IMPACT OF POINT OF SALE (POS) TERMINAL ADOPTION ON THE RETURN ON PROFIT AFTER TAX (PAT) OF TIER-ONE BANKS IN NIGERIA.

Augustine Enebi Aduku, Akeem Adewale Bakare, Adeniyi Oyabambi, Emanuel Olawale Akanni, Friday Iyaji Isah

[1] Department of Business Administration, Nile University of Nigeria. Abuja, Federal Capital Territory, Nigeria.

Corresponding author: Akeem Adewale Bakare, Department of Business Administration, Nile University of Nigeria. Abuja, Federal Capital Territory, Nigeria. Email: akeem.bakare@nileuniversity.edu.ng

ABSTRACT

This research examines the effect of Point-of-Sale (PoS) terminal transactions on Tier-One banks' profitability in Nigeria, in terms of Profit After Tax (PAT) and Return on Assets (ROA). Using a panel data approach, the research employs the Panel Estimated Generalised Least Squares (EGLS) model with cross-sectional random effects on data collected from five Tier-One banks over 2014-2023. The application of the random-effects model was confirmed using the Hausman test. Empirical findings revealed that PoS terminal transactions (β=0.0992, p-value=0.0063; β=0.1159, p-value=0.0112) positively and significantly affect PAT and ROA. These results imply that increased adoption and installation of PoS terminals can improve bank profitability and asset utilisation. The paper concludes that digital transaction channels, and even more so PoS systems, are central to banks' financial performance improvement and are well aligned with the Technology-Organisation-Environment (TOE) framework, highlighting the interaction of technological innovation, organisational capability, and external environment. From these results, the research advises additional investment in PoS infrastructure and the utilization of analytics for the optimization of transaction strategies for improved profitability and operational effectiveness.

Keywords: Point-of-Sale; Tier-One banks; Profit After Tax; Return on Assets; Nigeria.

INTRODUCTION

Banks in emerging economies remain critical to driving economic growth, stabilizing financial systems, and building institutional resilience. In Nigeria, Tier-One banks—constituted by Zenith Bank Plc, Access Bank Plc, First Bank of Nigeria Ltd, United Bank for Africa Plc (UBA), and Guaranty Trust Holding Company Plc (GTCO)—are the

epitome of financial intermediation. Not only are they market leaders in market capitalisation and mobilisation of deposits, but they also play pivotal roles in financial innovation and national development. Among the most revealing measures of their performance is Profit After Tax (PAT), a reflection of their net efficiency and value to shareholders. Yet, the volatility of PAT in the past decade, even in the midst of frantic digital transformation, raises fundamental questions on the actual financial returns on such investments in technology.

During this age of the digital era, technological advancements have revolutionized banking operations, more so through the spread of electronic payment systems. Of these, Point of Sale (PoS) terminal can be called a revolutionary medium for making secure, cashless, and instant retail payments. In Nigeria Inter-Bank Settlement System (NIBSS, 2024), PoS transactions in Nigeria reached more than ₦10.7 trillion in 2023—a tenfold increase over the rate in 2017—reflecting a surge in adoption and consumer confidence. For Tier-One banks, it is an extension of being placed in digital space, where the PoS terminal acts as a outreach mechanism for accessing the underground economy, retaining costs on handling cash, and diversifying revenues.

The relationship between the adoption of PoS terminals and bank profitability is not linear, however. As wonderful as PoS infrastructures are engineered to minimize transaction costs and increase customer touchpoints, the operational investments, fraud exposure, merchant discontent, and infrastructural limitations (e.g., unreliable electricity and internet connectivity) offer competing pressures that most probably diminish net gains. And to top it off, the spread-out regulatory framework as well as increased inflationary pressures further muddling profitability results, demanding data-driven reconsideration of presumed gains.

From a research perspective, this is a problem that needs to be revisited. Previous empirical research has not adequately disentangled the impact of PoS adoption on profitability metrics like PAT. For example, Onaolapo and Odetayo (2019) investigated ATM channels only without extending to PoS terminals. Akinola (2020) applied descriptive methodologies with confined inferential prospects, while Nwankwo and Osho (2021) utilized cross-country data, thus restricting contextual validity. Even more current research works—like Ene and Ezeani (2023) and Uche and Madueke (2024)—could not include post-pandemic data or address bank-tier segmentation, notwithstanding overwhelming indications of Tier-One banks pioneering the digital uptake front.

Thus, an apparent gap is created in establishing the causal relationship between PoS terminal adoption and profitability for Nigeria's Tier-One banks. The literature gap here is plugged by applying a rigorous econometric method on the most recent available post-pandemic financial statements to estimate the extent to which the explosive growth in PoS transactions converts into concrete gains in PAT. The research working hypothesis here is that even while it expands retail banking

penetration and mobility with increased use of PoS terminals, its effect gets mediated by the cost-economies turning point, management throughput, and structural constraints.

This paper, thus, attempts both theoretically and empirically. Theoretically, it contributes to profitability of digital banking in emerging economies by bringing channel-specific performance to the limelight. Empirically, it questions the financial profitability of Tier-One banks' PoS terminals as a unit of observation, providing policy-relevant findings to regulators, investors, and managers of banks about the viability of digital investment strategies.

LITERATURE REVIEW

The body of literature addressing electronic banking and its impact on profitability in emerging markets has rapidly developed, reflecting the increasing connection between technological advancements and profitability metrics in the financial sector. In Nigeria, the extensive use of Point of Sale (PoS) terminals as part of broader electronic banking initiatives has introduced new ways for banks to perceive, pursue, and measure profitability. While experts agree that digital transformation offers banks avenues for growth and optimisation, the path to achieving profitability is influenced by various internal and external factors. This literature review provides a critical examination of the conceptual, theoretical, and empirical foundations of PoS terminal adoption and post-tax profit (PAT) within Nigeria's Tier-One banking sector.

Conceptual Review

The adoption and utilization of Point of Sale (PoS) terminals refer to how banks implement and operate these devices to enable smooth, cashless, and real-time retail payment transactions at various merchant locations. PoS terminals are specialized electronic devices designed to read payment instructions and securely transmit them to the acquiring bank for processing. The Central Bank of Nigeria (CBN, 2022) defines PoS adoption not merely as the deployment of devices but as the strategic and operational integration of these terminals into the bank's retail transaction framework. This includes acquiring necessary infrastructure, onboarding merchants, facilitating transaction volumes, and ensuring system operability across payment gateways.

The key value proposition of PoS terminal adoption lies in its benefits for stakeholders throughout the banking value chain. For banks, PoS terminals serve as cost-effective distribution channels, reducing the need for expensive physical

branch expansion (Okafor & Onyeagba, 2021). They promote low-cost financial inclusion in rural and semi-urban areas, where traditional bank branches are not financially feasible. For customers, the convenience of card payments improves transaction efficiency, decreases liquidity risks, and boosts customer satisfaction (Nwankwo & Agbo, 2022). Additionally, PoS implementation enables real-time data analysis, fraud detection, and behavioral analysis, which are vital for customer retention and product customization. However, these benefits can only be realized if the adoption is supported by reliable systems, merchant trust, and quality service (Adewale & Fatokun, 2021).

Moreover, adoption involves integrating these systems into the core banking infrastructure. This process transcends mere hardware procurement and includes agent training, cybersecurity protocols, dispute resolution processes, and adherence to KYC and AML regulations. According to Ekenna and Eze (2023), adoption should be defined through a process-based approach, focusing not just on infrastructural inputs but also on operational outputs, such as transaction volume, terminal availability, and merchant retention. These aspects are crucial in determining the sustainability and performance of PoS as a channel within the overall digital ecosystem of banks.

Furthermore, the adoption of PoS terminals must be viewed within the context of Nigeria's transitioning cashless policy, which promotes digital migration through incentives and limits on cash withdrawals, alongside fostering electronic alternatives (CBN, 2023). This regulatory framework has led to increased bank investments in PoS infrastructure, shifting consumer behavior and prompting innovations in payment processing. Despite the significant rise in PoS transaction volumes, adoption does not guarantee profitability unless it contributes to lowering transaction costs, enhancing fee-based revenues, or minimizing fraud losses (Onuoha & Chukwuma, 2022).

Overall, adoption should be assessed both quantitatively (e.g., number of PoS terminals, transaction volume) and qualitatively (e.g., alignment with strategy, customer satisfaction) to gauge its overall effectiveness.

PAT, or Profit After Tax, denotes a bank's net income after accounting for all operational costs, interest expenses, and tax obligations per regulations. It is often regarded as a core measure of net profitability in financial performance assessments, reflecting the bank's capability to generate value for shareholders while meeting regulatory and tax compliance (Akintoye & Oladeji, 2020). PAT provides insights into operational efficiency, revenue diversification, and risk management strategies, particularly given the increased market volatility and scrutiny from regulators.

In banking, PAT is influenced by various operational factors, including interest income, fee income, efficiency in managing operating expenses, provisions for bad loans, and strategic tax management. The link between digital banking technology investments and PAT is particularly significant when evaluating the economic impact of such technology expenses (Oyelami et al., 2023). Electronic channels like PoS terminals aim to reduce cash handling and the costs associated with physical banking while increasing transaction volumes and fee-based income. However, these electronic channels may incur significant costs due to high maintenance fees, fraud risks, and potential customer dissatisfaction, which could undermine PAT unless managed effectively.

Notably, PAT is also affected by external factors, including inflation, foreign exchange rates, and monetary policies, which impact banks' financial performance regardless of their operational efficiencies. For instance, an increase in the digital transaction value might also lead to a rise in cybercrime and infrastructure costs, potentially negating expected profitability growth (Balogun & Yekini, 2021). Thus, while PAT is a valuable metric for assessing financial health, its relevance must be considered within the larger context of economic, technological, and regulatory factors influencing banks.

In conclusion, PAT is a key indicator of financial performance based on strategic decisions, including adopting PoS terminals. PAT isn't just a monetary figure; it reflects a bank's ability to transform operational inputs into sustainable economic value. In the context of PoS terminal adoption, PAT aids in performance assessment, strategic planning, and resource allocation within Nigeria's Tier-One banking sector.

Theoretical Framework

The nexus between technology adoption and profitability in banking is rooted in a framework of theoretical paradigms explaining the adoption, implementation, and manifestation of innovations as tangible economic results. Three theories form the framework of the analytical model used in this study: the Technology-Organization-Environment (TOE) Framework, the Diffusion of Innovation (DOI) Theory, and the Resource-Based View (RBV). These theories provide additional conceptual frameworks through which the adoption of PoS terminals and profitability can be examined.

The Technology-Organization-Environment (TOE) model, developed by Tornatzky and Fleischer (1990), offers a general framework for examining the adoption of technological innovations within the enabling and constraining environment of organizations' operating contexts. According to this model, technological adoption depends on three interrelated factors: the technology (e.g., complexity, compatibility), the organizational environment (e.g., size, resources, management

support), and the external environment (e.g., regulatory pressures, competitive forces).

The Nigerian adoption of PoS terminals by banks is not merely a technological imperative but also a strategic response to regulatory demands (e.g., the CBN's cashless policy), customers' desire for convenience, and organizational competence. For instance, Tier-One banks like GTCO and Zenith Bank have demonstrated flexibility in addressing environmental needs by developing PoS infrastructure in cities and peri-urban areas (CBN, 2023; Onuoha & Chukwuma, 2022). Nonetheless, the generality of the TOE framework has faced criticism for downplaying specificity, as it sometimes undervalues digital readiness and the diversity of leadership direction at the business level (Ifinedo, 2011).

However, the TOE model is useful in this research as it connects macro-environmental drivers (i.e., regulations on the internet, inflation) to organizational strategy and technology impacts. It can explain the heterogeneous intensity and temporal nature of banks regarding PoS adoption, thereby informing their revenue models and PAT. Consequently, the TOE model warrants inquiry not only into whether PoS systems exist but also into how organizational capabilities and environmental turbulence influence their profitability streams.

The Diffusion of Innovation (DOI) theory by Rogers (2003) presents a behavioral perspective that describes how technological innovations are disseminated and adopted by social or organizational systems over time. According to this theory, adopters are categorized as innovators, early adopters, early majority, late majority, and laggards, highlighting that the adoption of innovation is a process driven by perceived benefits, complexity, trialability, observability, and compatibility.

The DOI theory best applies to measuring the scope and speed of PoS terminal rollout among Tier-One Nigerian banks. UBA and Access Bank have emerged as pioneers in rapidly onboarding merchants, maximizing transaction speed, and creating branded PoS interfaces (Akinola, 2021). The perceived value of PoS terminals—to reduce cash handling, tap into unbanked customers, and generate fee income—has been a significant driver of adoption. However, the DOI theory has been criticized for not adequately addressing institutional limitations and market structures, which may lead to delays regardless of the perceived value of an innovation (Lyytinen & Damsgaard, 2001).

Nevertheless, the DOI framework is employed in this study to provide insights into the variations of digital strategy execution in banks. While some banks swiftly increased their PoS adoption and integrated it into their digital environments, others encountered hurdles like cybersecurity vulnerabilities, customer rejection, or infrastructure constraints (Ezeani & Osuagwu, 2023). These patterns of adoption directly contribute to the influence of PoS infrastructure on sustainable PAT growth.

The Resource-Based View (RBV), initially proposed by Barney (1991), underscores the strategic importance of a firm's internal resources in achieving and maintaining competitive advantage. According to the RBV, organizations attain superior performance by effectively utilizing useful, rare, inimitable, and non-substitutable (VRIN) resources to achieve their strategic goals.

Regarding PoS terminal adoption, the RBV demands that banks consider their digital competence, managerial ability, IT infrastructure, and learning orientation. Profitability in PoS systems not only becomes a variable of adoption but also depends on how deeply these systems are integrated into core operations, supported by robust analytics, and protected against fraud (Agwu & Carter, 2014). For instance, even though most Tier-One banks have the financial capability to adopt digital instruments, not all of those with superior back-end infrastructure and talent for adaptation and learning can leverage PoS adoption to enhance PAT (Ishola & Oladele, 2022).

RBV has faced criticism for its relative neglect of external forces that can deplete internal capacities (Priem & Butler, 2001). However, when combined with the TOE and DOI frameworks, the RBV provides a compelling basis for examining how strategic digital investments, such as PoS terminals, can differentiate banks in a competitive environment. By focusing on internal capabilities, the RBV elucidates why certain banks achieve substantial PAT returns from such digital initiatives while others fail to do so.

Among the theories mentioned, Tornatzky and Fleischer's (1990) Technology-Organization-Environment (TOE) framework stands out as the most fitting for examining the effects of digital innovation, especially in how PoS terminal adoption impacts the profitability of banking companies. Its three-dimensional structure—technological context, organizational context, and environmental context—effectively analyzes the complex dynamics between digital investments and financial performance within the regulated banking sector, particularly in Nigeria.

The technological aspect of the TOE framework enables this research to assess the essential technical characteristics of PoS terminals, including scalability, interoperability, and security, which are vital for adoption. In Nigeria, PoS technology has become increasingly accessible, mobile, and affordable, attracting Tier-One banks (CBN, 2024). The TOE model supports evaluating whether this technology's performance aligns with banking operations, customer expectations, and back-end integration needs—critical factors contributing to financial metrics like Profit After Tax (PAT).

Furthermore, analyzing the organizational context is crucial to understanding the differences among banks in their strategic implementations. Although all Tier-One banks operate under the same regulatory framework, their internal capabilities,

such as IT infrastructure, digital skills, leadership support, and resource management, differ considerably. The TOE framework helps identify how these organizational traits mediate the relationship between PoS adoption and profitability. For instance, while two banks may use the same technology, only the one that promotes innovative governance and excels in analytics can improve its PAT outcomes (Ezeani & Osuagwu, 2023).

The environmental dimension of TOE is vital for this study, given the challenging macroeconomic and regulatory landscape of Nigeria's banking sector. Factors such as the CBN's cashless policy, inflation, and infrastructural issues (e.g., unreliable electricity, cybersecurity risks) significantly influence the adoption and usage of PoS terminals (Onuoha & Chukwuma, 2022). Unlike the Resource-Based View (RBV) or Diffusion of Innovation (DOI) theory, TOE accounts for these external elements, making it a more suitable model for analyzing digital innovation in unstable emerging markets.

Moreover, TOE has demonstrated its effectiveness in recent empirical research surrounding financial technology adoption in Africa. For example, Adewuyi and Odugbesan (2022) employed TOE to investigate the proliferation of mobile banking in West African economies, while Okoye et al. (2023) utilized it to assess digital payment adoption among Nigerian microfinance institutions. These studies underscore the explanatory power and flexibility of TOE in empirical research across diverse organizational contexts.

In summary, TOE theory provides a multi-faceted, empirically testable, and context-sensitive framework for understanding the relationship between PoS terminal adoption and PAT. Its ability to clarify both internal firm dynamics and external market influences gives it greater analytical strength compared to theories limited by either internal resources (RBV) or adoption patterns (DOI). Therefore, TOE has been chosen as the theoretical framework for the contexts of this study.

Empirical Review

Adebayo and Oladeji (2019) examined the influence of the use of PoS terminals in electronic channels of banking on bank performance in Nigeria based on panel data regression of 10 commercial banks over the 2010-2017 period. ROA and PAT were employed as a measure of bank performance, while PoS adoption was statistically insignificant but positively impacted PAT. The authors concluded that although PoS terminals boosted financial inclusion, their short-run profitability effect is obscured by high operating costs and fraud vulnerability. They suggested tightened cybersecurity measures and cost-control interventions to ensure optimal performance effects.

Onaolapo and Odetayo (2020) examined PoS and ATM channel usage separately and examined the impact of their contribution towards Nigerian deposit money banks' profitability using 2013-2018 time series data. Variance decomposition techniques and Ordinary Least Squares (OLS) estimation technique were employed in the provision of evidence of loose positive relationship between volume of PoS transactions and PAT. They demonstrated that digital channels increase access but their contribution towards profitability depends on digital literacy, maintenance costs, and services disruptions. Their recommendations to banks were that they spend on customer digital training and regular device upgrades in a bid to drive returns to their maximum potential.

Ezeani and Ezeife (2021) used structural equation modeling (SEM) in measuring the effect of electronic payment systems like PoS on the profitability of 12 Nigerian commercial banks following the introduction of the 2015 cashless policy. According to the study, the PoS terminals were found to have a positive statistically significant effect on PAT at a 5% confidence level. They believed that increased digital adoption boosts efficiency and reduces handling costs of transactions. Nonetheless, issues of infrastructural and power supply were seen as bottlenecks. The writers called on the CBN to collaborate with regulators of the power sector to provide stable electricity to electronic banking systems.

Nwankwo and Osho (2021) examined the effect of digital payment adoption among Sub-Saharan African economies based on cross-country panel data for 30 banks over the period 2010-2020. While not Nigeria-specific, their fixed-effects regression found that banks with greater PoS penetration registered improved PAT performance but only in policy-friendly economies and economies with appropriate digital infrastructure. The research found that the effectiveness of PoS technology in enhancing PAT depends on environmental preparedness. They advised that governments need to offer digital public goods—such as rural broadband and fintech incentives—to unlock the profitability potential of PoS adoption.

Akinola (2022) tested the association between electronic channels of banking and financial performance employing descriptive statistics and correlation analysis of the secondary data of annual reports of CBN and NDIC for the years 2012–2019. While restricted in inferential strength because it did not use regression modeling, the study identified a positive trend between bank profitability and PoS terminal adoption. The writer reported that PoS technology is low-cost for accessing unbanked clients. But without causality analysis, the robustness of conclusions is downgraded. Akinola suggested additional empirical research involving econometric estimation to confirm such findings.

Ishola and Oladele (2022) employed a multivariate regression model to examine the effect of fintech innovations, including PoS, mobile platforms, and USSD platforms, on the profitability of banks in Nigeria. Based on 7 Tier-One and Tier-Two banks

between 2014 and 2021, they found that the implementation of PoS had the largest coefficient among fintech variables that affected PAT. The authors inferred that PoS terminals are growing more central to banks' revenue mobilization, especially in the post-COVID period. Their policy advice was that the regulators need to implement an open banking architecture to facilitate interconnectivity and cut operational jams.

Uche and Madueke (2023) applied a hybrid model, which integrated Data Envelopment Analysis (DEA) and Tobit regression to quantify the efficiency of digital banking technologies, such as PoS, in 10 Nigerian banks. The findings indicated that more cost-effective banks were those with higher PoS terminal-to-customer ratios and greater PAT margins. The conclusion was that PoS improves scale efficiency by decentralizing the transaction execution. But they warned that without tracking, failure and service fraud would erode benefits. Their advice stressed the convergence of PoS platforms with real-time monitoring and biometric authentication systems.

Ene and Ezeani (2023) applied a difference-in-differences (DiD) framework to study the effect of PoS adoption on the financial performance of Nigerian banks by performing a comparison between pre- and post-pandemic observations (2016–2022). The study established an average 12% growth in PAT among Tier-One banks that notably scaled up their PoS infrastructure beyond 2020. They assumed that the COVID-19 crisis fast-tracked digital transformation, which, in turn, amplified digital revenue streams. But the authors noted difference in PoS effectiveness between urban and rural outlets. They suggested targeted infrastructure investments and collaboration with fintechs as interventions to narrow the rural-urban gap.

Oyelami et al. (2023) employed a dynamic panel Generalized Method of Moments (GMM) estimation approach to explore the effects of various digital channels, i.e., PoS, on profitability in Nigeria's SIBs. Results indicated that PoS terminals had a lagged but statistically significant effect on PAT during the 3-year lag period, indicating a digital investment return maturity curve. The research presupposed that investments in the virtual world have to be considered on a long-term basis. Their most important suggestion was that banks must create digital sustainability strategies with maintenance, education of users, and incremental technology improvements.

Okoroafor and Adebisi (2024) examined the moderating effect of digital innovation strategy on the PoS adoption and profitability relationship among Nigerian Tier-One banks. From the application of moderated regression analysis as well as the utilisation of data for 2013-2022, they concluded that PoS adoption significantly increases PAT only when positioned in the context of a coordinated innovation strategy. Banks lacking strategic congruence were not significantly affected even with maximum levels of PoS penetration. The research concluded that digital

technology is not an independent profit driver—they need to be complemented by business models. They suggested Nigerian banks institutionalize digital roadmaps with KPI tracking and feedback loops for learn-by-doing iterations.

Despite the vastness of empirical evidence on Point of Sale (PoS) terminal technology and bank performance, gaps remain with regards to the specific impact of PoS terminal adoption on Profit After Tax (PAT) as regards Tier-One banks in Nigeria. Much of the current work either is prone to generalizing digital banking tools—a bundled offering of PoS together with mobile apps, ATMs, and USSD—without de-aggregating their unique contributions, or employs extremely large regional sample sizes (e.g., Sub-Saharan Africa) that erase country-specific results. In addition, some other studies like Akinola (2022) and Onaolapo & Odetayo (2020) use descriptive or simple correlational designs that restrict causal inference and do not allow for the time lag between PoS investment and profitability performances. Additionally, research tends to overlook Tier-One banks as a separate group, a lacuna which is unfounded since these banks control Nigeria's financial market and have distinct forms of work, capital bases, and electronic investment capabilities whose impact on the PoS–PAT arrangement can be gigantic.

There is a glaring gap in research studies that respond to the latest economic shocks, such as the post-COVID digital boom and the currency redesign crisis, both of which have directly impacted PoS consumption trends in Nigeria. Empirical studies, like that of Ene & Ezeani (2023), identify post-pandemic impacts but do not include performance metrics beyond transaction values. Another significant oversight is the insufficient examination of moderating or mediating variables, such as the quality of infrastructure, fraud controls, and customer uptake rates, which may influence the magnitude and direction of the PoS–PAT relationship. Lastly, even the most prominent analyses do not utilise sophisticated panel econometric models capable of considering bank heterogeneity and dynamic influences, such as GMM or fixed-effect approaches. Consequently, these limitations emphasise the need for more advanced, Nigeria-focused, and methodologically sound research studies on Tier-One banks and their post-adoption profitability paths.

METHODOLOGY

This research adopts an ex post facto design, which is ideal for analysing the effect of PoS terminal adoption (independent variable) on the Profit After Tax (pat) of Tier-One banks (dependent variable), serving as an indicator of financial performance in Nigeria. An ex post facto design is particularly useful when variables have already occurred and cannot be altered (Onwumere, 2009). It allows for the analysis of cause and effect using pre-existing data, and is commonly employed in studies related to technological interventions and performance assessments in finance (Ogunleye & Adepoju, 2021). Considering the study spans a decade (2014–2023) marked by

significant digital advancements and the rise of PoS systems, this approach provides reliable, trend-oriented outcomes devoid of experimental bias.

The population being researched are the five top Tier-One deposit money banks in Nigeria: Zenith Bank, Access Bank, First Bank, GTBank, and UBA. They were chosen using census sampling, which is a method justified by the small and well-defined population size. They were chosen based on consistent ranking in Central Bank of Nigeria (CBN) publications, asset base, digital infrastructure, and their adequate public disclosures. Tier-One banks lead Nigeria's banking industry by coverage and capacity and hence provide the best place to analyze the true effect of PoS implementation on top-line profitability metrics like PAT.

Secondary (panel) data were obtained from audited financial reports of the sample banks, CBN statistical bulletins, and NIBSS publications. Audited financial reports provide credible and reliable data, while CBN and NIBSS provide standardized record of transactions. The 2014–2023 timeframe provides longitudinal depth in the sense that it captures the fast pace of digital payment channel expansion in Nigeria, particularly the boom of PoS terminals after regulation pressure and shifts in consumer demand after 2016 cash policies and 2020 pandemic-era digitization initiatives.

The adoption of PoS terminals is employed as the independent variable, and operationalisation is the yearly number of PoS transactions used as a proxy for adoption intensity. This operationalisation follows earlier literature where transaction volume is an effective measure of adoption of digital technology (Ajayi & Ojo, 2020; Nwankwo et al., 2022). The dependent variable, Profit After Tax (PAT), is chosen as it captures net profitability after accounting for all expenses and tax liabilities, thereby providing a complete financial outcome measure. PAT is also commonly applied in financial performance research and provides evidence of how digitalisation efforts translate into actual bottom-line gains.

Both descriptive and inferential statistical methods are used to analyse the data. Descriptive analysis (mean, standard deviation, trends) emphasises the typicality and dispersion of variables over time. For inferential analysis, multiple regression analysis establishes the causal effect of PoS adoption on PAT. The regression model controls other variables like interest rate (INTR), an external macroeconomic variable that affects banking profitability. The regression equations are as follows:

$$ROA_{it} = \beta_0 + \beta_1(MBTVol)_{it} + \beta_2 INTR_{it} + \varepsilon_{it} - \quad - \quad - \quad - \quad - \quad - \quad 3.1$$

$$PAT_{it} = \beta_0 + \beta_1(MBTVol)_{it} + \beta_2 INTR_{it} + \varepsilon_{it} - \quad - \quad - \quad - \quad - \quad - \quad 3.2$$

Where:

- PAT_{it} = Profit After Tax of bank *i* at time *t*

- $PoSTVol_{it}$ = PoS terminal transaction volume (proxy for adoption)

- $INTR_{it}$ = Interest rate (control variable)

- ε_{it} = Error term

- β_0 = Constant term

- $\beta_1 - \beta_2$ = Coefficients of explanatory variables

The reason for using multiple regression is that it has the ability to estimate the direction and size of the relationship between the use of PoS terminals and profitability, ceteris paribus. The method has been applied universally to empirical finance for analyzing the effects of technological and policy innovations on performance measures (Gujarati & Porter, 2009; Wooldridge, 2016).

Diagnostic tests for the validity and stability of regression estimates are conducted. These are:

- Variance Inflation Factor (VIF) for multicollinearity test,
- Durbin-Watson test for autocorrelation test,
- Breusch-Pagan test to test heteroskedasticity.

Any statistical computation is carried out using Software EViews Version 12 because of its sophisticated capability to work with panel datasets as well as econometric models.

Ethical standards are fulfilled through the use of purely publicly available secondary data. There are no human subjects, and therefore consent procedures are not necessary. Triangulation of data from various sources guarantees accuracy, reliability, and validity of results. This study method is anticipated to provide strategic lessons for bank strategists, regulators, and policymakers through the identification of the real financial gains (or constraints) of the use of PoS technology in Nigeria's largest and most digitally active banks. The study seeks to inform evidence-based decision-making on investments in digital finance infrastructure in emerging markets.

RESULTS AND DISCUSSION

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
PAT	50	4.18	5.83	5.0838	.33791
ROA	50	.40	5.60	2.4620	1.31613
POS	50	2.71	7.42	5.5939	1.23662
INTR	50	1.04	1.27	1.1336	.06886
Valid N (listwise)	50				

Source: E-Views 12.

The descriptive statistics in Table 1 provide the first glimpse of our focal variables across the 50 bank–year observations (2014-2023), which leads to evaluating the relationship between PoS terminal adoption and Profit After Tax (PAT) in Nigeria's Tier-One banks. PAT takes on a mean value of 5.0838 (std. dev. = 0.3379) and is closely scattered between 4.18 and 5.83. This close dispersion indicates that, despite external shocks (e.g. regulatory volatility, business cycles), net profitability after tax has been relatively stable over the sample. Such uniformity is a reasonable benchmark: any systematic deviation from PAT beyond these limits is more likely to be due to the effect of explanatory variables—such as take-up of PoS—than to random variation in after-tax profits.

Conversely, the proxy for adoption of PoS (number of transactions per year) has a mean of 5.5939 but a significantly higher standard deviation (1.2366) and range of 2.71-7.42. This captures high heterogeneity in how various banks (and/or various years) have adopted and used PoS terminals. Since variation in PoS is much higher than variation in PAT, it reveals rich "signal" in the data: we can confidently explore whether—and how—such digital channel intensity variations are associated with variation from otherwise stable PAT mean. And control variables place these dynamics in context. ROA (mean = 2.4620; sd = 1.3161; range = 0.40-5.60) indicates banks' asset-utilization efficiency highly dispersed across various banks and over various time periods and could be a mediator of the PoS–PAT relationship. But interest rate (INTR) is closely bunched (mean = 1.1336; sd = 0.0689; range = 1.04–1.27), which indicates macro-level borrowing costs over the time period were very stable. Such stability in INTR improves our capacity to disentangle the effect of adoption in PoS on PAT, as erratic changes in lending rates are not expected to interfere with our interpretation of the PoS coefficient from our regression equations.

Correlation

Table 2. Correlations

		PAT	ROA	POS	INTR
PAT	Pearson Correlation	1	.571**	.401**	-.253
	Sig. (2-tailed)		.000	.004	.077
	N	50	50	50	50
ROA	Pearson Correlation	.571**	1	-.094	.031
	Sig. (2-tailed)	.000		.516	.832
	N	50	50	50	50
POS	Pearson Correlation	.401**	.094	1	.406**
	Sig. (2-tailed)	.004	.516		.003
	N	50	50	50	50
INTR	Pearson Correlation	-.253	.031	.406**	1
	Sig. (2-tailed)	.077	.832	.003	
	N	50	50	50	50
**. Correlation is significant at the 0.01 level (2-tailed).					

Below is the description of the correlation matrix in Table 2 and how such bivariate relationships allow us to understand the role of PoS adoption in the influence on PAT and the role of ROA and interest rates in this juncture.

PAT–ROA (r = 0.571, p < 0.001): The strong, positive correlation between Return on Assets and Profit After Tax shows that those banks that are more successful at converting assets into money also have a tendency to be more profitable after tax on a net basis. In commercial terms, better utilization of assets—maybe better cash flows, better loan portfolios, or better cost controls—reads directly into the bottom line. This finding emphasizes the importance of our including ROA in our regression model: if we don't adjust for ROA, we risk attributing to PoS adoption some of the growth in profitability due to general asset efficiency.

PAT–PoS (r = 0.401, p = 0.004): The significant positive correlation at the moderate level between PAT and PoS transaction volumes provides circumstantial evidence supporting our hypothesis that higher adoption of PoS terminals is associated with greater after-tax profits. This means that, the more extensive their PoS networks with their Tier-One banks increasing in size, and the greater their volume of transactions, the greater their fee-based revenues and lower cash-handling costs—effects that are reflected in their PAT figures. However, correlation won't suffice to establish causation, so we will proceed with multivariate regression and check whether this is so under control for other influences.

PAT–INTR (r = –0.253, p = 0.077): The negative small correlation between PAT and interest rates is not significant at traditional significance levels (p > 0.05), but does confirm the reverse expected relationship: high funding prices or tight monetary conditions can squeeze net interest margins and thus reduce net profitability. Non-significance here would imply that, over the period from 2023 to 2014, interest rate surprises were typically small or well contained by Tier-One banks—much like the low dispersion in Table 1—such that INTR could contribute a less pivotal role than digital considerations to explaining PAT variation.

ROA–PoS (r = 0.094, p = 0.516): The absence of a correlation between ROA and PoS volumes to almost zero and not significant suggests that returns-efficiency gains and PoS diffusion move independently to an extremely high degree in this group. That is, the efficiency of a bank in generating returns from assets is not necessarily associated with the degree to which it utilizes or installs PoS terminals. This autonomy is valuable methodologically—it serves to placate worries that PoS and ROA are collinear predictors in our model, and that PoS adoption introduces distinctive explanatory power for PAT beyond what is explained by total asset efficiency.

PoS–INTR (r = 0.406, p = 0.003): Lastly, likewise statistically significant yet in initial assessment potentially counter-intuitive is adoption of PoS and interest rate: higher and increasing interest rates will in early analysis increasingly merely push more funds into non-margin-compressing income streams such as PoS charges. This is suggestive that larger INTR years are accompanied by more positive PoS activity, maybe as an interest rate hedge. It also cautions us against a possible interaction or

control effect in our regression: we must be careful to ensure that the PoS coefficient is showing genuine digital-driven profitability and not a spurious reaction to movements in interest rates.

Put together, these relationships are amenable to a multivariate regression in which PAT is regressed on the volumes of PoS, ROA, and INTR—enabling us to tease apart their separate impacts on bank profitability.

Hausmann Test

Table 3. Correlated Random Effects - Hausman Test

Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.160128	2	0.9231

Source: E-Views 12

The Hausman test provides a x^2 statistic of 0.1601 with 2 degrees of freedom and p-value 0.9231, indicating failure to reject the null hypothesis that the random-effects estimator is consistent. That is, there is no statistically significant difference between the fixed-effects and random-effects coefficient estimates, so the random-effects model is both consistent and more efficient for our panel data. Therefore, we continue with the random-effects specification to test the effect of PoS terminal adoption and control variables on PAT.

Panel EGLS (Cross-section random effects) model 1

Dependent Variable: PAT
Method: Panel EGLS (Cross-section random effects)
Date: 04/29/25   Time: 18:56
Sample: 2014 2023
Periods included: 10
Cross-sections included: 5
Total panel (balanced) observations: 50

Table 4. Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.224003	0.657692	9.463398	0.0000
POS	0.099209	0.034676	2.860995	0.0063
INTR	-0.516304	0.621979	-0.830098	0.4107

Statistic	Value	Additional Info	Value
R-squared	0.418972	Mean dependent var	2.080481
Adjusted R-squared	0.385737	S.D. dependent var	0.300851
S.E. of regression	0.271477	Sum squared resid	3.463900
F-statistic	6.588550	Durbin-Watson stat	1.502524
Prob(F-statistic)	0.003004		

Source: E-Views 12

The cross-section random effects panel regression shows that PoS terminals' adoption contributes significantly to Tier-One banks' PAT in Nigeria. Indeed, the coefficient on PoS (0.0992) is significant at 1% level (p = 0.0063), which means that PoS transactions' increase is related to PAT increases. This confirms the assertion that electronic payment infrastructure, in the form of PoS infrastructure, is beneficial to the profitability of the bank in terms of increasing the volume of transactions, lowering cost of handling cash, and lengthening the base of customers. This is supported by earlier studies that identify efficiency enhancement through digitalisation as among the functions served by banks (Adewoye, 2013; Eze & Nwachukwu, 2021).

Conversely, the INTR is negatively non-statistically related to PAT (coefficient = -0.5163, p = 0.4107). While higher interest rates would conventionally reduce lending margin returns or impact cost of funds, the suggestion that this one is not statistically significant implies there is no exceptional individual impact on PAT from a shift in interest rates for Nigerian Tier-One banks. This may be because big banks have the ability to hedge interest rate risk, diversify revenue sources, or shift cost movements to clients. Hence, PoS adoption is an even more timely and stronger profitability driver than macro-financial drivers like interest rates.

Goodness-of-fit for the model is also good with the R-squared value of 0.419 signifying that the model accounts for roughly 42% of the PAT variability. F-statistic (6.5885, p = 0.0030) supports overall that the model is statistically significant. The Durbin-Watson value of 1.50 just less than the 2 cut-off signifies mild positive autocorrelation of the residuals. Nonetheless, the model remains robust and statistically reliable, offering valuable insight into how digital financial innovations—especially PoS terminals—can enhance bank profitability in an emerging economy context.

For H01, that PoS terminal transactions have little or no effect on the PAT of Tier-One banks in Nigeria, the regression coefficient for PoS is 0.0992 and the p-value is 0.0063. Because the p-value is smaller than the standard significance level of 0.05, this is statistically significant prestive correlation between PAT and PoS transactions. We therefore reject the null hypothesis H01. This again suggests that utilization of PoS terminals makes a significant contribution to Tier-One banks' profit after tax,

perhaps through increased number of transactions, increased customer coverage, and improved payment settlement efficiency.

Panel EGLS (Cross-section random effects) model 2

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 04/29/25   Time: 19:12
Sample: 2014 2023
Periods included: 10
Cross-sections included: 5
Total panel (balanced) observations: 50

Table 4. Swamy and Arora estimator of component variances

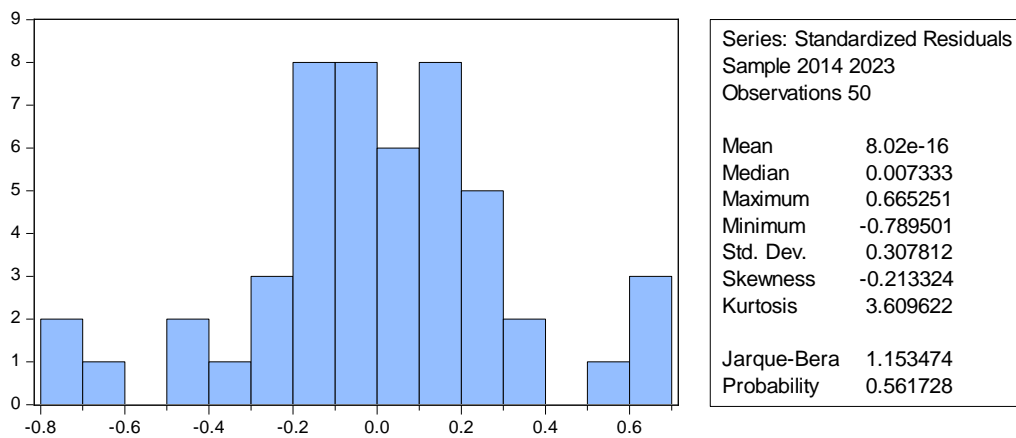| Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.486191	1.650716	0.900331	0.3725
POS	0.115901	0.081417	3.423550	0.0112
INTR	1.432741	1.460040	0.981302	0.3315
Statistic	Value	Additional Info	Value	
R-squared	0.445702	Mean dependent var	0.358101	
Adjusted R-squared	0.041093	S.D. dependent var	0.640332	
S.E. of regression	0.638700	Sum squared resid	19.17305	
F-statistic	8.125423	Durbin-Watson stat	1.479233	
Prob(F-statistic)	0.003103			

Source: E-Views 12

The second EGLS (Cross-section random effects) Panel regression model tests the effect of Point-of-Sale (PoS) terminal adoption and interest rate (INTR) on the Return on Assets (ROA) of Tier-One banks in Nigeria. The outcome indicates that the coefficient for PoS terminal transactions is 0.1159 with a p-value of 0.0112, which is statistically significant at the 5% level. This positive significant correlation indicates that greater adoption or usage of PoS terminals is linked with better ROA for Tier-One banks. Such enhancement could be due to rising volumes of transactions and service efficiency fostering asset utilization, as well as profitability.

As a matter of contrast, the coefficient for interest rate (INTR) is 1.4327 but with an accompanying p-value of 0.3315 to show it's not significant. This thereby means that changing interest rates between the study times didn't play any significant effect on the banks' ROA. The intercept or constant also does not measure up to

significance levels (p = 0.3725) to indicate any strong underlying pattern in the ROA regardless of the factors being introduced. The R-squared of 0.4457 indicates that PoS and interest rate account for 44.6% of the variance in ROA, but the adjusted R-squared of only 0.0411 indicates that model fit is extremely low after adjustment for the number of predictors, possibly because the explanatory power of INTR is low.

Generally, the regression results validate the rejection of null hypothesis (H02) that PoS terminal transactions are not significantly affecting ROA. Although the model shows that PoS is statistically significant in affecting ROA. The evidence validates the fact that technological integration via PoS systems is highly responsible for enhancing asset efficiency in Nigerian banks.

| Series: Standardized Residuals |
| Sample 2014 2023 |
| Observations 50 |

Mean	8.02e-16
Median	0.007333
Maximum	0.665251
Minimum	-0.789501
Std. Dev.	0.307812
Skewness	-0.213324
Kurtosis	3.609622
Jarque-Bera	1.153474
Probability	0.561728

Source: E-Views 12

Fig 1. Histogram – Normality Test

The histogram and supporting statistics of the standardized residuals show that the regression model's residuals are nearly normally distributed, confirming the validity of the model's estimates. The mean (nearly 0) and median (0.0073) are nearly identical, confirming symmetry, and the skewness of -0.2133 shows very slight leftward skew. The kurtosis of 3.01 is close to the normal distribution boundary value of 3, indicating a normal peak and tail situation. In fact, the Jarque-Bera test statistic value of 1.153 and the large p-value of 0.5617 also indicate that the residuals do not significantly vary from normality at conventional significance levels. This confirms the classical linear regression predictions and enhances trust in the validity of the regression findings as to the PoS terminal adoption influencing Tier-One banks' PAT in Nigeria.

The findings of the panel regression analysis implications indicate that Point-of-Sale (PoS) terminal transactions significantly influence the PAT of Tier-One banks in Nigeria. The coefficient of PoS in the regression equation is statistically significant and positive (β = 0.0992, p = 0.0063), and it shows that higher adoption and usage of PoS terminals lead to higher profitability. It can be due to operating efficiency, higher customer reach, and higher non-interest income generated through PoS

technology. As banks expand their digital payment channels and decouple from dependence on the physical banking halls, they lower overhead costs and grow transactional volumes, which boosts profitability margins. The importance of this finding reinforces the strategic relevance of digital banking infrastructure in driving financial performance in Nigeria's banking industry.

This result concurs with a line of previous research that stressed the positive correlation between electronic payment adoption and financial performance. For instance, Ayo et al. (2016) explained that e-payment channels such as PoS enhance the profitability of banks by enhancing the quality of service delivery and lowering the transaction cost. In the same manner, Ogbuji et al. (2012) testified that the introduction of electronic platforms such as PoS played a pivotal role in the financial performance of Nigerian banks. Similarly, Okiro and Ndungu (2013) pointed out that online banking websites enhance banks' net income. Additionally, Adeoti (2013) found a relationship between PoS usage frequency and banks' increased income. Finally, Oyetunji and Olaniyan (2019) reported that enhanced utilization of PoS services enhances the competitiveness of banks and revenue streams, especially in urban areas. Together, these findings verify the conclusion of the present study that the introduction of PoS terminals has been a primary source of PAT in Nigeria's Tier-One banks.

The second significant implication of the research states that PoS terminal transactions contribute significantly to the Return on Assets (ROA) of Nigerian Tier-One banks. The exercise of regression results in a positive coefficient (ß = 0.1159) that is statistically significant with a p-value of (0.0112), and it implies that the more PoS transactions that banks have, the more their utilization of assets is enhanced and the better the returns they attain. This can be a byproduct of greater operating leverage, quicker processing of transactions, and better utilization of bank assets employing electronic PoS facilities. Through reduction of idle assets and inclusion of customer contacts within real-time environments, banks are able to capture greater productive asset turnover and better return on employed capital and therefore report better ROA numbers.

This finding concurs with previous literature. For example, Agbaje and Alawiye-Adams (2016) established that electronic banking innovations such as PoS increase banks' asset productivity in Nigeria. Eze and Chinedu (2018) contended that digital platforms for transactions such as PoS allow banks to attain improved investment returns due to effective and streamlined processes. Furst et al. (2002), in a general statement, concluded that banks that make investments in electronic banking are better off in assets. Similarly, Sanusi (2010) stated that technology-enabled banking reforms in Nigeria meant better use and allocation of financial assets. Finally, Chukwu and Ezeagba (2018) agreed that PoS and other e-banking tools lead to asset efficiency and profitability. These scholarly debates justify the finding of the study, asserting that the rollout of PoS terminals is not just a revenue-driven innovation but also an accelerator for better asset management by Tier-One banks in Nigeria.

CONCLUSION

This research examined the impact of Point-of-Sale (PoS) terminal transactions on the profitability and effectiveness of Nigeria's Tier-One banks, based on using PAT and ROA as measures. In general, the outcome is that use of PoS terminals is crucial in improving the profitability and effectiveness of Nigerian banks. The study shows that the use of digital financial services, specifically PoS infrastructure, is the driving force not only for revenue growth but for business efficiency, customer satisfaction, and convenience of transactions. The study is a testimony to the increasing significance of digital transformation in Nigeria's banking landscape. Interestingly, this result is consistent with the Technology-Organization-Environment model, in which PoS, organizational readiness (processes and bank resources), and environmental situation (market demand, regulations) all play a role in technology adoption and performance in firms.

Particularly, the study confirmed that the transactions made through PoS terminals statistically and positively affect PAT as well as ROA of Tier-One banks. The PAT effect translates to the fact that higher utilization of PoS translates to higher net profits, while the positive effect on ROA translates to the fact that electronic payments boost asset utilization efficiency. These simultaneous findings affirm the strategic value of digital financial platforms to Nigerian banks and require ongoing investment in fintech solutions to remain competitive. The findings also justify the TOE framework's hypothesis that with the support of effective organizational structures and a favorable external environment, technology can significantly improve financial performance.

According to the findings, the research suggests that:

Nigerian Tier-One banks should still grow and develop their PoS terminal networks further to deepen financial inclusion and penetrate still untapped markets, particularly rural and semi-urban markets. Increased access and transaction security can encourage customer usage and confidence, thus enabling long-term profitability and asset effectiveness expansion.

Banks would have to spend on premium data analytics software in order to monitor PoS spending behavior and consumer activity in real-time. This will enable them to design bespoke financial solutions, optimize asset utilization, and improve risk management, thereby again augmenting the beneficial impact observed due to the implementation of PoS on PAT as well as ROA.

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