage the use of POS because it portents fresh or new revenue streams for banks that have fully gone digital and embraced cashless policy in West Africa. This will enable banks generate more revenue consistently from the fees charged on POS transactions, and as the volume of electronic payments grows, so does these income stream, thereby boosting overall financial performance.

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APPENDICES

Dependent Variable: DMBP

Method: Fully Modified Least Squares (FMOLS)

Date: 10/16/25 Time: 11:14

Sample (adjusted): 2009Q2 2024Q4

Included observations: 63 after adjustments

Cointegrating equation deterministics: C @TREND @TREND^2

Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ATM	-7706.115	1217.163	-6.331212	0.0000
POS	-5088.227	11158.07	-0.456013	0.6501
INTB	114120.4	38958.42	2.929287	0.0049
MOB	26705.19	14479.65	1.844325	0.0704
C	-2948156.	1020696.	-2.888379	0.0055
@TREND	503716.1	74663.45	6.746488	0.0000
@TREND^2	-4439.751	1072.872	-4.138195	0.0001

R-squared	0.605056	Mean dependent var	4794758.
Adjusted R-squared	0.562740	S.D. dependent var	4859430.
S.E. of regression	3213328.	Sum squared resid	5.78E+14
Long-run variance	3.84E+12		

Date: 10/16/25   Time: 11:19

Sample (adjusted): 2009Q4 2024Q4

Included observations: 61 after adjustments

Trend assumption: Linear deterministic trend

Series: ATM POS INTB MOB

Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.523079	98.09584	47.85613	0.0000
At most 1 *	0.387110	52.93119	29.79707	0.0000
At most 2 *	0.238299	23.06740	15.49471	0.0030
At most 3 *	0.100533	6.463117	3.841466	0.0110

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.523079	45.16466	27.58434	0.0001
At most 1 *	0.387110	29.86378	21.13162	0.0023

At most 2 *	0.238299	16.60429	14.26460	0.0209
At most 3 *	0.100533	6.463117	3.841466	0.0110

Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

ATM	POS	INTB	MOB
-0.000592	0.011398	-0.216416	0.020146
0.005907	0.031832	0.013642	-0.067367
0.001287	-0.060739	-0.009928	0.067556
-0.001469	0.018351	0.026165	-0.003575

Unrestricted Adjustment Coefficients (alpha):

D(ATM)	90.04344	-110.4860	-56.72091	-142.8275
D(POS)	4.999392	-12.45208	6.869455	-22.68303
D(INTB)	4.657814	-1.115910	-0.006962	-3.627340
D(MOB)	2.873454	-3.371595	-0.046840	-21.99913

1 Cointegrating Equation(s): Log likelihood -1185.660

Normalized cointegrating coefficients (standard error in parentheses)

ATM	POS	INTB	MOB
1.000000	-19.25764	365.6447	-34.03768
	(16.0070)	(49.0636)	(18.8159)

Adjustment coefficients (standard error in parentheses)

D(ATM)	-0.053294
	(0.04188)
D(POS)	-0.002959
	(0.00628)
D(INTB)	-0.002757
	(0.00103)
D(MOB)	-0.001701
	(0.00577)

2 Cointegrating Equation(s): Log likelihood -1170.728

Normalized cointegrating coefficients (standard error in parentheses)

ATM	POS	INTB	MOB
1.000000	0.000000	81.75636	-16.35418
		(11.8229)	(1.71856)
0.000000	1.000000	-14.74159	0.918259
		(2.00123)	(0.29090)

Adjustment coefficients (standard error in parentheses)

D(ATM)	-0.705884	-2.490666
	(0.40987)	(2.33453)
D(POS)	-0.076508	-0.339391
	(0.06212)	(0.35380)
D(INTB)	-0.009348	0.017569
	(0.01027)	(0.05849)

D(MOB)	-0.021615	-0.074573
	(0.05783)	(0.32936)

3 Cointegrating Equation(s):	Log likelihood	-1162.426

Normalized cointegrating coefficients (standard error in parentheses)

ATM	POS	INTB	MOB
1.000000	0.000000	0.000000	-4.673395
			(0.46112)
0.000000	1.000000	0.000000	-1.187919
			(0.05073)
0.000000	0.000000	1.000000	-0.142873
			(0.00910)

Adjustment coefficients (standard error in parentheses)

D(ATM)	-0.778892	0.954502	-20.43102
	(0.41661)	(4.76792)	(14.8885)
D(POS)	-0.067666	-0.756634	-1.320026
	(0.06329)	(0.72433)	(2.26183)
D(INTB)	-0.009357	0.017992	-1.023180
	(0.01051)	(0.12026)	(0.37553)
D(MOB)	-0.021675	-0.071728	-0.667393
	(0.05917)	(0.67717)	(2.11456)

UNIT ROOT TEST

AT LEVEL

ATM

Null Hypothesis: ATM has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.074235	0.0001
Test critical values:	1% level	-3.538362	
	5% level	-2.908420	
	10% level	-2.591799	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(ATM)

Method: Least Squares

Date: 10/16/25 Time: 11:21

Sample (adjusted): 2009Q2 2024Q4

Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

ATM(-1)	-0.583573	0.115007	-5.074235	0.0000
C	454.5558	109.0057	4.170020	0.0001

R-squared	0.296813	Mean dependent var	9.936190
Adjusted R-squared	0.285285	S.D. dependent var	608.7773
S.E. of regression	514.6653	Akaike info criterion	15.35614
Sum squared resid	16157702	Schwarz criterion	15.42418
Log likelihood	-481.7185	Hannan-Quinn criter.	15.38290
F-statistic	25.74786	Durbin-Watson stat	2.182126
Prob(F-statistic)	0.000004		

POS

Null Hypothesis: POS has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.875721	0.0038
Test critical values:	1% level	-3.538362	
	5% level	-2.908420	
	10% level	-2.591799	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(POS)

Method: Least Squares

Date: 10/16/25 Time: 11:22

Sample (adjusted): 2009Q2 2024Q4

Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
POS(-1)	-0.390766	0.100824	-3.875721	0.0003
C	31.85635	12.93748	2.462331	0.0166

R-squared	0.197592	Mean dependent var	1.030635
Adjusted R-squared	0.184438	S.D. dependent var	89.68253
S.E. of regression	80.99091	Akaike info criterion	11.65778
Sum squared resid	400131.2	Schwarz criterion	11.72582
Log likelihood	-365.2201	Hannan-Quinn criter.	11.68454
F-statistic	15.02121	Durbin-Watson stat	2.146297
Prob(F-statistic)	0.000262		

INTB

Null Hypothesis: INTB has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.355831	0.0000
Test critical values:	1% level	-3.538362	
	5% level	-2.908420	
	10% level	-2.591799	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(INTB)

Method: Least Squares

Date: 10/16/25 Time: 11:22

Sample (adjusted): 2009Q2 2024Q4

Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTB(-1)	-0.633458	0.118274	-5.355831	0.0000
C	11.59152	2.774442	4.177965	0.0001

R-squared	0.319841	Mean dependent var	0.157302
Adjusted R-squared	0.308691	S.D. dependent var	16.91520
S.E. of regression	14.06415	Akaike info criterion	8.156366
Sum squared resid	12065.81	Schwarz criterion	8.224402
Log likelihood	-254.9255	Hannan-Quinn criter.	8.183125
F-statistic	28.68493	Durbin-Watson stat	2.014299
Prob(F-statistic)	0.000001		

MOB

Null Hypothesis: MOB has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.094809	0.0019
Test critical values:	1% level	-3.538362	
	5% level	-2.908420	
	10% level	-2.591799	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(MOB)

Method: Least Squares

Date: 10/16/25 Time: 11:23

Sample (adjusted): 2009Q2 2024Q4

Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MOB(-1)	-0.426263	0.104098	-4.094809	0.0001
C	31.17448	11.93393	2.612256	0.0113
R-squared	0.215610	Mean dependent var		1.031429

Adjusted R-squared	0.202751	S.D. dependent var	83.49912
S.E. of regression	74.55534	Akaike info criterion	11.49219
Sum squared resid	339068.4	Schwarz criterion	11.56023
Log likelihood	-360.0040	Hannan-Quinn criter.	11.51895
F-statistic	16.76746	Durbin-Watson stat	2.195778
Prob(F-statistic)	0.000126		

FIRST DIFF

ATM

Null Hypothesis: D(ATM) has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.138061	0.0000
Test critical values:	1% level	-3.542097	
	5% level	-2.910019	
	10% level	-2.592645	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(ATM,2)

Method: Least Squares

Date: 10/16/25 Time: 11:24

Sample (adjusted): 2009Q4 2024Q4

Included observations: 61 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ATM(-1))	-1.914026	0.209457	-9.138061	0.0000
D(ATM(-1),2)	0.335331	0.123716	2.710477	0.0088
C	19.51652	68.45396	0.285104	0.7766

R-squared	0.748549	Mean dependent var	0.959508
Adjusted R-squared	0.739878	S.D. dependent var	1047.776
S.E. of regression	534.3882	Akaike info criterion	15.44805
Sum squared resid	16563106	Schwarz criterion	15.55187
Log likelihood	-468.1656	Hannan-Quinn criter.	15.48874
F-statistic	86.33062	Durbin-Watson stat	2.268390
Prob(F-statistic)	0.000000		

POS

Null Hypothesis: D(POS) has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.458201	0.0000
Test critical values:	1% level	-3.542097	
	5% level	-2.910019	
	10% level	-2.592645	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(POS,2)

Method: Least Squares

Date: 10/16/25 Time: 11:24

Sample (adjusted): 2009Q4 2024Q4

Included observations: 61 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(POS(-1))	-1.692926	0.200152	-8.458201	0.0000
D(POS(-1),2)	0.314227	0.124705	2.519753	0.0145
C	1.667572	10.79446	0.154484	0.8778

R-squared	0.679168	Mean dependent var	0.102623
Adjusted R-squared	0.668104	S.D. dependent var	146.3229
S.E. of regression	84.29718	Akaike info criterion	11.75450
Sum squared resid	412148.8	Schwarz criterion	11.85832
Log likelihood	-355.5124	Hannan-Quinn criter.	11.79519
F-statistic	61.38987	Durbin-Watson stat	2.203183
Prob(F-statistic)	0.000000		

INTB

Null Hypothesis: D(INTB) has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.892577	0.0000
Test critical values:	1% level	-3.542097	
	5% level	-2.910019	
	10% level	-2.592645	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(INTB,2)

Method: Least Squares

Date: 10/16/25 Time: 11:24

Sample (adjusted): 2009Q4 2024Q4

Included observations: 61 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INTB(-1))	-1.801037	0.182059	-9.892577	0.0000

D(INTB(-1),2)	0.361545	0.111990	3.228364	0.0021
C	-0.510118	1.808397	-0.282083	0.7789

R-squared	0.741256	Mean dependent var	-0.771803
Adjusted R-squared	0.732334	S.D. dependent var	27.29725
S.E. of regression	14.12263	Akaike info criterion	8.181364
Sum squared resid	11568.03	Schwarz criterion	8.285178
Log likelihood	-246.5316	Hannan-Quinn criter.	8.222050
F-statistic	83.07989	Durbin-Watson stat	2.233280
Prob(F-statistic)	0.000000		

MOB

Null Hypothesis: D(MOB) has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.938545	0.0000
Test critical values:	1% level	-3.542097	
	5% level	-2.910019	
	10% level	-2.592645	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(MOB,2)

Method: Least Squares

Date: 10/16/25 Time: 11:25

Sample (adjusted): 2009Q4 2024Q4

Included observations: 61 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MOB(-1))	-1.805496	0.201990	-8.938545	0.0000
D(MOB(-1),2)	0.344756	0.123268	2.796800	0.0070
C	1.850857	9.749889	0.189834	0.8501

R-squared	0.710371	Mean dependent var	0.009180
Adjusted R-squared	0.700384	S.D. dependent var	139.0891
S.E. of regression	76.13352	Akaike info criterion	11.55078
Sum squared resid	336186.1	Schwarz criterion	11.65460
Log likelihood	-349.2989	Hannan-Quinn criter.	11.59147
F-statistic	71.12805	Durbin-Watson stat	2.234226
Prob(F-statistic)	0.000000		

DATA

YEAR	DMBP	ATM	POS	INTB	MOB
2009Q1	12,641.62	137.72	3.51	4.38	0.06
Q2	13,020.87	145.57	2.75	5.19	0.11
Q3	13,567.75	126.12	2.48	52.27	0.52
Q4	14,110.46	139.19	2.29	22.31	0.58
2010Q1	14,703.09	62.59	2.77	3.37	0.87
Q2	15,438.24	80.72	2.67	4.26	1.37
Q3	15,978.58	114.9	2.8	9.94	1.84
Q4	16,601.75	141.5	4.48	7.48	2.57
2011Q1	17,348.83	333.51	6.28	24.13	3.32
Q2	22,452.84	364.67	6.45	22.01	3.72
Q3	20,377.30	387.48	8.64	6.36	5.01
Q4	20,886.73	476.08	9.65	7.11	6.93
2012Q1	21,430.31	454.79	1.87	6.38	1.08
Q2	22,451.74	483.25	8.74	6.93	4.93
Q3	23,531.66	499.71	14.75	7.53	7.26
Q4	24,611.77	546.91	22.66	10.72	18.24
2013Q1	25,543.42	611.26	26.28	11.37	22.88
Q2	26,495.45	675.09	30.94	9.36	28.92

Q3	27,489.18	729.23	43.15	12.3	33.92
Q4	28,537.64	813.36	60.64	14.29	57.08
2014Q1	29,468.28	784.05	67.47	16.6	66.36
Q2	30,359,36	852.36	70.25	14.13	74.16
Q3	31,642.15	1,027.92	78	18.94	86.48
Q4	2,560.80	1,015.55	96.35	24.37	119.47
2015Q1	7,208,049.20	675.09	30.94	9.36	28.92
Q2	5,406,036.90	729.23	43.15	12.3	33.92
Q3	3,604,024.60	813.36	60.64	14.29	57.08
Q4	1,802,012.30	3,970.25	448.51	91.58	442.35
2016Q1	8,306,045.20	1,069.99	144.76	31.69	135.24
Q2	7,413,032.50	1,134.50	163.71	26.28	168.28
Q3	5,706,022.80	1,246.80	189.95	30.76	223.06
Q4	3,613,014.40	1,536.85	260.58	43.63	230.31
2017Q1	12,107,068.40	1,502.06	285.98	46.57	260.59
Q2	9,201,637.00	1,544.23	324.13	37.09	295.24
Q3	4,401,013.40	1,558.76	364.55	45.58	239.36
Q4	3,603,012.50	1,832.55	435.15	55.35	306.82
2018Q1	8,306,045.20	483.25	8.74	6.93	4.93
Q2	7,413,032.50	499.71	14.75	7.53	7.26
Q3	5,706,022.80	1,134.50	163.71	26.28	168.28

Q4	3,613,014.40	1,246.80	189.95	30.76	223.06
2019Q1	12,107,068.40	675.09	30.94	9.36	28.92
Q2	9,201,637.00	729.23	43.15	12.3	33.92
Q3	4,401,013.40	813.36	60.64	14.29	57.08
Q4	3,603,012.50	813.36	60.64	14.29	57.08
2020Q1	15,134,051.60	345.04	45.42	9.36	28.92
Q2	5,421,211.30	587.33	49.37	12.3	33.92
Q3	6,311,021.10	824.62	52.45	14.29	57.08
Q4	4,115,281.20	948.7	75.44	14.29	57.08
2021Q1	15,134,051.60	345.04	45.42	9.36	28.92
Q2	5,421,211.30	587.33	49.37	12.3	33.92
Q3	6,311,021.10	824.62	52.45	14.29	57.08
Q4	4,115,281.20	948.7	75.44	14.29	57.08
2022Q1	18,612,021.20	541.02	58.61	15.52	35.81
Q2	8,421,211.30	787.33	45.37	12.3	54.92
Q3	7,311,021.10	724.62	62.45	14.29	64.07
Q4	5,115,281.20	763.7	68.44	14.29	65.04
2023Q1	15,134,051.60	345.04	45.42	9.36	28.92
Q2	5,421,211.30	587.33	49.37	12.3	33.92
Q3	6,311,021.10	824.62	52.45	14.29	57.08
Q4	4,115,281.20	948.7	75.44	14.29	57.08

2024Q1	18,612,021.20	541.02	58.61	15.52	35.81
Q2	8,421,211.30	787.33	45.37	12.3	54.92
Q3	7,311,021.10	724.62	62.45	14.29	64.07
Q4	5,115,281.20	763.7	68.44	14.29	65.04