Article

Forensic Accounting, Fraud Detection, and Prevention in Deposit Money Banks in Nigeria

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Abstract: This study examines the critical role of forensic accounting in detecting and preventing fraud in Nigerian Deposit Money Banks. Despite increased regulatory efforts, financial institutions continue to face evolving fraud schemes, highlighting a persistent knowledge gap in effective fraud management practices. The research aims to assess how forensic accounting techniques such as trend analysis, data mining, and asset misappropriation detection influence fraud prevention. A survey research design was employed, using data from 18 registered Nigerian Deposit Money Banks as of December 31, 2022. Primary data were gathered through structured questionnaires and analyzed using panel corrected standard error regression and descriptive statistics to address heteroscedasticity and endogeneity issues. Findings revealed that trend analysis ($\beta = 0.5329$, $t = 7.017$, $p < 0.001$), data mining ($\beta = 0.4109$, $t = 5.700$, $p < 0.001$), and asset misappropriation detection ($\beta = 0.6325$, $t = 8.153$, $p < 0.001$) significantly enhance fraud detection and prevention. The study concludes that forensic accounting tools are essential for safeguarding financial institutions' integrity, emphasizing the need for continuous adoption of advanced fraud detection methods.

Keywords: Trend analysis, Data mining, Asset misappropriation

1. Introduction

Fraud detection and prevention faces numerous challenges in an increasingly digital and interconnected world. One significant issue is the rising sophistication of cybercriminals who employ advanced tactics like phishing, ransomware, and AI-powered attacks. These tactics constantly evolve, making it crucial for organizations to invest in cutting-edge technology and threat intelligence to detect and thwart fraudulent activities effectively. The exponential rise in identity theft and data breaches is another urgent global issue. Massive data breaches reveal sensitive information, including financial and personal details, allowing fraudsters to commit a variety of identity-related offenses. Strong security measures, including encryption, multi-factor authentication, and constant monitoring to identify illegal access and suspicious activity, are now more important than ever due to the size and frequency of these breaches (Okoye, et al., 2020).

The significant financial impact of fraud was underlined by figures from throughout the world on fraud detection and prevention, with businesses losing about 5% of yearly profits to fraudulent activity. Ransomware and phishing assaults in particular have increased in frequency and severity, posing serious risks to both individuals and enterprises. Globally, the regulatory environment was changing, with tougher anti-money laundering (AML) requirements and data protection laws like GDPR changing how

businesses handle sensitive data and financial transactions (Pejic-Bach, 2023). The use of cutting-edge technologies for fraud prevention was on the rise, with the goal of improving accuracy and efficiency in spotting fraudulent operations. These technologies included machine learning and artificial intelligence. While data breaches and hacks remained common worries, affecting firms of all sizes and industries, employee training and awareness programs were increasingly important to reduce internal fraud threats.

Fraud detection and prevention in Nigerian Deposit Money Banks (DMBs) faces several pressing issues. First and foremost is the challenge posed by the evolving tactics of fraudsters. Cybercriminals in Nigeria and globally are becoming increasingly sophisticated, employing advanced techniques such as phishing, social engineering, and malware to target DMBs and their customers. The rapid growth of digital banking and online transactions has provided fraudsters with new avenues to exploit, making it essential for banks to continuously upgrade their security measures to stay ahead of emerging threats. Also, regulatory compliance is a significant concern for Nigerian DMBs.

The Central Bank of Nigeria (CBN) and other regulatory bodies have implemented stringent anti-money laundering (AML) and know-your-customer (KYC) regulations. Balancing regulatory compliance with fraud prevention efforts is critical to maintaining trust in the Nigerian banking sector. However, the recurring nature of fraud has hindered the effective performance of Deposit Money Banks (Ewa et al., 2020). Bingilar and Light (2021) argued that the banking sector is one of the most controlled and regulated sectors in Nigeria. Despite this, there is still evidence of fraud cases in the sector. This growing level of fraudulent activities and the negative image of the banking sector is a cause of concern for necessary mechanisms or controls that will address it in the system (Ewa et al., 2020).

Despite the crucial role that forensic accounting plays in identifying and stopping fraud in the Nigerian banking industry, there are a number of pressing problems and obstacles that prohibit its efficient implementation. Deposit money banks in Nigeria are still dealing with an increasing number of financial fraud instances, from sophisticated cybercrimes to insider trading and embezzlement. These occurrences not only cause significant financial losses for the banks and their clients, but they also damage public trust in the banking industry. In addition, the regulatory environment in Nigeria is always changing, making it necessary for DMBs to modify their fraud detection and prevention techniques accordingly. It is critical to evaluate whether DMBs in Nigeria have the appropriate knowledge, tools, and technology to proactively identify and stop fraud.

The overall success of forensic accounting efforts can also be affected by flaws with the legal and judicial processes surrounding fraud cases, such as the speed and efficacy of legal actions. In order to strengthen their resistance against fraud, safeguard the interests of stakeholders, and preserve the integrity of the banking sector, Nigerian DMBs must address these issues. Financial fraud poses an ongoing and changing problem to Nigeria's Deposit Money Banks (DMBs), endangering not just the stability of these financial institutions but also the public's confidence in the banking industry. Fraud remains a serious concern, resulting in considerable financial losses for DMBs and their clients despite regulatory efforts and internal control measures. The complexity of fraudsters, who use cutting-edge strategies to influence financial systems including cybercrime and insider fraud, is an issue that is getting worse.

These complex fraudulent schemes are frequently difficult to identify and prohibit using traditional audit techniques and control measures. In order to combat the growing issue of fraud in Nigerian DMBs, it is imperative to investigate the role of forensic accounting as a specialized and proactive strategy. A significant and complex issue is the detection and prevention of fraud in Nigeria's Deposit Money Banks (DMBs). The Nigerian banking industry is still plagued by financial fraud, which results in significant financial losses and erodes public faith in these institutions. This is true despite the deployment of

regulatory frameworks and internal control systems. The endurance of this problem is made worse by the constantly changing strategies used by fraudsters to take advantage of technical improvements and more sophisticated techniques, such as cybercrime, insider trading, and identity theft. Due to this ongoing threat, Nigerian DMBs must come up with creative and flexible ways to protect their business operations and the interests of their clients. Also, the inadequacy of conventional banking systems and audit procedures to successfully identify and mitigate contemporary fraud schemes is one of the major difficulties in the area of fraud detection and prevention inside Nigerian DMBs. With an increase in internet transactions, mobile banking, and electronic payment systems, Nigeria's banking sector has quickly transitioned toward digitization. Fraudsters now have more opportunity to target holes in these systems thanks to the digital transition. A thorough and modern strategy is required to address both external and internal threats since internal fraud risks caused by dishonest personnel and insufficient internal controls continue to exist (Lilian, 2020).

Additionally, although being designed to improve security and transparency in the banking industry, Nigeria's regulatory environment can present difficulties for DMBs. Although it is crucial, managing compliance with anti-money laundering (AML), customer due diligence (CDD), and data privacy legislation may be challenging and resource-intensive. For Nigerian DMBs, finding the ideal balance between regulatory compliance and the economical adoption of effective fraud detection and prevention methods is a difficult and constant task. As a result, the goal of this study is to thoroughly analyze these interrelated problems, evaluate the effectiveness of current fraud prevention techniques, and suggest novel tactics that take into account the constantly changing fraud threats facing the Nigerian banking sector (Agboare, 2021).

Also one deterrent factor relating to the problem is the fact that there is limited personnel (forensic accountants) who can help in fraud detection and prevention in the deposit money banks in Nigeria and also DMBs should incorporate automated control measures such as biometric authentication of transactions to serve as deterrent for fraud occurring (Salami, 2021). In light of the above, the research seeks to investigate forensic accounting as a tool for fraud detection and prevention in deposit money banks in Nigeria.

In line with the problems identified concerning forensic accounting as a tool for fraud detection and prevention in deposit money banks in Nigeria, the following questions were raised:

1. What is the effect of data mining on fraud detection and prevention in deposit money banks in Nigeria?
2. How does trend analysis affect fraud detection and prevention in deposit money banks in Nigeria?
3. To what extent does asset misappropriation affect fraud detection and prevention in deposit money banks in Nigeria?

The main objective of the study is to determine the effect of forensic accounting as a tool for fraud detection and prevention of deposit money banks in Nigeria. The specific objectives are to:

1. assess the effect of data mining on fraud detection and prevention in deposit money banks in Nigeria.
2. investigate the effect of trend analysis on fraud detection and prevention in deposit money banks in Nigeria.
3. establish the extent to which asset misappropriation affect fraud detection and prevention in deposit money banks in Nigeria.

In providing answers to the research questions raised, the following hypotheses were formulated for analyses:

H01: There is no significant effect of data mining on fraud detection and prevention in deposit money banks in Nigeria.

H02: The effect of trend analysis on fraud detection and prevention in deposit money banks in Nigeria is not significant.

H03: There is no significant effect of asset misappropriation on fraud detection and prevention in deposit money banks in Nigeria.

The study covered 18 registered deposit money banks operating in Ondo State, Nigeria as at 31 December, 2023. Apart from the above introduction, the study had subsections of literature review, methodology, data analyses and discussions of findings, and summary, conclusion and recommendations.

Literature Review

Conceptual Review

The major concepts of this study included forensic accounting and fraud detection and prevention. Forensic accounting was proxied with trend analysis, data mining and asset misappropriation.

Forensic Accounting

A subspecialty of accounting called forensic accounting uses analytical and investigative methods to find financial abnormalities, fraud, and wrongdoing. In order to locate and record evidence that may be utilized in court, forensic accountants investigate financial records, transactions, and documents using their understanding of accounting, auditing techniques, and investigative experience. In order to look into financial crimes, embezzlement, money laundering, or other financial irregularities, they frequently collaborate with law enforcement, attorneys, or other stakeholders.

Their employment may also include estimating monetary losses in cases involving litigation or insurance claims. In order to assist the pursuit of justice and financial recovery, forensic accountants are essential in identifying financial misbehavior and offering expert testimony in court. The application of natural laws to human laws is known as forensic accounting. Forensic scientists typically perform this function as fact interpreters, examiners, and providers of expert opinions regarding their findings in a court of law (Abdulrahman et al., 2020).

The field of forensic accounting is attracting more and more attention from auditors and accountants. A study by Imoniana, Antunes, and Formigoni (2019) found that 42% of businesses think using forensic accountants is necessary given the rapid rise in fraud and other economic crimes. According to Anyadufu and Obi (2023), forensic accountants are trained to handle real-world scenarios and see beyond the numbers. Furthermore, they noted that forensic accounting entails the close examination and fact-finding of financial data; the creation of computer programs to facilitate the investigation and the presentation of financial evidence; the dissemination of their findings via reports, exhibits, and record assembly; and the provision of support for legal proofs, including professional witness testimony and the installation of visual aids.

Al-Sharaivi (2018) views forensic accounting as a homogeneous blend that, from a legal perspective, connects accounting, auditing, and the judiciary to provide a report that ultimately aids in the settlement of conflicts. In order to solve a legal issue or potential issue involving bribery, fraud, embezzlement, corruption, or forgery that may arise from an economic or financial transaction, Olukayode (2018) defined forensic accounting as the application of auditing, accounting, statistics, research, and economic concepts and techniques in investigation. In order to address legal and related issues, forensic accounting is a science that uses accounting facts and concepts discovered through auditing approaches, tactics, and procedures, according to Okoye et al. (2020). It blends expertise from auditing, accounting, and investigative fields.

Asset Misappropriation

Asset misappropriation refers to dishonest activities including falsifying financial records, stealing money or assets, and members of the organization spending funds improperly that cause monetary losses and damage to the organization's financial integrity. Employees and other trusted individuals commonly take advantage of weaknesses in internal control and circumvent monitoring procedures when they misappropriate or steal resources from a firm for their own financial gain (Beasley, et al., 2023). The illegal taking of an organization's assets by insiders, usually under false pretenses, is known as asset misappropriation. Effective fraud detection and prevention strategies, such as internal audits, employee training, and internal reporting systems, must be put in place to guard against such fraudulent activities (Bako et al., 2022).

Trend Analysis

In order to identify any anomalies, inconsistencies, or new patterns that may indicate fraud, trend analysis involves reviewing and evaluating historical data and trends. In order to identify and stop fraud, trend analysis is the act of analyzing past data using statistical techniques to identify deviations from predefined norms. Organizations that regularly monitor and assess trends might recognize evolving fraud practices and adjust their preventive measures accordingly (Beasley et al., 2021). Trend analysis, which involves looking at historical data to find abnormalities and deviations from the norm, is crucial to stopping and identifying fraud. Companies that detect changes in trends in financial and operational data might take preemptive measures to mitigate potential fraud risks and vulnerabilities (Bako et al., 2022).

Data Mining

The methodical investigation and analysis of big databases to find hidden patterns, anomalies, and perhaps fraudulent activity is known as data mining. Sophisticated algorithms, statistical methods, and machine learning are employed to detect minute patterns and irregularities in operational or financial data. Data mining is crucial for identifying suspicious trends, behaviors, or transactions—such as unauthorized access, unusual spending patterns, or deviations from established norms—that may indicate fraudulent conduct. By employing data mining technologies, organizations may detect fraudulent activities in advance, distinguish genuine transactions from fraudulent ones, and develop predictive models to enhance their fraud prevention abilities. This tactic helps businesses and organizations safeguard their resources, cut losses, and improve their fraud protection procedures by putting the findings to use.

The studies described above provide as evidence that data mining is a multidisciplinary process that uses machine learning, statistical techniques, and sophisticated computer tools to glean insights, patterns, and trends from enormous and complex datasets. Because data mining makes it possible for researchers and industry professionals to identify trends, abnormalities, and undiscovered correlations across a range of data sources, including social media and online transactions, it is crucial for the detection and prevention of fraud. These insights allow businesses to anticipate fraudulent activity, develop effective preventive strategies, and react swiftly to evolving fraud schemes. Data mining is a useful method for utilizing data's potential to increase security, lower risks, and make well-informed judgments in a variety of industries (Bako et al., 2022). Data mining software is extremely helpful in discovering fraud since it can search databases of organizations for irregularities and strange patterns, which are signs of fraud. It also offers scripting capabilities (Ewa et al., 2020).

Fraud Detection and Prevention

"Fraud detection and prevention" refers to a set of preventive measures and tools meant to identify, minimize, and deter fraudulent conduct within an organization or financial system. These programs aim to prevent financial fraud, identity theft,

embezzlement, and cybercrimes, among other forms of fraud. Using sophisticated data analysis techniques, pattern recognition, and anomaly detection, detection is the process of looking for signs of fraud or anomalies in financial transactions, behaviours, or system activities. On the other hand, prevention is centered on establishing procedures, policies, and controls that discourage fraud and fortify the organization's defenses against it. This includes developing strong internal controls, cybersecurity protections, personnel training, and a strong ethical culture.

By employing technology and analytics to identify and minimize fraudulent conduct in real-time or through retrospective analysis, fraud detection and prevention seeks to safeguard assets and maintain the integrity of financial systems (Okoye et al., 2020). As agreed upon by Anyadufu and Obi (2023), the modern definition of fraud appears to have emerged from case and statute law, even though many of the original components remain relevant. Its roots can be discovered in the Latin term fraus, which has several meanings related to wrongdoing, harm, and dishonesty. The focus of the current definition drawn from fraud is the intention of the fraudster(s) to separate the trusting victim from property or a legal right through deceit for his or her personal profit.

These kinds of behaviors, which can be expressed verbally or physically, are carried out by an individual or group of individuals against another individual or organization (Ekundayo, 2020). Through the use of technology, data analysis, and efficient rules and procedures, fraud detection and prevention refers to the proactive tactics and techniques used to identify and prevent deceitful or dishonest behaviors, including but not limited to financial fraud (Golden et al., 2019). In order to guarantee the complete elimination or marked decrease in the occurrence of fraud, it is imperative to foster attitudes of integrity, genuineness, and support. Uniamikogbo, Adeusi and Amu (2019) state that effective fraud deterrence involves concentrating on an organization's traditions and utilizing strategies to create an environment that is low- or non-fraudulent. This might be accomplished by identifying the fundamental causes, filling in the holes that criminals are exploiting, and—above all—ensuring that the workers' welfare is properly taken care of (Alhassan, 2021).

Theoretical Review

Three theories were reviewed in this study: Fraud Triangle theory, Fraud Diamond theory and Agency theory.

Fraud Triangle Theory

The Fraud triangle theory was first presented by Cressey (1953) when he released "Other People's Money: An Investigation into the Social Psychology of Theft." Here, he introduced the idea and went over the three primary variables—pressure, opportunity, and rationalisation—that affect embezzlement and fraud. An essential concept in the study of criminology and white-collar crime is the Fraud Triangle Theory, as described by Donald Cressey. This theory holds that when three fundamental elements—pressure, opportunity, and rationalisation—come together, a person is more inclined to engage in fraud and other dishonest activities. The word "pressure" refers to a person's emotional or financial challenges, such debt or personal problems, which can act as a trigger for deception. An opportunity is a situation or environment that allows someone to commit fraud without being caught. Rationalisation is the process by which someone justifies their dishonest behavior. They frequently accomplish this by convincing themselves that their acts are necessary or appropriate in the present situation.

The Fraud Triangle Theory provides a framework for understanding and addressing business fraud, as well as useful insights into the situational and psychological factors that drive dishonest behavior. It also serves as inspiration for the development of effective techniques for fraud detection and prevention. Donald Cressey initially proposed the Fraud Triangle Theory, which is necessary to comprehend the mechanics of fraud within

Nigerian deposit money banks. It claims that the probability of fraud is increased when three important factors—pressure, rationalisation, and opportunity—align. This theory provides forensic accounting with an analytical framework for detecting and preventing fraud. The term "pressure" refers to the psychological or material stresses that can induce dishonest behavior, such as manipulating accounts or embezzling money, in bank employees or other individuals. Rationalisation is the psychological shield people employ to convince themselves that lying is okay.

Prospect is associated with the circumstances and vulnerabilities inside the banking system that permit fraudulent activity (Abdulrahman, 2019). The Fraud Triangle's components can all be identified and reduced with the help of forensic accounting, which keeps a close eye on financial transactions, looks for warning signals, and provides evidence to support legal action when necessary. When forensic accountants in Nigerian deposit money institutions have a better understanding of these three components, they may develop targeted preventive and detection strategies that would ultimately strengthen the security and integrity of the banking sector (Bingilar & Light, 2021). In order to create a strong defense against financial misbehavior, forensic accounting explores every facet of the Fraud Triangle Theory in further detail when used in Nigerian deposit money institutions.

Financial pressures experienced by employees or external factors such as economic downturns can put individuals under pressure and encourage fraud. Understanding the defenses someone may employ to defend their actions—which are typically driven by entitlement or made-up grievances—is necessary to understand the rationalization process. Opportunity focuses on identifying and addressing weaknesses in bank processes that permit fraud, such as oversight gaps or inadequate controls. Forensic accountants use specialized knowledge and tools to thoroughly analyze financial data, transactions, and internal controls in an attempt to pinpoint these elements (Bingilar & Light, 2021). Their goal is to prevent fraud in Nigerian deposit money banks by identifying abnormalities, assessing the risks, and providing the necessary documentation for a lawsuit.

Fraud Diamond Theory

This study was hinged on the fraud diamond theory, which was developed by Wolfe and Hermanson (2004) on the premise that many frauds would not have happened in the absence of the right person with the right capabilities in place. In their individual studies, Wolfe and Hermanson (2004), Thanasak (2013), Normah and Hesri (2010), Florenz (2012), Gbegi and Adebisi (2013) investigated and expatiated the fraud diamond theory (FDT). They all submitted that FDT was an extended or improved version of the fraud triangle theory (FTT) with an addition of "capability" added to the three basic elements of fraud in the FTT. Wolfe and Hermanson (2004) asserted that the presence of the right person with the right capabilities in place would have prevented many frauds, including some multibillion-dollar ones; and that by adding a fourth element—capability—to Donald Cressey's fraud triangle theory, which focuses on pressure, rationalization, and opportunity, fraud prevention and detection could be enhanced. It was used to assess forensic accounting's efficacy as a fraud prevention and detection tool, as well as its ability to stop fraud and the value of its methods and skills in fraud investigations. (Abdulrahman, 2019; Bingilar & Light, 2021; Bashir & Augustine, 2019; Oladipupo & Omolola, 2019; Rizqa et al., 2019).

The Fraud Diamond Theory, an extension of the Fraud Triangle, looks at the underlying causes of fraud in Nigerian deposit money institutions as well as the role forensic accounting plays in detection and prevention. It is predicated on four fundamental elements: capacity, opportunity, pressure, and rationalization. Within this particular context, "pressure" pertains to the kinds of personal or financial hardships—like debt or other financial difficulties—that could serve as a driving force behind deception. The term "rationalization" describes the justifications that they can give for their behavior, which are

typically driven by feelings of entitlement or resentment. The term "opportunity" describes the conditions or weaknesses in internal controls that allow fraud to occur; forensic accounting can help detect and address these problems. Finally, "capability" describes the knowledge and skills needed to carry out deceitful plans; forensic accountants play a critical role in seeing signs of these abilities while doing their investigation (Rizqa, et al., 2019).

By having a solid understanding of these four components, deposit money institutions in Nigeria can utilize forensic accounting to identify specific areas of risk and put preventive measures in place to discourage fraudulent conduct while boosting the possibility of successful fraud detection. Because individuals who fit these four characteristics are more prone to conduct occupational fraud, which calls for the use of forensic accounting, the study is relevant to the Fraud Diamond Theory. (Bako et al, 2022).The foundation of this study is the fraud diamond theory, which was developed by Wolfe and Hermanson in 2004 on the premise that many frauds would not have happened in the absence of the right person with the right capabilities in place.

Agency Theory

The economic and management idea of agency theory was introduced by Stephen A. Ross in 1973 and looks at the interaction between principals and agents in organisations. This theory explores the inherent conflicts of interest that might develop when people (called agents) are trusted to act as representatives of other people (called principals) and make choices. The application of agency theory to corporate governance and financial institutions examines how conflicts of interest can result in issues like information asymmetry, moral hazard, and adverse selection. The idea offers a framework for comprehending how businesses should set up agreements, rewards, and oversight procedures to balance the interests of principals and agents. This lowers agency expenses and guarantees that agents work in the principals' best interests.

The principal-agent relationship in these financial institutions is examined via agency theory. Deposit money banks assign its executives and staff (the agents) the duty of carrying out different financial and operational tasks on behalf of the banks, while their management (the principals) is in charge of managing daily operations. Because of this agency relationship, workers may be enticed to commit fraud for their own gain at the expense of the bank's interests. This can lead to conflicts of interest. With its investigative and analytical skills, forensic accounting is essential to tracking and resolving these disputes. By methodically looking through financial records, transactions, and internal controls, it helps find instances of fraud, misbehavior, or breaches of trust and lessens the knowledge imbalance that exists between principals and agents (Oladipupo & Omolola, 2019) Through resolving agency problems and encouraging openness, forensic Accounting guarantees the alignment of interests and improves the general integrity of these financial organizations, which is why it plays a major role in fraud detection and prevention in Nigerian deposit money banks.

As the investigative branch of this theory, forensic accounting turns into an indispensable instrument for dealing with these agency issues. It offers a methodical way to look for and stop fraudulent activity by closely examining internal controls, financial records, and transactions. Forensic accountants carefully review data to look for anomalies, misbehavior trends, and financial disparities. When suspicious activity is detected, they carry out thorough investigations and track the movement of funds. These forensic investigations not only identify instances of fraud but also yield crucial proof that can be utilized in court cases, disciplinary procedures, and rehabilitation initiatives (Bako et al., 2022).

Empirical Review

Oladipupo and Omolola (2019), investigated the effect of forensic accounting on the identification and prevention of fraud in Ekiti State's deposit money institutions. The study

used a descriptive survey approach, and respondents were asked to provide the necessary data through a well-structured questionnaire and straightforward linear regression analysis. According to the study's findings, forensic accounting has an effect on how fraud is found and stopped in Ekiti State's money deposit banks.

Okoye et al. (2019) examined the efficacy of investigative accounting in embezzlement mitigation and that of forensic litigation on recovery of funds lost to embezzlement. The study employed survey research design by administering 190 copies of questionnaire to the accounting staff of Nigeria Breweries Plc, Cadbury Nigeria Plc, Nigerian Bottling Company and Dupril Forma Nigeria Ltd, all in Aba, Abia State. Descriptive statistics and regression analysis were the statistical tools used by the study to test hypotheses. The study results showed that investigative accounting cogently enhanced embezzlement identification and mitigation, and that forensic litigation had no cogent favourable effect on recovery of funds lost to embezzlement.

Ismail (2020) evaluated the nexus of investigative accounting and embezzlement identification and mitigation in the government concerns in Nigeria. A survey research design was employed to distribute questionnaire to 50 respondents comprising auditors and accountants in 10 ministries selected from FCT Abuja in Nigeria. Analysis of Variance (ANOVA) was the statistical tool employed to test the hypotheses of the study. The study found that investigative accounting was efficacious in identifying embezzlement, and that the correlation between investigative accounting and litigation support service in Nigerian courts was cogent.

Okoye and Mbanugo (2020) domiciled their study on investigative accounting as an instrument for identifying and mitigating embezzlement in tertiary institutions in the South East Nigeria. The study used descriptive survey research design. The population of the study was 470 account staff in 7 public tertiary institutions in South East Nigeria. Census sampling technique was adopted distributing 470 questionnaires, out of which 350 were filled and returned. Analysis of Variance (ANOVA) was used to test the study hypotheses. The study found that fraud cases in the tertiary institutions in the South East Nigeria were cogently reduced by investigative accounting.

Abdulrahman et al. (2020) determined the effect of investigative accounting practices in identifying and mitigating embezzlement from UAE banking organisations. The study employed cross-sectional survey research design, and the tool of analysis employed was descriptive statistics. Judgemental sampling technique was used by the study. The results revealed that there was a cogent effect of investigative accounting on the identification of embezzlement in UAE banking enterprises.

Ojukwu et al. (2020) investigated the efficacy of investigative accounting in monetary embezzlement control and its veracity in upgrading financial reporting quality. It also examined the nexus between investigative accounting and internal controls. Desk survey method was used by the study. The statistical tool employed in the study was Pearson Product Moment Correlation. The study results showed that there were cogent nexuses between (i) investigative accounting and monetary embezzlement identification; (ii) investigative accounting and financial reporting quality; and (iii) investigative accounting and internal control.

Okoye et al. (2020) objected to ascertain the impact of investigative accounting on monetary embezzlement in Nigerian Deposit Money Banks (DMBs) and determine whether investigative accounting report could help court adjudication on monetary embezzlement in Nigeria. Using cross-sectional survey design and purposive sampling technique, the study administered questionnaire to one hundred and thirty five (135) staff and management team of DMBs and Chartered Accountant firms in Owerri, Imo State, Nigeria. The study findings showed that investigative accounting inquests had a cogent effect in identifying monetary embezzlement in Nigerian DMBs.

Owolabi and Ogunsola (2021) investigated the possibility that forensic auditing detected and prevented frauds in deposit money banks in Ibadan Municipality. The study used judgemental sampling technique to select 120 respondents from six deposit money banks in Ibadan. Using survey method by distributing questionnaire, the study analysed primary data with the aid of Analysis of Variance and Pearson Moment Correlation technique. It was discovered that knowledge of procedures, forensic accounting skills, legal background and knowledge of forensic accounting assisted in the prevention of fraud and statistically significant with (β = -0.758, $p < 0.01$), (β = -0.766, $p < 0.01$), (β = -0.697, $p < 0.01$) and (β = -0.729, $p < 0.01$) respectively. The study recommended that there was need for forensic audit in the deposit money banks.

Idogho and Orbunde (2021) investigated how forensic accounting affected fraud identification and mitigation in the Health Maintenance Organisations (HMOs) located in Abuja municipality. The study used descriptive survey research design. Employing convenient sampling method, the study distributed well-structured questionnaires to 88 respondents in 8 HMOs in Abuja, out of which 80 respondents submitted. Spearman rank correlation was the statistical tool employed to analyse the data. The findings showed that there was a significant and positive nexus between forensic accounting and fraud identification and mitigation.

Olaniyan et al. (2021) investigated the effect of forensic accounting on detection and prevention of fraud in Ministries, Departments and Agencies in Nigeria. The study was hinged on three theories namely Policeman theory, White collar theory and Fraud diamond theory. A cross-sectional survey design was used by the study. Data were collected by distributing questionnaires to the staff of integrated personnel payroll information system and office of the Accountant General of the Federation. A sample size of seventy-five (75) questionnaires was used. Descriptive statistics and regression analysis were the statistical tools of analysis employed by the study. The study results revealed that forensic accounting had positive and significant influence on fraud prevention but foreign account had no total control on fraud detection. Also it was found that forensic litigation had no significant positive influence on recovery of funds lost to fraud.

Tiruneh (2021) explored the effect of investigative accounting and auditing techniques on embezzlement identification and mitigation in the Ethiopian government establishments audit. Employing non-experimental descriptive survey design, the study findings showed that investigative accounting and auditing techniques were not fairly applied in the Ethiopian government concerns audit. Agboare (2021) used survey research layout to investigate the effect of investigative accounting on monetary embezzlement identification in deposit money banks (DMBs) in Nigeria. The results revealed that the effect of investigative accounting on monetary embezzlement identification in DMBs in Nigeria was cogent.

Utama and Basuki (2022) explored fraud-forensic accounting disclosures from the viewpoint of the four largest public accounting firms in the world. The study employed exploratory qualitative, with the content analysis method using NVivo software R1. The study produced the theme of business, knowledge, time, and reports, and the themes of accounting, fraud and forensics. Cooper and Kawada (2022) analysed the ability of accounting students to apply skills beyond traditional accounting in a thoughtful and analytical way. The study considered how students could use critical thinking and problem-solving skills in applying accounting knowledge to a supplier-customer commercial damages litigation matter.

Badua (2022) asserted that accountants were familiar with cases that could be used to illustrate instances of and investigations into financial statement fraud, and that the full scope of forensic accounting included consideration of other crimes and misdeeds. The study found that students could be introduced to forensic accounting areas such as occupational fraud, corruption, cyber crimes, money laundering, the fraud triangle,

whistle-blowing, and giving testimony, by providing a list of historical cases and resources in various media for the forensic accounting course instructor's use.

Alsheikh et al. (2022) explored factors implanted in the successful implementation of forensic accounting emphasizing both organisational and people derived factors. The study purposively chose 120 academicians and practitioners. A total of 107 responses were used in the analysis. The findings revealed that information technology solutions, absence of creative accounting practices, forensic accounting education, forensic accounting training, and forensic accountants experiences were significant predictors of the successful implementation of forensic accounting.

Alfordy (2022) examined the feelings of practising accountants on the efficacy of fraud identification and mitigation by public cum private enterprises in Saudi Arabia. The study employed survey research design. The findings showed that practising accountants in Saudi Arabia public and private sectors were greatly informed on fraud identification and mitigation.

Ikhsan et al. (2022) reviewed the use of data analytics and artificial intelligence in fraud detection to support internal audits. The study used a qualitative method with a scoping review approach. The study facts consisted of 24 online journal articles indexed by Scopus and Sinta. Identifying research questions, using keywords, selecting literature, mapping the results of research data, and compiling a summary of research results were the stages carried out in this study. The study concluded that the fraud detection model based on data analytics and artificial intelligence had a high accuracy value in improving audit quality.

Eko (2022) evaluated forensic accounting techniques on fraud management in the public sector ministries, departments and agencies (MDAs) in Nigeria. The study investigated how data mining, accounting ratios and trend analysis tools detect and prevent fraudulent activities in MDAs. The study used a survey research design. The statistical tool of analysis employed by the study was ordinary least square (OLS) multiple regression analysis technique. The study found that the adoption of forensic accounting tools (data mining, accounting ratios and trend analysis) significantly enhanced the ability to detect and/or prevent fraud in MDAs.

Ojo-Agbodu et al. (2022) used survey research design to investigate the effect of forensic accounting on fraud detection and prevention in selected quoted deposit money banks (DMBs) in Nigeria. Proportionate and simple random sampling technique was used by the study to distribute questionnaires to 115 resident internal control officers, branch operation managers and cash officer. The statistical tool of analysis employed was linear regression. The study results showed that there was a significant relationship between forensic accounting and fraud detection, and that forensic accounting had no effect on fraud prevention in the quoted deposit money banks (DMBs).

Egiyi (2022) investigated the effect of investigative accounting on embezzlement identification and mitigation in enterprises in Nigeria. The study employed simple random sampling to select 15 professionals (such as auditors and accountants) each from the 15 Nigerian enterprises to have a sample size of 150 responses. The study was hinged on white-collar crime theory. The study distributed 170 copies of questionnaire, out of 150 were returned, yielding a return rate of 94%. The statistical tools employed were respondents demographic statistics and chi-square. The study findings showed that investigative accounting enhanced embezzlement identification and mitigation in the enterprises studied.

Bako et al. (2022) examined the effects of data mining techniques, computer-assisted audit technique and trend analysis on the identification of civil embezzlement in deposit money banks in Nigeria. The study adopted a survey research design distributing well-structured questionnaires to relevant respondents. The statistical tools of analysis employed by the study were descriptive statistics and ordinary least square (OLS)

regression. The study results showed that all the three proxies of investigative accounting (data mining techniques, computer-assisted audit techniques, and trend analysis had a cogent favourable effect on identification of civil embezzlement in deposit money banks in Nigeria.

Obiora et al. (2022) employed Kendall's Coefficient of Concordance to examine the effect of investigative accounting on the frequency of embezzlement in health care firms in Nigeria. The study was hinged on White Collar Crime theory. The study employed a survey research layout distributing well-structured questionnaires to relevant accounting employees of health care firms in Nigeria. The results of the study showed that investigative accounting service had curtailed the intensity of embezzlement in health care firms in Nigeria at 1% level of significance.

Ibrahim et al. (2022) employed Altman Z-Score Model to investigate the relationship the relationship between investigative accounting and fraud identification in Nigerian Oil and Gas industry. Out of the population of eleven (11) listed Oil and Gas companies in Nigeria, the study purposively selected eight (8) companies. Ex post facto research layout was used by the study as annual reports and accounts of the Oil and Gas companies were used for data collection. Descriptive and inferential statistics were used to test the study hypotheses. Specifically One-Sample t-test was used to attest the Altman's Z-Score result for hypothesis 1. The findings showed that the results of the original Z-Score were not the same with modified Z-Score.

Afriyie et al. (2023) acknowledged that forensic accounting was a new trend that went beyond normal audit approaches and procedures for fraud identification. According to them, the practice applied reliable principles and methods to obtain sufficient facts or data that provided basis for prosecution in the law court.

Akinbowale et al. (2023) used explanatory research design involving the use of simulated data to mirror the situation in the banking industry. The big data analytical approach considered by Akinbowale et al. (2023) was machine learning that involved a neural network with two-layer feed forward, one hidden layer and five hidden neuron layers created to detect the presence of fraud and classify them into two namely fraudulent and non-fraudulent. They employed confusion matrix to visualise the percentages of correct and incorrect classification. The findings showed the feasibility of neural networks in classifying internal fraud into three levels of risks and fraud detection. The percentages obtained from the confusion matrix for correct classification and incorrect classification were 95% and 5% respectively.

Al Natour et al. (2023) examined the role of forensic accounting skills in enhancing auditor's self-efficacy toward fraud detection in Egypt. The study employed a cross-sectional survey and distributed questionnaire to 117 external auditors working in Egypt. The study also used partial least square structural equation modelling to test the study hypotheses. The findings depicted significant direct relationship between effective communication skills, psycho-social skills, accounting and auditing skills and an auditor's self-efficacy.

Alshurafat et al. (2023) identified the learning objectives outlining the core knowledge for forensic accounting education. The study employed Bloom's taxonomy to outline and analyse the core knowledge for forensic accounting education (e.g. fraud examination, litigation support, business valuation, and IT forensic accounting) in 15 Australian universities that provide forensic accounting courses. The study applied qualitative method to forensic accounting curricula, handbooks, and syllabi. The results showed learning objectives under core content knowledge distributed over Bloom's cognitive areas.

Mandal and Amilan (2023) examined the perceived willingness to adopt and use Forensic Accounting and Investigation Standards (FAIS) in Forensic Accounting and Investigation (FAI) assignment. The study also analysed the usefulness of FAIS in

achieving the principle of natural justice (PNJ) concerning fairness. The study employed survey research design distributing questionnaires to 118 accounting professionals whose online survey responses were analysed descriptively. The study also used 2 by 2 contingency analysis representing two levels of usefulness and fairness. The findings showed FAIS 410 received the highest mean rating while FAIS 240 received the lowest mean rating in willingness to adopt and use FAIS, and most of the standards were related to the principle of natural justice concerning fairness.

Hassan et al. (2023) examined the perceptions of financial accountants and both internal and external auditors regarding the effect of corporate governance (CG) and information technology (IT) on the detection and prevention of fraud within organisations. The study collected primary data from 250 financial accountants, internal auditors and external auditors through questionnaire. The study employed non-probability snowball sampling technique for data collection, with the sample t-test, one-way ANOVA and paired sample t-test applied for analysis. The findings showed that elaborate CG practices and IT techniques significantly help in pinpointing and curbing fraudulent activities by minimising opportunities, rationalisations, pressures and capabilities of potential employees to commit fraud.

Sulaiman et al. (2023) employed survey research design to investigate forensic accounting and fraud detection in the Nigerian public sector. The study chose a sample of one hundred (100) respondents comprising practising accountants of four (4) ministries selected from FCT Abuja in Nigeria. Analysis of Variance (ANOVA) was the statistical tool employed to test the hypotheses of the study. The results of the study showed that forensic accounting in Nigerian public sector was efficacious in fraud identification and mitigation.

Anghel and Poenaru (2023) employed survey research design by distributing 206 questionnaires to accounting expert from the South-Muntenia region. Only 108 questionnaires were recovered in a usable form. The Pearson correlation between "To what extent do you think that current accounting technology and software help in preventing and detecting fraud?" and "How high do you consider the risk of financial fraud in your field of work?" was 0.7825, indicating a strong positive correlation between the two variables.

Islam et al. (2023) asserted that data analytics (DA) had gained widespread attention in accounting and auditing recently. The study noted that the application of DA programming languages such as R and Python remained limited. The study presented the tidyverse approach of R for DA in the field of accounting.

Jones and Sah (2023) demonstrated how Machine Learning techniques and Big Data Analytics could be used in the insurance sector. The study found that machine learning in the insurance sector had a wide range of uses, such as customer segmentation, fraud detection, customer retention, claim processing, and claim review. The study also discovered that machine learning created various prediction models for the insurance industry such as AdaBoost, Naive Bay, K-Nearest Neighbour and Decision Tree.

Aziz (2023) reviewed relevant studies on the impact of business intelligence and data analytics in the field of accounting. The obtained information was based on articles published from 2010 to 2022. For the selection of research studies, the study used Sciencedirect, JSTOR, and Google Scholar. The criteria used were that articles were required to contain at least one or more than one selected keyword. The study used five keywords which included data analytics, accounting, business intelligence, financial reporting, and auditing. With these inclusion criteria, the study found more than 63 articles. The study analysed these articles by following the abstract screening approach. After the abstract screening, a total of 10 research articles were used for a detailed literature review. Based on the literature review and collected research data, the study identified the following five challenges with the use of big data analytics in business enterprises for accounting systems: (i) velocity, (ii) volume, (iii) variety, (iv) value, (v) veracity.

Singh et al. (2023) declared that the use of big data analytics in healthcare was growing rapidly as a result of the increasing availability of large, complex, and diverse data sets. The study found that big data analytics could be used to improve patient outcomes, reduce costs, and enhance clinical decision-making. The study provided an overview of the opportunities and challenges of big data analytics in healthcare.

Badiyani and Rohit (2023) investigated the influence of data analytics, cyber forensic accounting, and the effects of cryptocurrencies on this field. The study discussed the practical implementation, advantages, drawbacks, and ethical implications of data analytics, cyber forensic accounting and cryptocurrencies.

Bakhtiari et al. (2023) proposed different solutions for detecting and predicting credit card fraud. One of these methods is data mining and machine learning. The study examined the Ensemble Learning methods including gradient boosting (LightGBM, and LiteMORT) combined with averaging methods (Simple and Weighted Averaging methods). By evaluating the models by Area under the curve (AUC), Recall, F1-score, Precision, and Accuracy criteria, the study reached the best results of 95.20, 90.65, 91.67, 92.79 and 99.44 for the combination of LightGBM and LiteMORT using weighted averaging, respectively.

Franca et al. (2023) evaluated the effect of forensic accounting on fraud detection in the Nigerian government concern using Rivers State as the study area. The study distributed structured questionnaires to 357 accountants, directors and senior staff of various Ministries, Departments, and Agencies (MDAs) using stratified random sampling method. Spearman rank correlation was the statistical tool of analysis employed by the study. Forensic accounting was proxied using forensic accounting competency, forensic accounting techniques and proactive fraud audit. Fraud was proxied using the two fraud dimensions namely payroll and procurement fraud. The study findings revealed that all the three proxies of forensic accounting were negatively and significantly correlated with payroll and procurement fraud.

Ozili (2023) reviewed relevant forensic accounting studies around the world and suggested avenues for future research in forensic accounting. The study employed the thematic and systematic literature review methodologies. The study found that the major thematic areas in the literature were fraud motivation, fraud consequences, fraud detection using forensic accounting techniques, forensic accounting theory, forensic accounting skills, forensic accounting education and forensic accounting jobs. The study also found that the quantity of forensic accounting research was relatively small compared to the quantity of research in other accounting specialisations.

Newman et al. (2023) investigated how forensic auditing services helped in fraud detection in state owned enterprises. The study adopted quantitative research methodology and questionnaires were used to collect data. The findings showed that forensic auditing had a significant positive correlation relationship in fraud detection in state owned enterprises. The study also found that forensic auditing, although used by ZESA, was not being effectively implemented to detect and prevent fraud.

Adebayo (2023) reviewed literature on forensic accounting and fraud detection and prevention. It used the systematic review method using Google Scholar, Semantic Scholar, RefSeek and Google to search for articles. The study found that forensic accounting cut down fraudulent activities in Nigerian banking and insurance companies.

Kaur et al. (2023) reviewed studies on investigative accounting and its effects on embezzlement identification and mitigation. The study identified the standard techniques for embezzlement identification and the cogent challenges that inhibit the efficacy of investigative accounting in embezzlement identification and mitigation. The study employed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) method in the studies review to pinpoint and evaluate the existing studies on

investigative accounting. The study results showed that there was a positive correlation between investigative accounting and embezzlement identification and mitigation.

Ofoje and Aggreh (2023) investigated the opinions on investigative accounting practice regading embezzlement identification in the Nigerian government parastatals; examined the nexus between embezzlement litigation practice and embezzlement identification in the Nigerian government parastatals; and evaluated the opinions of accountants on whether computerised investigative accounting techniques assisted in embezzlement identification in the Nigerian government parastatals.

Employing descriptive survey research design and judgemental sampling, the study distributed structured questionnaire to two hundred and forty two (242) professional accountants from a population of 612 professional accountants who were members of ICAN and ANAN practising in Anambra State. Ordinal Regression Model at 5% significance level was used to test the hypotheses of the study. The study findings showed that while the effect of investigative accounting on embezzlement identification in Nigerian government parastatals was favourable and cogent; the nexus between embezzlement litigation and embezzlement identification in the Nigerian government parastatals was adverse and not cogent; and embezzlement identification in the Nigerian government parastatals was cogently helped by computerised investigative accounting techniques.

Odeyemi et al. (2024) investigated the contemporary landscape of forensic accounting integrating cutting-edge technologies and digital methodologies. The study advocated that forensic accountants should stay abreast of technological advancements to effectively detect and prevent fraud in the modern era. According to the study, the forensic accountants should be well versed in data analytics, artificial intelligence, blockchain and marchine learning.

Ayinla et al. (2024) examined the practical application, challenges and implications of data analytics, machine learning and big data technologies in fraud identification and mitigation. The results showed the transformative impact of data analytics, machine learning and big data on fraud identification and mitigation.

Hasan et al. (2024) carried out a literature review related to forensic accounting, internal audit and fraud. The study examined the themes and approaches found in forensic accounting research. The study employed a descriptive research design. The study found that forensic accounting was crucial for fraud identification and prevention in businesses. The study also revealed that organisations' internal audit systems were strengthened by forensic accounting, which had a good effect on corporate governance.

Riadi and Aprilian (2024) examined whether fraud mitigation was affected by forensic accounting, investigative audits, and whistleblowing system. Using a survey research design, the study administered questionnaires on all auditors employed by the State Development Audit Agency of Riau Island. The data collected were subjected to validity tests, reliability tests, and classical assumption tests. The study used a quantitative approach, specifically multiple linear regression for data analysis. The results showed that forensic accounting significantly influenced fraud mitigation while investigative audits and whistleblowing system did not have a significant effect on fraud mitigation.

Conceptual Framework

Figure 1 showed the interconnections between forensic accounting and fraud detection and prevention.

INDEPENDENT VARIABLES   DEPENDENT VARIABLE

DATA MINING

TREND ANALYSIS

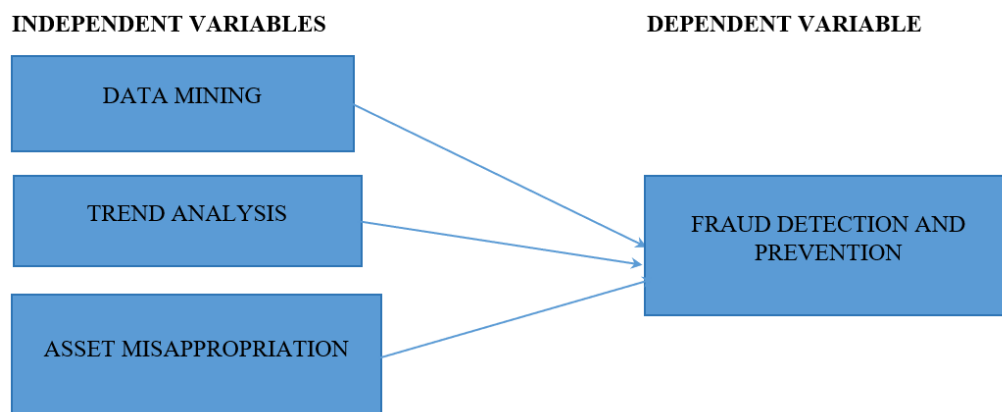ASSET MISAPPROPRIATION

FRAUD DETECTION AND PREVENTION

Figure 1. Conceptual Framework of Forensic Accounting and Fraud Detection and Prevention

Source: Author's Conceptualisation 2024

The independent variable is forensic accounting proxied by data mining, trend analysis, and asset misappropriation. The dependent variable is fraud detection and prevention. Figure 2.1 showed the effects of data mining, trend analysis and asset misappropriation on fraud detection and prevention. The three proxies of forensic accounting impacted fraud detection and prevention.

2. Materials and Methods

The research design used in this study was survey-based. This option was chosen because the survey approach worked effectively for obtaining responses, viewpoints, views, and descriptions from respondents regarding a specific topic, as well as for determining the cause and fostering productive relationships. In order to gather primary data for the study, respondents were given structured questionnaire, comprising straightforward, closed-ended questions that aligned with the study goals, the questionnaire was designed using a five-point Likert scale. The population of the study was on 18 registered Banks in Ondo State, Nigeria.

For this investigation, the sample size was determined using the sample size determination model developed by Krejcie and Morgan (1970). Separately, of the 275 respondents who comprised the study's population, 130 respondents (n = 130) were selected for the study from the internal audit and internal control unit staff. These let the researcher gathered sufficient data to generalize the findings. Cronbach Alpha was employed to demonstrate the questionnaire's reliability. With an alpha level of 82%, it surpassed the 75% significance limit. which demonstrated the validity of the questionnaire.

The study adapted the model of Ewa et al. (2020) which was stated as follows:

$FRP = \beta_0 + \beta_1 CDM + \beta_2 RAS + \beta_3 TRD + \mathcal{M}$ ……………………………..(i)

Where:

β_0 = Unknown constant term to be estimated.

FRP = Fraud prevention/detection.

CDM = Commercial Data Mining Software techniques

RAS = Ratio Analysis Techniques

TRD = Trend Analysis Techniques

$\mathcal{M}$ = Stochastic error term

$\beta 1$, $\beta 2$, $\beta 3$ = Unknown coefficients to be estimated.

$\beta 0$, $\beta 1$, $\beta 2$, $\beta 3 \geq 0$ The current study replaced ratio analysis techniques with asset misappropriation as follows:

FRD = $\beta 0$ + $\beta 1$DM + $\beta 2$AM + $\beta 3$TA + $\mathcal{M}$

Where:

FRP = Fraud Prevention/Detection

DM = Data Mining Techniques

AM = Asset Misappropriation

TA = Trend Analysis Techniques

$\mathcal{M}$ = Stochastic error term

$\beta 1$, $\beta 2$, $\beta 3$ = Unknown coefficients to be estimated.

$\beta 0$, $\beta 1$, $\beta 2$, $\beta 3 \geq 0$

The Table 1 below showed the variables descriptions and how they are measured.

Table 1. Variables Descriptions and Measurements

Variables	Descriptions	Measurements	Sources of Variable
Trend Analysis	Analyzing historical data to find and comprehend trends, alterations, and advancements across time is known as TA.	Mean score responses to questions in 1-10 section B in the questionnaire.	Ofoje and Aggreh (2023)
Data Mining	Finding important patterns, trends, and insights in huge datasets through a variety of computational and statistical methods is known as DM.	Mean score responses to questions in 11-20 section B in the questionnaire	Ayinla *et al*. (2024)
Asset Misappropriation	AM is the fraudulent act of taking anything of value like money, supplies, or intellectual property and exploiting it for one's own benefit.	Mean score responses to questions in 21-30 section B in the questionnaire	Riadi and Aprilian (2024)

Source: Author's Compilation (2024)

Descriptive and inferential statistics were used to assess the data gathered for this study in order to determine and investigate the relationship between the dependent and independent variables. The link and level of significance between each independent variable and the dependent variable were determined by multiple regression analysis.

3. Results and Discussion
Descriptive Statistics

Table 2 below showed the mean, median, maximum, minimum, standard deviation, skewness, kurtosis, Jarque-Bera, probability, sum and sum square deviation of the independent and dependent variables.

Table 2. Descriptive Statistics

	FRP	C	AM	DM	TA
Mean	4.3592	1.0000	4.2976	4.2876	4.3969
Median	4.3	1.0000	4.3	4.3	4.45
Maximum	5	1.0000	5	5	5
Minimum	1	1.0000	1	1	1
Std. Dev.	0.4616	0.0000	0.4267	0.5054	0.4566
Skewness	-0.8607	NA	-0.2772	-0.7706	-2.0410
Kurtosis	4.8262	NA	2.8137	4.2830	12.6331
Jarque-Bera	34.1185	NA	1.8534	21.7863	592.9136
Probability	3.9017	NA	0.3958	1.8584	1.7800
Sum	566.6999	130	558.7	557.4	571.5999
Sum Sq. Dev.	27.49392	0	23.4893	32.9603	26.8987
Observations	130	130	130	130	130

Source: Author's Computation (2024)

Table 2 showed that the mean of data mining on fraud detection and prevention was 4.2876 with maximum and minimum value of 5.000000 and 1.000000 respectively. The standard deviation of 0.505476 with Skewness -0.770693 showed that when deciding on the impact of data mining on fraud detection and prevention, information consideration of data mining was always vital, with median 4.30000 and kurtosis of 4.283052 correspondingly. The implication was that data mining was mandatory for fraud detection and prevention.

The average and standard deviation of trend analysis as a tool for fraud detection and prevention in deposit money banks in Nigeria were 4.3969 and 0.4566 respectively showing that trend analysis had a significant effect on fraud detection of deposit money banks with maximum and minimum value of 5.0000 and 1.0000. This meant that ability of deposit money banks to maximize their fraud detection and prevention was dependent on trend analysis; negative skewness of -2.0410 with median 4.450000 and kurtosis of 12.6331 individually; the implication was that trend analysis helped in prevention and detection of frauds of deposit money banks in Nigeria.

The maximum and minimum value of 5.000000 and 1.00000 explained the relationship between asset misappropriation and fraud prevention of listed money deposit banks in Nigeria respectively. With other connected standard deviation of 0.426717 and mean score of 4.2976 indicating that the responses of respondents on asset misappropriation varied as they were far from the mean. The effect of asset misappropriation on fraud detection and prevention of listed money deposit banks in Nigeria with sums squared deviation of 23.4893 of and skewness of -0.2772 and Kurtosis 2.8137 was paramount.

Demographic Distribution of Respondents

Table 3 below showed the demographic distribution of respondents. The distributions were according to gender, age, management in banking sector, educational qualification and work experience.

Table 3. Demographic Distribution of Respondents

S/No	Variables	Classifications of variables	Frequency	Percentage (%)
1	Gender	Male	66	50.77 %
		Female	64	49.23%
2	Age	Below 20yrs	7	5.38%
		21 – 25yrs	46	35.38%
		26 – 30yrs	18	13.84%
		31 – 35yrs	35	26.92%
		36 and above	23	17.69%
3	Management in Banking Sector	Commercial Banks	109	83.62%
		Microfinance Banks	10	7.69%
		Mortgage Banks	4	3.08%
		Merchants Banks	4	3.08%
		Development Banks	2	1.54%
		Others	1	0.77%
4	Educational Qualification	WASC	16	12.31%
		OND/NCE	5	3.85%
		HND/BSC	65	50%
		M.Sc/M.BA/Ph.D	44	33.85%
5	Work Experience	5 Years and below	61	46.92%
		6-10 years	17	13.08%
		11-15 years	14	10.77%
		16-20 years	19	14.62%
		21-25 years	19	14.62%
		26 years and above	-	-

Source: Author's Computation (2024)

An attempt was made in this section to explain the demographical characteristics of the respondents with 130 responses. Information on the distribution of respondents by gender revealed that, 50.77% of the respondents were males and 49.23% of the respondents were female, this indicated that male had highest percentage compared to female. The implication of this result was that, there were more male than the female in deposit money banks in Nigeria. Information on the distributions of respondents by age was group into five and was presented thus: 5.38% of the respondents in age group 20 yrs and below, 35.38% of the respondents were between 21-25 yrs, 13.84% of the respondents between 26-30 yrs, 26.92% of the respondents were between 31-35 yrs old and 17.69% were 36 years and above. The implication of this result was that the age group of respondents of deposit money banks with highest percentage of 35.38% fell in the category 21-25 years were more than the rest in the four categories of respondent age group in deposit money banks.

The distributions of the respondents by management in banking sector were classified into six categories. That is, 83.62% (109) frequency of the respondents were in commercial, 7.69% (10) frequency of the respondents were in microfinance banks, 3.08% (4) of the respondents were in mortgage banks and merchants' banks, 1.54% (2) of the respondents made up of the development banks and 0.77% (1) of the respondent was in other banks. This implied that, the bulks of the respondents of 83.62% (109) were in commercial banks, both mortgage banks and merchants' banks shared 3.08% (4) while other banks had the lowest percentage of 0.77% (1).

The distributions of the respondents by educational qualification were classified into four categories. Specifically, 12.31% (16) of the respondents had WASC or other related O'level results, 3.85% (5) frequency of the respondents had OND/NCE result, 50% (65) of the respondents were HND/B.Sc. holders, while, 33.85% (44) of the respondents were MSC/MBA or Ph.D. holders. This implied that, the bulks of the respondents of 50% (65)

had HND/B.Sc certificates, while 3.85% of the respondents had OND/NCE which was the least frequency.

The distributions of the respondents by work experience were classified into six categories. That is, 46.92% (61) frequency of the respondents were 5 Years and below, 13.08% (17) frequency of the respondents were in 6-10 years, 10.77% (14) of the respondents were in the range of 11-15 years, 14.62% (19) of the respondents were between 16-20 years and 21-25 years and no response for category of 26 years and above. This implied that, the bulks of the respondents of 46.92% (61) were in the category of below 5 years, both 16-20 years and 21-25 years had 14.62% (19) while category of 26 years and above had no response.

Effect of Trend Analysis on Fraud Detection and Prevention

Table 4 below showed the results of the regression analysis of the effect of trend analysis on fraud detection and prevention in DMBs in Nigeria.

Table 4. Regression Analysis of the Effect of Trend Analysis on Fraud Detection and Prevention

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.016218	0.33568	6.006258	0.00000
TA	0.532875	0.07594	7.017018	0.00000

R-squared	0.27780	Mean dependent var		4.3592
Adjusted R-squared	0.27216	S.D. dependent var		0.4616
S.E. of regression	0.39385	Akaike info criterion		0.9896
Sum squared resid	19.8558	Schwarz criterion		1.0337
Log likelihood	-62.3246	Hannan-Quinn criter.		1.0075
F-statistic	49.2385	Durbin-Watson stat		2.1777
Prob(F-statistic)	0.00000			

Source: Author's Computation (2024)

The regression analysis indicated that effect of trend analysis in fraud detection and prevention in deposit money banks in Nigeria showing trend analysis was an effective tool for detecting irregularities and potential fraudulent activities in financial records; as such trend analysis was crucial for identifying patterns and anomalies in financial data among listed deposit money banks in Nigeria which led to 0.532875 coefficient and it was statistically cogent at 1% due to the P–value of 0.000. This meant that trend analysis led to a cogent increase in fraud detection and prevention in deposit money banks in Nigeria. The coefficient 0.532875 attained in trend analysis indicated that a unit increase led to 53% increases in fraud detection and prevention in deposit money banks in Nigeria.

The Adjusted R^2 of 0.27216 indicated that trend analysis as a variable explained 27% of the variation in the dependent variable. The Durbin-Watson stat. of 2.1777 indicated the absence of first order serial autocorrelation. Hence, the study had confidence in the model in predicting the fraud detection and prevention in deposit money banks in Nigeria with Standard Error of 0.39385, the T- stats 7.017018 and Hannan-Quinn criter 1.0075, these results showed that there was a favourable nexus between trend analysis and embezzlement identification and mitigation in deposit money banks in Nigeria; the effect of trend analysis on embezzlement identification and mitigation in deposit money banks

in Nigeria is cogent at 1%. Banks that did not incorporate trend analysis with business decision might be victim of embezzlements.

Therefore, this study did not accept hypothesis formulated earlier and thereby accepted an alternate hypothesis, that there was favourable cogent nexus between trend analysis and embezzlement identification and mitigation in financial institutions in Nigeria. This finding supported the study of Franca et al. (2023) which investigated connection between expert evidence from forensic accountants and embezzlement dampening, identification, and mitigation. According to the study, it was found that the mitigation, identification, and dampening of fraud were greatly impacted by the expert testimony of forensic accountants.

However, this study had a mixed finding to the study of Sulaiman et al. (2023) which investigated how Nigerian deposit money banks were using forensic accounting methods to find fraud. The results of the study showed that banking industry was advised to implement the forensic accounting findings that were found to be useful in identifying fraudulent activity and disregard the otherwise.

Effect of Data Mining on Fraud Detection and Prevention

Table 5 below showed the regression analysis of the effect of data mining on fraud detection.

Table 5. Regression Analysis of the Effect of Data Mining on Fraud Detection and Prevention

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.5972	0.3112	8.3448	0.0000
DM	0.4109	0.07209	5.7001	0.0000

R-squared	0.2025	Mean dependent var	4.3592
Adjusted R-squared	0.1962	S.D. dependent var	0.4616
S.E. of regression	0.4138	Akaike info criterion	1.0888
Sum squared resid	21.9278	Schwarz criterion	1.1329
Log likelihood	-68.7763	Hannan-Quinn criter.	1.1067
F-statistic	32.4912	Durbin-Watson stat	2.0880
Prob(F-statistic)	0.0000		

Source: Author's Computation (2024)

The regression analysis showed the result of data mining on fraud detection and prevention in deposit money banks in Nigeria. The result revealed that integration of data mining techniques enhanced the capabilities of forensic accountants in uncovering financial irregularities; also, the result showed that data mining was a time-efficient tool for forensic accountants to identify and analyze large volumes of financial data which led to a figure 0.4109 and it was statistically cogent at 1% due to the P–value of 0.000. This meant that data mining led to a cogent increase in fraud detection and prevention in deposit money banks in Nigeria. The coefficient 0.4109 attained indicated that a unit increase led to 41% increases in fraud detection and prevention in deposit money banks in Nigeria.

The Adjusted R2 of 0.1962 indicated that data mining as a variable explained 20% of the variation in the dependent variable. The Durbin-Watson stat. of 2.0880 indicated the absence of first order serial autocorrelation. Hence, the study had confidence in the model in predicting the fraud detection and prevention in deposit money banks in Nigeria with

Standard Error of 0.4138, the T- stats 5.7001 and Hannan-Quinn criter 1.1067, these results showed that there was a favourable nexus between data mining and embezzlement identification and mitigation in financial institutions in Nigeria; the effect of data mining on embezzlement identification and mitigation in financial institutions in Nigeria was cogent at 1%: showing that data mining analysis was an effective method for detecting patterns indicative of embezzlement in financial data among financial institutions in Nigeria.

Therefore, this study did not accept hypothesis formulated earlier and thereby accepted an alternate hypothesis, that there was favourable cogent nexus between data mining and embezzlement identification and mitigation in financial institutions in Nigeria. This finding supported the study of Efut and Okoye (2019) which investigated how forensic accounting can be used to take on this urgent problem head-on. The investigation revealed that using forensic accounting services helped minimize fraud in Nigerian deposit money banks and even prevent it altogether.

Effect of Asset Misappropriation on Fraud Detection and Prevention

Table 6 below revealed the results of regression analysis of the effect of asset misappropriation on embezzlement identification and mitigation in the financial institutions in Nigeria.

Table 6. Regression Analysis of the Effect of Asset Misappropriation on Fraud Detection and Prevention

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.6407	0.3350419150	4.8973	0.0000
AM	0.6325	0.0775800173	8.1533	0.0000
R-squared	0.3418	Mean dependent var		4.3592
Adjusted R-squared	0.3366	S.D. dependent var		0.4616
S.E. of regression	0.3759	Akaike info criterion		0.8967
Sum squared resid	18.0958	Schwarz criterion		0.9409
Log likelihood	-56.2917	Hannan-Quinn criter.		0.9147
F-statistic	66.4763	Durbin-Watson stat		2.2226
Prob(F-statistic)	0.0000			

Source: Author's Computation (2024)

The result revealed that asset misappropriation was a prevalent issue in organizational financial activities and strong internal controls were crucial for mitigating the risk of asset misappropriation and this led to a coefficient figure of 0.6325 and it was statistically cogent at 1% due to the P–value of 0.000. This meant that asset misappropriation led to a cogent increase in embezzlement identification and mitigation in financial institutions in Nigeria. The coefficient 0.6325 attained in asset misappropriation indicated that a unit increase led to 63% increases in embezzlement identification and mitigation in financial institutions in Nigeria.

The Adjusted R2 of 0.33668 indicated that asset misappropriation as a variable explained 34% of the variation in the dependent variable. The Durbin-Watson stat. of 2.2226 indicated the absence of first order serial autocorrelation. Hence, the study had confidence in the model in predicting the embezzlement identification and mitigation in financial institutions in Nigeria with Standard Error of 0.37599, the T- stats 8.1533 and Hannan-Quinn criter 0.9147, these results showed that there was a favourable nexus

between asset misappropriation and embezzlement identification and mitigation in financial institutions in Nigeria; the effect of asset misappropriation on embezzlement identification and mitigation in financial institutions in Nigeria was cogent at 1%: showing that investigative accounting played a cogent role in the recovery of assets that had been misappropriated.

Therefore, this study did not accept hypothesis formulated earlier and thereby accepted an alternate hypothesis, that there was favourable cogent nexus between asset misappropriation and embezzlement identification and mitigation in financial institutions in Nigeria. This finding supported the study of Agboare (2021) who investigated the impact of investigative accounting on embezzlement identification and mitigation in the Nigerian banking industry. The results for the first hypothesis show that investigative accounting cogently and favorably affected the banking industry in Nigeria in terms of embezzlement identification and mitigation.

However, this study negated the study of Ojo-Agbodu et al. (2022) who investigated the impact of investigative accounting on the identification and avoidance of embezlement in a few Nigerian financial institutions. According to the study's findings, asset misappropriation and embezzlement identification are cogently linked, but it had no bearing on mitigating embezzlement in the DMBs that were used as examples.

4. Conclusion

The study concluded that all the three proxies of investigative accounting (trend analysis, data mining, and asset misappropriation) had favourable and cogent effect on embezzlement identification and mitigation in the financial institutions in Nigeria. Based on these conclusions and findings, the study recommended that:

1. The data mining was a prerequisite for obtaining embezzlement identification and mitigation in financial institutions in Nigeria, hence, banks management should invest in contemporary technology that would help prevent embezzlement.
2. Management of the financial institutions should incorporate trend analysis technique so as to identify and mitigate embezzlement, as the result showed that trend analysis techniques had a favourable cogent effect.
3. Management of financial institutions should also strive to ensure that their assets which comprised of both financial and non-financial assets should be free from embezzlement by ensuring continuous monitoring and surveillance necessary for effective mitigation of asset misappropriation.

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