The Impact of Forensic Accounting Techniques in Mitigating Electronic Fraud in Nigeria's Deposit Money Banks

OLUYIDE, Sopefoluwa Eunice <http://orcid.org/0009-0000-9806-531X>

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Abstract

In this paper, we examined the impact of Forensic Accounting Techniques (Investigative Accounting, Digital Forensics, and Data Analytics) in mitigating Electronic Fraud (e-fraud) in Nigeria's deposit money banks (DMBs). The study used a positivist deductive approach and was conducted quantitatively through an online survey. A stratified random sampling method was employed to select a sample of 95 respondents, representing eight 'best-fit' groups, including staff from operations, Information Technology, and Electronic Channel departments of five participating Deposit Money Banks, as well as accountants, auditors, representatives from bank regulators, professional accounting bodies, and law enforcement agencies in Nigeria. The results showed that only investigative accounting is statistically significant in reducing electronic fraud within banks. In contrast, digital forensics and data analytics did not show statistical significance in mitigating electronic fraud, implying they do not reduce e-fraud severity. It is suggested that if the scope of data analytics were expanded, it could help mitigate e-fraud, as it shows significance at a 10% level. The findings also indicate that a more refined model, possibly a longitudinal study, could provide deeper insights into the effect of forensic accounting techniques in combating electronic fraud within Nigeria's Deposit Money Banks.

Keywords: *Forensic Accounting, Fraud Mitigation, Electronic Fraud, Deposit Money Banks, Forensic Accounting Techniques.*

1. Introduction

A report from the Association of Certified Fraud Examiners in 2024 revealed losses exceeding $3.1 billion from 1,921 fraudulent cases between January 2022 and September 2023, with the banking and financial services sectors experiencing the highest incidence of fraud. In Nigeria alone, 84% of bank fraud incidents in 2021 were electronic, committed through ATMs, mobile banking, electronic cards, and point-of-sale services, among other methods. The ripple effect of this growing threat is palpable among bank customers, within the financial sector, and across the nation (Kanu et al., 2023). Although the banking sector is crucial to society by providing an effective payment system, facilitating financial intermediation, and aiding in the implementation of monetary policies, it sometimes falls short of achieving its corporate profit-making goals due to losses incurred from fraud (Rybalchenko et al., 2022). This situation arises as the global banking industry, the custodian of liquid assets, remains a vulnerable sector and a significant target for fraudsters (Sood & Bhushan, 2020). Various types of fraud occur in banks; however, it is argued that electronic fraud is more prevalent in developing countries such as Nigeria.

Electronic fraud, also referred to as e-fraud, involves the perpetration of fraud through computerised devices designed to facilitate faster and more seamless banking activities. Combating e-fraud in emerging and developing economies, such as Nigeria, poses significant challenges due to the rapid adaptability of fraudsters and the advancement of technology. Furthermore, the lack of up-to-date security measures and resources for investigating electronic fraud has contributed to its recent rise (Kritznger & Solms, 2012; Dzomira et al., 2014). Research indicates that e-fraud cases have escalated over the years due to the proliferation of electronic-based banking products. E-banking in Nigeria represents a consequence of the banking sector's deregulation, which aims to enhance service delivery to bank customers through technology. Nevertheless, the sweeping global technological changes affecting financial intermediation and markets have bolstered e-banking in an increasingly technology-driven world (Akinwale et al., 2022). With e-banking fraud on the rise due to vulnerabilities in banking operations (Fadayo, 2018), several scholars have investigated the rationale, determinants, and impacts of e-fraud on Nigerian Deposit Money Banks (DMB) (Oko, 2019; Ololade et al., 2020), while others have examined fraud prevention, detection, and control within Nigerian banks (Owolabi & Ogunsola, 2021; Adesina et al., 2020; Rashid, 2022). However, this study investigates the effect of forensic accounting techniques, including investigative accounting, digital forensics, and data analytics, on mitigating e-fraud in Nigeria's DMBs.

The paper comprises various sections that address the research objectives. Following this introduction, which provides a brief overview of the study context, the literature review examines the role of forensic accounting techniques through the theoretical lens of Routine Activity Theory (RAT). The methodology section details the study's quantitative approach and data collection methods, while the data analysis section presents both descriptive and inferential results. The final section offers a comprehensive conclusion that summarises the key findings of the study and their implications for reducing banking sector fraud. This section also recognises study limitations and suggests directions for future research, including recommendations for longitudinal studies and larger sample populations that could enhance the generalisability of findings across Nigeria's wider banking sector.

2. Theoretical Reflection and Literature Review

The Nigerian banking sector introduced the cashless policy in 2011 to align with global cashless initiatives. Consequently, electronic transactions increasingly supplanted cash-based transactions (Acha et al., 2017). A cashless policy facilitates the payment for goods and services through direct transfers, credit cards, and debit cards (Mamudu & Gayovwi, 2018). Other monetary policies implemented by the CBN that have spurred the rapid growth of e-fraud in Nigeria include the mobile payment system, Payment System Vision 2020, and the Financial Inclusion Policy. However, advancements in IT have also given rise to sophisticated crimes and significantly increased fraud despite their positive contributions (Chaimaa et al., 2021).

Fraud through electronic channels has persisted, and its impacts are being felt by customers, financial institutions, and society (Kanu et al., 2023). Of the 211,713 various types of fraud in Nigeria's banks in 2021, over 178,000 stemmed from electronic channels such as ATM/card-related transactions, web-based activities, internet banking, mobile banking, POS transactions, and e-commerce (NDIC, 2022). In Nigeria, the annual fraud count surged by 112% from 44,947 in 2019 to 95,630 in 2023, with a five-year increase in losses amounting to 496%, rising from ₦2.9 billion to ₦17.67 billion (NIBSS, 2023). The mobile, web, and POS channels are reportedly the most exploited by fraudsters in 2023, followed by Internet banking, e-commerce, and ATMs. The geometric growth of losses in Nigeria's DMB could lead to the collapse of banks if precautionary measures are not implemented, as many investors have already lost confidence in the banking industry (Taiwo et al., 2016).

Routine Activity Theory

Although the emergence of technology in organisations, such as the banking sector, has improved productivity and efficiency, it has also exposed financial institutions to cyberattacks by fraudsters (Aldasoro et al., 2022). This study is examined through the theoretical lens of Routine Activity Theory (RAT), introduced by Cohen and Felson in 1979. The theory suggests that structural changes in overall routines can affect the convergence in time and space of motivated offenders and suitable targets when capable guardians are absent. In other words, the three key factors for a successful crime are motivated offenders, suitable targets, and the lack of capable guardians. Some early scholars argued that offenders are motivated when their intentions are activated and circumstances are conducive to crime (Briar & Piliavin, 1965; Jacobs & Wright, 1999). However, for fraud to occur, the motivated offender and the suitable target must converge in time and space, meaning both victim and offender must share similar

routine activities (Mohammad & Nooraini, 2021). While these elements are difficult to control due to digitalisation and human resources, the third component of Routine Activity Theory, the absence of a capable guardian, can be managed. Cohen and Felson (1979) claimed that control through routine activities could prevent criminal acts. Therefore, adopting specific measures, such as forensic accounting techniques, within daily banking operations could reduce e-fraud. Consequently, this study will explore how forensic accounting techniques act as capable guardians in reducing electronic fraud in Nigerian Deposit Money Banks.

Forensic Accounting Techniques as a Guardian to Mitigate e-Fraud in DBMs.

Forensic accounting combines accounting principles, investigative skills, and legal procedures to detect, analyse, and prevent fraud in financial institutions (Akinbowale et al., 2023). Forensic accounting techniques are a last resort in investigating what, who, and when fraudulent activities occur. They help rebuild entire financial systems, uncover financial statement fraud, trace funds, discover hidden assets, and more (Oyedokun et al., 2016). They act as a capable guardian and a tool to mitigate the risk of digital financial fraud in place of the statutory audit (Daraojimba et al., 2023). Dada and Jimoh (2020) argued that investigative accounting, data analytics, and digital forensics are practical tools that can be adopted across various business sectors. Similar studies in the manufacturing and Federal Public Sectors in Nigeria indicate that forensic accounting significantly reduces fraud (Osunwole et al., 2020; Nnah et al., 2024).

This study will, therefore, focus on the effect of forensic accounting techniques in mitigating e-fraud in Nigeria's DMB. Specifically, the research examines three key forensic accounting techniques: investigative accounting, digital forensics, and data analytics. By investigating their individual and collective impact on electronic fraud mitigation, this study aims to provide practical insights for banking sector stakeholders and contribute to the growing body of knowledge on forensic accounting applications in developing economies.

Investigating accounting involves examining the accounts, identifying red flags, and uncovering potential fraud with a high degree of professional scepticism (Kranacher & Riley, 2019). It requires the routine application of investigative skills to unveil fraudulent transactions. The forensic accountant’s understanding of the law aids in revealing the extent of fraud and identifying the perpetrators, which can inform the organisation about the motivated offenders and better equip them to reduce future occurrences. Some tools used in investigative

accounting include Computer-Aided Tools and Techniques (CATT), data mining, link analysis software, case management software, and technology.

Digital forensics is also known as forensic computing, computer forensics, or network forensics (Shrivastava et al., 2016). It represents a branch of forensic science that enhances investigative accounting, termed the 'deep investigation approach' (Kazure et al., 2023). It employs a forensic approach within a digital environment for cybercrime, utilising information flows to conduct investigations and ensure that the appropriate judgements are made in the event of court decisions. The two types of digital forensics analysis tools that could reveal fraud and instil the fear of discovery in potential fraudsters are Autopsy and Encase (Koul et al., 2020). Their adoption will properly inform motivated offenders about the high likelihood of being discovered; hence, it could mitigate electronic fraud in banks.

Inspections of transactional data should not be limited solely to forensic investigations; there should also be regular data analytics performance (Sasidharan & Pal, 2017). Data analytics serve as a proactive technological anti-fraud tool, enabling fraud investigators to access the organisation's data to assess the effectiveness of internal controls and identify transactions vulnerable to fraud. Implementing data analytics in forensic accounting could assist in analysing extensive data, extracting value from information and accessing hidden values that fraudsters might exploit as opportunities to commit fraud (Deniswara et al., 2022).

3. Methodology

This study investigates the effect of forensic accounting techniques (investigative accounting, digital forensics, and data analytics) in mitigating electronic fraud in Nigeria's deposit money banks. The following hypotheses were proposed:

H1: There is a significant and positive relationship between investigative accounting and electronic fraud mitigation in Nigeria's DMB.

H2: There is a significant and positive relationship between digital forensics and electronic fraud mitigation in Nigeria's DMB.

H3: There is a significant and positive relationship between data analytics and electronic fraud mitigation in Nigeria's DMB.

3.1 Instrument Development and Validation

Primary data was collected using a structured questionnaire comprising 20 items measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The instrument consisted of four constructs, each with five questions, as shown in Table 1 and Appendix 1. The survey was administered online to 148 respondents, consisting of bank staff from operations, IT, e-channel, and internal audit departments. The sampled banks include First Bank of Nigeria, Guaranty Trust Bank, Zenith Bank, Access Bank and Fidelity Bank. In addition, more respondents were representatives from Nigeria's law enforcement agencies and banking regulators, such as the Nigerian Deposit Money Banks, the Federal Ministry of Finance, and the Central Bank of Nigeria. This is due to their awareness and involvement in electronic fraud cases within banks.

The questionnaire items were developed and validated through an extensive review of the literature on forensic accounting techniques and electronic fraud mitigation. A pilot study involving 10 banking professionals was conducted to ensure clarity, relevance, and reliability, resulting in minor adjustments based on their feedback. The constructs of the questionnaire were operationally defined as follows:

Table 1: Questionnaire constructs and definitions

Constructs	Definitions
Electronic Fraud Mitigation	Organisational and systemic measures that reduce the impact and occurrence of fraudulent electronic activities.
Investigative Accounting	Techniques used to examine financial records and identify fraudulent activities
Digital Forensics	Technology-based investigative methods for examining digital evidence
Data Analytics	Statistical and computational methods for detecting fraud patterns

Source: Author's Compilation

However, the researcher collected 95 responses for the data at the end of the period. The response rate analysis for the question is detailed in Table 2. The response rate of 64.19% is considered suitable and adequate for analysis (Babbie, 2004).

Table 2: Distribution of Questionnaire/ Response Rate

	Frequency	Percentage%

No of questionnaires distributed	148	100
No of questionnaires returned	95	64.19
No of questionnaires not returned	53	35.81

Source: Author's Compilation

3.2 Respondents' Demographics

The study employed stratified random sampling to ensure representation across key stakeholder groups in Nigeria's banking sector. Participants were drawn from eight distinct categories: banking personnel (operations, IT, and e-channel departments), external auditors and accountants, representatives from the regulatory body, staff from the professional accounting body, and personnel from law enforcement agencies. This sampling approach was designed to capture comprehensive perspectives on forensic accounting techniques and electronic fraud mitigation across the banking ecosystem. Table 3 presents the descriptive statistics of the respondents' demographics.

Table 3: Descriptive representation of Respondents' demographics

S/N	Items	Frequency	Percentage (%)
1	**Gender**		
	Male	56	58.9
	Female	39	41.1
2	**Respondents**		
	IT staff in DBM	26	27.4
	Operation & Management staff in DBM	21	22.1
	E-channel staff in DBM	18	18.9
	Accountants	13	13.7
	Auditors	6	6.3
	Bank Regulators' representatives	4	4.2
	Professional bodies' representatives	4	4.2
	Law Enforcement Agencies representatives	3	3.2
3	**Banking institution representation (65)**		
	First Bank of Nigeria	22	33.9
	Guaranty Trust Bank	8	12.3

	Zenith Bank	19	29.2
	Access Bank	13	20
	Fidelity Bank	3	4.6
4	**Years of Experience of respondents**		
	<5 years	27	28.4
	5-10 years	42	44.2
	11-15 years	14	14.7
	>15 years	12	12.7

Source: Author's Compilation

The data collected from the questionnaire were analysed using the Statistical Package for Social Sciences (SPSS) version 26 because it does not require any programming, and the interpretation of its results is straightforward and easily understood (Milovanovic & Perisic, 2020). The results from the various statistical tests were interpreted, and findings were made and tested using the hypothesis. The model for the hypothesis is specified in equation (1).

$$EFRM = f(FAT) \quad (1)$$

where EFRM = E-Fraud Mitigation,

FAT = Forensic Accounting Techniques.

Therefore, FAT = (X1, X2, X3)

such that X1 =investigative accounting, X2 =digital forensics, and X3 =data analytics.

The dependent variable is E-fraud mitigation, while the independent variables are investigative accounting, digital forensics, and data analytics.

4. Data Analysis and Discussion of Findings

Descriptive statistics from all questionnaire responses were analysed and interpreted statistically. Correlation analysis and multiple regression were employed to examine the relationship between the dependent and independent variables. Furthermore, the previously developed hypotheses were ultimately tested. Table 4 presents summary statistics for the dataset.

Table 4: Summary statistics for the observed variables

Variable	Observations	Mean	Std. Dev.	Min	Max

Electronic Fraud Mitigation (EFRM)	95	3.97	0.83	1	5
Investigative Accounting (IA)	95	3.98	0.64	1	5
Digital Forensics (DF)	95	4.11	0.67	1	5
Data Analytics (DA)	95	3.65	0.73	1	5

Source: Author's research

The average mean response on electronic fraud mitigation (EFRM) was 3.97, indicating a high level, with a standard deviation of 0.83. According to Nik et al. (2010), a mean score is considered low if it is less than 2.33, moderate between 2.33 and 3.67, and high when above 3.67. The average response for investigative accounting (IA) is 3.98, with a standard deviation of 0.64, indicating that respondents perceive investigative accounting as an effective technique for reducing electronic fraud. Additionally, digital forensics has a mean of 4.11 and a standard deviation of 0.67. Furthermore, the mean score of 3.65 for data analytics indicates a moderate level, suggesting that respondents believe data analytics could mitigate electronic fraud in banks if implemented. Finally, all variables have a minimum of 1 and a maximum of 5.

The reliability test's analysis of data using SPSS reveals Cronbach's alpha of 0.83, as shown in Table 5. This indicates that internal consistency exists among the scales of the dependent and independent variables. Cronbach and Shapiro (1982) assert that the minimum value for data reliability is 0.70, and any value below that indicates unreliability. For this study, the data for analysis are considered reliable, as they exceed the threshold.

Table 5: Reliability Statistics of Variables

Cronbach's Alpha	Cronbach's Alpha based on standardised items	No of items
0.827	0.835	4

Source: Author's research

4.1 Correlation Coefficients

The correlation test of the variables is conducted using Spearman rank correlation analysis. Table 6 displays the strength and type of relationship between the dependent variable and each independent variable. According to the strength of association guide by Akoglu (2018), the relationship between the variables indicates a positive association to varying degrees. Investigative accounting and data analytics exhibit a moderate strength of relationship, with coefficients of 0.58 and 0.51, respectively, while digital forensics demonstrates a weak

relationship of 0.36 with electronic fraud mitigation. Furthermore, all correlation coefficients of the variables are significant at the 0.000 level.

Table 6: Spearman's Rho Correlation Analysis of the Variables

Latent Variables	EFRM	IA	DF	DA	Sig.
EFRM	1	.508**	.357**	.509**	0.00
IA	.580**	1			0.00
DF	.357**		1		0.00
DA	.509**			1	0.00

Source: Author's research

4.2 Multiple Regression Analysis

A multiple regression analysis was performed to provide a neutral assessment of the extent and nature of the relationship between independent and continuous dependent variables.

Table 7 summarises the model and presents information regarding the level of variance in the dependent variable (EFRM) explained by the model. The R^2 in the model is .392, indicating that 39.2% of the variance in electronic fraud mitigation in DMBs has been accounted for. In contrast, the remaining 60.8% of the variation in the dependent variable is attributed to other factors not covered in the study.

According to the assertion made by Cohen (1988), an R^2 classification of 0.02 is considered weak, 0.13 is moderate, and 0.26 is substantial. Thus, the R^2 value of 0.392 in this study is significant. However, the generalisability of this model to the population was 0.372, as indicated by the adjusted R^2.

Table 7: Multiple regression model summary

Model	R	R Square	Adjusted R square	Std Error of the Estimate
1	.626[a]	0.392	0.372	0.65420

a. Predictor: (Constant), IA, DF, DA

Source: Author's research

4.3 Analysis of Variance

Table 8 presents the analysis of variance (ANOVA) table and the significance level of the statistics. The F value of 19.554 indicates the model's fit for hypothesis testing. A significant value of 0.000 reveals a relationship between the dependent and independent variables. However, it does not elucidate the relative contribution of each independent variable to the dependent variable (Green & Salkind, 2008).

Table 8: Analysis of Variance Summary (ANOVA)

Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1 Regression	25.106	3	8.369	19.554	.000[b]
Residual	38.946	91	0.428		
Total	64.052	94			

a. Dependent Variable: E-fraud Mitigation

b. Predictors: (Constant), IA, DF, DA

Source: Author's research

This result predicts that each forensic accounting technique (Investigative Accounting-IA, Digital Forensics-DF, and Data Analytics- DA) positively relates to electronic fraud mitigation. This presupposes that any increase in forensic accounting techniques will lead to an increase in the mitigation of electronic fraud. Implementing these forensic accounting techniques would lead to higher E-fraud mitigation in Nigeria's DMB.

The coefficients in Table 9 indicate the extent of the relationship between the components of the independent variables (IA, DF, DA) and the dependent variable (EFRM). Overall, the results suggest a positive relationship between forensic accounting techniques and electronic fraud mitigation in Nigeria's DMBs. The null hypothesis is accepted at a 5% significance level. This is because, although the t-calculated value of 1.140 exceeds the t-tabulated value of 0.257, it remains statistically significant since the significance level is above 0.05. Therefore, based on these results, it can be concluded that forensic accounting techniques do not significantly impact electronic fraud mitigation in Nigeria's DMB.

Meanwhile, the coefficients of IA (β_1), DF ($\beta 2$), and DA ($\beta 3$) are all more significant than zero; hence, the a priori expectation that the four variables have a positive relationship is satisfied.

EFRM= 0.530+0.512*IA+0.144*DF+0.221*DA+0.465.

Table 9: Coefficient of Multiple Regression Model

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	0.530	0.465		1.140	0.257
IA	0.512	0.167	0.398	3.060	0.003
DF	0.144	0.144	0.117	0.997	0.321
DA	0.221	0.115	0.197	1.926	0.057

a. Dependent Variable: E-fraud Mitigation

Source: Author's research

4.4 Hypothesis Testing

Table 10: Summary of hypothesis testing

Hypothesis	Relationship	T-test	Sig.(p-value)	Decision
H1	Electronic fraud mitigation and investigative accounting	3.060	0.003	Accept
H2	Electronic fraud mitigation and digital forensics	0.997	0.321	Reject
H2	Electronic fraud mitigation and data analytics	1.926	0.057	Reject

Source: Author's compilation

Electronic Fraud Mitigation and Investigative Accounting

The summary of the results in Table 10 indicates a p-value of 0.003, while the joint significance of the model, measured by the F-statistic, shows a value of 19.554. Therefore, we reject the null hypothesis and accept the alternative hypothesis, which states that investigative accounting, as a forensic accounting technique, mitigates electronic fraud in Nigeria's DMB. A positive moderate correlation of 0.58 exists between E-fraud mitigation in Nigeria's DMB and investigative accounting. Furthermore, the high average mean value of 3.98, with a standard deviation of 0.64 for the variable, provides descriptive affirmation of the inferential result. This indicates that using investigative tools, such as data mining software, reduces E-

fraud in DMB and serves as a means of searching for evidence. In conclusion, the successful investigation of past E-frauds in banks aids DMB management in establishing necessary checks for future occurrences. In summary, we accept the alternative hypothesis that investigative accounting reduces electronic fraud if implemented in Nigeria's DMB. This finding aligns with a study by Kaunda (2021), which demonstrates a positive relationship between forensic accounting practices and fraud mitigation among commercial banks in Kenya. Additionally, Uduehe et al. (2024) argue that employing investigative accounting tools, such as computer-assisted auditing tools, enhances fraud management in banks.

Electronic Fraud Mitigation and Digital Forensics

From Table 10, the digital forensics technique indicates a significant level of 0.321, which exceeds 0.05; thus, the null hypothesis, which states that implementing digital forensics in Nigeria's DMB does not mitigate electronic fraud, and the alternative hypothesis is rejected. Thorough investigations into past events lack statistical significance regarding E-fraud in DMB, as the p-value of 0.321 is above the significance threshold of 0.05. Furthermore, the correlation analysis between E-fraud mitigation in Nigeria's DMB and digital forensics reveals a value of 0.357, indicating a weak but positive relationship. The descriptive analysis illustrates a high-level average mean of 4.11 and a standard deviation of 0.67. However, in contrast to this study, Mabior et al. (2024) found that forensic investigations significantly reduce financial fraud in South Sudan's commercial banks, and Awodiran et al. (2023) assert that digital forensic tools decrease phishing scams, advance fee fraud, and credit card fraud in Nigeria.

Electronic Fraud Mitigation and Data Analytics

The result in Table 10 shows a significant level of 0.057, greater than 0.05. Therefore, the null hypothesis that implementing data analytics in the day-to-day activities of Nigeria's DMB does not hinder electronic fraud should be accepted. In contrast, the alternative hypothesis, which states otherwise, should be rejected. In addition, the descriptive analysis shows a low average mean of 3.65 and a standard deviation of 0.73. This is despite the collective F-statistics of 19.554 and a positive, moderate correlation of 0.509 between electronic fraud mitigation in Nigeria DMB and data analytics. However, Paramore (2025), in their study on the impact of forensic accounting on mitigating tax fraud in Nigeria, claims the importance of big data analytics and predictive analytics in reducing the occurrence of fraud. A study by Onamusi et al. (2024) postulates that fraud detection software has a weaker but still positive impact on fraud prevention in banks.

Analysing the 3 predicting variables shows investigative accounting (β_1 =.512, t=3.060, p<.003), digital forensics (β_2=.144, t=0.997, p<.321) and data analytics (β_3=.221, t=1.926, p<.057). Only investigative accounting is statistically significant. Therefore, H_{A2} and H_{A3}, the alternative hypotheses, are rejected, while only H_{A1} will be accepted.

5. Conclusion and Recommendations

Forensic accounting techniques are practical tools that can be utilised in organisations. Consequently, this study investigates the impact of forensic accounting techniques such as investigative accounting, digital forensics, and data analysis in mitigating E-fraud within Nigeria's DMB if implemented. To achieve this, primary data were collected using a survey from five representative banks in Nigeria, and a model was constructed. The study's findings indicate the potential for e-fraud mitigation through forensic accounting techniques. Of the forensic accounting techniques examined in this study, only investigative accounting can effectively mitigate fraud. If implemented in Nigeria's DMB, digital forensics and data analysis cannot prevent electronic fraud. The study reveals a need to employ specialists known as forensic accountants in the daily operational activities of banks. These professionals could collaborate with the bank's information technology (IT) department to implement precautionary measures to reduce e-fraud in DMB. Additionally, besides hiring specialist forensic accountants, regular training and career development could be provided for these specialists to keep them updated on recent technological and accounting advancements. Stakeholders in banks, including the government, staff, management, law enforcement agencies, banking sector regulators, and accounting professional bodies, should work together to reduce E-fraud in Nigeria's DMB significantly.

However, as the significant level of data analytics (0.057) is close to statistical significance, the researcher believes that broadening the scope of data analytics might also mitigate electronic fraud within Nigeria's DMB. Further recommendations include employing a longitudinal study to provide a comprehensive range of data. This study also suggests that the data collection should fully represent all DMBs in Nigeria, enabling researchers to obtain more robust data from staff in various departments such as operations, IT, E-channels, audits, and compliance.

References

Acha, I. A., Kanu, C., & Agu, G. A. (2017). Cashless policy in Nigeria: The mechanics, benefits and problems. *Innovative Journal of Economics and Financial Studies 1*(1), pp. 28-38.

Adesina, K., Erin, O., Ajetunmobi, O., Ilogho, S., & Asiriuwa, O. (2020). Does forensic audit influence fraud control? Evidence from Nigerian deposit money banks. *Banks and Bank Systems 15*(2), pp. 214-229.

Aduba, J. J. (2021). On the determinants, gains and challenges of electronic banking adoption in Nigeria. *International Journal of Social Economics 48*(7), pp. 1021-1043.

Akinbowale, O. E., Klingelhöfer, H. E., & Zerihun, M. F. (2023). Application of forensic accounting techniques in the South African banking industry for the purpose of fraud risk mitigation. *Cogent Economics & Finance 11*(1), 2153412.

Akinwale, F. F., Ailemen, I. O., & Areghan, I. (2022). Electronic fraud: an emerging cause of bank failure in Nigerian deposit money banks. *Journal of Money Laundering Control 25*(1), pp. 249-263.

Akoglu, H. (2018). User's guide to correlation coefficients. *Turkish journal of emergency medicine 18*(3), pp. 91-93.

Aldasoro, I., Gambacorta, L., Giudici, P., & Leach, T. (2022). The drivers of cyber risk. *Journal of Financial Stability 60*, 100989, pp. 1–13. DOI: https://doi.org/10.1016/j.jfs.2022. 100989

Association of Certified Fraud Examiners (ACFE). (2024). Occupational Fraud 2024 : A report to the Nations. Retrieved from: 2024-report-to-the-nations.pdf (Accessed February 20, 2025).

Awodiran, M. A., Ogundele, A. T., Idem, U. J., & Emem, O. (2023, January). Digital forensic accounting and cyber fraud in Nigeria. In *2023 international conference on cyber management and engineering (CyMaEn)* (pp. 321-326). IEEE.

Babbie, E. R. (2020). *The practice of social research*. Cengage Au.

Briar, S., & Piliavin, I. (1965). Delinquency, situational inducements, and commitment to conformity. *Social Problems 13*(1), pp. 35–45.

Chaimaa, B., Najib, E., & Rachid, H. (2021). E-banking Overview: Concepts, Challenges and Solutions. *Wireless Personal Communications 117*(2), pp. 1059-1078.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciencies*. Routledge.

Cohen, L. E., & Felson, M. (1979). Social change and crime rate trends: a routine activity approach. *American Sociologial Revie, 44 (4), pp. 588-608*.

Cronbach, L. J., & Shapiro, K. (1982). *Designing evaluations of educational and social programs*. Jossey-Bass.

Dada, S. O., & Jimoh, F. B. (2020). Forensic accounting and financial crimes in Nigerian public sector. *Journal of Accounting and Taxation 12*(4), pp. 118-125.

Daraojimba, R. E., Farayola, O. A., Olatoye, F. M. O., Mhlongo, N., & Oke, T. T. L. (2023). Forensic accounting in the digital age: a US perspective: scrutinizing methods and challenges in digital financial fraud prevention. *Finance & Accounting Research Journal 5*(11), pp. 342-360.

Deniswara, K., Nathanael Mulyawan, A., Theodore Kesuma, J., & Susilo Martanti, B. (2022, February). Reimagining a New Transformation of Digital Forensic Accounting: Strategic Analysis of the Use of Big Data Analytics in the Covid-19 Pandemic Era as an Opportunity for the Industries in Indonesia. In *DSDE 2022: 2022 the 5th International Conference on Data Storage and Data Engineering* (pp. 44-49).

Dzomira, S. (2014). Electronic fraud (cyber fraud) risk in the banking industry, Zimbabwe. *Risk Governance and Control: Financial Markets and Institutions 4*(2), pp. 16-26.

Fadayo, O. M. (2018). *An examination of e-banking fraud prevention and detection in Nigerian banks.* (Doctoral dissertation, De Montfort University, Faculty of Business & Law, Department of Accounting & Finance)

Jacobs, B. A., & Wright, R. (1999). Stick-up, street culture, and offender motivation. *Criminology 37*(1), pp. 149–174.

Kanu, C., Nnam, M. U., Ugwu, J. N., Achilike, N., Adama, L., Uwajumogu, N., & Obidike, P. (2023). Frauds and forgeries in banking industry in Africa: a content analyses of Nigeria Deposit Insurance Corporation annual crime report. *Security Journal 36*(4), pp. 671-692.

Kaunda, F. O. (2021). *Effect of forensic accounting practices on fraud mitigation among commercial banks in Kenya* (Doctoral dissertation, KCA University, School of Business And Public Management).

Kazaure, A. A., Yusoff, M. N., & Jantan, A. (2023). Digital Forensics Investigation Approaches in Mitigating Cybercrimes: A Review. *Journal of Information Science Theory & Practice (JIStaP)*, *11*(4), pp. 14-39.

Koul, S., Raj, Y., & Koul, S. (2020) Analyzing Cyber Trends in Online Financial Frauds using digital Forensics Techniques. *International Journal of Innovative Technology and Exploring Engineering (IJITEE) 9*(9), pp. 446-451.

Kranacher, M. J., & Riley, R. (2019). *Forensic accounting and fraud examination*. John Wiley & Sons.

Kritzinger, E. and SH von Solms. (2012). A Framework for Cyber Security in Africa. *Journal of Information Assurance and Cibersecurity 2012,* 322399.

Mabior, M. M., & Wanyama, K. W. (2024). Role of forensic investigations in reduction of financial fraud among commercial banks in South Sudan. *International Journal of Finance and Accounting 3*(1), pp. 1-14.

Mamudu, Z. U., & Gayovwi, G. O. (2019). Cashless policy and its impact on the Nigerian economy. *International Journal of Education and Research 7*(3), pp. 111-132.

Milovanović, M., & Perišić, J. (2020). Advantages and limitations of using SPSS in teaching statistics. In *MEFkon 2020: Innovations in the function of development: international thematic monograph - thematic proceedings* (pp. 274-289). Faculty of Applied Management, Economy and Finance.

Mohammad, T., & Nooraini, I. (2021). Routine activity theory and juvenile delinquency: The roles of peers and family monitoring among Malaysian adolescents. *Children and Youth Services Review 121*, 105795.

Nigeria Deposit Insurance Corporation (NDIC). (2022). *2022 Annual Reports and Statement of Account*. Retrieved from : 2022 Annual Report+241.cdr (Accessed February 16, 2025).

Nigeria Interbank Settlement System (NIBSS). (2023). *Annual Fraud Landscape*. Retrieved from: 2023 Annual Fraud Landscape - NIBSS (Accessed February 14, 2025).

Nnah, L., & Maccarthy, M. I. T. (2024). Digital accounting system and fraud mitigation in federal public enterprises in Rivers State, Nigeria. *BW Academic Journal 10*(1), pp. 93-121.

Oko, I. (2019). Electronic fraud and financial performance of quoted commercial banks in Nigeria. *International Journal of Advanced Academic Research 5*(4), pp. 15-35.

Ololade, B. M., Salawu, M. K., & Adekanmi, A. D. (2020). E-fraud in Nigerian banks: why and how?. *Journal of Financial Risk Management 9*(3), pp. 211-228.

Onamusi, O. U., Farouk, M. A., Uyagu, B. D., & Ekele, J. S. (2024). Effects of Forensic Accounting Tools on Fraud Prevention in Nigeria Listed Deposit Money Banks. *International Journal of Public Administration and Management Research 10*(5), pp. 18-31.

Osunwole, O. O. (2020). Forensic accounting and fraud mitigation in the manufacturing industry in Nigeria. *International Journal on Integrated Education 3*(12), pp. 22-29.

Owolabi, S. A., & Ogunsola, O. A. (2021). Forensic Auditing And Fraud Detection In The Nigerian Deposit Money Banks. *American Journal of Humanities and Social Sciences 5*(2), pp. 347-355.

Oyedokun, G. E. (2016). Forensic Accounting Investigation Techniques: Any Rationalization?. DOI: 10.2139/ssrn.2910318

Paramole, I. B. (2025). The Impact of Forensic Accounting on Mitigating Tax Fraud in Nigeria: An Analysis of Current Trends and Organisational Implications. *Jurnal Ekonomi Akuntansi Manajemen Agribisnis 3*(1), pp. 51-60.

Rashid, C. A. (2022). The role of internal control in fraud prevention and detection. *Journal of Global Economics and Business 3*(8), pp. 43-55.

Rybalchenko, L., Ryzhkov, E., & Ciobanu, G. (2022). Global consequences of the loss of business in countries around the world caused by fraud. *Philosophy, Economics and Law Review 2*(1), pp. 118-126.

Sasidharan, A. & Pal, N. (2017). *Not So Risky Business: Leveraging Analytics to Fix Blind Spots in Auditing.*

Shrivastava, G., Sharma, K., & Kumari, R. (2016, March). Network forensics: Today and tomorrow. In *2016 3rd International Conference on Computing for Sustainable Global Development (INDIACom)* (pp. 2234-2238). IEEE.

Sood, P., & Bhushan, P. (2020). A structured review and theme analysis of financial frauds in the banking industry. *Asian Journal of Business Ethics 9*(2), pp. 305-321.

Taiwo, J. N., Agwu, M. E., Babajide A. A., Okafor T. C., & Isibor A. A.(2016). Growth of bank frauds and the impact on the Nigerian banking industry. *Journal of Business Management and Economics 4*(12), pp. 1-10.

Appendix 1: Sample questionnaire design.

S/N	Statements/ Questions	SA%	A%	N%	D%	SD%
	ELECTRONIC FRAUD MITIGATION					
1	The use of technology in banks reduces electronic fraud (E-fraud).	27.4	31.6	13.7	16.8	10.5
2	Regulatory bodies of Nigerian banks, such as CBN and NDIC, work with law enforcement agencies, e.g. EFCC and ICPC, to mitigate the occurrence of E-fraud in banks.	33.7	46.3	7.4	7.4	5.3
3	Effective internal control and regular checks by auditors can reduce E-fraud perpetrated by internal stakeholders, such as management and staff.	44.2	44.2	5.3	2.1	4.2
4	Professional bodies in Nigeria, such as ICAN and ANAN, continually train their members, who are stakeholders in the banking sector, on E-fraud mitigation schemes.	21.1	45.3	26.3	3.2	4.1
5	E-fraud can be avoided if all stakeholders of Nigerian banks pay attention to red flags. A red flag is a warning of a potential threat or danger of fraud.	61.1	31.6	0	2.1	5.3
	INVESTIGATIVE ACCOUNTING					
1	The use of investigative tools such as data mining software uncovers E-fraud activities in Nigerian banks.	18.9	64.2	12.6	2.1	2.1
2	Investigative tools assist in the search for evidence.	36.8	56.8	3.2	1.1	2.1
3	Punitive measures, such as termination of employment and legal proceedings, caution potential fraudsters from engaging in E-fraud in Nigerian banks.	27.4	46.3	13.7	10.5	2.1
4	Forensic accounting investigative tools reduce the likelihood of e-fraud from occurring.	16.8	44.2	27.4	7.4	4.2
5	A successful investigation of past e-fraud in banks helps management put proper checks in place.	36.8	53.7	5.3	2.1	2.1
	DIGITAL FORENSICS					
1	The use of more sophisticated investigative tools in banks, such as Autopsy and Encase, helps expose digital crimes.	32.6	45.2	17.9	1.1	3.2

2	Engaging digital forensics specialists in the day-to-day operations of Nigerian banks can stop internal stakeholders from perpetrating E-fraud.	32.6	55.8	7.4	1.1	3.2
3	The deployment of technological devices which reveal fraud before it is carried out can serve as E-fraud mitigation in Nigeria's banks.	38.9	52.6	4.2	2.1	2.1
4	Evidence from digital forensics can be used as evidence in prosecuting potential fraudsters of digital crimes.	42.1	47.4	6.3	2.1	2.1
5	Digital forensics can predict the intentions of people transacting online.	25.3	45.3	23.2	3.2	3.2
	DATA ANALYTICS					
1	Internal auditors utilise data analytics as one of the control measures to mitigate e-fraud in Nigerian banks.	18.9	56.8	14.7	5.3	4.2
2	IT departments in Nigerian banks collaborate with auditors to ensure that data analytics tools, such as Tableau, Excel, and RapidMiner, are utilised in Nigerian banks to reduce E-fraud.	11.6	55.8	22.1	7.4	3.2
3	Both audit and IT staff are well-trained in using data analytics tools effectively in Nigerian banks.	12.6	48.4	24.2	12.6	2.1
4	The use of data analytics in banks has reduced E-fraud occurrences in banks.	10.5	42.1	32.6	9.5	5.3
5	Data analytics provide a proactive fight against E-fraud in Nigeria's banks.	17.9	52.6	22.1	4.2	3.77

Source: Field Survey