

# Forensic Accounting, Internal Control Impact on Nigerian Public Sector Fraud Prevention: A Descriptive Analysis

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## Abstract

Fraud remains a pervasive challenge in Nigeria's public sector, undermining governance, public trust, and economic stability despite extensive reforms and anti-corruption initiatives. This persistent challenge erodes public trust, hinders economic development, and weakens governance structures. This study investigates the combined roles of forensic accounting and internal controls in preventing fraud in the Nigerian public sector. Using the COSO framework and the Fraud Pentagon Model, the research aims to evaluate the interplay of these mechanisms in addressing fraud risks. A quantitative approach was adopted, and primary data was collected from 385 finance, accounting, audit, and forensic experts in federal ministries and agencies. A structured Likert-scaled questionnaire was used to assess the effectiveness of internal controls, forensic accounting practices, and the prevalence of fraud risk factors. Descriptive statistical analysis was performed using SPSS software to identify trends and relationships within the data. The study confirmed the presence of all five components of the Pentagon fraud model of pressure with a mean of 3.50, opportunity (3.31), motivation (3.47), capability (3.34), and personal ethics (3.47), indicating a high probability of fraudulent activities. Internal control elements showed moderate effectiveness, with control activities (mean = 3.50) and monitoring (3.49) being the strongest, while risk assessment (3.27) and communication practices (3.36) were weaker. Forensic accounting practices contributed significantly to fraud prevention through control system reliance (3.42), digital fraud review frequency (3.39), and ethical philosophy (3.39). However, critical tools such as whistleblower systems (2.91), litigation support (3.18), and sustainable governance mechanisms (3.07) were underutilized, limiting their impact on fraud prevention efforts. The findings underscore the

need for enhanced fraud prevention strategies in Nigeria's public sector. Strengthening underperforming internal control elements and underutilized forensic accounting tools, particularly whistleblower protections and governance frameworks, are critical. Investments in advanced digital fraud detection technologies and regular employee training can significantly enhance fraud prevention. Promoting ethical leadership and fostering a culture of accountability are also crucial to mitigating fraud risks. Integrating forensic accounting and internal controls offers a comprehensive approach to combating fraud, strengthening governance, and restoring public trust.

### Keywords

Forensic Accounting, Fraud Prevention, Internal Control, Vutumu Forensic Accounting Theory, Pentagon Fraud Model, Nigerian Public Sector

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## 1. Introduction

Nigeria is the most populous country in Africa and a key player in its economic dynamics, so it heavily relies on its public sector to drive developmental goals. The Nigerian Public Sector, characterized by its size, complexity, and critical role in national development, has evolved, adapting to changing socio-economic and technological landscapes. However, the sector has historically grappled with issues of corruption, financial mismanagement, and fraudulent practices (Efut & Okoye, 2019; Agbo & Obodoekwe, 2020). Public Sector Corruption (PSC) in Nigeria is a social reality which is a multifaceted phenomenon (Suleiman, Yahaya, & Abba, 2018) that has witnessed a surge in recent years (Alhassan, 2021; Egiyi, 2022). The misallocation and misappropriation of public funds pose a significant threat to the nation's socio-economic fabric. The evolution of fraud within this context has transitioned from traditional forms of corruption to more sophisticated schemes. In other words, traditional forms of corruption, such as bribery and embezzlement, infringement of public property, nepotism, money laundering, collusion, procurement of goods, bribery, and blandishment in the awarding of public contract (Sorunke, 2018; Dwimawanti & Ramadani, 2023), have been compounded by sophisticated financial schemes and cybercrimes. These crimes are a bane of slow development to the Nigerian and developing economies, causing financial distress and income inequality to the populace (Dada & Jimoh, 2020). Understanding this evolution is crucial in developing comprehensive strategies that address both historical and emerging forms of fraudulent activities.

Over the years, the Nigerian government has recognized the urgency of addressing fraud within its public sector (Amaefule, Okoye, & Umeaka, 2017; Amah, 2023). Various initiatives and reforms have been implemented to strengthen institutional frameworks, enhance transparency, and promote accountability within the public sector. These efforts include the establishment of anti-corruption agencies, the adoption of technology-driven solutions, and a commitment to integrating

international best practices in financial management (Ogunode & Dada, 2022). Some of these institutional frameworks include the Economic and Financial Crimes Commission (EFCC), the Independent Corrupt Practices Commission (ICPC), the Code of Conduct Bureau (CCB) and the Police Special Fraud Unit (PSFU) (Mike, Okpe, & Abu, 2022; Eneisik & Ogbonna, 2021).

Despite these reforms, fraud remains a pervasive issue in Nigeria's public sector, straining resources and eroding institutional trust (Amaefule, Okoye, & Umeaka, 2017). Furthermore, Onuora, Akpoveta, and Agbomah (2018) emphasize that fraud in Nigeria is most pronounced in the public sector, contributing to widespread economic distress. The persistent nature of these challenges highlights the need for more proactive and sophisticated fraud prevention methods. Fraud prevention involves the integration of all efforts that may be used to reduce the opportunities to commit fraud, ensure employees are not under any pressure to meet their needs that would lead to committing fraud, and lastly, ensure that there is no justification by employees to commit fraud (Nyakarimi, Kariuki, & Kariuki, 2020). As Adebayo (2023) puts it, fraud prevention implies several systems designed to prevent the occurrence and prevalence of fraud.

Therefore, in this intricate landscape, the interconnected roles of forensic accounting and internal control mechanisms have emerged as crucial components in safeguarding public resources and fostering accountability in the Nigerian public Sector. Internal controls encompass various policies, procedures, and practices designed to ensure compliance, safeguard assets, and promote effective governance (Okoye & Mbanugo, 2020; Eze & Okoye, 2019). In other words, internal control systems are organizational policies and procedures created to prevent the misguided use of business resources for unauthorized or illegal functions, thereby enhancing operational efficiency. Internal control mechanisms form the backbone of any effective fraud prevention strategy (Agbenyo, Jiang, & Cobblah, 2018; Murti & Kurniawan, 2019), thereby acting as the first defense against fraud in any organization's governance structure. As Agang and Njoka (2020) emphasize, fraud prevention plays an integral part in the governance of institutions in any country. Strong internal control will enhance business operational efficiency, while weak internal control systems increase the chances of fraud and scandals occurring. In other words, weak internal control creates opportunities for perpetrators of fraud. (Jikiri et al., 2022).

However, existing literature reveals that internal control systems within the Nigerian public sector have been weak, with numerous cases of fraud and corruption involving government officials exposed in the media (Ogunode & Dada, 2022). Weak internal control systems within public institutions have been accused as significant enablers of these fraudulent activities. These systems, designed to ensure accountability and transparency, often fail due to insufficient oversight, poor enforcement of existing regulations, collusion (Ogwiji & Lasisi, 2022; Suleiman et al, 2018), lack of deterrents against fraudulent practices, further compounded by weak internal audit functions (Dada & Jimoh, 2020).

These observations reinforce the urgency for adopting forensic accounting tools, such as fraud auditing, data analytics, and investigative techniques (Ogunode & Dada, 2022), as part of a broader strategy to reinforce internal control systems in combating fraud. In other words, the need for forensic accounting arises from the failure of traditional internal control mechanisms to detect sophisticated fraud schemes, thereby playing a critical role in enhancing fraud detection and prevention. Forensic accounting combines accounting, auditing, and investigative skills to examine financial transactions, uncover fraud, and support litigation in legal disputes (Alhassan, 2021). Therefore, by implementing forensic accounting practices, public sector institutions can strengthen their internal controls, mitigate the risk of fraud, and ensure more transparent management of public resources. Unfortunately, studies have identified the absence of political will, poor ethical leadership, and a shortage of skilled forensic accounting professionals as significant barriers to effective fraud prevention in Nigeria (Abdulrahman, 2019).

This paper thus aims to use a robust descriptive analysis to shed light on how forensic accounting and internal control, as symbiotic forces, can significantly fortify the resilience of the Nigerian Public Sector against the ever-evolving threats of fraudulent activities. While existing research has predominantly examined these components separately, this study takes a novel approach by investigating their synergistic effects, offering a more comprehensive understanding of how these tools can jointly fortify the public sector against evolving fraud threats within the proposed multivariate framework under the Vutumu Forensic Accounting theory (Vutumu, 2024). The findings aim to contribute to the ongoing discourse on enhancing Nigeria's anti-fraud architecture, with implications for policy and practice in one of Africa's most critical public sectors.

## 2. Review of Literature

### 2.1. Overview of Public Sector Fraud in Nigeria

Public sector fraud in Nigeria is a critical challenge that has undermined sustainable governance, socio-economic growth and development, and public trust for decades, fueled by weak governance structures, lack of accountability, and entrenched corruption (Okoye & Mbanugo, 2020), exacerbated by illicit financial flows and the mismanagement of government enterprises (Dada & Jimoh, 2020).

Common types of fraud in the Nigerian public sector include procurement fraud, payroll fraud (ghost workers), contract inflation, embezzlement, misappropriation of funds, money laundering, extortion, bribery, financial statement fraud, and digital fraud. These various forms of fraud illustrate the complexity of the issue and the urgent and continual need for robust preventive measures.

#### **Fraud Prevention Initiatives in Nigeria**

Several initiatives have been undertaken to prevent fraud in both the public and private sectors (Okpala & Enwefa, 2017). Erbuğa (2022) emphasized that taking preventive measures against fraud risks and managing them is the most fundamental

step to prevent fraud in the public sector. Some of the key initiatives aimed to enhance transparency, accountability, and the overall integrity of financial processes in the Nigerian public sector include the following:

**1) Establishment of anti-corruption agencies:** Such as the Economic and Financial Crimes Commission (EFCC) and the Independent Corrupt Practices and Other Related Offences Commission (ICPC) to function as anti-corruption crusaders (Suleiman, Yahaya, & Abba, 2018), responsible for investigating and prosecuting cases of fraud, deterring potential offenders, and recovering stolen assets (Amaefule, Okoye, & Umeaka, 2017).

**2) Legal Reforms:** The enactment of comprehensive legal frameworks that provide a solid foundation for the investigation, prosecution, and punishment of fraudulent activities. For example, the Whistleblower Protection Act (2016) encourages individuals to report fraud by providing safeguards and incentives for whistleblowers.

**3) Financial management:** The implementation of International Public Sector Accounting Standards (IPSAS) and the adoption of modern accounting systems, among other financial management reforms, help enhance financial transparency, accountability, and accuracy of financial reporting in Nigeria's public and private sectors.

**4) Technological Advancements:** The adoption of digital systems and tools has enhanced efficiency, transparency, and accountability in various sectors (Abu, Lateef, & Echobu, 2018).

**5) Capacity Building Programs:** Institutions such as the Nigerian Institute of Chartered Accountants (ICAN) and the Association of National Accountants of Nigeria (ANAN) provide training, certification, and continuing professional development programs in forensic accounting and fraud examination.

**6) International Cooperation:** international cooperation in the fight against fraud, such as the United Nations Office on Drugs and Crime (UNODC), Interpol, the Financial Action Task Force (FATF), and the World Bank to strengthen its anti-fraud efforts. These initiatives highlight Nigeria's commitment to combating this pervasive problem.

## 2.2. Theoretical Framework

The research's theoretical framework integrates the Fraud Pentagon Model, the COSO Internal Control Framework, and the proposed Vutumu Forensic Accounting theoretical framework.

### 2.2.1. The Fraud Pentagon Model

This model, evolving from earlier fraud theories, emphasizes five elements: opportunity, pressure, rationalization, capability, and personal ethics. The study utilizes this model to explore factors contributing to fraud and assess how internal control mechanisms influence these elements. Earlier fraud theories included the White-collar crime Theory developed by Sutherland in 1939, the Fraud Triangle Theory developed by Donald Cressey in 1953, then the Fraud Diamond Theory

developed by Wolfe and Hermanson, in 2004, as a refinement of the Fraud Triangle Theory by including the capability (Ogunode & Dada, 2022). This, therefore, led to the Fraud Pentagon Model, developed by a Nigeria researcher, Sorunke, in 2016, who, after critically examining the fraud diamond theory, proposed that personal ethics should be integrated into the model as a key factor in fraudster's motivation. This has been supported by other studies such as Said, Alam, Ramli, & Rafidi (2017) and by Sujeewa, Yajid, Khatibi, Azam, & Dharmaratne (2018), who highlight the significance of incorporating the ethical values of the employees into those grounded theories in Malaysia. The study will investigate how internal control mechanisms and forensic accounting practices influence these elements and, consequently, the effect on the occurrence of fraud.

### **2.2.2. Internal Control (COSO) Framework**

The Committee of Sponsoring Organisations of the Treadway Commission (COSO) model is a widely recognized model that aims to improve the effectiveness of internal control systems. It identifies key components for designing robust control systems and is a foundation for assessing their effectiveness in preventing fraud. (Mardas, Zentar, & Loulid, 2022; Nyakarimi, Kariuki, & Kariuki, 2020). The COSO Framework holds significant relevance for fraud prevention within the Nigerian public sector because, given the specific challenges and vulnerabilities in the public sector, implementing strong internal controls becomes paramount to preventing fraud. The COSO Internal Control components are control environment, risk assessment, control activities, information and communication, and monitoring activities. The Control Environment is the foundation for fraud prevention, emphasizing establishing an ethical culture and management's unwavering commitment to integrity. The Risk Assessment component is pivotal, contributing to fraud prevention by systematically identifying and evaluating potential risks, enabling organizations to address vulnerabilities proactively. Control Activities form an integral part of the framework, involving implementing specific policies, procedures, and controls such as segregation of duties and authorization processes, creating a robust structure for preventing and detecting fraudulent activities. Information and Communication play a crucial role by ensuring transparent communication of anti-fraud policies and procedures, fostering awareness, and cultivating a vigilant organizational environment. Monitoring Activities, the final component, involves continuous evaluation and surveillance of internal controls and fraud prevention measures, allowing organizations to adapt swiftly to emerging risks and changing dynamics.

### **2.2.3. Vutumu Forensic Accounting Theory (VFAT)**

The Vutumu Forensic Accounting Theory is the new multivariate theory proposed by Vutumu (2024), designed to extend beyond existing fraud prevention models by incorporating multiple variables crucial for effective forensic accounting. These variables include control system reliance, litigation support, whistleblower hotlines, sustainable governance systems, ethical philosophies, digital

fraud review frequencies, accounting record-to-reporting quality, and the frequency of system review. Control system reliance variable assesses an organization's dependency on internal controls for mitigating fraud risks, ensuring their effectiveness. Litigation support variable involves providing expert financial analysis and testimony during legal proceedings, aiding in resolving disputes arising from fraudulent activities. Whistleblower hotlines offer a confidential avenue for reporting suspicions of fraud and facilitating early detection and investigation. Sustainable governance systems prioritize ethical practices and transparency, fostering integrity and responsibility in forensic accounting. Ethical philosophies guide professional conduct, emphasizing high ethical standards to enhance the credibility of fraud prevention efforts. Digital fraud review frequencies ensure adaptability by regularly assessing digital transactions in the evolving financial landscape. Accounting record-to-reporting quality is paramount, as well as maintaining accurate and reliable financial records for robust fraud prevention. Lastly, the frequency of system reviews demonstrates an organization's commitment to identifying weaknesses and enhancing fraud prevention measures by regularly assessing internal control systems, accounting processes, and information systems.

Integration of these theories in this study involves using the Fraud Pentagon to identify risks, testing the effectiveness of the COSO framework to address them, and examining the proposed Vutumu Forensic Accounting Theory (VFAT) variables for preventive and detective investigation assurance. aiming to contribute valuable insights to enhance fraud prevention efforts.

### 2.3. Empirical Review

A review of empirical studies underscores the critical role of forensic accounting and robust internal controls in safeguarding organizational integrity, particularly in the public sector. It explores diverse frameworks and models to better understand the mechanisms driving fraud prevention in the Nigerian public sector.

On forensic accounting, [Alhassan \(2021\)](#) empirically evaluated the relationship between forensic accounting and fraud detection and prevention in Nigerian ministries using a survey design. Primary data was obtained by administering questionnaires to a sample of fifty (50) respondents consisting of auditors and accountants in ten (10) ministries chosen from Federal Capital Territory (FCT) Abuja in Nigeria. Testing the hypotheses using the analysis of variance (ANOVA) at a 5% significant level showed that forensic accounting has a significant effect on fraud prevention. Another study carried out by [Oladipo & Olurotimi \(2021\)](#) to examine the influence of forensic accounting as a tool of fraud prevention and fraud detection in MDAs (Ministry, Department, or Agency) in Nigeria predicated on the policeman theory, white-collar theory, and fraud diamond theory. The study adopted a cross-sectional survey design covering 10 years from 2010-2020. Primary data was collected by administering seventy-five (75) questionnaires to the Integrated Personnel Payroll Information System staff and Office of the Account General of Federation. Descriptive statistics was used, while regression analysis

was employed to test the hypotheses. The findings revealed a significant positive relationship between forensic accounting and fraud prevention in Nigeria MDAs, recommending that forensic accounting systems be allowed as a procedure for an effective fraud prevention system for internal control systems. The current study deviates from the recommendation because it has not considered forensic accounting as part of the internal control system but aimed to examine the combined effect of internal control and forensic accounting on fraud prevention. Similar findings were recorded from other studies, such as [Eze & Okoye \(2019\)](#) on the effects of forensic accounting and fraud prevention in the Nigerian public sector with Imo state as a case study; [Afriyie et al. \(2021\)](#) on the relevant forensic accounting knowledge in fraud detection and prevention; and [Okoye & Mbanugo \(2020\)](#) on how forensic accounting can be used as a tool for the detection and prevention of fraud in tertiary institutions in Southeast Nigeria.

[Ariyo-Edu & Woli-Jimoh \(2024\)](#) investigated the impact of forensic accounting on detecting and preventing public sector fraud in Kwara State, Nigeria, by administering 100 questionnaires to accountants and internal auditors from 15 MDAs across diverse sectors within Kwara State. The results of the descriptive and inferential statistics analysis revealed that forensic accounting techniques positively impacted fraud detection and prevention. Similarly, [Aliyu & Hussaini \(2024\)](#) examined the impact of forensic accounting on fraud management in the Nigerian public sector, using three states of the North-Eastern geo-political zone of Nigeria as a case study and found a significant positive relationship between forensic accounting and the public sector fraud prevention and detection. This contrasted with a study carried out by [Wahyudi et al. \(2024\)](#) on the effect of internal control, forensic accounting, and investigative audits on fraud, who found that forensic accounting has no effect on fraud disclosure but does have a positive and significant effect on internal control and investigative audits in Indonesian public sector. This was after applying multiple regression analysis techniques to responses from 96 auditors at the Regional Inspectorate of PALI Regency, Indonesia.

On internal control, [Ibrahim \(2017\)](#) carried out an empirical analysis of the effect of internal control on the public sector revenue generation in Nigeria at the Federal Inland Revenue Service (FIRS), using both qualitative and quantitative approaches, with questionnaires administered on a population of 38 senior staff in 2016. The data was analyzed using linear regression, and it found that all the COSO components significantly impact the quality of the organization's internal control systems. However, it needed to indicate which framework component was more impactful than the others. [Vutumu, Aregbeyen, & Akinteye \(2024\)](#) investigated the effect of internal control and fraud prevention in the Nigerian Public Sector using a descriptive cross-sectional survey design with a questionnaire administered to 43 federal ministries and agencies involved in governance oversight. A sample of 385 respondents, comprising accounting and finance managers, internal auditors, and forensic accountants, was analyzed through Partial Least Squares Structural Equation Modeling (PLS-SEM). The study revealed that risk

assessment, information and communication, and monitoring activities significantly positively impact fraud prevention in the Nigerian public sector; control activities showed a significant but negative relationship, while control environment had an insignificant effect.

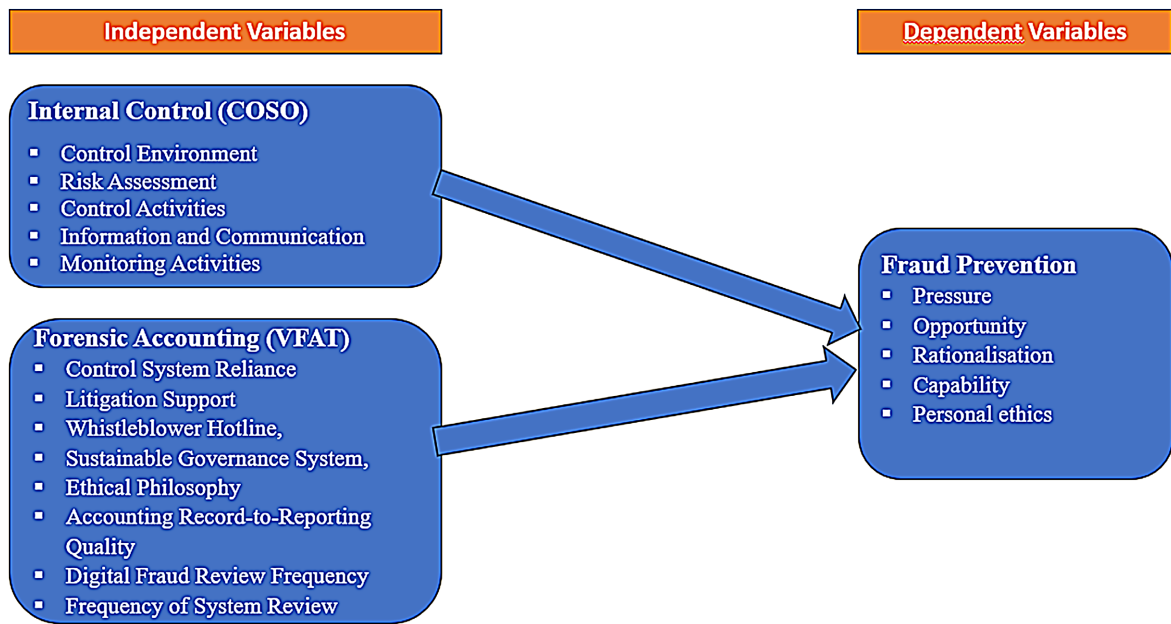
In another study, [Oguda, Odhiambo, & Byaruhanga \(2015\)](#) investigated the effect of internal controls on fraud prevention and detection in district treasuries of Kakamega County in Kenya, revealing that there was a statistically significant and positive relationship between the adequacy of internal control systems and fraud prevention and detection in district treasuries. And analyzing the effect of internal control and antifraud awareness on fraud prevention in inter-governmental organizations, [Yuniarti \(2017\)](#) found that internal control and anti-fraud awareness have significant effects on fraud prevention. That robust internal control and increased anti-fraud awareness constitute strong deterrence to the occurrence of fraud.

Similarly, on fraud prevention theories, [Suleiman, Yahaya, and Abba \(2018\)](#) explored expert perceptions of public sector fraud in Nigeria, following challenges in obtaining insights directly from the perspectives of corrupt public officials. Face-to-face interviews were conducted with representatives from Nigeria's prominent anti-corruption agencies, the Independent Corrupt Practices Commission (ICPC) and the Economic and Financial Crimes Commission (EFCC). Using a qualitative research approach, the study found that public sector fraud in Nigeria is a complex social reality, emphasizing the importance of understanding perceptions of fraud and implementing appropriate measures to address them. However, the study did not target the fraudsters to understand what pushes them to commit fraud. In another study, [Dwimawanti and Ramadani \(2023\)](#) empirically assessed the fraud potential of the public service in Indonesia by analyzing the components of the Fraud Diamond Theory, adopting the descriptive qualitative approach by using secondary data. The study found that public service fraud in Indonesia is influenced by Fraud Diamond Theory components of pressure, opportunity, rationalization, and capability.

Most studies have focused on examining either the impact of internal controls or forensic accounting on fraud prevention, with only a few, such as [Wahyudi et al \(2024\)](#), exploring both aspects together. This study addresses the gap by integrating internal controls and forensic accounting, employing the COSO framework and the proposed multivariate Vutumu Forensic Accounting Theory to assess their respective impacts. Unlike earlier studies that primarily examined individual variables or separate frameworks, this research adopts an integrated approach to analyze the combined impact of internal controls and forensic accounting on fraud prevention in Nigeria's public sector, providing a novel contribution toward a lasting solution to fraud.

## 2.4. Conceptual Framework

The conceptual framework for this study ([Figure 1](#)) revolves around examining



**Figure 1.** Conceptual framework: combining effect of COSO and VFAT on fraud prevention.

the interplay between forensic accounting and internal control as independent variables and their collective impact on fraud prevention, the dependent variable. In other words, the research anticipates uncovering insights into how integrating forensic accounting practices and robust internal control systems can contribute to enhanced fraud prevention measures within the Nigerian public sector.

### 3. Methodology

A quantitative research approach was adopted for the study. Primary data was collected using a cross-sectional correlational design employing a closed-ended structured questionnaire administered to respondents using a five-point Likert scale system. Over 650 questionnaires were administered. The choice of the quantitative survey research design approach and method is found in extant literature in different settings tacking different populations, such as studies by Saman (2019), Lawan, Abba, & Suleiman (2018), Ojo-Agboodu, Abiola, & Ndubusi (2022).

#### Sample Size and Sampling Technique

The study population involved the finance, accounting, internal audit, and forensic experts within federal ministries and agencies. Given the large and unknown population, this study adopted the minimum acceptable sample size using **Cochran's formula** (Cochran, 1977) for calculating sample size as follows:

$$N = z^2 pq / d^2,$$

where  $z = (1.96)^2$ ,  $p = 50\%$ , for a population of unknown proportion,  $q = 1 - p$ , and  $d^2 = (0.05)^2 = 384.15$ . The minimum sample size was therefore estimated at 385. This is supported by studies by Ashwin, Avinash, Som, & Arati (2020).

The study adopted a mixed sampling technique, which was a combination of

the non-probability purposive sampling technique to select expert populations within the federal ministries and agencies and then a random sampling technique to select respondents to the questionnaires within the samples of specialized individuals purposively selected.

The validity and reliability of the instruments were assessed using Cronbach's alpha. These constructs/items were derived from the Pentagon fraud Model, Vutumu Forensic Accounting Theory, and the COSO framework. The pilot test revealed that all items achieved Cronbach's Alpha values above 0.7, demonstrating strong reliability and high factor loadings.

Data analysis adopted the descriptive technique, which included tabulation, depiction, and description of data gathered from the sample. Data collected manually and by an internet-based tool was analyzed via the Statistical Package for Social Science (SPSS). This test provided a clear picture of the properties of collected data to summarise it into a manageable form.

#### 4. Data Analysis and Interpretations

In designing the research questions, we delved into the perspectives of the participants regarding diverse aspects contributing to fraud as spelled out in the Pentagon Fraud Model, the impact of the Internal Control components, and the Vutumu Forensic Accounting framework metrics on fraud prevention within the Nigerian public sector. Participants assessed the degree to which the questionnaire items aligned with the conceptualizations of these various measures. Employing a 5-point Likert-type scale, responses spanned from "strongly agree" (5) to "strongly disagree" (1), with a neutral midpoint at 3. A mean score of 3 and above denoted agreement or a positive response, while a mean below 3 suggested a less favorable viewpoint.

For our analysis, we shall regroup respondents' views as follows: "agree" and "strongly agree" shall be grouped under "agree" and "disagree" and "strongly disagree" shall be grouped under "disagree."

##### 4.1. Fraud Prevention in the Nigerian Public Sector

The study identified factors contributing to fraud within the Nigerian public sector through the Pentagon Fraud Model variables of pressure, opportunity, rationalization, capability, and personal ethics, as follows:

###### 1) Pressure

**Table 1.** Respondents' views on pressure.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
External pressures and fraud risk	14 (3.6%)	27 (7.0%)	91 (23.6%)	179 (46.5%)	74 (19.2%)	3.71
Addressing external pressures	14 (3.6%)	103 (26.8%)	111 (28.8%)	134 (34.8%)	23 (6.0%)	3.31
Overall mean						<b>3.5</b>

An assessment of respondents' views on fraud prevention and the fraud Pentagon model recorded 253 (65.7%) agreement that external pressures, such as economic conditions or political influence, contribute to the risk of fraud in the Nigerian public sector (**Table 1**). This highlights the importance of addressing these external pressures in fraud prevention strategies to mitigate the risk of fraudulent behavior. The mean of 3.71 recorded on this item shows relatively high agreements.

Similarly, 157 (40.8%) of the respondents agreed that the Nigerian public sector addresses and mitigates external pressures in fraud prevention. However, there is still room for improvement, as a significant percentage of 111 (28.8%) respondents are neutral. A mean of 3.31 confirmed that, on average, opinions weighed more towards an agreement that the Nigerian public sector addresses and mitigates. The overall mean of 3.5 also confirms this assertion.

### 2) Rationalization

Half of the respondents, 193(50.2%), agreed that fostering a culture of ethics and fairness helps deter the rationalization of fraudulent behavior in the Nigerian public sector. Nonetheless, a significant proportion of 129 (33.5%) recorded neutral views on this and a mean of 3.39, which may imply that they do not have adequate information on the actions put in place. Also, actively discouraging the rationalization of fraudulent actions among public sector employees is crucial for effective fraud prevention, recorded 224 (58.1%) in agreement and a mean of 3.54 (**Table 2**). The overall mean of 3.47 shows that these measures should be put in place to mitigate against chances of fraud occurring.

### 3) Opportunity

About 165 (42.9%) agreed that the internal controls and checks within Nigeria's public sector organizations effectively prevent fraud (Mean = 3.18) (**Table 3**). However, 199 (51.7%) respondents confirmed that existing opportunities within the Nigerian public sector contribute to the occurrence of fraud (Mean = 3.44). The neutral responses of 137 (35.6%) at 3.44 mean that most of the neutral are

**Table 2.** Respondents' views on rationalization.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Culture of ethics and fairness	12 (3.1%)	51 (13.2%)	129 (33.5%)	162 (42.1%)	31 (8.1%)	3.39
Discouraging rationalization of fraud	7 (1.8%)	50 (13.0%)	104 (27.0%)	178 (46.2%)	46 (11.9%)	3.54
Overall mean						<b>3.47</b>

**Table 3.** Respondents' views on opportunity.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Effectiveness of internal controls	20 (5.2%)	76 (19.7%)	124 (32.2%)	147 (38.2%)	18 (4.7%)	3.18
Existing opportunities and fraud occurrence	10 (2.6%)	39 (10.1%)	137 (35.6%)	172 (44.7%)	27 (7.0%)	3.44
Overall mean						<b>3.31</b>

tilted towards agreeing that the existing opportunities encourage fraudulent activities. This is further affirmed by the overall mean of 3.31, higher than 3.18, which is the mean of the point that checks within public sector organizations in Nigeria are effective in preventing fraud.

#### 4) Capability

The survey recorded 154 (40%) responses that public sector employees in Nigeria were adequately trained and equipped to prevent fraudulent activities (mean 3.09) (Table 4). The low mean of 3.09 on training is a strong signal that more efforts are required to improve the training of employees and fraud awareness campaigns. However, they recognize that training reduces fraud likelihood with 199 (51.7%) confirmation. The highly neutral responses in both cases may imply that the employees do not have adequate information on the training agenda.

#### 5) Personal Ethics

Strong personal ethics among public sector employees contribute to a more effective fraud prevention environment, as fortified by 227 (59.0%) agreements (Table 5). Similarly, 199 (51.7%) respondents confirm that existing ethics training and awareness programs effectively deter fraudulent behaviors in the Nigerian Public Sector (Mean = 3.41). These responses and the very high mean strongly support the Pentagon Fraud Model for adding the fifth element to the Fraud Diamond Theory.

Figure 2 shows a comparative view of the respondents' views on the different dimensions of the fraud prevention Model. The rationality factor stood out with the highest average score on the agreement scale, while the opportunity factor recorded the lowest score. However, all the factors were above the 3-point neutral, pointing towards agreement on the indicators.

## 4.2. Internal Control System of Nigeria's Public Sector

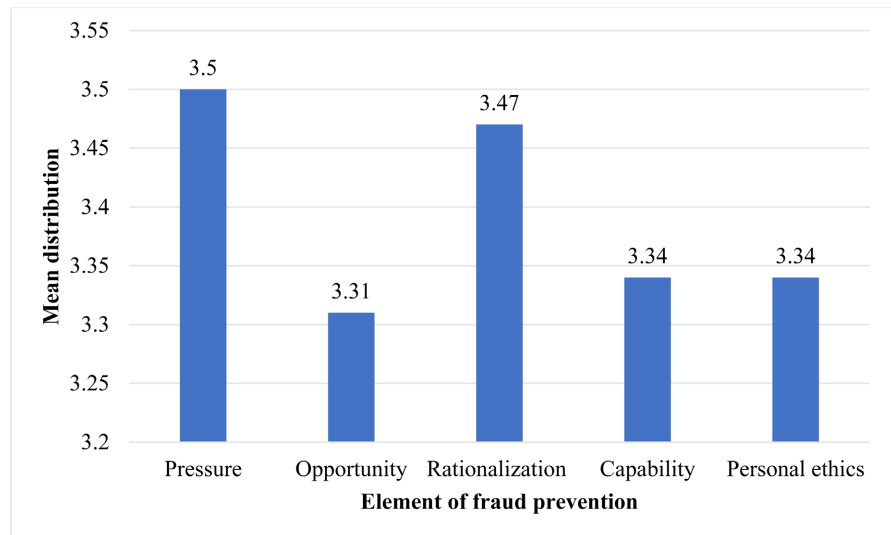
Another aspect of the study is to describe the internal control system within the

**Table 4.** Respondents' views on capability.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Adequate training of employees	26 (6.8%)	85 (22.1%)	120 (31.2%)	137 (35.6%)	17 (4.4%)	3.09
Training reduces fraud likelihood	11 (2.9%)	50 (13.0%)	125 (32.5%)	170 (44.2%)	29 (7.5%)	3.41
Overall mean						3.34

**Table 5.** Respondents' views on personal ethics.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Personal ethics	5 (1.3%)	40 (10.4%)	113 (29.4%)	199 (51.7%)	28 (7.3%)	3.54
Awareness of fraud prevention programs	11 (2.9%)	50 (13.0%)	125 (32.5%)	170 (44.2%)	29 (7.5%)	3.41
Overall mean						3.47



**Figure 2.** Mean distribution of the elements of fraud prevention in the Nigerian public sector.

Nigerian public sector as perceived by the respondents, using the COSO framework comprising control environment, risk assessment, control activities, information and communication, and monitoring activity criteria.

**1) Control Environment**

**Table 6** outlines responses on senior management commitment, ethical priorities, and the control environment in the Nigerian public sector. Approximately 46.7% agree senior management demonstrates a strong commitment to integrity, with 27.0% neutral. Similarly, 46.2% agree that ethical behavior and integrity are priorities emphasized by senior management, with 25.7% neutral. Over half (52.5%) believe the sector has established a controlled environment fostering accountability and transparency, supported by a mean of 3.29. Additionally, 55.9% confirm that accountability and transparency are actively promoted within the control environment, with a mean of 3.39. About 58.9% believe the control environment positively influences employee behavior, reducing the likelihood of fraud, reflected in a mean of 3.42. While some respondents hold neutral or opposing

**Table 6.** Respondents’ views on control environment.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Management’s Commitment to Integrity	22 (5.7%)	79 (20.5%)	104 (27.0%)	150 (38.9%)	30 (7.8%)	3.23
Emphasis on Ethical Behaviour	20 (5.1%)	85 (22.1%)	99 (25.7%)	158 (41.1%)	20 (5.1%)	3.19
Positive Control Environment	16 (4.2%)	86 (22.3%)	81 (21.0%)	176 (45.7%)	26 (6.8%)	3.29
Promotion of Accountability	10 (2.6%)	80 (20.8%)	80 (20.8%)	180 (46.8%)	35 (9.1%)	3.39
Control Environment & Fraud Prevention	14 (3.6%)	72 (18.7%)	70 (18.2%)	193 (50.1%)	34 (8.8%)	3.42
Overall mean						<b>3.30</b>

views, the overall mean of 3.30 indicates a tendency towards agreement in various aspects of the control environment in the Nigerian public sector.

### 2) Risk Assessment

A positive response is noted in **Table 7**, where 48.8% agree that regular risk assessments are conducted, which is crucial for identifying potential risks. Additionally, 49.1% acknowledge management's use of fraud risk assessment results to develop control measures, with 23.1% disagreeing. Regarding the prompt implementation of control measures, 47.8% agree that a crucial step in mitigating risks. Effective risk assessment processes are recognized by 50.4%, and 57.6% confirm using risk assessment findings to implement fraud prevention measures. With means averaging 3.25 to 3.47, the opinions suggest that risk assessments are a robust control measure in the Nigerian public sector, as reflected in the global mean of 3.31, tilted towards agreement.

### 3) Control Activities

In **Table 8**, 62.8% agree that control activities, including segregation of duties and authorization processes, effectively prevent fraud in the Nigerian public sector, with a high mean of 3.60 confirming this positive perception. Moreover, 62.3% assert a strong internal control system focused on safeguarding assets and proactively identifying potential fraudulent activities, supported by a mean of 3.56. Additionally, 55.1% agree that robust internal controls are firmly established in the sector, focusing on safeguarding assets and identifying potential fraud (mean

**Table 7.** Respondents views on risk assessment.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Regular Risk Assessments	17 (4.4%)	80 (20.8%)	100 (26.0%)	165 (42.9%)	23 (5.9%)	3.25
Utilization of Assessment Insights	13 (3.4%)	76 (19.7%)	107 (27.8%)	163 (42.3%)	26 (6.8%)	3.29
Prompt Control Measures	12 (3.1%)	79 (20.5%)	100 (26.0%)	170 (41.6%)	24 (6.2%)	3.27
Effective risk assessment processes	12 (3.1%)	79 (20.5%)	110 (28.6%)	160 (44.2%)	24 (6.2%)	3.29
Utilization of risk assessment findings	9 (2.3%)	48 (12.5%)	106 (27.5%)	195 (50.6%)	27 (7.0%)	3.47
Overall mean						3.314

**Table 8.** Respondents' views on control activities.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Control activities like segregation of duties	3 (0.8%)	66 (17.1%)	74 (19.2%)	188 (48.8%)	54 (14.0%)	3.60
Prioritization of control activities	7 (1.8%)	62 (16.1%)	76 (19.7%)	190 (49.3%)	50 (13.0%)	3.56
Robust internal controls	12 (3.1%)	57 (14.8%)	104 (27.0%)	175 (45.5%)	37 (9.6%)	3.44
Monitoring of control activities	02 (0.5%)	78 (20.3%)	101 (26.2%)	161 (41.8%)	43 (11.2%)	3.43
Continuous evaluation of controls	4 (1.0%)	75 (19.5%)	99 (25.7%)	182 (47.3%)	35 (9.1%)	3.51
Overall mean						3.51

= 3.44). Continuous monitoring commitment is acknowledged by 53.0%, and a mean of 3.43 suggests ongoing effectiveness. Lastly, 56.4% recognize continuous evaluation as vital for maintaining control activity efficiency in preventing fraud, as reflected in the mean of 3.51. Overall, the results indicate a strong emphasis on control activities in the Nigerian public sector, with means consistently above the threshold of 3 and a positive perception towards ongoing assessment and improvement.

#### 4) Information and Communication

Regarding information and communication practices in the Nigerian public sector, 60.6% confirm effective processes for communicating internal control policies and fraud prevention guidelines (Table 9). This positive perception is supported by a mean of 3.51. However, only 43.3% agree that employees feel comfortable reporting suspected fraud, reflected in a low mean of 3.15, indicating a less supportive environment for reporting and potential whistleblower retaliation. Overall, information and communication practices are perceived as relatively less effective in promoting accountability and integrity, with a mean of 3.15. Despite 57.4% agreeing that accountability and integrity are fostered through effective practices, a high degree of neutral views suggests a need to address reasons behind neutrality for more effective promotion of transparency and ethical conduct. The global mean of 3.36 highlights the importance of addressing

**Table 9.** Respondents' views on information and communication.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Communication of internal control policies	5 (1.3%)	58 (15.1%)	89 (23.1%)	202 (52.5%)	31 (8.1%)	3.51
Comfort in reporting suspected fraud	18 (4.7%)	102 (26.5%)	98 (25.5%)	138 (35.8%)	29 (7.5%)	3.15
Effective communication practices	24 (6.2%)	94 (24.4%)	102 (26.5%)	131 (34.0%)	34 (8.8%)	3.15
Fostering accountability and integrity	14 (3.6%)	50 (13.0%)	100 (26.0%)	179 (46.5%)	42 (10.9%)	3.48
Reducing likelihood of fraudulent activities	7 (1.8%)	57 (14.8%)	106 (27.5%)	170 (44.2%)	45 (11.7%)	3.49
Overall mean						<b>3.36</b>

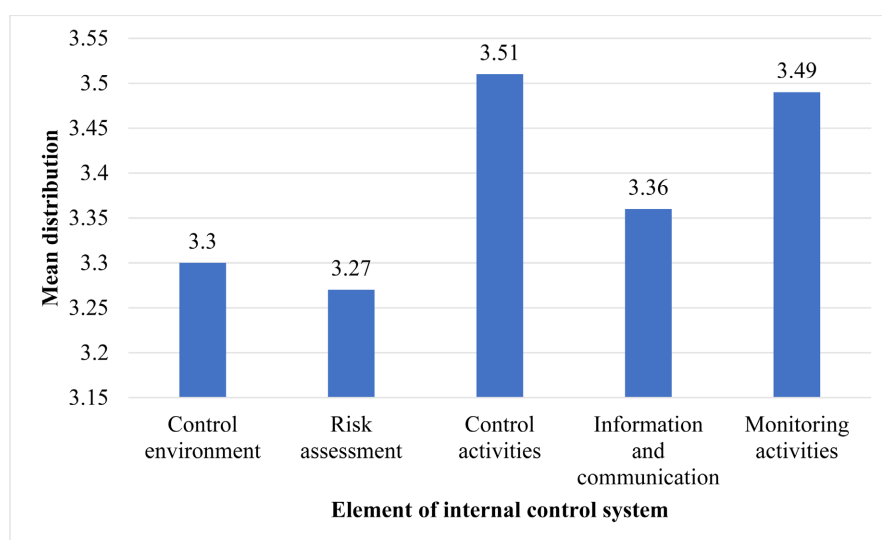
**Table 10.** Respondents' views on monitoring activities.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Regular monitoring of fraud prevention	18 (4.7%)	65 (16.9%)	89 (23.1%)	186 (48.3%)	27 (7.0%)	3.39
Dedicated team for fraud investigation	18 (4.7%)	64 (16.6%)	92 (23.9%)	183 (47.5%)	28 (7.3%)	3.36
Emphasis on continuous monitoring	6 (1.6%)	52 (13.5%)	82 (21.3%)	195 (50.6%)	50 (13.0%)	3.60
Continuous monitoring for timely insights	13 (3.4%)	49 (12.7%)	74 (19.2%)	212 (55.1%)	37 (9.6%)	3.55
Timely insights for fraud risk management	7 (1.8%)	52 (13.5%)	89 (23.1%)	195 (50.6%)	42 (10.9%)	3.56
Overall mean						3.49

these factors to enhance the overall effectiveness of information and communication practices in the Nigerian public sector.

### 5) Monitoring Activities

Monitoring activities in the Nigerian public sector were affirmed by 55.3%, with a mean of 3.39 indicating overall acknowledgment, despite 23.1% expressing neutrality (Table 10). Additionally, 54.8% acknowledge a dedicated team for monitoring and investigating suspected fraudulent activities, with a mean of 3.36. Regarding the importance of continuous monitoring, 63.6% confirm significant emphasis, reflected in a high mean of 3.60. Although 21.3% are uncertain, the majority agree that continuous monitoring is a key element in the sector's strategy, providing timely insights into potential fraud risks (mean = 3.55). Furthermore, 61.5% believe that insights from continuous monitoring help identify and address potential fraud risks promptly, supported by a mean of 3.56. These findings collectively suggest a strong focus on monitoring activities and their positive impact on fraud prevention in the Nigerian public sector.



**Figure 3.** Mean distribution of the elements of internal control system in the Nigeria public sector.

Figure 3 displays global means for internal control elements in the Nigerian public sector. Control Activities has the highest mean of 3.51, indicating a strong positive perception and emphasis on implementing activities to mitigate risks effectively. Risk assessment, with the lowest mean of 3.27, suggests a moderately positive perception. Overall, respondents hold a moderately positive view of the Internal Control System, with Control Activities seen as a strength. Areas for improvement include the control environment and risk assessment. Strengthening these, along with improving information flow and communication channels, could enhance the system's overall effectiveness in the Nigerian public sector.

### 4.3. Descriptive Analysis of Vutumu Forensic Accounting Metrics

This section conducts a descriptive analysis of forensic accounting implementation

in the Nigerian public sector, covering the proposed eight variables outlined in the Vutumu Forensic Accounting framework. The following sections and tables unveil the intricate dynamics associated with these components.

### 1) Control System Reliance

**Table 11** reveals that 60% of respondents express favourability towards the reliance and effectiveness of control systems in preventing and detecting fraud in the Nigerian Public Sector. A majority (53.6%) agree that control systems effectively safeguard assets, with a mean of 3.30, indicating a slightly above-neutral perception. Additionally, 56.1% of respondents acknowledge employee trust in these systems for financial transaction integrity, with a mean of 3.38. Despite a global mean of 3.42 suggesting overall trust in control systems, a significant proportion still expresses scepticism or dissatisfaction with their reliance on and effectiveness in the Nigerian Public Sector.

### 2) Litigation Support

**Table 12** illustrates that 74.5% of respondents believe forensic accounting techniques strengthen the Nigerian Public Sector's ability to gather evidence for litigation, with a mean of 3.298 indicating a high-level belief in effectiveness. Additionally, 67.6% agree that forensic accountants provide valuable expert testimony in fraud cases, supported by a mean of 3.222. About 53.3% acknowledge the availability of forensic accounting support for fraud detection, but 29.9% are neutral. The overall mean of 3.182 suggests a low positive perception of forensic accounting and litigation support in the Nigerian Public Sector, with a majority

**Table 11.** Respondents' views on control system reliance table.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Strong reliance on control systems to prevent	17 (4.4%)	80 (20.8%)	57 (14.8%)	168 (43.6%)	63 (16.4%)	3.47
Control systems effectively safeguard assets	19 (4.9%)	87 (22.6%)	73 (19.0%)	170 (44.2%)	36 (9.4%)	3.30
Trust and rely on the control systems to ensure the integrity	14 (3.6%)	85 (22.1%)	70 (18.2%)	172 (44.7%)	44 (11.4%)	3.38
<b>Overall mean</b>						<b>3.42</b>

**Table 12.** Respondents' views on litigation support.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Forensic accounting strengthens their organization's ability	9 (2.3%)	28 (7.3%)	61 (15.3%)	209 (54.3%)	78 (20.3%)	3.298
Provide valuable expert testimony and analysis in legal cases	10 (2.3%)	40 (10.4%)	76 (19.7%)	202 (52.5%)	58 (15.1%)	3.222
Forensic accounting uncovers fraud and assists in legal proceedings	8 (2.1%)	57 (14.8%)	115 (29.9%)	160 (41.6%)	45 (11.7%)	3.026
<b>Overall mean</b>						<b>3.182</b>

uncertain about the techniques' effectiveness in evidence gathering, expert testimony, and fraud detection support in legal proceedings.

### 3) Whistleblower Hotline

**Table 13** reveals that 44.1% of respondents agree that the Nigerian Public Sector has an effective whistleblower hotline, countered by 31.4% and 24.4% being uncertain. Confidence in the hotline's effectiveness for taking appropriate action and ensuring protection is expressed by only 44.5%, resulting in a mean of 2.85. Only 33.0% believe hotline reports led to identifying and preventing fraud, reflected in a mean of 2.98. The global mean of 2.91 suggests a lack of confidence in the whistleblower hotline system in the Nigerian Public Sector, with a substantial proportion being neutral or disagreeing with the assessment.

### 4) Sustainable Governance System

About 49.3% agree that the Nigerian Public Sector has a sustainable governance system, but the low mean of 2.872 suggests neutrality leaning towards disagreement (**Table 14**). Regarding fraud risks, 42.3% believe the governance system effectively identifies and addresses risks, with a mean of 3.124. Additionally, 46.8% think the system supports long-term fraud prevention through oversight and controls. The global mean of 3.071 indicates a significant proportion of responses leaning towards neutrality on the sustainability of the governance system, with less than half believing it promotes positive values and is capable of preventing fraud through robust oversight and controls.

### 5) Ethical Philosophy

**Table 15** indicates that 49.3% agree the Nigerian Public Sector has a clear ethical philosophy guiding employee behaviour. The average viewpoint of 3.435 signifies strong agreement. Additionally, 42.3% agree employees are committed to the organisation's ethical philosophy, reducing fraud likelihood. The ethical

**Table 13.** Respondents' views on whistleblower hotline.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Established Whistleblower Hotline	17 (4.4%)	104 (27.0%)	94 (24.4%)	136 (35.3%)	34 (8.8%)	2.917
Confidence in Hotline & Protection	15 (3.9%)	100 (26.0%)	99 (25.7%)	150 (39.0%)	21 (5.5%)	2.85
Hotline led to Fraud Prevention	12 (3.1%)	130 (33.7%)	113 (29.4%)	104 (27.0%)	26 (6.8%)	2.98
Overall mean						2.91

**Table 14.** Respondents' views on sustainable governance system.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Sustainable Governance System	20 (5.2%)	87 (22.2%)	88 (22.9%)	168 (43.6%)	22 (5.7%)	2.872
Effective Fraud Identification	12 (3.1%)	100 (26.0%)	110 (28.6%)	144 (37.4%)	19 (4.9%)	3.124
Long-term Fraud Prevention	12 (3.1%)	80 (20.8%)	113 (29.4%)	154 (40.0%)	26 (6.8%)	3.217
Overall mean						3.071

philosophy encourages reporting, with 46.8% in agreement. Overall, there's moderate agreement that the public sector's ethical philosophy fosters a reporting culture and discourages fraudulent or unethical activities, reflected in a mean of 3.39.

### 6) Digital Fraud Review Frequency

Assessment of digital fraud review frequency reveals 57.1% agree that regular reviews occur in the Nigerian Public Sector (Table 16). Additionally, 54.3% agree that review frequency effectively addresses emerging fraud threats and technological advancements. This moderate agreement (mean = 3.207) suggests sufficiency in addressing evolving fraud in the digital landscape. Furthermore, 54.6% agree that digital fraud reviews significantly prevent and detect fraud in digital transactions and systems. Overall, a substantial portion believes these reviews effectively address digital fraud, as indicated by a mean of 3.39.

### 7) Accounting Record to Reporting Quality

Concerning accounting record quality, 48.8% agree that records in the Nigerian Public Sector are high, ensuring accurate reporting (Table 17). However, 31.6% remain neutral, leaning towards inadequate quality, with a mean of 3.263. In terms of reporting processes, 49.8% agree they are robust, indicating a moderate

**Table 15.** Respondents' views on ethical philosophy.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Ethical Philosophy & Decision-Making	20 (5.2%)	87 (22.2%)	88 (22.9%)	168 (43.6%)	22 (5.7%)	3.435
Employee Commitment & Integrity	12 (3.1%)	100 (26.0%)	110 (28.6%)	144 (37.4%)	19 (4.9%)	3.346
Encouragement to Report Fraud	11 (3.1%)	81 (20.8%)	113 (29.4%)	154 (40.0%)	26 (6.8%)	3.389
Overall mean						3.39

**Table 16.** Respondents' views on digital fraud review frequency.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Regular Digital Fraud Reviews	8 (2.1%)	76 (19.7%)	81 (21.0%)	178 (46.2%)	42 (10.9%)	3.033
Pace of Fraud Reviews	8 (2.1%)	82 (21.3%)	86 (22.3%)	179 (46.5%)	30 (7.8%)	3.207
Role in Fraud Prevention	10 (2.6%)	56 (14.5%)	113 (29.4%)	170 (44.2%)	36 (9.4%)	3.25
Overall mean						3.39

**Table 17.** Respondents' views on accounting record to reporting quality.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Quality of Accounting Records	9 (2.3%)	65 (16.9%)	123 (31.9%)	166 (43.1%)	22 (5.7%)	3.263
Robust Reporting Processes	18 (4.7%)	80 (20.8%)	95 (24.7%)	153 (39.7%)	39 (10.1%)	3.274
Overall mean						3.26

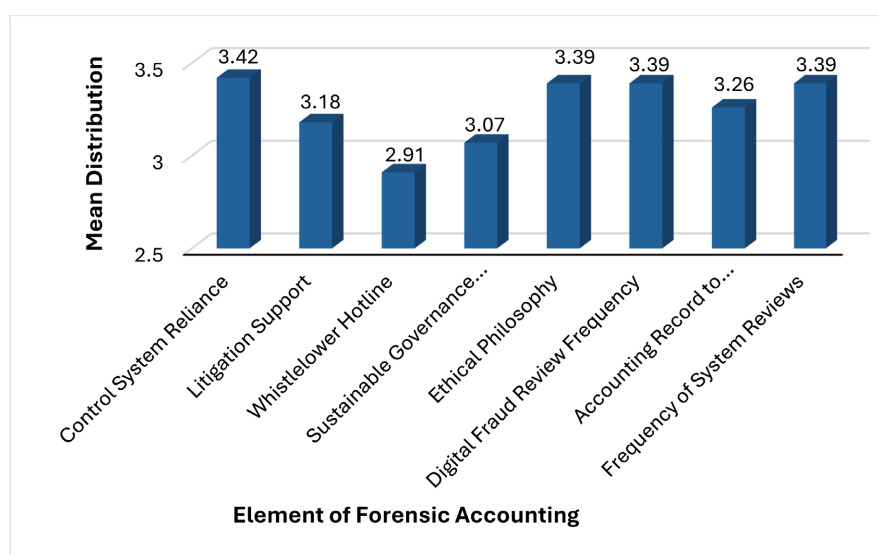
level of agreement. Yet, in the overall, 50.2% either disagree or are neutral, suggesting a significant portion feels the reporting processes lack robustness as illustrated by the mean of 3.26.

### 8) Frequency of System Reviews

Regarding system reviews in the Nigerian Public Sector, 48.6% agree that they are conducted regularly to assess control effectiveness, while 27.5% stay neutral or disagree (Table 18). Moreover, 59.5% agree that system reviews significantly improve fraud prevention efforts and internal control effectiveness. In the overall, a considerable portion believes in regular system reviews, a significant number still feels otherwise, as shown by the mean of 3.39.

**Table 18.** Respondents' views on frequency of system reviews.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Regular System Reviews	16 (4.2%)	76 (19.7%)	106 (27.5%)	162 (42.1%)	25 (6.5%)	3.274
Role in Fraud Prevention	9 (2.3%)	55 (14.3%)	92 (23.9%)	194 (50.4%)	35 (9.1%)	3.517
Overall mean						3.39



**Figure 4.** Mean distribution of the elements of Vutumu Forensic accounting theory metrics.

Figure 4 reveals that control system reliance, system review frequency, digital fraud review frequency, and ethical philosophy are highly practiced forensic accounting elements in the Nigerian public sector. Conversely, the whistleblower hotline is the least practiced, possibly due to fear of retaliation and a lack of awareness about whistleblower protection laws. Control system reliance is crucial for fraud prevention; frequent system reviews are essential for identifying weaknesses in anti-fraud measures and addressing them promptly; digital fraud review frequencies are essential for addressing fraud in digital platforms; and ethical philosophy for promoting ethical behavior among public servants.

## 5. Discussion

The findings on Pentagon fraud model variables reveal that external pressures, including economic conditions and political influence, significantly contribute to the risk of fraud in the Nigerian public sector, with a substantial agreement rate of 65.7% and a mean score of 3.71. Additionally, existing opportunities within the sector are identified as contributors to fraud occurrence, with 52% in agreement and a mean score of 3.44. The study emphasizes the importance of actively discouraging the rationalization of fraudulent actions among public sector employees, garnering a 58% agreement rate and a mean score of 3.4. However, concerning the capability of public sector employees in Nigeria to prevent fraudulent activities, the results indicate a lower % agreement rate of 40%, with a mean score of 3.09, suggesting a higher likelihood of fraud. These results align with the findings of Achmad, Hapsari, & Pamungkas (2022), who researched state-owned companies listed on the Indonesia Stock Exchange (IDX) from 2015 to 2019, revealing that external pressure and rationalization significantly influenced fraudulent financial reporting, while effective capability and arrogance have no considerable impact. On a positive note, there are reported strong personal ethics among public sector employees, contributing to a more effective fraud prevention environment, as evidenced by a 51.7% agreement rate and a mean score of 3.54. This is consistent with the findings of Said et al. (2017) on the impact of ethical values in the Malaysian banking industry, Sujeewa et al. (2018) on the significance of ethical values of the employee's attitude to fraud, and finally Dwimawanti and Ramadani (2023) who confirmed the existence of the components of Fraud Diamond Theory as key enablers of fraud in the public service in Indonesia. Additionally, it aligns with the work of Suleiman, Yahaya, and Abba (2018), who explored expert perceptions of public sector fraud in Nigeria. However, there is a paucity of studies on the effect of fraud on each component of the Pentagon fraud model in the Nigerian public sector.

The findings relating to the COSO Internal control components indicate that a substantial portion of respondents, comprising 52%, acknowledged the existence and significant role of the control environment in preventing fraud within the Nigerian public sector. Nearly half, at 49%, expressed agreement regarding the crucial nature of implementing and regularly conducting risk assessments to identify and evaluate potential risks, with a global mean of 3.27 indicating a prevailing inclination toward agreement. Control activities emerged as critical in preventing fraud, garnering recognition and emphasis, as indicated by 58% agreement and a global mean of 3.51. Information and communication practices were perceived as playing a preventive role by enhancing awareness and encouraging adherence to policies and procedures, with 58% in agreement and a mean of 3.36. Furthermore, a significant 60% agreement underscored the importance of continuous monitoring processes as a key element in the Nigerian public sector's strategy, providing timely insights into potential fraud risks, as reflected in the mean of 3.49. In summary, the analysis indicates a moderately positive perception among respondents

regarding the elements of the COSO framework in the context of the Nigerian public sector. This is in line with the findings of [Mardas, Zentar and Loulid \(2022\)](#) and [Nyakarimi, Kariuki, and Kariuki \(2020\)](#), who highlighted that robust control systems serve as a foundation for assessing their effectiveness in preventing fraud; [Ibrahim \(2017\)](#) who found that the COSO components have a significant impact on the quality of the public sector revenue generation; [Oguda, Odhiambo, and Byaruhanga \(2015\)](#) and [Yuniarti \(2017\)](#) who found a statistically significant and positive relationship between the adequacy of internal control systems and fraud prevention. Additionally, studies like [Vutumu, Aregbeyen, and Akinteye \(2024\)](#) examined the effect of individual COSO components, revealing that risk assessment, information and communication, and monitoring activities significantly positively influence fraud prevention in the Nigerian public sector, while control activities had a significant negative relationship, and the control environment had an insignificant effect.

The results from the Vutumu Forensic Accounting Theory (VFAT) variables indicate that more than half of the respondents, comprising 57%, expressed reliance and perceived effectiveness on the control systems in place, supported by an overall mean score of 3.42 for this construct. A majority of 65% believed in the efficacy of forensic accounting techniques for litigation support, with a mean score of 3.18. This is supported by a study by [Bassey & Ahonkhai, \(2017\)](#), which found that strengthening forensic accounting services through litigation support is required to strengthen the credibility of the Nigerian legal system. However, approximately 55.5%, a significant portion expressed uncertainty or disagreement regarding the impact of whistleblower reports in identifying and preventing fraudulent activities, resulting in a mean score of 2.8, agreeing with findings by [Rahman \(2020\)](#) that the whistleblowing system has a positive and significant effect on fraud detection and prevention. Less than half, 46%, believed that the governance system in the public sector promotes positive values, reflecting a neutral stance with a mean score of 3.07. This is supported by [Xanthopoulou et al. \(2024\)](#), who emphasized that the integration of corporate governance and Forensic Accounting is a sustainable approach within corporate strategy. Regarding ethical philosophy, a moderate level of agreement was observed, with 46% stating that it promotes a culture of reporting and discourages fraudulent or unethical activities, as indicated by a mean score of 3.39. This aligns with [Sujeewa et al. \(2018\)](#), who found that conformity with the code of ethics was insufficient in Malaysia. A substantial portion, constituting 46%, believed that digital fraud reviews effectively address digital fraud and protect against fraudulent activities, with a mean score of 3.39. This aligns with [Patil et al. \(2024\)](#), who emphasized the importance of cyber security and digital payment fraud prevention awareness. However, 73% disagreed or remained neutral on the strength and reliability of reporting processes in place, while only 46% agreed, resulting in a mean score of 3.26. Lastly, approximately 54% agreed that system reviews significantly improve fraud prevention efforts, reflected in a

mean score of 3.39. Based on the overall results, the VFAT variables underscore the critical role of forensic accounting in Nigeria's public sector fraud prevention strategy, as confirmed by studies from [Oladipo and Olurotimi \(2021\)](#), [Eze and Okoye \(2019\)](#), [Alhassan \(2021\)](#), and [Aliyu and Hussaini \(2024\)](#).

## 6. Conclusion and Recommendations

The study confirmed the presence of all five components of the Pentagon fraud model—pressure, opportunity, motivation, capability, and personal ethics—in the Nigerian public sector, suggesting a high probability of fraudulent activities occurring.

Regarding the COSO internal control framework, the study revealed that the control environment, risk assessment, and information and communication were the least implemented components. Control activities received significant recognition, with a strong emphasis on their implementation to effectively mitigate risks. Although monitoring processes were recognized for their importance in identifying potential fraud risks, the study observed that these activities did not fulfill their intended role in deterring fraud within the Nigerian public sector. Overall, the analysis showed a moderately positive perception of the effectiveness of COSO framework elements in the Nigerian public sector.

In the context of the proposed Vutumu Forensic Accounting Theory, control system reliance, digital fraud review frequency, sustainable governance systems, ethical philosophy, accounting record to reporting quality, and system review frequency were acknowledged by a significant portion of public services employees as contributing positively to the enhancement of fraud prevention efforts in the Nigerian public sector; meanwhile, whistle-blower hotlines, litigation support, and sustainable governance are among the least implemented components.

Considering the study's findings, it is recommended that the government of Nigeria should strengthen control systems across public institutions by investing in continuous assessment and regular employee training. Additionally, the government should enhance whistleblower mechanisms by establishing strong protection policies and secure, confidential reporting channels to promote trust and accountability. Promoting ethical leadership at all governance levels, supported by training programs and awareness campaigns, will contribute to a work environment that discourages fraudulent activities. Lastly, the government should invest in advanced digital fraud prevention technologies and ensure regular cybersecurity updates to effectively combat the increasing threat of digital crimes. Overall, the combination of internal control and forensic accounting constitutes a strong synergy in the fight against fraud in the Nigerian Public sector, recommending the full implementation of the VFAT variables. These recommendations are aimed to capitalize on identified strengths while addressing areas for improvement to fortify fraud prevention efforts in the Nigerian public sector.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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## Abbreviations

ACFE	Association of Certified Fraud Examiners
COSO	Committee of Sponsoring Organizations
MDA	Ministry, Department or Agency
SPSS	Statistical Package for Social Sciences
VFAT	Vutumu Forensic Accounting Theory