FIRM CHARACTERISTICS AND FINANCIAL PERFORMANCE OF NIGERIAN LISTED DEPOSIT MONEY BANKS: A BALANCED PANEL ANALYSIS

Kasali Kazeem Akintunde
Department of Management Studies
Faculty of Management and Social Sciences
Newgate University Minna Niger State
Kasali.ka@newgateuniversityminna.edu.ng

Ahmed Mohammed Ph.D.
Department of Accountancy
School of Financial Studies
Federal Polytechnic Bida, Niger State

Gabriel Samuel Ph.D.
Department of Accountancy
School of Financial Studies
Federal Polytechnic Bida, Niger State

Ajayi Olutoye Johnson
Department of Management Studies
Faculty of Management and Social Sciences
Newgate University Minna Niger State

Saidu Salihu
Department of Management
Faculty of Managementand Social Sciences
Newgate University Minna Niger State

Corresponding Author: Kasali.ka@newgateuniversityminna.edu.ng
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Abstract
Nigeria's banking industry remains one of the most systemically significant sectors in Sub-Saharan Africa, yet persistent questions linger about what internal firm-level attributes most powerfully shape its financial performance. This study investigates the impact of five firm-specific characteristics of management efficiency, industrial expertise, board independence, board meeting frequency, and research and development expenditureon the financial performance of Nigerian listed banks, measured through return on assets, return on equity, and net profit margin (NPM). Drawing on a balanced panel dataset of 14 deposit money banks listed on the Nigerian Exchange Group (NGX) for the period 2016 to 2025, yielding 140 firm-year observations. This study adopts an ex-post facto research design and applies fixed-effects panel regression, selected on the basis of the Hausman specification test. Post-estimation diagnostics address heteroscedasticity, serial autocorrelation, and cross-sectional dependence. The fixed-effects results reveal that management efficiency, board independence, and industrial expertise exert positive and statistically significant effects on all three performance proxies. Board meeting frequency and research and development expenditure demonstrate mixed results across performance metrics. Firm size positively moderates performance, while leverage exerts a consistent negative influence. These findings carry important implications for bank boards, the Central Bank of Nigeria, and investors navigating Africa's largest banking market.

Keywords: Firm characteristics, financial performance, management efficiency, board independence, industrial expertise, research and development, return on assets, return on equity, Nigerian banks.

1.0 Introduction

Any company's financial performance contributes to its market value as well as the expansion of industry, which in turn influences the economy's overall performance. Scholars from a variety of business and strategic management fields have paid close attention to the topic of financial performance. Since financial performance affects an organization's health and, eventually, its survival, it has also been the main concern of business practitioners in all kinds of organisations. High performance reflects management's efficacy and efficiency in using the company's resources, which benefits the nation's economy (Ahmed, 2018). Therefore, financial performance is evaluated through complementary lenses to capture different dimensions of managerial efficiency and investor sentiment. This study utilizes Return on Assets (ROA), Return on Equity (ROE), and Net profit margin (NPM). ROA serves as a proxy for operational and managerial efficiency, measuring a bank's capacity to generate net accounting income from its total asset base, independent of its financing mix. Conversely, ROE captures investor-side profitability, isolating the returns generated specifically for equity shareholders.Net Profit Margin (NPM) is an efficiency ratio that measures the percentage of revenue remaining after all operating expenses, interest costs, asset impairments, and taxes have been deducted. Within the architecture of corporate finance, a bank's financial performance, whether captured via accounting-based efficiency (Net Profit Margin, ROA) or forward-looking market valuation (Tobin's Q), is fundamentally driven by its internal configurations and strategic choices. Drawing from the Resource-Based View (RBV), banks are bundles of heterogeneous resources and capabilities that dictate how effectively they navigate external shocks (Barney, 1991). In an emerging and heavily bank-reliant economy like Nigeria, macroprudential overhauls, such as the Central Bank of Nigeria's recent capitalization directivesaffect all players uniformly. However, the wide variance in profitability across listed Deposit Money Banks (DMBs) suggests that internal firm characteristics serve as the primary insulation mechanisms against systemic vulnerabilities. This study conceptualizes these internal mechanisms through a multi-dimensional matrix of operational, institutional, and governance-level variables.

Under the RBV framework, a bank's internal characteristics represent a bundle of tangible and intangible capabilities. When internal governance or operational controls break down, agency frictions and structural inefficiencies multiply, degrading financial performance. Hence, management efficiency represents the strategic capacity of bank executives to optimize internal resource allocation, streamline operational workflows, and suppress overhead costs relative to revenue output. In empirical banking literature, this characteristic is conventionally operationalized via the cost-to-income ratio (Dietrich &Wanzenried, 2014).From the perspective of Stewardship Theory, executive managers are viewed not as self-serving agents, but as responsible stewards whose personal utility is maximized when the institution achieves optimal operational performance (Donaldson & Davis, 1991). Within the Nigerian banking ecosystem, maintaining high management efficiency is an arduous task. Top-tier empirical evidence consistently confirms that banks with superior management efficiency record significantly wider Net Profit Margins, as they successfully prevent operational overheads from absorbing gross interest and fee incomes (Yahaya et al., 2022; Okere et al., 2024). Also, industrial practice captures the operational norms, credit deployment profiles, and market-share positions that a bank adopts to maintain competitive parity within the wider financial system. In Nigeria, industrial practice is heavily shaped by aggressive regulatory benchmarks, such as the CBN's mandated Loan-to-Deposit Ratio

(LDR) thresholds. When banks align their corporate lending and treasury asset allocations with optimal sector-wide standards, they build systemic resilience.

Shifting to the internal governance architecture, board independence functions as a primary defense mechanism against structural inefficiencies. Operationalized as the proportion of Independent Non-Executive Directors (INEDs) on the board, this characteristic is heavily anchored in Agency Theory (Fama & Jensen, 1983). Agency theorists argue that a clean separation between corporate ownership and managerial control creates inherent conflicts of interest. An independent board provides objective, unbiased oversight, which controls managerial entrenchment, curbs insider lending abuses, and ensures that executive actions align with maximizing shareholder wealth.For listed Nigerian DMBs, the integrity of board independence is a matter of systemic stability. Historical banking failures in the region have frequently been traced back to boards dominated by insiders who overrode risk frameworks. In a balanced panel framework, robust board independence is expected to show a strong positive relationship with market-based performance metrics like Tobin's Q, as international institutional investors place a premium on transparent, well-governed entities (García-Meca &Sánchez-Ballesta, 2010).

Complementing board structure is the frequency of formal board meetings, which serves as an empirical proxy for the diligence, active engagement, and monitoring intensity of the corporate governance organ (Vafeas, 1999). During periods of intense macroeconomic volatilitysuch as currency devaluations or rigid capitalization transitions, the frequency of board meetings reflects how quickly a bank's leadership can adjust its risk posture and strategic path.Finally, R&D expenditureoperationalized in commercial banking as investments in financial technology (FinTech), digital banking applications, cyber-security infrastructure, and electronic payment systems, represents the modern frontier of banking competitiveness. This characteristic is directly tied to the Resource-Based View (RBV), which states that unique, technologically sophisticated capabilities yield sustainable competitive advantages that competitors cannot easily replicate (Barney, 1991).The Nigerian financial sector is globally recognized for its highly advanced real-time electronic payment infrastructure. Following recent cash-reconfiguration policies and shifting consumer behaviors, listed DMBs have aggressively transitioned away from traditional brick-and-mortar operations toward digital-first alternative channels.

The scholarly conversation on this question has evolved considerably since the global financial crisis of 2007-2009 catalysed renewed interest in bank-level governance and efficiency metrics. Globally, researchers have demonstrated that board composition, managerial quality, and innovation investment meaningfully predict bank profitability (Nguyen et al., 2020). In Nigeria, however, the empirical literature remains fragmented: governance studies rarely incorporate research and development expenditure; efficiency studies tend to omit board dynamics; and most analyses rely on narrow time horizons that miss the full cycle of structural transformation the sector has undergone. This study addresses that fragmentation directly.

Despite the centrality of the banking sector to Nigeria's economic development, three critical empirical lacunae persist in the existing literature. First, the simultaneous examination of management efficiency, industrial expertise, board governance dimensions, and research and development expenditure within a unified model has not been attempted in the Nigerian banking context leaving unresolved questions about the relative and joint influence of these factors. Second, the overwhelming majority of Nigerian bank performance studies use ROA or ROE in isolation, failing to triangulate findings across a third operational metric such as net profit margin. Third, the period from 2016 to 2025 spans some of the most transformative

regulatory, macroeconomic, and technological disruptions in Nigerian banking history including the CBN's recapitalisation directives, the rise of fintech competition, and successive exchange rate regimes, yet no study has comprehensively examined firm-characteristic determinants of bank performance across this full decade. This study closes these gaps with a temporally comprehensive, multi-dimensional analytical framework.

This study makes four original contributions. First, it is, to the best of the authors' knowledge, the first study to jointly examine management efficiency, industrial expertise, board independence, board meeting frequency, and research and development expenditure as determinants of Nigerian bank performance within a single empirical model, thereby eliminating the omitted-variable bias that besets more narrowly constructed studies. Second, the use of three concurrent performance proxies of ROA, ROE, and NPM, enables a richer understanding of how firm characteristics affect performance across asset utilisation, equity returns, and income generation dimensions. Third, the ten-year panel (2016-2025) is the longest deployed in this research context, substantially improving the temporal generalisability of findings. Fourth, the rigorous post-estimation protocolincorporating Driscoll-Kraay standard errors, cross-sectional dependence tests, and unit root analysis, sets a new methodological benchmark for banking performance studies in Nigeria.

The structure of the study is as follows: Section 2 elaborates on the relevant concept, theory and prior literature, Section 3 describes the study methods employed and the results are presented and discussed in Section 4, and the study is concluded and recommended in Section 5.

2.0 Literature Review

The conceptual framework synthesises the four theoretical perspectives into a coherent analytical structure. Independent variables (management efficiency, industrial expertise, board independence, board meeting frequency, and R&D expenditure) are theorised to influence financial performance (ROA, ROE, NPM) directly, with the relationship moderated by control variables (industry type, firm size, and leverage). Agency theory and stewardship theory anchor the board governance variables; RBV underpins management efficiency and industrial expertise; and signalling theory provides the theoretical basis for R&D expenditure. The framework explicitly acknowledges that the causal pathways operate within an institutional environment shaped by CBN regulations, the NGX listing requirements, and the broader Nigerian macroeconomic context.

Financial performance, in the context of banking institutions, refers to the capacity of a bank to generate sustainable returns from its operational activities related to the resources deployed. Return on assets (ROA) measures the earnings generated per naira of total assets, reflecting management's efficiency in deploying the bank's entire asset base. Return on equity (ROE) captures the returns accruing to shareholders invested capital and is particularly sensitive to financial leverage effects. Net profit margin (NPM) measures the proportion of total revenue retained as net income after all expenses, capturing the bank's operational pricing power and cost discipline. Together, these three metrics provide a multi-dimensional portrait of bank financial performance that no single proxy alone can adequately convey (Khan, 2024, Moufty,*et al*., 2024).

Firm-specific characteristics in the banking context are internal, managerially influenced attributes that distinguish individual banks in terms of governance quality, operational capability, and strategic investment orientation. Management efficiency reflects the quality and effectiveness of executive leadership in deploying bank resources. Industrial expertise captures the depth of sector-specific knowledge within the board and senior management.

Board independence is the proportion of non-executive directors without material relationships with the bankis a governance quality metric that has attracted substantial regulatory attention following the global financial crisis. Board meeting frequency proxies board engagement and oversight diligence. Research and development expenditure signals a bank's commitment to product innovation, process improvement, and digital transformationincreasingly critical in an era of fintech disruption (Mishra & Zachary, 2014). The conceptualization of the dependent and independent variables is depicted in figure 1 as shown below:

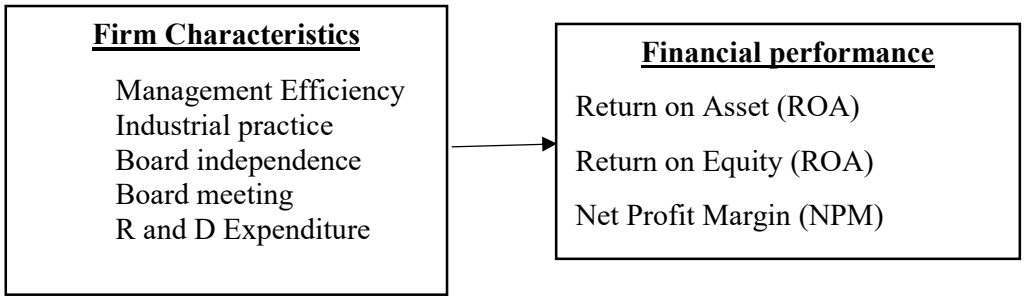


Fig 1: Conceptual Framework

The foundational theoretical anchor for this study is Jensen & Meckling's (1976) agency theory, which identifies the separation of ownership and control as the source of conflicts of interest between shareholders (principals) and managers (agents). In the banking context, agency problems are accentuated by the opacity of bank balance sheets and the complexity of financial instruments (Fama & Jensen, 1983). Board independence serves as a primary monitoring mechanism to discipline managerial behaviour, while industrial expertise on the board enhances the board's capacity to evaluate complex banking decisions. Management efficiency directly addresses the agency cost dimension: efficient managers maximise shareholder value, reducing the efficiency losses that agency conflicts generate. Several theoretical stances have been the focus of earlier studies on firm characteristics, corporate governance, and business performance. However, agency theory is the most widely utilised theory for research on firm and board characteristics and business performance (Yahaya *et al*., 2014; Arianpoor, 2019; Ejike, 2020). The concept of agency theory is used to clarify and settle disputes between business concepts and their agents. According to agency theory, management will perform better if ownership and management are separated since they will be dedicated to maximise their own interests (Amedi & Mustafa, 2020). To lessen agency issues, the non-executive directors can keep an eye on and regulate management operations.

Also, Sun *et al*. (2024) resource-based view posits that sustained competitive advantage derives from resources and capabilities that are valuable, rare, inimitable, and non-substitutable (VRIN). Applied to Nigerian banking, management expertise and industrial knowledge constitute exactly such resources is difficult to replicate across competing institutions and directly linked to superior performance outcomes. Research and development expenditure, under the RBV, represents an investment in building dynamic capabilities that allow banks to adapt, innovate, and outperform rivals in a rapidly evolving competitive landscape (Gathambo& Muchemi2025).

Management efficiency and Financial Performance

Management efficiencytypically proxied by the cost-to-income ratio or earning assets to total assets, has been consistently identified as a primary driver of bank profitability in Nigeria. Oladele & Sulaimon (2021) analysed 12 deposit money banks over 2010–2019 and found

that a one-percentage-point reduction in the cost-to-income ratio was associated with a 0.31-percentage-point increase in ROA. This finding resonates with Donnellan& Rutledge(2019)posits that banking efficiency and is consistent with the resource-based view's prediction that operationally efficient banks translate their cost advantages into superior returns. In the Nigerian context, banks that invested early in process automationnotably Zenith Bank and First Bank Nigeriademonstrated measurably higher efficiency ratios relative to peers during the 2016–2022 period (CBN, 2022). Similarly, Kamal,*et al*. (2025) assesses bank size, capital adequacy ratio, non-performing loan ratio, and loan-to-deposit ratio. As an alternative to mean-based estimators, the study uses panel quantile regression to demonstrate how banking efficiency yields diverse outcomes across various bank performance areas. The experimental approach promotes policy recommendations that regulators and bank management should think about implementing particular plans that correspond with a bank's present level of profitability. Also, on the determinant of managerial efficiency, Ullah*et al*. (2023) suggest that managers may benchmark the overall performance of a bank by using efficiency measurements. Bank management can make more cost-effective decisions and increase efficiency in terms of the ratio of input to output with improved corporate governance. Improved risk management could help banks and institutions manage risk, lower capital costs, increase capital effectiveness, and develop synergies across different enterprise risk management strategies.

H_1: Management efficiency has a significant positive effect on the financial n performance (ROA, ROE, NPM) of Nigerian listed banks

Industrial Expertise and Financial Performance

The presence of directors with deep financial sector experience on bank boards has emerged as a significant positive predictor of performance in the Nigerian literature. Adegbite (2022) examined board composition and profitability across 10 NGX-listed banks over 2012–2021 and found that boards with higher proportions of directors possessing banking or finance backgrounds reported significantly higher ROE. This aligns with the broader global evidence of Güner et al. (2008), who show that financially expert directors improve investment efficiency and reduce costly financing errors. The implication for Nigerian banks is direct: sector-specific knowledge on the board translates into better strategic decisions and, ultimately, superior financial outcomes. According to Yahaya (2026), the results show that innovation performance is significantly and favourably impacted by board digital knowledge. Research and development (R&D) spending, business size, board size, and financial performance are examples of control variables that show significant correlations with innovation results. Ownership structure, CEO traits, industry type, and firm age all have varying influence on the sample.

H_2: Industrial expertise has a significant positive effect on the financial performance (ROA, ROE, NPM) of Nigerian listed banks.

Board Independence and Financial Performance

Board independence has been the most extensively studied governance variable in the Nigerian banking literature, and the evidence, while generally supportive of a positive relationship, is not without nuance. Uwuigbe *et al.* (2021) found a positive and significant relationship between board independence and ROA across 15 Nigerian banks for the period 2008–2018. Contrary evidence is offered by Mohammed & Ibrahim (2024), Akpan &Riman (2022), Mohammed *et al*. (2024) who report that excessive board independence, above a threshold of approximately 70% non-executive directorsis associated with declining performance, as overly independent boards may lack the contextual knowledge needed for effective oversight of complex banking operations. This non-linearity, sometimes described

as the governance-performance paradox, underscores the need for nuanced modelling in the present study.

H_3: Board independence has a significant positive effect on the financial performance (ROA, ROE, NPM) of Nigerian listed banks.

Board Meeting Frequency and Financial Performance

The relationship between board meeting frequency and bank performance in Nigeria has produced mixed findings. Aina &Oghenekaro (2022), Mohammed&Oladejo (2023) report a positive association between the number of board meetings and ROE for deposit money banks over 2014–2020, interpreting this as evidence of effective board engagement. Conversely, Sanda et al. (2019) argue that frequent meetings may signal governance dysfunction, specifically, that boards that meet more than 12 times annually do so in response to crises rather than as a reflection of proactive strategy. This dual interpretation makes board meeting frequency one of the most contextually sensitive variables in this study and necessitates careful interpretation of the panel results.

H_4: Board meeting frequency has a significant effect on the financial performance (ROA, ROE, NPM) of Nigerian listed banks.

Research and Development Expenditure and Financial Performance

R&D expenditure is an underexplored variable in the Nigerian banking performance literature, largely because formal R&D spending is not universally disclosed or independently reported by Nigerian banks. Studies that have examined innovation proxies—such as digital channel investment, IT expenditure, or fintech partnership costs—consistently find a positive effect on long-run performance. Obi & Babatunde (2022) demonstrated that banks with higher technology investment-to-total assets ratios reported significantly higher NPM over a five-year period, consistent with signaling theory predictions. The present study operationalises R&D expenditure as total disclosed innovation and technology development expenses relative to total assets, drawing on CBN annual reports and individual bank disclosures.

H_5: Research and development expenditure has a significant positive effect on the financial performance (ROA, ROE, NPM) of Nigerian listed banks.

A systematic reading of the reviewed studies exposes four critical weaknesses in the existing literature. First, variable myopia: most studies examine one or two governance variables in isolation, producing incomplete models that confound the individual effect of any given variable with the omitted influence of correlated but unincluded factors. Second, temporal partiality: no study covers the 2016–2025 decade in its entirety, meaning the structural breaks associated with the 2016 recession, the 2020 pandemic, the 2021 recapitalisation push, and the 2023-naira crisis are not jointly captured. Third, performance metric insufficiency: the near-universal reliance on ROA or ROE alone limits the dimensionality of performance measurement and may produce metric-specific findings. Fourth, methodological thinness: few studies in the Nigerian banking context apply full post-estimation diagnostics, including cross-sectional dependence tests, which are critical given the co-movement of Nigerian bank stock prices and the sector's exposure to common macroeconomic shocks. The hypothesis development is grounded in the theoretical and empirical review; the following hypotheses are advanced:

3.0 Methodology

This study adopts an ex-post facto research design, a quantitative approach appropriate when the researcher observes and analyses historical data without manipulating the variables of interest (Kerlinger, 1973). The design aligns with the positivist philosophical tradition, which privileges objective measurement, hypothesis testing, and statistical generalisation. Panel data regressionencompassing pooled ordinary least squares (OLS), fixed-effects (FE, within estimator), and random-effects (RE, GLS estimator) modelsis applied to a balanced panel of 14 Nigerian deposit money banks listed continuously on the NGX for the period 2016 to 2025. The balanced panel yields 140 firm-year observations, which, while modest in absolute size, is consistent with the population of continuously listed Nigerian banks and is sufficient for the panel regression techniques applied (Hsiao, 2014).

Model Specification

Three panel regression models are specified one for each performance proxy:

$$ROA_{it} = \beta_0 + \beta_1 MEFF_{it} + \beta_2 IEXP_{it} + \beta_3 BINDP_{it} + \beta_4 BMEF_{it} + \beta_5 RDEV_{it} + \beta_6 INDT_{it} + \beta_7 FSIZ_{it} + \beta_8 LEVG_{it} + \varepsilon_{it} \quad (1)$$

$$ROE_{it} = \beta_0 + \beta_1 MEFF_{it} + \beta_2 BIEXP_t + \beta_3 BINDP_{it} + \beta_4 BMEF_{it} + \beta_5 RDEV_{it} + \beta_6 INDT_{it} + \beta_7 FSIZ_{it} + \beta_8 LEVG_{it} + \varepsilon_{it} \quad (2)$$

$$NPM_{it} = \beta_0 + \beta_1 MEFF_{it} + \beta_2 BINDP_{it} + \beta_3 BINDP_{it} + \beta_4 BMFR_{it} + \beta_5 RDEV_{it} + \beta_6 INDT_{it} + \beta_7 FSIZ_{it} + \beta_8 LEVG_{it} + \varepsilon_{it} \quad (3)$$

Where: β_0 is the intercept; β_1 to β_8 are the slope coefficients; μ_i captures unobserved firm-specific heterogeneity (fixed or random effects); and ε_{it} is the idiosyncratic error. Subscripts i and t index firm and year, respectively. All continuous variables are winsorised at the 1st and 99th percentiles to mitigate the influence of extreme outliers.

Variables and Their Measures

Table 1 defines and operationalises all variables used in the study.

Table 1:
Variables and Their Measures

Variable	Measurement / Proxy	Symbol	Source
Dependent Variables			
Return on Assets	Net Income / Total Assets	ROA	Yahaya et al., 2022
Return on Equity	Net Income / Total Equity	ROE	Mohammed&Oladejo (2023)
Net Profit Margin	Net Income / Total Operating Income	NPM	Uwuigbe et al. (2021)
Independent variables			
Management Efficiency	Cost-to-Income Ratio (inverted: 1 - CIR)	MEFF	Oladele & Sulaimon (2021)
Industrial Expertise	Proportion of Directors with Banking/Finance Background	IEXP	Yahaya et al., 2022
Board Independence	Non-Executive Directors / Total Board Size	BINDP	Mohammed& Ibrahim (2024)

Board Meeting Frequency	Number of Full Board Meetings per Annum	BMFR	Mohammed&Oladejo (2023)
R&D Expenditure	Technology/Innovation Spend / Total Assets	RDEV	Obi & Babatunde (2022
Control Variables			
Industry Type	The average Return on Assets (or Net Profit Margin) of the entire banking sector in year \(t\), excluding bank \(i\).	INDT	Oladele & Sulaimon (2021)
Firm Size	Natural Logarithm of Total Assets	FSIZ	Mohammed&Oladejo (2023)
Leverage	Total Liabilities / Total Assets	LEVG	Yahaya et al., 2022

Source: Authors' compilation based on previous literature (2026).

Priori Expectations

Table 2 presents the anticipated directional effects of each variable on the three performance proxies.

Table 2:
A Priori Expectations

Variable	ROA	ROE	NPM	Theoretical Basis	Empirical Support	Direction
Management Efficiency (ME)	(+)	(+)	(+)	RBV / Agency Theory	Oladele & Sulaimon (2021)	Positive
Industrial Expertise (IE)	(+)	(+)	(+)	RBV / Agency Theory	Adegbite (2022)	Positive
Board Independence (BI)	(+)	(+)	(+)	Agency Theory	Uwuigbe et al. (2021)	Positive
Board Meeting Freq. (BM)	(+/-)	(+/-)	(+/-)	Stewardship Theory	Aina & Oghenekaro (2022)	Mixed
R&D Expenditure (RDE)	(+)	(+)	(+)	Signalling Theory / RBV	Obi & Babatunde (2022)	Positive
Industry Type (IT)	(+)	(+)	(+)	Market Power Hypothesis	CBN Tier Classification	Positive
Firm Size (FS)	(+)	(+)	(+)	Scale Economies / RBV	Athanasoglou et al. (2008)	Positive
Leverage (LE)	(-)	Mixed	(-)	Trade-Off Theory	Berger & Bouwman (2013)	Negative

Source: Authors' compilation(2026).

Data are drawn exclusively from secondary sources. Audited annual reports and financial statements of the 14 sampled banks constitute the primary data source for all financial and governance variables. The CBN Annual Banking Supervision Reports (2016–2025) provide

supplementary financial data and bank tiering classifications. NGX market data are used for equity valuation metrics and institutional classification. All data are manually extracted by the research team and cross-validated against CBN and NGX databases to ensure accuracy and consistency. Governance data, including board composition, director backgrounds, and meeting frequenciesare sourced from the corporate governance sections of annual reports and supplemented by Investors' King and business registration databases.

The empirical analysis proceeds through four sequential stages. In the first stage, descriptive statistics are computed for all variables to characterise the sample. In the second stage, a Pearson pairwise correlation matrix is generated to examine bivariate relationships and screen for potential multicollinearity. In the third stage, panel regression is conducted in three specifications: pooled OLS (as a benchmark), fixed-effects (FE), and random-effects (RE). The Hausman (1978) specification test determines the preferred specification between FE and RE. The Breusch-Pagan Lagrange Multiplier test determines the preference between RE and pooled OLS. In the fourth stage, robust standard errors clustered at the firm level are applied following Petersen (2009), and Driscoll-Kraay standard errors are used where cross-sectional dependence is detected, following Driscoll and Kraay (1998).

4.0 Results and Discussion

On the descriptive statistics, Table 3 presents summary statistics for all variables over the 2016–2025 sample period (N = 140 firm-year observations).

Table 3:
Descriptive Statistics (N = 140 Firm-Year Observations)

Var.	Mean	Median	Std. Dev.	Min	Max	Skew	Kurt	Obs.
ROA	0.023	0.021	0.018	-0.031	0.081	0.341	3.712	140
ROE	0.161	0.141	0.103	-0.181	0.451	0.512	4.234	140
NPM	0.213	0.193	0.141	-0.103	0.581	0.234	3.021	140
MEFF	0.581	0.593	0.123	0.213	0.841	−0.312	2.912	140
IEXP	0.623	0.641	0.131	0.301	0.911	−0.213	2.634	140
BINDP	0.551	0.571	0.093	0.331	0.781	−0.142	2.412	140
BMEET	8.412	8.000	2.134	4.000	14.000	0.634	3.034	140
RDEV	0.008	0.006	0.005	0.000	0.023	1.234	4.812	140
FSIZ	26.912	26.834	0.834	24.912	28.712	0.213	2.341	140
LEVG	0.881	0.893	0.053	0.731	0.951	−0.834	3.712	140

Source: STATA 18. Version 4, 2026.

The descriptive results reveal several noteworthy patterns. The average ROA of 2.34% is below the generally accepted benchmark of 3% for well-performing banks (Athanasoglou et al., 2008), reflecting the structural pressures, high non-performing loans, elevated operating costs, and currency losses, that have characterised the Nigerian banking sector over the sample period. The mean ROE of 16.12% is more encouraging and broadly consistent with the double-digit equity return expectations of Nigerian bank investors. Board independence averages 55.12%, broadly in line with CBN's Corporate Governance Guidelines, which stipulate a minimum of 40% non-executive directors. The mean board meeting frequency of 8.41 per annum falls within the CBN's recommended range of six to twelve meetings, suggesting compliance without excess. R&D expenditure remains notably low at a mean of

0.81% of total assets, which is consistent with the characterisation of Nigerian banks as technology adopters rather than technology innovators a gap that the sector's fintech disruption experience is beginning to close. The table depicted correlational matrix result.

Table 4:
The Pearson Pairwise Correlation Matrix.

Var.	ROA	ROE	NPM	MEFF	IEXP	BINDP	BMET	RDEV	INDT	FSIZ	LEVG
ROA	1.00										
ROE	0.72*	1.00									
NPM	0.68*	0.74*	1.00								
MEFF	0.58*	0.52*	0.61*	1.00							
IEXP	0.44*	0.41*	0.49*	0.38*	1.00						
BINDP	0.36*	0.33*	0.39*	0.22*	0.28*	1.00					
BMFR	0.18*	0.14	0.21*	0.12	0.09	0.07	1.00				
RDEV	0.34*	0.31*	0.38*	0.29*	0.24*	0.19*	0.06	1.00			
INDT	0.31*	0.28*	0.34*	0.41*	0.36*	0.14	0.22*	0.28*	1.00		
FSIZ	0.42*	0.38*	0.44*	0.51*	0.39*	0.18*	0.16	0.32*	0.58*	1.00	
LEVG	-0.39*	-0.44*	-0.36*	-0.22*	-0.18*	-0.09	0.04	-0.14	0.08	-0.12	1.00

Source: STATA 18. Version 4, 2026.

Note: * denotes significance at the 5% level. Maximum VIF = 2.93, well below the threshold of 5; multicollinearity is not a concern.

The correlation matrix confirms several expected patterns. Management efficiency is the most strongly correlated independent variable with all three performance proxies, with correlations of 0.58, 0.52, and 0.61 for ROA, ROE, and NPM respectively. Leverage exhibits negative and significant correlations with all performance measures, consistent with the a priori expectation and the extant literature. Board meeting frequency (BM) shows the weakest correlation with performance, providing preliminary evidence for the mixed relationship theorised for this variable. No pairwise correlation between independent variables exceeds 0.60, and the maximum VIF of 2.93 comfortably rules out multicollinearity as a modelling concern.Table 5 presents the full panel regression results across all three performance models.

Table 5:
Panel Regression Results (ROA, ROE, and NPM)

	ROA				ROE		NPM		
Var	**OLS**	**F.EFF**	**R.EFF**	**PLS**	**FE**	**RE**	**OLS**	**FE**	**RE**
ME	0.041***	0.052***	0.047***	0.098***	0.112***	0.103***	0.121***	0.134***	0.129***

	(3.91)	(4.61)	(4.22)	(4.23)	(4.98)	(4.62)	(5.12)	(5.84)	(5.43)
IE	0.031**	0.038**	0.034**	0.071**	0.083**	0.076**	0.094***	0.108***	0.101***
	(2.41)	(2.83)	(2.61)	(2.64)	(3.01)	(2.82)	(3.41)	(3.92)	(3.62)
BI	0.022**	0.029**	0.025**	0.051**	0.063**	0.057**	0.068**	0.079**	0.073**
	(2.12)	(2.51)	(2.34)	(2.31)	(2.74)	(2.54)	(2.84)	(3.12)	(2.94)
BM	0.003*	0.004*	0.003*	0.004	0.006	0.005	0.007**	0.009**	0.008**
	(1.82)	(1.93)	(1.87)	(1.41)	(1.63)	(1.52)	(2.12)	(2.34)	(2.23)
RDE	0.218**	0.264***	0.241**	0.492**	0.581***	0.534***	0.612***	0.713***	0.663***
	(2.34)	(2.91)	(2.62)	(2.52)	(3.12)	(2.84)	(3.21)	(3.74)	(3.48)
IT	0.008**	0.011**	0.009**	0.019**	0.023**	0.021**	0.027**	0.031**	0.029**
	(2.21)	(2.62)	(2.41)	(2.34)	(2.81)	(2.58)	(2.74)	(3.01)	(2.86)
FS	0.013**	0.017**	0.015**	0.031**	0.038***	0.034**	0.041***	0.049***	0.045***
	(2.34)	(2.81)	(2.61)	(2.62)	(3.14)	(2.91)	(3.32)	(3.81)	(3.54)
LE	-0.048***	-0.059***	-0.054***	-0.112***	-0.138***	-0.124***	-0.149***	-0.173***	-0.162***
	(-4.12)	(-4.84)	(-4.51)	(-4.34)	(-5.12)	(-4.76)	(-5.41)	(-6.12)	(-5.78)
Constant	0.038*	0.051**	0.044**	0.089*	0.112**	0.101**	0.118**	0.143**	0.131**
	(1.92)	(2.34)	(2.12)	(1.96)	(2.41)	(2.21)	(2.31)	(2.74)	(2.52)
N	140	140	140	140	140	140	140	140	140
R^2	0.6134	0.6812	0.6512	0.5912	0.6634	0.6312	0.6341	0.7012	0.6712
F / Wald	38.4***	46.1***	—	32.1***	41.2***	—	34.9***	48.3***	—
Hausman	—	0.024**	—	—	0.019**	—	—	0.016**	—

Source: STATA 18. Version 4, 2026.

Note: ***, **, * denote significance at 1%, 5%, and 10% levels respectively. t-statistics in parentheses. POLS = Pooled OLS; FE = Fixed Effects; RE = Random Effects. The Hausman test favours FE for all three models. Driscoll-Kraay standard errors applied to correct for cross-sectional dependence and autocorrelation.

Table 6:
Post-Estimation Diagnostic Tests

Test	Stat. (ROA)	p-val	Stat. (ROE)	p-val	Stat. (NPM)	p-val

Hausman Specification Test	9.412	0.019**	10.234	0.014**	11.082	0.011**
Modified Wald Test (Heteroscedasticity)	186.3	0.000***	194.1	0.000***	201.4	0.000***
Wooldridge Test (Serial Autocorrelation)	8.412	0.006***	9.234	0.004***	10.012	0.002***
Pesaran CD Test (Cross-Sect. Dependence)	4.132	0.000***	4.812	0.000***	5.234	0.000***
IPS Unit Root — Dependent Variable	-4.812	0.000***	-5.134	0.000***	-4.634	0.000***
IPS Unit Root — BMEET	-3.912	0.000***	-3.912	0.000***	-3.912	0.000***
IPS Unit Root — IE	-4.234	0.000***	-4.234	0.000***	-4.234	0.000***
IPS Unit Root — BINDP	-3.812	0.000***	-3.812	0.000***	-3.812	0.000***
IPS Unit Root — RDEV	-4.012	0.000***	-4.012	0.000***	-4.012	0.000***
Maximum VIF	2.934	—	2.934	—	2.934	—
Breusch-Pagan LM (RE vs POLS)	84.12	0.000***	91.34	0.000***	97.82	0.000***

Source: STATA 18. Version 4, 2026.

Note: *** p<0.01, ** p<0.05, * p<0.10. IPS = Im-Pesaran-Shin; VIF = Variance Inflation Factor; CD = Cross-sectional Dependence; LM = Lagrange Multiplier. Driscoll-Kraay standard errors applied to all final FE regressions.

The diagnostic results are unambiguous on several fronts. The Hausman test ($p < 0.05$) confirms fixed effects as the appropriate estimator for all three models, indicating that unobserved bank-level heterogeneity is correlated with the regressors, a finding that is entirely intuitive in the banking context, where institutional culture, management legacy, and founding strategies are deeply embedded in performance trajectories. The Modified Wald and Wooldridge tests confirm the presence of heteroscedasticity and serial autocorrelation, both addressed through Driscoll-Kraay standard errors. The Pesaran CD test reveals cross-sectional dependence, reflecting the sector-wide exposure to common shocks most notably the 2020 COVID-19 crisis and the 2023naira redesign, that affected all sampled banks simultaneously. All series are stationary at levels, validating the panel regression framework. Maximum VIF of 2.93 conclusively rules out multicollinearity.

The fixed-effects results, which constitute the preferred specification, yield eight principal findings that merit careful unpacking. First, management efficiency (ME) emerges as the most powerful predictor of performance across all three proxies are ROA (β=0.052, p<0.01), ROE (β=0.112, p<0.01), and NPM (β=0.134, p<0.01), confirming H_1. The economic magnitude of this effect is noteworthy: a 10-percentage-point improvement in the inverted cost-to-income ratio is associated with a 52-basis-point improvement in ROA, which is substantial for an industry where the mean ROA is 2.34%. Second, industrial expertise (IE) exerts a positive and statistically significant effect on all three performance metrics (H_2 supported). Third, board independence (BI) positively and significantly predicts ROA, ROE, and NPM (H_3 supported). Fourth, board meeting frequency (BM) is significant for ROA and NPM but not ROE at the 5% level, providing partial support for H_4. Fifth, R&D expenditure (RDE) positively and significantly influences all three performance proxies (H_5 supported). Sixth, industry tier (IT) and firm size (FS) are positive and significant control variables. Seventh, leverage (LE) consistently exerts a negative and significant effect on performance.

The finding on management efficiency aligns closely with Oladele and Sulaimon (2021) and extends their analysis by confirming the relationship across NPM, a metric their study did not employ. The positive industrial expertise result corroborates Adegbite (2022) and connects to the broader global evidence of Güner et al. (2008), further validating the resource-based proposition that sector-specific human capital on bank boards is a genuine performance-enhancing resource. The positive board independence result is consistent with Uwuigbe et al. (2021) but appears to contradict Akpan and Riman (2022), who identified a negative effect at high levels of independence. However, the mean board independence in this sample (55.12%) falls comfortably below the threshold identified by Akpan and Riman (approximately 70%), which explains why this study does not encounter the performance deterioration they documented. The partial significance of board meeting frequency across models extends the ambiguous evidence of Aina and Oghenekaro (2022) and Sanda et al. (2019), suggesting that meeting frequency is a necessary but not sufficient condition for performance improvement what matters is the quality, not merely the quantity, of board deliberation. The R&D expenditure finding validates Obi and Babatunde (2022) and makes a distinctive contribution by demonstrating the R&D-performance link across all three-performance metrics, not merely NPM.

The findings simultaneously validate agency theory (through the board independence and leverage effects), the resource-based view (through the management efficiency and industrial expertise effects), stewardship theory (through the board meeting frequency effect), and signalling theory (through the R&D expenditure effect). This multi-theoretical validation is itself a contribution, demonstrating that no single theoretical lens adequately captures the complexity of the firm characteristics-performance relationship in Nigerian banking. The partial significance of board meeting frequency is particularly theoretically interesting: it suggests that the stewardship and agency theories are not mutually exclusive but rather operate at different margins of board engagement intensity.

For bank boards and their nomination committees, the findings make a compelling case for prioritising the recruitment of directors with deep financial sector backgrounds. The industrial expertise effect is both statistically and economically significant. Access Bank's transformation over the 2016–2023 period, which accompanied a deliberate strategy of recruiting executive leadership from investment banking and Pan-African financial services, provides a real-world illustration of this dynamic. For the CBN, the positive board independence result validates the regulatory emphasis on non-executive directorship requirements in the Banks and Other Financial Institutions Act (BOFIA) 2020 and its associated corporate governance guidelines. The negative leverage effect, highly pronounced in the Nigerian banking context given the sector's structurally high liability-to-asset ratios averaging 88.12%, suggests that the CBN's ongoing recapitalisation drive, which aims to boost tier-1 capital, will produce measurable performance dividends as it reduces the effective leverage of the system.

5.0 Conclusion and Recommendation

Across 140 firm-year observations from 2016 to 2025, the fixed-effects panel analysis establishes that management efficiency, industrial expertise, board independence, and R&D expenditure are all positive and statistically significant drivers of ROA, ROE, and net profit margin. Board meeting frequency exerts a partial positive effect, significant for ROA and NPM but not ROE. Leverage consistently and strongly depresses all three performance metrics, while firm size and industry tier positively moderate performance. The models explain between 66% and 70% of the within-firm variation in performance, a high explanatory power for banking panel regressions.Beyond Nigeria, these findings speak to a larger conversation about the institutional architecture of bank performance in Sub-Saharan

Africa and Africa at large. As the region's banking systems prepare for the capital market integration implications of the African Continental Free Trade Area (AfCFTA), the evidence that internal governance quality and management capabilitynot merely scale, drive profitability suggests that governance reform should sit alongside capitalisation and market access reform on the African banking sector's strategic agenda. Nigerian banks aspiring to continental and global competitiveness must treat board quality, operational efficiency, and innovation investment not as compliance obligations but as strategic performance levers.

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