An Empirical Investigation of Digital Frauds and Financial Performance of Nigerian Deposit Money Banks

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Abstract

This study empirically investigates trends in digital banking fraud and its effects on the financial performance of Nigerian Deposit Money Banks (DMBs). Using secondary panel data from twelve (12) DMBs over a fourteen-year period (2010-2023), the study employs both descriptive (tables and figures) and inferential statistics (Feasible Generalised Least Squares (FGLS) technique to address heteroskedasticity and autocorrelation. The results show that ATM/Card-related fraud ($\beta = -1.82$, $p = 0.053$) and e-commerce fraud ($\beta = -1.84$, $p = 0.035$) exert significant negative effects on bank financial performance. In contrast, internet banking fraud ($\beta = 0.74$, $p = 0.527$) and web-based fraud ($\beta = 1.33$, $p = 0.166$) have statistically insignificant effects. Trend analysis further reveals a substantial increase in digital fraud incidents, from 2014 to 2023, reflecting heightened exposure of the Nigerian banking sector to technology-driven financial crimes. The study concludes that the impact of digital banking frauds vary across banking channels due to differences in risk management and control systems. The study recommends that bank management and regulators should adopt comprehensive, technology-driven fraud prevention strategies through secure authentication, real-time monitoring, consumer protection, and artificial intelligence to effectively curb the rising incidence of digital banking fraud and its adverse impact on bank performance in Nigeria.

Keywords: Digital fraud, World Wide Electronic Banking (WEB), E-Commerce, Financial Performance.

JEL Code: G2, G21, G28

1. Introduction

Digital banking has transformed banking operations in Nigeria by facilitating the cashless policy and enabling transactions through mobile banking, POS terminals, internet banking, and other electronic platforms. While the adoption of information and communication technology (ICT) has improved efficiency and customer convenience, it has also heightened banks' exposure to digital or electronic fraud. Digital banking fraud involves the unauthorized

transfer of funds through electronic channels, often exploiting security weaknesses associated with expanding digital financial activities. The rising incidence and sophistication of digital banking fraud have resulted in financial losses, increased operational risk, reduced shareholder returns, and declining investor confidence, positioning digital fraud as a major strategic risk for the Nigerian banking sector (Ololade, Salawu, & Adekanmi, 2020; Okoye, Onuoha & Akuesodo, 2021; Osakwe & Ezeaku, 2022; Chukwudi, (2024; Awuondo & Mutswenje, 2025).

Despite its growing relevance, empirical evidence on the effect of digital banking fraud on bank performance in Nigeria remains inconclusive, with limited focus on long-term fraud trends and channel-specific impacts. This study addresses this gap by examining trends in digital banking frauds and its effects on the financial performance of Nigerian Deposit Money Banks (DMBs). Consequently, empirical evidence linking disaggregated digital fraud indicators to return on equity in Nigerian Deposit Money Banks over an extended period remains limited, a gap this study further seeks to address. Using return on equity (ROE) as the performance measure, the study investigates observable fraud trends over time and assesses the effect of digital fraud on DMBs financial performance.

The study provides policy-relevant insights for bank management, regulators, and investors by highlighting the performance implications of digital fraud and informing the development of effective risk management and regulatory frameworks. The remainder of the paper is structured into literature review, methodology, results and discussion, and conclusion sections.

2. Literature Review

Digital banking systems, though resilient to many conventional security threats, are inherently more exposed to cyber-attacks than traditional banking structures due to their open architecture and rapid technological evolution (Osakwe & Ezeaku, 2022). In Nigeria, Deposit Money Banks (DMBs) have increasingly deployed digital platforms such as Automated Teller Machines (ATMs), Point of Sale (POS) terminals, internet banking, and Web-based applications to enhance service delivery, support the cashless policy, and expand financial inclusion (Kim, Zoo, Lee & Kang, 2018). However, the proliferation of these channels has simultaneously expanded the opportunity set for digital banking fraud, consistent with the Fraud Triangle Theory, which identifies opportunity as a critical driver of fraudulent behaviour (Cressey, 1973).

Empirical evidence suggests that card-related and e-commerce fraud constitute major components of digital banking fraud in emerging economies. Studies report that ATM/card fraud and POS-related fraud have increased significantly with the expansion of cashless payment systems, often due to weak authentication mechanisms and customer information disclosure (Ololade, Salawu, & Adekanmi, 2020). Similarly, the growth of e-commerce and digital payment platforms has been linked to rising incidents of phishing, identity theft, and unauthorized online transactions (Aamir, Ercan, & Muhammad, 2023). These fraud channels are expected to negatively affect bank financial performance by increasing operational losses, risk provisioning, and compliance costs, thereby reducing returns to shareholders.

Conversely, evidence on internet banking and web-based fraud remains mixed. While ICT-based banking increases exposure to cyber risks, some studies find that robust internal controls and improved monitoring systems can mitigate the performance impact of internet-related fraud (Udeh & Ugwu, 2018). This suggests that not all digital fraud channels exert uniform effects on bank performance, particularly where risk management capabilities differ across platforms.

From a performance perspective, return on equity (ROE) is widely employed to assess banks' ability to generate profits from shareholders' funds and to capture the combined effects of profitability, leverage, and risk (Muritala, Ijaiya and Adeniran, 2017). Studies from Nigeria document a negative relationship between electronic fraud and bank performance (Obadeyi, Akande and Jekayinoluwa 2022), while cross-country evidence reveals both short-run negative and long-run positive effects of digital finance on bank profitability (Aamir et al.,

2023). Furthermore, studies emphasize that effective fraud management and digital governance frameworks enhance customer trust and financial performance (Awuondo & Mutswenje, 2025; Singh, 2023).

Theoretically, this study is anchored on the Fraud Triangle Theory (Cressey, 1973), which posits that fraud occurs when pressure, opportunity, and rationalization coexist. The rapid expansion of ICT-based banking channels increases opportunities for fraud, particularly where internal controls and customer awareness are weak. Consistent with this framework, persistent growth in reported fraud cases and associated losses in Nigerian DMBs documented in regulatory reports over the 2010 - 2023 period as reflected in table 1.1 underscores the need for empirical analysis of both fraud trends and their performance implications.

Based on the theoretical framework and empirical evidence, this study specifies a performance model in which return on equity (ROE) is regressed on disaggregated digital fraud indicators, namely ATM/Card-related fraud (LATM), e-commerce fraud (LECM), internet banking fraud (LINT), and web-based fraud (LWEB).

Table 1.1 Reported Frauds and Forgeries in DMBS from 2010 to 2023

Year	Total No. of Fraud Cases	Total Amount Involved (₦)	Total Actual Loss (₦)	Proportion of Expected Loss to Amount Involved (%)
2010	383	5322750000	2919750000	49.6025
2011	588	7100000000	1018000000	31.9275
2012	846	4491250000	1383250000	35.275
2013	939	5448750000	1439000000	25.49
2014	2,655	6402000000	1548000000	35.573
2015	3010	4505250000	792500000	22.5675
2016	4188	2170500000	600000000	29.7475
2017	6546	3002750000	592500000	18.79
2018	9453	9730750000	3787500000	35.795
2019	13189	51162750000	1365750000	22.5725
2020	36546	30196500000	1333500000	9.9275
2021	52928	12870750000	1798250000	13.8975
2022	43099	13525250000	3000250000	22.3375
2023	32263	9696250000	3237000000	38.23

Source: NDIC Annual report, (2024)

Literature Gap

Despite extensive research on digital banking and electronic fraud, important gaps remain in the literature. Existing Nigerian studies predominantly analyse electronic fraud in aggregate, which masks the heterogeneous effects of specific digital fraud channels such as ATM/card-related, e-commerce, internet banking, and web-based fraud on bank performance (Ololade et al., 2020; Obadeyi et al., 2022). Moreover, much of the empirical evidence is based on short time spans or cross-sectional designs, limiting understanding of the long-run dynamics of fraud and bank performance (Udeh & Ugwu, 2018). While cross-country studies highlight mixed profitability effects of digital finance, they often overlook country-specific institutional and regulatory contexts in emerging economies like Nigeria (Aamir et al., 2023). In addition, few studies employ robust panel estimation techniques that adequately address heteroskedasticity

and serial correlation inherent in bank-level data (Muritala et al., 2017).

3. Methodology

The study adopted an ex post facto research design with a purposive sampling technique. Secondary data covering the period, 2010 - 2023 were sourced from the annual reports and financial statements of selected Deposit Money Banks (DMBs), as well as the Nigeria Deposit Insurance Corporation (NDIC) annual reports and fraud statistics. The population comprised twenty-four (24) DMBs in Nigeria, from which twelve (12) banks were selected based on net worth and size to ensure data consistency and availability. Data were analysed using the Feasible Generalised Least Squares (FGLS) estimation technique, which accounts for potential heteroskedasticity and autocorrelation in panel data. While the sampling approach and use of secondary data may limit the generalisability of the results, the methodology provides robust estimates for the sampled banks over the study period.

Model Specification

This study examines trends in digital banking frauds and effects on the financial performance of Nigerian Deposit Money Banks, proxied by return on equity (ROE). A panel multiple regression model is employed to analyse the relationship between ROE and disaggregated digital fraud indicators. Accordingly, the model specification is expressed as follows:

$$ROE_{it}=\beta_0+\beta_1 LATM_{it}+\beta_2 LWEB_{it}+\beta_3 LINT_{it}+\beta_4 LECM_{it}+\beta_5 LEV_{it}+\beta_6 FSI_{it}+\epsilon_{it} \quad 3.1$$

Where:

- ROE_{it} = Return on Equity of bank *i* at time *t*
- $LATM_{it}$ = ATM/card-related fraud for bank *i* at time *t*
- $LWEB_{it}$ = Web-based fraud for bank *i* at time *t*
- $LINT_{it}$ = Internet banking fraud for bank *i* at time *t*
- $LECM_{it}$ = E-commerce fraud for bank *i* at time *t*
- LEV_{it} = Leverage ratio of bank *i* at time *t*
- FSI_{it} = Firm size of bank *i* at time *t*
- β_0 = Intercept term
- β_1–β_6 = Coefficients of the explanatory variables
- ϵ_{it} = Random error term
- All monetary variables were log-transformed to correct for scale differences and reduce skewness.

The table 1.2 depicts that Return on equity (ROE) measures the efficiency with which banks generate profits from shareholders' funds and is widely used as a proxy for financial performance in the banking sector. Digital fraud variables such as ATM/card-related fraud (LATM), web-based fraud (LWEB), internet banking fraud (LINT), and e-commerce fraud (LECM) are expected to exert a negative effect on ROE. This expectation is consistent with the Fraud Triangle Theory, which posits that increased technological access expands opportunities for fraudulent activities, leading to higher operational losses, provisioning requirements, and compliance costs that erode bank profitability. Leverage (LEV), measured as the ratio of total equity to total assets, captures banks' capital structure and risk-bearing capacity. Its expected sign is ambiguous, as higher equity may enhance financial stability and confidence while potentially constraining profit-generating leverage. Firm size (FSE), proxied by the natural logarithm of net worth, is expected to have a positive effect on ROE due to

economies of scale, diversified operations, and stronger risk management capabilities commonly associated with larger banks.
Summarily, the expected negative signs of the digital fraud variables are grounded in fraud risk and agency theories, while the control variables reflect capital adequacy and scale effects commonly observed in banking performance literature.

Definition and Measurement of Variables

Table 1.2: Defining and Measuring Variables

S/N	Variables	Measurement	Expected Sign (A priori)
	Dependent Variable		
	Return on Equity (ROE)	Net income divided by shareholders' equity	
	Independent Variables		
1	ATM/Card-Related Fraud (LATM)	Natural logarithm of the total annual value of reported ATM/card-related fraud	$\beta_1 < 0$
2	Web-Based Fraud (LWEB)	Natural logarithm of the total annual value of reported web-based fraud	$\beta_2 > 0$
3	Internet Banking Fraud (LINT)	Natural logarithm of the total annual value of reported internet banking fraud	$\beta_3 > 0$
4	E-Commerce Fraud (LECM)	Natural logarithm of the total annual value of reported e-commerce fraud	$\beta_4 < 0$
	Control Variables		
1	Leverage (LEV)	Total equity divided by total assets	±
2	Firm Size (FSE)	Natural logarithm of banks' net worth	+

Estimation Technique

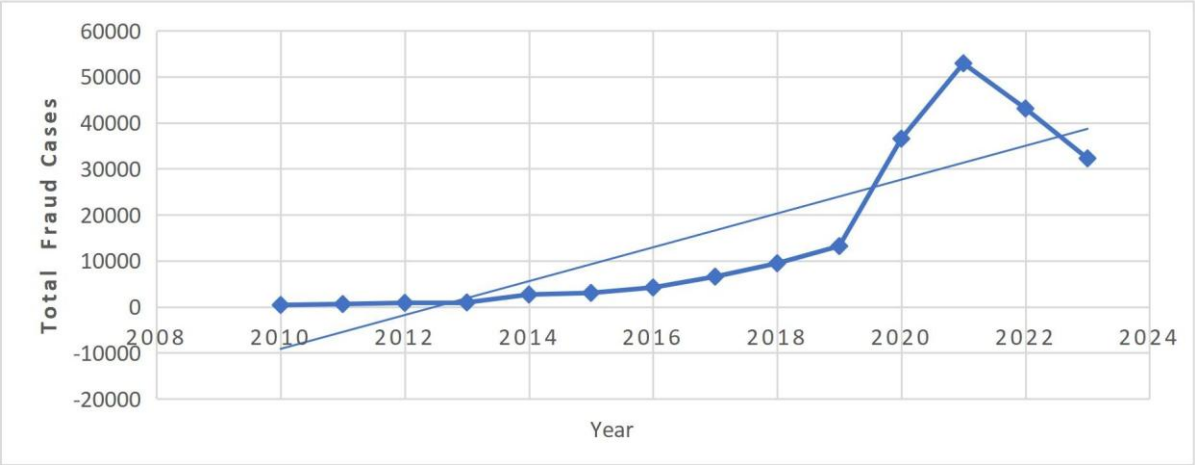
The Feasible Generalised Least Squares (FGLS) technique is employed to estimate the specified panel regression model due to the likelihood of heteroskedasticity and serial correlation in bank-level panel data. The dependent variable, return on equity (ROE), is measured as net income divided by shareholders' equity. The key explanatory variables such as ATM/card-related fraud (LATM), web-based fraud (LWEB), internet banking fraud (LINT), and e-commerce fraud (LECM) are measured as the natural logarithm of the annual value of reported fraud losses to stabilise variance and reduce the influence of extreme observations. Leverage (LEV), measured as total equity to total assets, and firm size (FSE), proxied by the natural logarithm of net worth, which are included as control variables. The FGLS estimator provides efficient and consistent parameter estimates under these conditions.

4. Results and Discussion

4.1 Descriptive Statistical Analysis of the Data

Figure 1.1 shows the trend of reported digital fraud cases in Nigerian Deposit Money Banks from 2010 to 2023, showing a sharp increase in ATM/card and e-commerce fraud, with corresponding fluctuations in total losses over the period. This highlights the growing operational risk associated with digital banking channels.

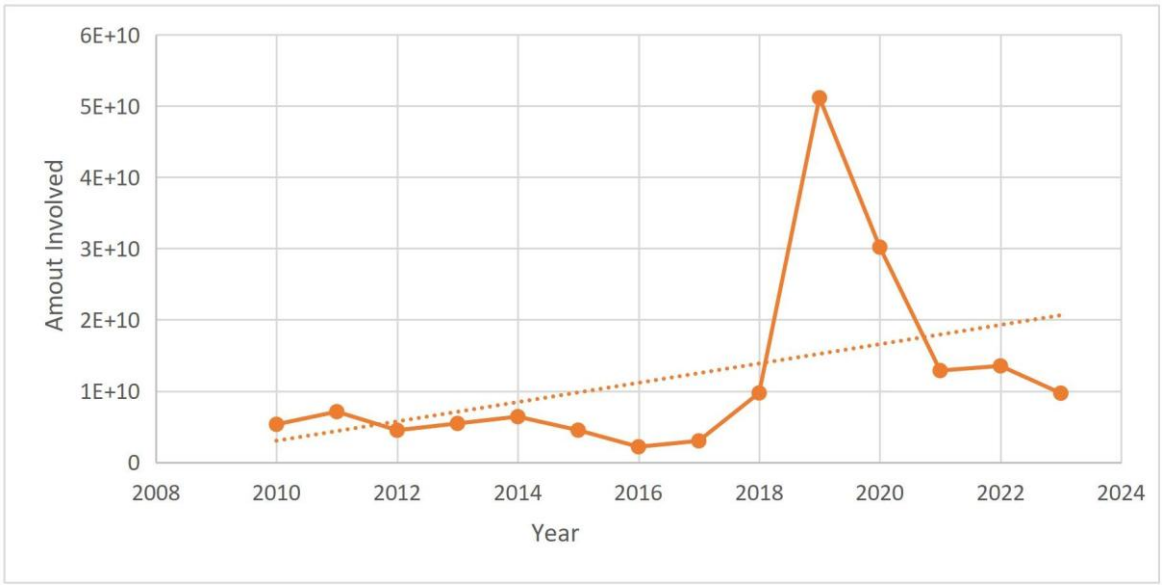
Figure 1.1: Total Number of Fraud Cases in Nigeria from 2010 to 2023



Source: Authors' Computation (2025)

Figure 1.2 reveals the rising trend in digital fraud cases in Nigerian Deposit Money Banks over the 2010-2023 period, with peaks around 2020-2021. ATM/card and e-commerce fraud dominate the reported cases, reflecting increasing operational risks associated with digital banking channels.

Figure 1.2: Total Amount Involved in Fraud Cases (2010–2023)

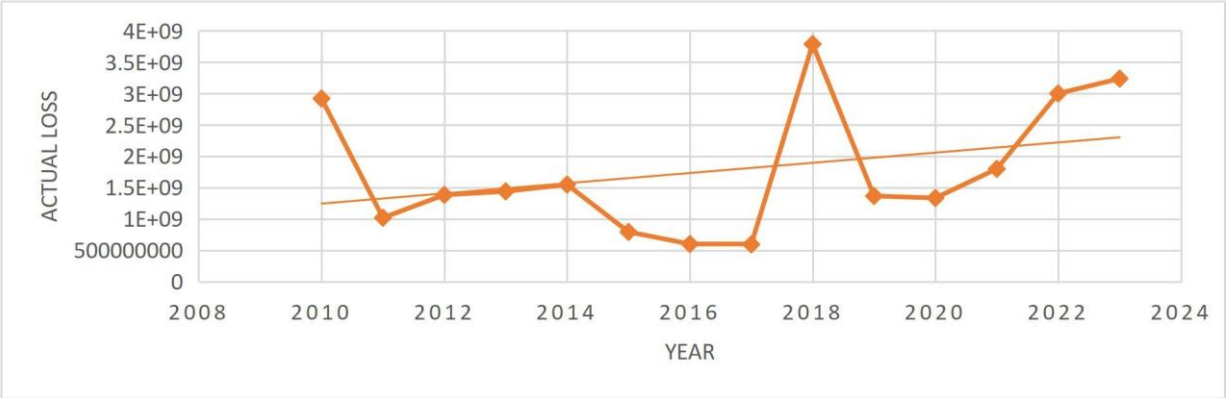


Source: Authors' Computation (2025)

Figure 1.3 shows an overall increase in reported digital fraud cases over the period, peaking in 2020 - 2021. ATM/card and e-commerce fraud constitute the majority of incidents,

highlighting growing operational risks in digital banking channels and underscoring the need for strengthened fraud prevention measures.

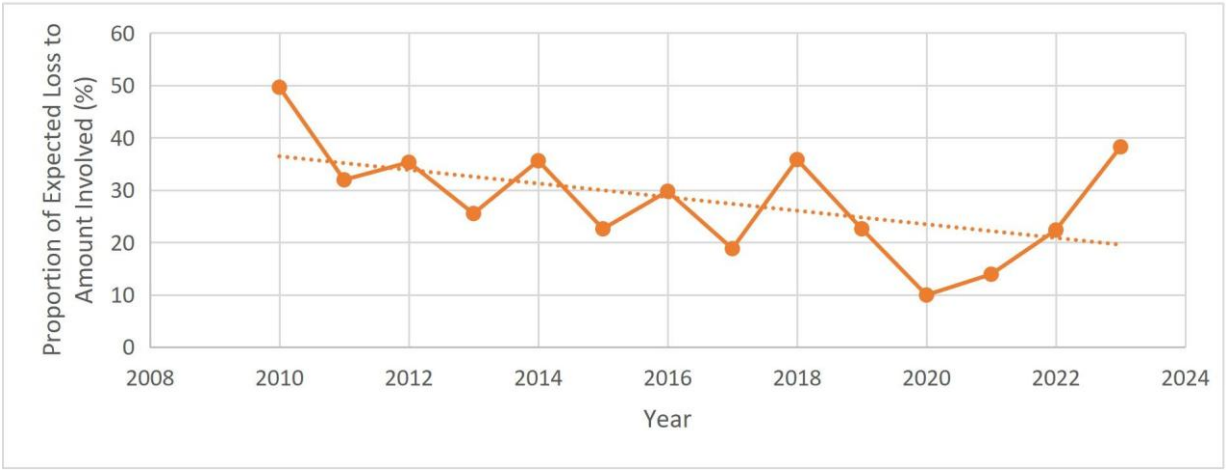
Figure 1.3: Total Actual Loss Due to Fraud from 2010 to 2023



Source: Authors' computation (2025)

Figure 1.4 reveals a rising trend in digital fraud cases over 2010–2023, with ATM/card and e-commerce fraud dominating, indicating increasing operational risk and the need for stronger fraud controls.

Figure 1.4: Proportion of Expected Loss to Amount Involved (%) in Nigeria from 2010 to 2023



Source: Authors' Computation (2025)

Summarily, figures 1.1 to 1.4 present the fourteen-year (2010–2023) trends of digital fraud in Nigeria, showing the total number of fraud cases, total amount involved, actual losses, and the proportion of losses to amounts involved (%). These visualizations facilitate the identification of patterns and support predictions within the study period.

Furthermore, table 1.3 shows the summary statistics of the study variables over 2010-2023. ROE averaged 14%, with some banks experiencing negative returns, indicating variability in financial performance. Digital fraud losses were substantial, with internet banking and ATM frauds showing the highest mean values, reflecting their dominant contribution to operational risk. Leverage exhibited wide dispersion, suggesting differences in banks' capital structures, while firm size varied considerably across the sampled banks. Overall, the descriptive statistics indicate significant heterogeneity in both performance and exposure to digital fraud, justifying the use of panel regression for robust analysis.

Table 1.3: Descriptive statistics

Stats	Mean	Min	Max	SD	N
ROE (%)	14.0379	-1.2132	41.2495	9.0518	168
ATM (₦)	943,000,000	59,000,000	2,640,000,000	693,000,000	168
ECM (₦)	66,400,000	20,000,000	177,000,000	47,800,000	168
WEB (₦)	905,000,000	70,000,000	3,850,000,000	1,120,000,000	168
INT (₦)	1,210,000,000	230,000,000	3,850,000,000	1,210,000,000	168
LEV (%)	5.6956	-154.7496	18.6556	25.3452	168
FSI (₦)	4,180,000,000,000	157,000,000,000	26,700,000,000,000	4,440,000,000,000	168

Source: Authors' Computation (2025)

4.1.5 Correlation Matrix

Table 1.4 displays the correlation matrix, which shows that internet banking fraud (LINT) is strongly negatively correlated with web-based fraud (LWEB, -0.722), suggesting these channels may be substitutes in fraud occurrence. ATM fraud (LATM) is positively correlated with e-commerce fraud (LECM, 0.585) and web-based fraud (LWEB, 0.678), indicating that certain fraud channels may co-occur. Leverage (LEV) exhibits minimal correlation with digital fraud variables, while firm size (LFSI) is positively associated with LINT (0.409) and LEV (0.483), reflecting that larger banks tend to experience more internet banking fraud but also maintain higher capital structures. Overall, correlations are below 0.8, indicating no serious multicollinearity, supporting regression analysis.

Table 1.4: Correlation Matrix

	LINT	LECM	LATM	LWEB	LEV	LFSI
LINT	1.0000					
LECM	-0.0332	1.0000				
LATM	-0.2870	0.5850	1.0000			
LWEB	-0.7224	0.3792	0.6777	1.0000		
LEV	-0.0670	0.0028	-0.0248	0.0034	1.0000	
LFSI	0.4086	-0.0765	-0.2151	-0.3244	0.4834	1.0000

Source: Authors' Computation (2025)

4.1.6 Variance Inflation Factor

Table 1.5 presents the VIF results, which indicate that multicollinearity among the explanatory variables is low to moderate, with all VIF values below the common threshold of 10. The mean VIF of 2.5 further confirms the absence of serious multicollinearity, suggesting that the regression estimates are reliable and not adversely affected by high correlations among independent variables.

Table 1.5: VIF Results

VARIABLE	VIF	1/VIF
LWEB	4.3700	0.2287
LINT	3.1100	0.3214

LATM	2.6300	0.3807
LFSI	1.7900	0.5594
LECM	1.6100	0.6205
LEV	1.4800	0.6744
MEAN VIF	2.5000	

Source: Authors' Computation (2025)

A VIF value exceeding 10 indicates significant multicollinearity (Gujarati, 2002). Based on this criterion, Point of Sale (LPOS) and Mobile Banking (LMBK) fraud variables were excluded from the model to ensure reliable estimation of the regression coefficients.

4.1.7 Stationarity Test for Panel Data

The ADF test results indicate that ROE, LECM, LEV, and LFSI are stationary at levels (I(0), while LATM, LWEB, and LINT become stationary after first differencing I(1). This mixed order of integration justifies the use of estimation techniques, such as FGLS, that can accommodate variables integrated of different orders without spurious regression, ensuring reliable inference in the panel data analysis as shown in table 1.6.

Table 1.6: Panel Unit Root Test Results

	Level		**First Difference**		
	Statistic	P-Value	Statistic	P-Value	Order of Integration
ROE	-1.4209*	0.0777			1(0)
LATM	-0.5971	0.2752	2.6307***	0.0043	1(1)
LWEB	0.7569	0.7755	-3.1976***	0.0007	1(1)
LINT	3.9159	1.0000	-1.3784*	0.0840	1(1)
LECM	-5.8672***	0.0000			1(0)
LEV	-2.8858***	0.0020			1(0)
LSFI	0.5958	0.7243	-3.1602***	0.0008	1(0)

Source: Authors' Computation (2025)

*Note: *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively.*

4.1.8 Cross-Sectional Dependence (CD) Test

Table 1.7 presents the results of Pesaran's CD test, which assesses cross-sectional dependence among the variables. The CD-test results indicate significant cross-sectional dependence among all variables at the 1% level. This suggests that shocks affecting one bank are likely to be correlated with others, reflecting interconnectedness in the Nigerian banking sector. The presence of cross-sectional dependence justifies the use of robust panel estimation technique (FGLS) to obtain efficient and unbiased parameter estimates.

Table 1.7: Cross-Sectional Dependence Test Results

VARIABLE	**CD-TEST**	**P-VALUE**
LEV	12.9130***	0.0000
LFSI	21.6180***	0.0000
LATM	24.3720***	0.0000
LECM	24.3720***	0.0000
LWEB	24.3720***	0.0000
LINT	24.3720***	0.0000

Source: Authors' Computation (2025)

*Note: *, **, *and* *** *denote significance at 10%, 5%, and 1% levels, respectively.*

4.1.9 Westerlund Test for Cointegration

The study employed the Westerlund test to assess the long-run equilibrium relationship among the variables. As shown in table 1.8, the Westerlund test statistic of 4.0289 with a p-value of 0.0000 is significant at 1% level, indicating the presence of cointegration. This result confirms that digital banking fraud variables (LATM, LWEB, LINT, LECM) and DMBs financial performance (ROE) share a stable long-term relationship, supporting the use of Feasible Generalised Least Squares (FGLS) for robust estimation.

Table 1.8 Westerlund Test for Cointegration

	Statistic	**p-value**
Variance ratio	4.0289***	0.0000

Source: Authors' Computation (2025)

To examine the impact of digital banking fraud on the financial performance of Nigerian Deposit Money Banks (DMBs) as indicated in table 1.9, shows the Feasible Generalised Least Squares (FGLS) estimates, which reveal that E-commerce (LECM) and ATM/card fraud (LATM) significantly reduce ROE, highlighting these channels as the primary drivers of digital fraud-related losses in Nigerian banks. Internet banking (LINT) and web-based fraud (LWEB) were not statistically significant, suggesting that stronger monitoring and risk management in these channels may be effective. Firm size (LFSI) positively influences ROE, reflecting economies of scale and better capacity to absorb risks, while leverage (LEV) has no significant effect.

The FGLS result shows that Internet Banking Fraud ($\beta = 0.74$, $p = 0.527$), has an insignificant impact on ROE; that is, increases in LINT do not meaningfully affect DMBs financial performance. E-Commerce Fraud ($\beta = -1.84$, $p = 0.035$) explains a significant negative effect; that is, a hundred percent (100%) increase in LECM reduces ROE by 18.81%. Also, the ATM/Card Fraud ($\beta = -1.82$, $p = 0.053$) has a significant negative effect; which shows that a hundred percent (100%) increase in LATM reduces ROE by 182.08%. The Web-Based Fraud ($\beta = 1.33$, $p = 0.166$) also has an insignificant effect on ROE; that is, increases in LWEB do not meaningfully affect DMBs financial performance. The Wald Chi-Square value of 53.02 with a p-value of 0.0000 shows that the overall model is statistically significant. This indicates that, together, the explanatory variables in the model significantly account for variations in DMBs financial performance. This indicates that the Wald chi-square statistic (χ^2 $= 53.02$, $p < 0.01$) confirms the overall statistical significance of the model, implying that the explanatory variables jointly account for a significant proportion of the variation in DMBs' financial performance, as measured by return on equity (ROE).

Table 1.9: FGLS Regression Results

ROE	**Coef.**	**Std. Err.**	**P-Value**
Cons	-87.4029**	35.38830	0.0140
LINT	0.7429	1.1735	0.5270
LECM	-1.8381**	0.8715	0.0350
LATM	-1.8208*	0.9424	0.0530
LWEB	1.3285	0.9589	0.1660
LEV	-0.0139	0.0345	0.6860
LFSI	4.534***	1.074	0.0000
Wald chi^2	53.0200***		0.0000

Source: Authors' computation (2025)

*Note: *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively.*

4.2 Findings

i. The findings indicate a sharp increase in digital banking fraud, particularly between 2014 and 2023, with peaks around 2020-2021, highlighting the urgent need for intervention by bank operators and regulatory authorities.

ii. The insignificant effect of internet banking fraud on return on equity (LINT = 0.74, p = 0.527) indicates that current risk management and control mechanisms are relatively effective; nonetheless, banks and regulators should sustain and periodically enhance these measures to prevent emerging threats from undermining future financial performance. The findings align with Chukwudi (2024) but contrast with Jolaiya (2024), who reported no effect of internet-related fraud on bank performance. The insignificant impact observed suggests that Nigerian Deposit Money Banks (DMBs) have effectively mitigated internet banking fraud risks through investments in secure authentication protocols and real-time monitoring systems. Early detection, transaction reversals, and the allocation of certain losses to negligent customers help minimize the immediate effect of internet fraud on return on equity.

iii. Findings reveal that E-Commerce Fraud (LECM) has a significant negative effect on ROE (Coef. = -1.84, p = 0.035), that is, a rise in e-commerce fraud reduces DMBs financial performance. The implication is that the significant negative impact of e-commerce fraud on return on equity (Coef. = −1.84, p = 0.035) underscores the need for regulators and bank management to strengthen cyber-security frameworks, enhance transaction monitoring, and enforce stricter controls on e-commerce platforms to mitigate fraud-related losses and improve bank financial performance. The findings contradict Okoye, Onuoha & Akuesodo (2021), who reported that e-commerce related fraud does not affect the financial performance of Nigerian Deposit Money Banks (DMBs). The significant impact observed in this study may be attributed to the rapid expansion of digital shopping platforms and weak consumer protection frameworks in Nigeria exposing banks to irreversible losses, particularly through card transaction chargebacks.

iv. Although Automated Teller Machine (LATM) shows a negative but statistically significant effect on return on equity (Coef. = -0.82, p = 0.053), that is, a rise in ATM fraud reduces DMBs financial performance. The findings align with Jolaiya (2024) but contradict Muoghalu et al. (2018), who reported that there is no effect of ATM-related fraud on the financial performance of banks. ATM fraud remains a persistent challenge, particularly in rural and semi-urban areas with outdated machines and weak surveillance. Common schemes include card skimming, PIN interception, and social engineering targeting customers.

v. The insignificant effect of web-based fraud on bank performance (Coef. = 1.33, p = 0.166) suggests that existing control measures may be relatively effective; however, banks and regulators should maintain proactive monitoring and strengthen digital risk management frameworks to prevent escalation and safeguard financial performance. The findings align with Muoghalu et al. (2018), who reported that web-based fraud does not significantly affect bank financial performance. This insignificance may be attributed to the fact that many losses are borne by customers, particularly in cases of proven negligence, thereby limiting the direct financial impact on banks.

In addition, Firm Size (LFSI) exhibits a strong positive effect on return on equity (Coef. = 4.53, p < 0.01), indicating that larger banks achieve higher financial performance. Leverage (LEV) shows an insignificant effect (Coef. = −0.0139, p = 0.686), suggesting that capital structure does not meaningfully influence bank performance in this context. This implies that strong positive effect of firm size on return on equity (Coef. = 4.53, p < 0.01) indicates that larger banks benefit from economies of scale and diversified operations, suggesting that regulators and bank management should encourage growth and consolidation strategies to

enhance financial performance. Also, the insignificant effect of leverage (Coef. = −0.0139, p = 0.686) implies that capital structure adjustments may have limited impact on performance, highlighting the need for banks to focus more on operational efficiency and strategic expansion rather than solely on debt financing.

5. Conclusion and Recommendations

The study concludes that digital banking fraud in Nigeria has risen sharply especially e-commerce and ATM-related fraud, which significantly and negatively affect bank performance, while internet and web-based fraud currently show insignificant effects, underscoring the urgent need for banks and regulators to strengthen proactive, technology-driven risk management and cyber-security frameworks.

On the basis of the findings, these were the recommendations:

i. There is need for bank managements to adopt holistic modern strategies in order to fight the continuous surge in the trends of digital banking frauds in Nigeria.

ii. Even though internet and web-based fraud show insignificant effects, continuous investment in secure authentication, real-time monitoring, and customer education is essential to prevent emerging threats.

iii. Regulators and banks should enhance cyber-security measures, implement stricter monitoring of third-party vendors, and enforce robust consumer protection frameworks to reduce losses from e-commerce fraud.

iv. Deposit Money Banks should prioritize the modernization of ATM networks, by improving surveillance systems and deploying advanced technologies such as artificial intelligence-driven transaction monitoring to curb ATM/card fraud, which poses the greatest threat to bank performance.

However, the study is limited by the exclusion of POS and mobile banking fraud variables due to high multicollinearity, as indicated by Variance Inflation Factor (VIF) values exceeding the acceptable threshold of 10. Additionally, the sample of Deposit Money Banks (DMBs) was reduced to twelve (12) because of the unavailability of data for 2024 and 2025.

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