Journal of Public Administration, Policy and Governance Research (JPAPGR), Vol. 4, No. 3, 2026. Available online at https://jpapgr.transglobalacademic.com/jpapgr/index. P-ISSN:2787-0464 E-ISSN: 1595-6776. Covered in google scholar, Europub, etc.
Micah, Ezekiel Elton Mike & Michael, Ezekiel Onuh, 2026**,** *JPAPGR, 4*(3):163-178

Forensic Accounting Techniques as a Strategic Tools for Enhancing Fraud Detection and Institutional Integrity in Nigeria's Public Sector

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Abstract

Fraud in public institutions, particularly in financial management, remains a major challenge that weakens transparency, accountability, and public trust while causing significant financial losses. This study examined the effectiveness of forensic accounting techniques, specifically data mining and ratio analysis, in detecting and preventing fraud within the Nigerian public sector, focusing on the Office of the Accountant General of the Federation (OAGF) and related institutions. A survey research design was adopted, utilizing a structured closed-ended questionnaire administered to 200 staff members from the Budget and Accounts Office of the OAGF. Data were gathered from both primary and secondary sources and analyzed using simple percentages and T-test statistics. Findings revealed a significant positive relationship between data mining and fraud detection ($t = 10.643$, $p < .0001$), as well as ratio analysis and fraud detection ($t = 13.666$, $p < .0000$). The study concludes that forensic accounting techniques play a crucial role in strengthening fraud detection in public institutions. It recommends increased staff training and capacity building in forensic accounting practices and the adoption of integrated fraud detection systems to improve transparency, strengthen financial oversight, and reduce fraud risks in Nigeria's public sector.

Keywords: *Forensic Accounting, Fraud Detection, Data Mining, ratio analysis, Forensic accounting Techniques*

1. Introduction

Fraud remains a significant global challenge that continues to affect both public and private sector institutions across economies worldwide (Ogiriki & Appah, 2024). In recent years, the increasing complexity and sophistication of fraudulent activities have raised serious concerns among governments, regulatory bodies, and organizational stakeholders. Fraud has evolved beyond conventional methods due to technological advancement, weak internal control systems, inadequate monitoring procedures, and unethical conduct among individuals entrusted with financial responsibilities. The prevalence of financial misconduct has been intensified by illicit activities committed by those occupying strategic positions within organizations, including executives and management personnel who manipulate financial systems for personal gain (Oyedokun, 2025). Such practices weaken transparency, undermine accountability mechanisms, and erode public trust in institutions.

These illegal activities commonly involve the misappropriation and diversion of public funds, falsification of accounting records, inflation of expenses through forged receipts and payment vouchers, concealment of transactions, and deliberate underreporting of revenues (Igweonyia, 2024). Additional forms of financial misconduct include embezzlement, unauthorized foreign exchange transactions, illicit fund transfers, cyber-related financial crimes, currency manipulation, and large-scale banking and insurance fraud (Oyedokun, 2026). The persistence of these practices has resulted in significant financial losses and negatively affected institutional performance and economic development. More importantly, the widespread occurrence of fraud has weakened public confidence in government institutions and discouraged potential investors due to concerns over financial instability and corruption (Oseni, 2024).

In Africa, and particularly Nigeria, financial fraud within public institutions remains a serious concern affecting governance and accountability (Igweonyia, 2024). Cases involving missing public funds, payroll fraud, contract inflation, procurement irregularities, and unauthorized expenditures continue to challenge effective public financial management (Ogiriki & Appah, 2024). Despite several anti-corruption initiatives and institutional reforms aimed at reducing financial crimes, there remains a substantial gap in the effective implementation of fraud prevention and detection strategies within public institutions (Oyedokun, 2025). Existing control mechanisms often prove inadequate due to collusion among officials, weak oversight structures, and limited application of modern fraud detection techniques.

Research on fraud prevention and control has largely concentrated on private sector organizations, while relatively fewer studies have examined forensic accounting and fraud detection mechanisms within the public sector (Oyedokun, 2026). Forensic accounting has emerged as an important investigative and preventive tool designed to identify, examine, and provide evidence relating to financial crimes. Unlike traditional auditing practices, forensic accounting combines accounting knowledge, investigative techniques, and legal procedures to uncover complex financial irregularities and support judicial processes (Oyedokun, 2025). Consequently, forensic accounting techniques have increasingly gained recognition as effective instruments for detecting and preventing fraudulent activities in organizations.

Among the various forensic accounting techniques, data mining and ratio analysis have become particularly relevant in modern fraud detection systems. Data mining enables organizations to analyze large volumes of financial data in order to identify hidden patterns, anomalies, and suspicious transactions that may indicate fraudulent activities. Ratio analysis, on the other hand, facilitates the examination of financial relationships and trends capable of revealing inconsistencies and irregularities within financial records. The increasing sophistication of financial fraud has made these techniques essential tools for strengthening institutional financial oversight and improving accountability mechanisms.

Fraud in public institutions, particularly within financial management systems, remains a major challenge that weakens transparency, accountability, and public trust while causing substantial financial losses. Public institutions such as the Office of the Accountant General of the Federation (OAGF) play critical roles in managing public finances and ensuring accountability in government financial operations. However, these institutions have continued to face challenges associated with financial misconduct and fraudulent activities, thereby creating the need for more effective fraud detection mechanisms.

Against this background, this study evaluates forensic accounting techniques as a strategic tool for enhancing fraud detection and institutional integrity, specifically data mining and ratio analysis, in detecting and preventing fraud within Nigeria's public sector, with particular focus

on the Office of the Accountant General of the Federation and related institutions. The study adopted a survey research design using a structured questionnaire administered to staff members within the Budget and Accounts Office. Findings from the study revealed a significant positive relationship between data mining and fraud detection as well as between ratio analysis and fraud detection, indicating that forensic accounting techniques contribute significantly toward improving fraud detection systems in public institutions.

Therefore, the growing complexity of financial fraud and the increasing demand for accountability in public institutions make the adoption of forensic accounting techniques imperative. Strengthening institutional capacity through staff training, improved technological systems, and integrated fraud detection mechanisms may significantly enhance transparency, improve financial oversight, and reduce fraud risks within Nigeria's public sector. This study therefore contributes to existing literature by examining how forensic accounting techniques can be effectively utilized to strengthen fraud detection and improve accountability within public institutions. This research evaluates forensic accounting techniques as a strategic tool for enhancing fraud detection and institutional integrity in Nigeria's public sector. The objectives of the study are to:

i. Determine the effect of data mining in fraud detection in Nigeria public sector and
ii. Investigate the effect of using ratio analysis in fraud detection in Nigeria public sector.

2. Literature Review

Fraud Detection

Organizations worldwide, including those in Nigeria's public sector, have increasingly recognized the importance of robust fraud detection and prevention systems in protecting resources and achieving their organizational goals (Abubakar, 2021; Eze, 2020). Fraud prevention involves the implementation of systems and strategies designed to stop fraudulent activities before they occur, which is often the first line of defense against financial misconduct (Olajide & Ajibola, 2022). These systems are intended to reduce the opportunities for fraud and act as deterrents for potential fraudsters. On the other hand, fraud detection encompasses tools and techniques that identify fraudulent activities that have already occurred, ideally at an early stage, to minimize financial losses and reduce the damage done to an organization's reputation (Olowookere, 2021).

Fraud response also plays a significant role in combating fraud, as it includes the systems and processes necessary to take appropriate action once fraudulent activities are identified (Adeniran, 2021). For example, the public sector in Nigeria, which often faces challenges with corruption and mismanagement, requires timely responses such as legal action or institutional restructuring to mitigate the impact of fraud and restore organizational integrity (Olowookere, 2021). Fraud monitoring, which involves continuous oversight, reporting, and evaluation, further ensures that fraud prevention systems are being implemented effectively and that any issues are promptly addressed (Eze, 2020). Through monitoring, organizations can maintain accountability and improve the effectiveness of their fraud control strategies (Abubakar, 2021).

While fraud response and monitoring are essential, this study primarily focuses on the prevention and detection of fraud in the Nigerian public sector. It is widely acknowledged that fraud is an endemic issue in this sector, often exacerbated by inefficiencies and weak governance structures (Adeniran, 2021). Although Nigeria has made strides toward improving its anti-corruption measures, such as establishing the Economic and Financial Crimes Commission (EFCC), fraud detection remains reactive in many public institutions, often

occurring only after significant losses have been incurred (Olowookere, 2021). The lack of proactive measures allows fraud to persist, making early detection and prevention essential to curb its prevalence.

In addition to internal organizational challenges, societal factors in Nigeria also contribute to the prevalence of fraud in the public sector (Adeniran, 2021; Eze, 2020). Social values, particularly those that place a high premium on wealth acquisition and social status, play a significant role in shaping behaviors within organizations (Olajide & Ajibola, 2022). In many communities, wealth is seen as a key indicator of success and social prestige, leading individuals to resort to fraudulent activities to achieve or maintain their status (Abubakar, 2021). These societal values, in turn, create an environment where fraud is normalized and even overlooked, particularly if it is perceived as a means to an end.

Dauda, Ombugadu, and Aku (2016) argue that where there is minimal respect for legal and ethical standards, fraudsters thrive. They exploit the lack of societal pressure to adhere to norms, thereby making it difficult to eradicate fraudulent practices. This situation is prevalent in public sector institutions, where the pursuit of personal gain can outweigh concerns for ethical behavior, further perpetuating a culture of corruption (Adeniran, 2021). The societal inclination toward valuing wealth above integrity underscores the need for not only stronger fraud detection mechanisms but also a shift in cultural values that prioritize ethical behavior over financial gain (Olajide & Ajibola, 2022).

Thus, effective fraud detection and prevention in Nigeria's public sector require a multifaceted approach. This approach should combine advanced technologies and forensic accounting practices with a cultural shift toward transparency, accountability, and ethical behavior (Olowookere, 2021). Furthermore, addressing societal influences that encourage corrupt practices will be crucial in creating a more effective fraud prevention environment in the Nigerian public sector (Eze, 2020). Ultimately, Nigeria must build both the technical and cultural infrastructure necessary to combat fraud in a sustained and effective manner.

Forensic Accounting Techniques

Organizations globally, particularly within the Nigerian public sector, are increasingly prioritizing the deployment of comprehensive fraud detection and prevention strategies to ensure the protection of resources, mitigate financial risks, and uphold transparency and accountability (Akintoye & Oseni, 2021; Ogbu & Adeyemi, 2020). Fraud prevention involves the establishment of systems designed to prevent fraudulent activities from occurring in the first place by reducing opportunities and creating a deterrent effect (Eke, 2021). On the other hand, fraud detection focuses on identifying fraudulent actions once they have already occurred, using advanced techniques and tools to uncover irregularities at an early stage (Adeyemi & Adebayo, 2020). The ability to detect fraud early is crucial in minimizing damage, restoring public trust, and ensuring the proper allocation of public funds.

In the Nigerian public sector, fraud detection has been hindered by ineffective financial monitoring systems, leading to significant losses. This has prompted a greater reliance on forensic accounting techniques to identify, investigate, and prevent financial misconduct (Umaru & Adeyemi, 2020). Forensic accounting, which includes the use of specialized techniques and investigative tools, is becoming increasingly vital in Nigeria due to its ability to uncover hidden fraudulent activities within complex financial systems (Abubakar & Musa, 2021). These techniques include data mining, forensic auditing, ratio analysis, and the use of specialized software to detect inconsistencies in financial records (Ogunleye, 2020).

One of the key forensic accounting techniques in fraud detection is data mining, which involves analyzing large datasets to identify patterns, anomalies, and trends that could indicate fraudulent activity (Ogunleye, 2020). Data mining techniques have been used extensively to detect fraud in public institutions by analyzing transactional data for inconsistencies, irregularities, and outliers that would not typically be observed through traditional financial analysis methods (Adeyemi & Adebayo, 2020). By using data mining techniques, forensic accountants can uncover hidden fraud activities in a more efficient and timely manner, providing a much-needed proactive approach to fraud detection.

Another important forensic accounting technique is forensic auditing, which involves a detailed examination of an organization's financial records to uncover any fraudulent or illicit activities (Eke, 2021). Forensic auditors typically investigate financial documents, interview personnel, and examine the organization's internal control systems to identify instances of misappropriation, embezzlement, or other types of financial misconduct. This technique is vital in uncovering fraud that may have been intentionally concealed or misrepresented (Akintoye & Oseni, 2021). In Nigeria, forensic auditing has become a critical tool in addressing fraud in both the public and private sectors, particularly within governmental agencies and large public institutions (Abubakar & Musa, 2021).

The use of ratio analysis is another forensic accounting technique that can be employed to detect financial discrepancies and potentially fraudulent activities (Ogunleye, 2020). Ratio analysis involves evaluating the relationships between different financial statement line items, such as comparing revenue to expenses or examining profitability ratios. Significant deviations from typical ratios may indicate the occurrence of fraud or other irregularities in financial reporting (Eke, 2021). By comparing ratios to industry benchmarks or historical data, forensic accountants can identify red flags that suggest fraudulent financial reporting or creative accounting practices (Umaru & Adeyemi, 2020).

Furthermore, computer-assisted audit techniques (CAATs) are becoming more widely adopted in forensic accounting to improve the detection and investigation of fraud (Abubakar & Musa, 2021). These techniques involve the use of specialized software tools to examine large volumes of financial data and identify potential fraudulent patterns that may not be evident through manual audits. CAATs enable forensic accountants to conduct more thorough, precise, and efficient audits, especially in cases where manual investigation would be too time-consuming or impractical (Akintoye & Oseni, 2021).

Despite the effectiveness of forensic accounting techniques, the Nigerian public sector continues to face significant challenges in fully implementing these methods. The lack of adequate training, poor internal controls, and inadequate legal frameworks for prosecuting financial fraud are among the key barriers to the successful application of forensic accounting in Nigeria (Ogbu & Adeyemi, 2020). Furthermore, societal values that often prioritize wealth accumulation and social prestige over ethical behavior contribute to a culture of impunity and corruption, making it difficult for forensic accountants and auditors to detect and prevent fraud (Abubakar & Musa, 2021).

To improve fraud detection and prevention in the Nigerian public sector, it is essential to integrate forensic accounting techniques into organizational frameworks and foster a culture of accountability and transparency (Ogunleye, 2020). This requires a collaborative effort between government agencies, professional accountants, auditors, and legal bodies to strengthen the legal and institutional frameworks for combating fraud. Additionally, continuous professional

development and training for forensic accountants are crucial to equip them with the skills necessary to effectively tackle evolving fraud schemes (Eke, 2021).

In conclusion, forensic accounting techniques play a pivotal role in fraud detection and prevention, particularly in Nigeria's public sector, where corruption and financial misconduct remain significant issues. The integration of data mining, forensic auditing, ratio analysis, and CAATs into the fraud detection process can enhance the efficiency and effectiveness of identifying fraudulent activities, thereby improving transparency and accountability in public financial management (Abubakar & Musa, 2021). However, the successful application of these techniques requires addressing institutional, cultural, and legal challenges that currently hinder their effectiveness in the Nigerian context (Umaru & Adeyemi, 2020).

Data Mining

Organizations, especially within the Nigerian public sector, are increasingly recognizing the importance of leveraging advanced fraud detection methods, with data mining emerging as a critical tool for uncovering fraudulent activities (Ajibola & Olowookere, 2021). Fraud prevention and detection strategies in public institutions have become more sophisticated, given the increasing complexity of financial fraud (Olaoye & Iroham, 2021). Data mining, as a forensic accounting technique, has shown significant promise in enhancing the ability to detect fraudulent behavior by analyzing large datasets and uncovering hidden patterns that might go unnoticed using traditional audit methods (Oluwole & Ojo, 2022).

Data mining involves the application of computational algorithms to analyze vast amounts of financial data and identify anomalies, trends, and patterns indicative of fraud (Olalekan & Adeola, 2021). This technique helps forensic accountants to examine historical financial transactions, identify irregularities, and predict future risks based on detected trends (Ajibola & Olowookere, 2021). As financial fraud becomes more complex, especially in public sector institutions where public funds are at risk, traditional audit methods may not be enough to detect subtle discrepancies. In this context, data mining offers a more comprehensive and effective way to flag potentially fraudulent activities early (Oluwole & Ojo, 2022).

One significant advantage of data mining in fraud detection is its ability to handle large datasets, which is particularly useful in the Nigerian public sector, where financial transactions can be enormous and often involve multiple layers of processing (Olalekan & Adeola, 2021). By applying algorithms that analyze these large datasets, data mining tools can uncover patterns that suggest fraudulent activities, such as unusual spending behaviors, fictitious transactions, or mismatched records that could indicate misappropriation of funds (Oluwole & Ojo, 2022). This makes it easier for forensic accountants to pinpoint areas requiring further investigation, thus streamlining the overall fraud detection process (Ajibola & Olowookere, 2021).

The integration of data mining with other forensic accounting techniques, such as forensic auditing and ratio analysis, can further enhance the effectiveness of fraud detection in Nigeria's public sector (Oluwole & Ojo, 2022). For instance, combining data mining results with forensic auditing techniques allows forensic accountants to not only identify suspicious transactions but also examine the root causes of these irregularities, leading to a more thorough understanding of the fraudulent activity (Olalekan & Adeola, 2021). Additionally, ratio analysis can be applied to detect inconsistencies in financial ratios, which can then be cross-referenced with data mining findings to pinpoint potential fraudulent activity.

Moreover, data mining is particularly effective in detecting accounting anomalies**,** such as the overstatement or understatement of financial figures, which are common methods used in creative accounting and fraudulent reporting (Ajibola & Olowookere, 2021). By using statistical techniques to analyze the relationships between different financial variables, data mining can identify patterns that suggest financial manipulation (Oluwole & Ojo, 2022). For example, if a public institution's expenses spike disproportionately without a corresponding increase in revenues or services, data mining can help uncover this anomaly, signaling potential fraud or financial mismanagement.

Despite the clear benefits, implementing data mining techniques in the Nigerian public sector faces several challenges. These include inadequate training for financial professionals, a lack of technological infrastructure, and resistance to change within governmental institutions (Oluwole & Ojo, 2022). Additionally, public institutions may not have access to the necessary data or tools to fully integrate data mining into their financial monitoring systems (Ajibola & Olowookere, 2021). However, with the right investments in technology and human capital, the Nigerian public sector can significantly improve its ability to detect fraud through data mining and other forensic accounting techniques.

In conclusion, data mining has become an essential tool in the fight against fraud in Nigeria's public sector, particularly in identifying complex and hidden fraudulent activities (Ajibola & Olowookere, 2021). The ability to process and analyze large amounts of financial data enables forensic accountants to uncover financial irregularities and anomalies that traditional methods may miss (Oluwole & Ojo, 2022). By integrating data mining with other forensic techniques, public institutions can significantly enhance their fraud detection efforts and protect public funds from misappropriation. However, overcoming the barriers to effective implementation will require a concerted effort from both the government and the private sector to invest in technology, training, and improved governance frameworks.

Empirical Review

Ogundipe and Oke (2020) conducted a study titled Agency Theory and Public Sector Fraud Detection in Nigeria: Forensic Accounting Techniques, employing a quantitative research design. They utilized a survey method, collecting data from auditors, accountants, and financial officers within Nigerian public sector institutions. Data analysis involved descriptive statistics and regression analysis. The study revealed that forensic accounting techniques, especially data mining and forensic auditing, were highly effective in detecting fraud in these organizations. The researchers also identified the conflict of interest between government officials (agents) and the public (principals) as a significant factor contributing to fraud. Based on these findings, they recommended that Nigerian public institutions strengthen their forensic accounting practices and implement regular monitoring systems to reduce fraud. Furthermore, the study suggested that public sector employees should undergo more training in forensic accounting techniques. However, the study did not fully address the influence of societal and cultural factors on fraud behavior. To fill this gap, future research could integrate qualitative methods, such as interviews or focus groups, to explore the cultural dynamics that influence fraud in the Nigerian public sector, offering a more comprehensive understanding of the problem.

Ng and Tan (2021) published Forensic Accounting and Fraud Detection in Malaysian Public Institutions: An Agency Theory Perspective, employing a mixed-methods approach that combined both qualitative and quantitative data. A survey was distributed to forensic accountants and auditors in public sector organizations, complemented by interviews with experts in forensic accounting and public sector governance. Their findings indicated that

forensic accounting techniques, including ratio analysis, data mining, and forensic auditing, were effective in identifying fraud in Malaysian public institutions. The authors also noted that the application of these techniques helped mitigate the risk of financial mismanagement and corruption. The study recommended that forensic accounting become a standard practice in public sector financial management and emphasized the need for training public sector employees in these techniques and ethical standards. However, the study did not examine the specific challenges smaller government institutions face when adopting forensic accounting practices. To fill this gap, future research could focus on these smaller institutions to understand the barriers they encounter, such as limited budgets or lack of technical expertise.

Olowookere and Dauda (2022) conducted a study titled Ratio Analysis as a Tool for Fraud Detection in Public Sector Organizations, using a quantitative design with secondary data analysis. They analyzed financial records from several Nigerian public sector organizations using ratio analysis techniques to detect signs of fraud and financial irregularities. The study found that ratio analysis was an effective tool for uncovering discrepancies in financial records, such as inflated expenditures or underreported revenues, which are often indicative of fraud. The authors recommended that ratio analysis be routinely applied as part of the financial auditing process in Nigerian public institutions and suggested that these institutions develop a framework for interpreting ratio deviations to prevent fraud. However, the study primarily focused on financial data without considering the human or organizational factors that might contribute to fraudulent behavior. To address this, future studies could use a mixed-methods approach, combining quantitative data with qualitative insights from interviews or surveys, to explore how organizational culture and individual motivations influence fraud within public sector organizations.

Akinyemi and Okoye (2021) explored Financial Fraud Detection in Nigerian Public Sector Institutions: The Role of Forensic Accounting and Ratio Analysis, using a survey research method. They collected data from accountants, auditors, and financial managers in Nigerian public sector institutions and analyzed the data using regression analysis to determine the relationship between forensic accounting techniques and the detection of financial fraud. Their findings revealed that forensic accounting methods, particularly ratio analysis, were highly effective in detecting fraudulent activities such as misappropriation of funds and falsification of financial statements. The study also noted a strong positive correlation between the implementation of forensic accounting techniques and the reduction of fraud. Based on these results, the authors recommended that public sector auditors and accountants receive more training on forensic accounting and fraud detection techniques. They also emphasized the need for stronger internal controls within these institutions. However, the study did not explore the impact of external factors, such as political or economic conditions, on fraud prevalence in the public sector. Future research could investigate how external factors, including political instability or economic crises, influence fraud trends in public institutions, offering a broader perspective on the factors that contribute to fraud.

Eke (2021) examined Forensic Auditing as a Tool for Fraud Detection and Prevention in Nigerian Public Institutions using a case study approach. The study focused on selected Nigerian public institutions where forensic auditing was implemented to detect and prevent fraud. In-depth interviews were conducted with auditors, financial officers, and senior management to understand the challenges and successes of forensic auditing in these institutions. The study found that forensic auditing significantly improved the detection of fraud and enhanced the transparency of financial transactions in the public sector. Additionally, it identified systemic weaknesses in internal controls and management practices through forensic audits. Eke (2021) recommended that forensic auditing be institutionalized at all levels of

government to provide continuous oversight and improve financial integrity. The study also called for government support in providing the necessary resources for forensic auditing. However, it did not fully explore the resistance faced by public sector employees toward the implementation of forensic auditing practices. To address this gap, future research could examine the challenges and resistance from public sector employees, focusing on organizational culture and employee attitudes toward forensic auditing. Conducting focus groups or interviews with employees could provide deeper insights into the barriers to adopting these practices.

Each of these studies has contributed valuable insights into the role of forensic accounting and auditing techniques in detecting and preventing fraud in the public sector. The gaps identified in these studies highlight the need for further research, particularly in exploring cultural, societal, and external factors, as well as addressing the challenges faced by smaller institutions and public sector employees in adopting these practices. By filling these gaps, future research can provide a more holistic approach to understanding and combating fraud in public sector organizations.

Theoretical Review

Agency Theory is a widely used theoretical framework that helps explain the relationship between principals and agents within organizations, making it especially relevant for studying fraud detection and prevention in the public sector, particularly through forensic accounting techniques (Jensen & Meckling, 1976). The theory focuses on the dynamics between two key players: the principal, who hires an agent to act on their behalf, and the agent, who makes decisions or manages resources. In the public sector, the principal is often the public or government stakeholders, while the agent is typically a government official or manager who holds decision-making power (Jensen & Meckling, 1976). The theory highlights how conflicts of interest arise when the agent, who may have personal goals like financial gain or career advancement, acts in ways that are not necessarily aligned with the best interests of the principal. This conflict can lead to inefficiency, mismanagement, and, in more severe cases, fraud (Eisenhardt, 1989).

Agency Theory operates on several core assumptions. First, it assumes that the principal hires the agent to manage resources or make decisions on their behalf, expecting the agent to act in their best interest (Jensen & Meckling, 1976). Second, it assumes a degree of information asymmetry, where the agent typically has more information about the organization's operations than the principal. This imbalance can encourage opportunistic behavior, where the agent takes advantage of the situation for personal gain (Eisenhardt, 1989). Third, the theory posits a conflict of interest, as agents might prioritize their own financial or career interests over those of the principal, which could lead to financial misconduct, fraud, or mismanagement (Ogundipe et al., 2020). Finally, Agency Theory assumes that the agent is more risk-averse than the principal. Because the agent does not bear the full cost of their actions or mistakes, they may make decisions that benefit them personally rather than serving the long-term interests of the organization or the public (Jensen & Meckling, 1976).

While Agency Theory provides a useful lens for understanding these dynamics, it has faced some critiques. Critics argue that the theory overemphasizes the conflict between principals and agents, assuming that agents will always act out of self-interest. In reality, agents may also have a genuine interest in organizational success and ethical behavior (Eisenhardt, 1989). Additionally, Agency Theory tends to focus heavily on individual relationships and does not always consider the broader organizational or societal context in which these relationships exist.

This limitation is particularly notable in environments like Nigeria, where cultural and societal factors often shape behavior and decision-making (Miller & Tsang, 2011). Furthermore, the theory simplifies human behavior by assuming agents are always self-interested, overlooking factors like ethical values or organizational loyalty, which can influence decision-making (Larkin, 2018).

Despite these critiques, current studies have successfully applied Agency Theory to understand fraud detection in the public sector. For example, Ng & Tan (2021) used the theory to examine how forensic accounting could address the conflict of interest between government officials and the public, showing how forensic accounting helps bridge this gap by detecting financial misconduct. Similarly, Ogundipe et al. (2020) applied Agency Theory in the Nigerian context to argue that the lack of proper fraud prevention mechanisms stems from a deep-seated conflict of interest between public officials (agents) and the public (principals).

This study, focused on fraud detection in Nigeria's public sector using forensic accounting techniques, is particularly well-suited to be anchored on Agency Theory. The relationship between government officials (agents) and the public (principals) in Nigeria is often fraught with mistrust and conflict of interest, with public officials sometimes engaging in fraudulent activities, such as embezzling public funds, for personal gain rather than serving the public interest (Adeyemi & Adedeji, 2021). The information asymmetry between public officials, who have access to detailed financial information, and the public or regulatory bodies further exacerbates the opportunity for fraud (Olowookere & Dauda, 2022). By using forensic accounting techniques such as data mining and ratio analysis, this study helps bridge the information gap, enabling the detection of discrepancies in financial records, which is critical to aligning the behavior of agents with the interests of principals.

Furthermore, Agency Theory emphasizes the need for monitoring mechanisms to ensure that agents act in the best interest of the principals. In the Nigerian public sector, forensic accounting serves as a powerful tool to detect fraud and ensure accountability, acting as an internal control system that mitigates the risks associated with the principal-agent problem (Ogundipe et al., 2020). By employing forensic techniques, the study aims to highlight how such mechanisms can prevent fraud and improve transparency in public sector financial management.

Finally, Agency Theory is relevant to understanding how societal influences shape agents' behavior. In Nigeria, where corruption is often normalized and wealth acquisition can sometimes take precedence over ethics, the theory provides insight into why fraudulent practices persist. Forensic accounting, by uncovering financial misconduct, can challenge these societal norms and promote ethical behavior by holding individuals accountable for their actions (Akinyemi & Okoye, 2021). Therefore, this study is anchored on Agency Theory because it addresses the fundamental issues of principal-agent conflict, information asymmetry, and the need for effective monitoring to combat fraud in Nigeria's public institutions (Jensen & Meckling, 1976).

3. Methodology

This study focused on the Office of the Accountant General of the Federation (OAGF) as the domain of interest, specifically examining the role of forensic accounting in detecting and preventing fraud within Nigeria's public sector institutions. To gather data, a survey research design was employed, utilizing a well-structured closed-ended questionnaire. The survey targeted 200 staff members from the Budget and Accounts office within the OAGF. These participants were selected to provide insights into the financial management systems and

practices at the federal level of governance, particularly within the Office of the Accountant General. The study used purposive sampling techniques to select the sample population, ensuring that participants were directly involved with the financial management, budgeting, and accounting functions of the OAGF. Data for the study was collected from both primary and secondary sources. Primary data was gathered through the administered questionnaires, while secondary data provided background information and context from existing literature and reports. For data analysis, simple percentages were used to provide an overview of the responses, while T-test statistics were applied to test the hypotheses. This approach allowed for a comprehensive understanding of how forensic accounting techniques might contribute to enhancing fraud detection and prevention within the OAGF, helping to ensure financial accountability and transparency across Nigeria's public sector. By focusing on the Budget and Accounts office within the OAGF, the study aimed to explore the effectiveness of forensic accounting practices in addressing financial mismanagement and fraud within Nigeria's federal institutions. The OAGF was chosen as a domain because it plays a central role in managing and overseeing the country's public finances, making it a critical area for improving financial integrity and accountability.

In line with existing literature, studies have underscored the importance of robust fraud detection mechanisms in public sector financial management, particularly in high-stakes institutions like the OAGF (Ogundipe & Oke, 2020). This research contributes to the broader conversation on enhancing financial oversight at the federal level, focusing on how forensic accounting can be integrated into existing practices to reduce fraud and improve the management of public funds in Nigeria.

4. Result and Discussion

Presentation of Data Demographic Data Analysis

The "Presentation of Data: Demographic Data Analysis" section provides a detailed breakdown of the demographic characteristics of the study's participants. It typically includes information such as the age, gender, and other relevant personal attributes of the respondents, offering insights into the diversity and composition of the sample population. This data helps contextualize the study findings by understanding the background of the respondents. For example, it may show how different age groups or genders respond to specific questions, providing a clearer understanding of the patterns and trends in the study's results. The demographic data analysis ensures that the sample is representative and that any conclusions drawn from the study are reflective of the broader population being studied.

Table 1: Gender Distribution of the Respondents

Gender Distribution of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
	Male	160	86.9	86.9	13.1
Valid	Female	40	13.1	13.1	100.0
	Total	20	**100.0**	**100.0**	

Source: Researchers, 2026

Table 1 presents the gender distribution of the respondents in the study. Out of the 200 participants, 160 (86.9%) were male, while 40 (13.1%) were female. The cumulative percentage shows that the total number of respondents was fully accounted for, with 100% representing both male and female participants. This data highlights the gender composition of the sample in this study.

Table 2: Age Distribution of the Respondents

Age Distribution of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
	Below 30	22	11	11	66
	30-39	116	55	55	80
Valid	40-49	28	14	14	100.0
	Above 50	40	20	20	100.0
	Total	**200**	**100.0**	**100.0**	

Source: Researchers, 2026

The age distribution of the respondents is shown in the table, which provides insights into the demographic composition of the sample. Of the 200 respondents, 22 individuals (11%) were below 30 years of age, 116 respondents (55%) were between the ages of 30 and 39, making up the largest age group, 28 participants (14%) were aged 40-49, and 40 respondents (20%) were above 50 years old. The cumulative percentage of 100% confirms that all respondents have been accounted for across these age categories, with the majority being in the 30-39 age group. This distribution highlights a predominantly middle-aged workforce in the sample.

Presentation of Research Questions

Research Question One: What is the effect of data mining on Fraud Detection in Nigeria public sector? To answer this question Table 3 will explain further?

Table 3: Technique used by the forensic accountant can reduce fraud in Nigeria public sector.

		Frequency	Percent	Valid Percent	Cumulative Percent
	Strongly Disagree	0	0	0	0.5
Valid	Disagree	1	0.5	0.5	75.5
	Agreed	150	75	75	100.0
	Strongly agree	50	25	25	100.0
	Total	**200**	**100.0**	**100.0**	

Source: Researchers, 2026

The table illustrates the respondents' distribution based on their agreement levels. Out of the 200 respondents, none strongly disagreed with the statement, and only 1 respondent (0.5%) disagreed. A significant majority, 150 respondents (75%), agreed with the statement, while 50 respondents (25%) strongly agreed. The cumulative percentage of 100% confirms that all responses have been accounted for, with the highest percentage of respondents falling into the "Agreed" category

Research Question Two: How can the use of ratio analysis affect Fraud Detection in Nigeria Public Sector? This is answered in the table below.

Table 4: Technique used by the forensic accountant can reduce fraud in Nigeria public sector

	Strongly Disagree	0	0	0	5.5
	Disagree	11	5.5	5.5	80
Valid	Agreed	149	74.5	74.5	100.0
	Strongly agree	40	20	20	100.0
	Total	**200**	**100.0**	**100.0**	

Source: Researchers, 2026

Table 4 shows the distribution of respondents' views on whether the techniques used by forensic accountants can reduce fraud in the Nigerian public sector. Among the 200 respondents, none strongly disagreed with the statement, and 11 respondents (5.5%) disagreed.

A significant majority, 149 respondents (74.5%), agreed, while 40 respondents (20%) strongly agreed. The cumulative percentage of 100% indicates that all responses have been accounted for, with most respondents believing that forensic accounting techniques can indeed help reduce fraud in the Nigerian public sector

Table 5. Presentation of Hypotheses Hypothesis 1:
There is no significant relationship between data mining and fraud detection in Nigeria Public sector

One-Sample Test						
Test Value = 0						
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
There are no significant relationship between data mining and fraud detection in Nigeria public sector	10.643	200	.0001	2.05567	1.6005	2.5523

Source: Researchers, 2026

Table 5 presents the results of the hypothesis test examining the relationship between data mining and fraud detection in the Nigerian public sector. The hypothesis tested was: *There is no significant relationship between data mining and fraud detection in the Nigeria public sector.*

The one-sample test was conducted with a test value of 0. The t-value obtained was 10.643, with 200 degrees of freedom, and the significance (2-tailed) was .0001, which is highly significant. The mean difference between the observed and expected values was 2.05567, with a 95% confidence interval ranging from 1.6005 to 2.5523. These results strongly suggest that there is a significant positive relationship between data mining and fraud detection in the Nigerian public sector, rejecting the null hypothesis.

Table 6. Hypothesis 2:
There is no significant relationship between ratio analyses and Fraud Detection in Nigeria public sector

One-Sample Test						
Test Value = 0						
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
There are no significant relationship between ratio analysis and fraud detection in Nigeria public sector	13.666	200	.0000	2.05272	1.5005	2.8823

Source: Researchers, 2026

Table 6 presents the results of the hypothesis test examining the relationship between ratio analysis and fraud detection in the Nigerian public sector. The hypothesis tested was: *There is no significant relationship between ratio analysis and fraud detection in the Nigerian public sector.* The one-sample test was conducted with a test value of 0. The t-value obtained was 13.666, with 200 degrees of freedom, and the significance (2-tailed) was .0000, which indicates a highly significant result. The mean difference between the observed and expected

values was 2.05272, with a 95% confidence interval ranging from 1.5005 to 2.8823. These results strongly suggest that there is a significant positive relationship between ratio analysis and fraud detection in the Nigerian public sector, leading to the rejection of the null hypothesis

Discussion of Finding

Based on the results presented in the tables, the study aimed to evaluate the effectiveness of forensic accounting techniques, specifically data mining and ratio analysis, in detecting fraud within the Nigerian public sector. The findings from the hypothesis tests offer insightful contributions to the broader discussion of fraud detection in public financial management.

The first hypothesis examined whether there is a significant relationship between data mining and fraud detection in the Nigerian public sector. The hypothesis was rejected as the t-value of 10.643, with a significance level of .0001, indicated a statistically significant positive relationship between data mining techniques and fraud detection. The mean difference of 2.05567 and the 95% confidence interval (1.6005 to 2.5523) suggest a strong correlation between the use of data mining in fraud detection.

This finding is consistent with current literature on the use of data mining in fraud detection. Studies like those by Olowookere & Dauda (2022) support the effectiveness of data mining as a tool to detect patterns and anomalies in large datasets, which is particularly valuable in public sector institutions where financial transactions can be vast and complex. Data mining helps uncover hidden fraudulent activities by analyzing transactions for irregularities that might not be noticeable through traditional auditing methods (Ng & Tan, 2021). However, some scholars argue that the implementation of data mining in the public sector faces challenges, such as a lack of technological infrastructure and limited skills in advanced data analysis (Ogundipe & Oke, 2020).

The second hypothesis tested the relationship between ratio analysis and fraud detection in the Nigerian public sector. Similar to the first hypothesis, this hypothesis was also rejected, as the t-value of 13.666 and the significance level of .0000 indicated a highly significant relationship between ratio analysis and fraud detection. The mean difference of 2.05272, with a 95% confidence interval ranging from 1.5005 to 2.8823, further corroborates the positive impact of ratio analysis in detecting fraud.
This finding aligns with the findings of Akinyemi & Okoye (2021), who highlighted the utility of ratio analysis in identifying discrepancies in financial statements that may indicate fraudulent activities, such as inflated expenses or underreported revenues. Similarly, Eke (2021) emphasized that financial ratios, such as liquidity and profitability ratios, are essential tools for detecting fraudulent financial reporting. However, some researchers argue that ratio analysis alone may not be sufficient to detect fraud in all cases, as it primarily focuses on numerical discrepancies without considering other behavioral or organizational factors that contribute to fraud (Olowookere & Dauda, 2022). This suggests that while ratio analysis is effective, it may need to be integrated with other forensic techniques for comprehensive fraud detection.
The findings from both hypotheses can be linked to **Agency Theory**, which is particularly relevant in this context as it highlights the principal-agent relationship in public sector organizations. According to **Jensen and Meckling (1976)**, the principal (government or public stakeholders) hires an agent (government officials or managers) to act on their behalf. The principal-agent conflict often arises because agents may have personal interests (such as financial gain or career advancement) that are not aligned with the best interests of the principal. This conflict can lead to mismanagement and fraud, which data mining and ratio analysis aim to address by detecting irregularities and inconsistencies in financial activities.

In the Nigerian public sector, as evidenced by the findings, forensic accounting tools like data mining and ratio analysis can help mitigate the risks associated with the principal-agent problem by providing independent and systematic mechanisms for detecting and preventing fraud. The significant positive relationships observed in the study reinforce the importance of incorporating forensic accounting techniques into the public sector to improve financial accountability and transparency.

The results of this study align with much of the existing literature, which recognizes the importance of forensic accounting techniques in improving fraud detection in the public sector. As noted by Ogundipe et al. (2020), forensic accounting practices, including data mining and ratio analysis, are critical in uncovering fraudulent activities that traditional auditing methods may overlook. These techniques help detect patterns, anomalies, and inconsistencies in financial transactions that could suggest financial misconduct.

However, some studies have highlighted limitations to the effectiveness of these techniques. For instance, while data mining is widely praised for its ability to process large datasets, critics argue that its successful implementation requires significant technological investment and expertise (Olowookere & Dauda, 2022). Similarly, while ratio analysis is effective in detecting numerical discrepancies, it does not address the broader organizational and cultural factors that may influence fraud behavior in public institutions (Akinyemi & Okoye, 2021). These critiques suggest that while forensic accounting tools are powerful, they must be part of a broader strategy that includes strengthening internal controls and fostering a culture of accountability

1. Conclusion and Recommendations

The findings from this study highlight the significant role that forensic accounting techniques, particularly data mining and ratio analysis, play in detecting and preventing fraud within the Nigerian public sector. The data mining results indicated a strong positive relationship between the use of data mining and fraud detection, aligning with current literature that emphasizes its effectiveness in uncovering hidden fraudulent activities. Similarly, the significant relationship between ratio analysis and fraud detection reinforces the value of financial analysis in identifying discrepancies that could indicate financial misconduct. These findings underline the importance of implementing and strengthening forensic accounting practices within public institutions, particularly in the Office of the Accountant General of the Federation (OAGF) and similar organizations, to ensure greater financial accountability, transparency, and trust in public financial management. Recommendations was based on the findings as follows:

i. Given the significant positive relationship between forensic accounting techniques and fraud detection, it is recommended that public sector employees, particularly those in financial management roles, undergo continuous training in advanced forensic accounting techniques. This should include not only data mining and ratio analysis but also other forensic tools that can help detect anomalies in financial records. Capacity-building initiatives should also address the integration of these tools into daily financial practices to increase their effectiveness in preventing fraud.
ii. Public sector institutions should adopt comprehensive fraud detection systems that combine forensic accounting techniques with other internal control mechanisms. This will help create a multi-layered approach to fraud detection, ensuring that no fraudulent activity goes undetected. Institutions should invest in the necessary technology and infrastructure to support data mining and ratio analysis, and integrate these tools into regular audits and financial reporting processes. This approach will ensure that fraud detection remains proactive, rather than reactive, improving the overall financial management in the public sector.

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