

# EFFECT OF FRAUD INVESTIGATION AND FRAUD ANALYTICS ON FRAUD MANAGEMENT IN SELECTED FEDERAL GOVERNMENT MINISTRIES IN NIGERIA

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## **Abstract**

*Despite the solidification of forensic accounting in government parastatals, the objectives are not attained at the expected level. This study examined the effect of forensic accounting practices on fraud management in selected federal government ministries in Nigeria. The study adopted a descriptive survey research design. The population for this study consists 1550 staff in the Office of Auditor General for the Federation. Three hundred and forty nine (349) questionnaires were administered. Primary data was collected using 5-point Likert scale structured questionnaire for the study. Partial Least Square Structural Equation Modeling (PLS-SEM) was employed to model the regression analysis. The study found that fraud investigation and fraud analytic have positive and significant effect on fraud management. The study recommends that organizations should ensure that adequate resources, including financial and human resources, are allocated to support fraud investigation efforts. Also, the study recommends that organizations should utilize sophisticated techniques to analyze vast amounts of data from various sources such as transaction records, customer information, and external databases.*

**Keywords:** forensic accounting; forensic accounting practices; fraud analytic; fraud investigation; fraud management;

## **1.0 Introduction**

Fraud has long been a pervasive issue within government organizations worldwide and Nigeria is no exception. Federal ministries in Nigeria, like many public institutions, have faced significant challenges in detecting, preventing, and mitigating fraudulent activities. The misappropriation of public funds, embezzlement, and corrupt practices have not only hindered the efficient functioning of these ministries but have also eroded public trust in the government.

Nigeria with its complex administrative structure and vast public expenditure, has encountered a multitude of fraudulent activities within its federal ministries. Fraudulent schemes range from bribery and corruption to procurement fraud, payroll fraud, and

asset misappropriation. These fraudulent acts divert significant financial resources away from essential public services, hinder socioeconomic development, and tarnish the image of the Nigerian government. To combat this problem, there is an increasing recognition of the importance of forensic accounting practices in enhancing fraud management within federal ministries in Nigeria

Globally, corruption has received attention with several international agreements aimed at addressing it. Corruption presents serious threats to economic growth, individual livelihoods, and civil society across the world.

The United Nations Convention Against Corruption (UNCAC) of which Nigeria is a signatory requires UNCAC State parties to the Convention to undertake effective measures to prevent corruption (Chapter II, articles 7 to 14), criminalise corrupt acts, and ensure effective law enforcement (Chapter III, articles 15 to 42), cooperate with other State parties in enforcing anti-corruption laws (Chapter IV, articles 43 to 50), and assist one another in the return of assets obtained through corruption (Chapter V, articles 51 to 59). The world in trying to be free from the frequent rise in white-collar crimes came up with the introduction of various anti-crimes agencies to fight financial crimes, irregularities and other fraudulent activities in all sectors of the economy (Simeunovic, et al., 2016; Temitope 2016; Sujatha & Gomez, 2015). The detection and evidences on it are comparatively more obscure and difficult (Gottschalk, 2010).

The collapse of companies like the Enron case in the United State of America and many others were of serious concern to many stakeholders (Kleinmann & Anandarajan, 2011; Eyisi & Agbaeze 2020; Rezaee et al 2016). However, authorities responsible for the establishment of laws came up with laws that would assist auditors and accountants to detect fraud within the organisations (DiGabriele, 2011; Sujatha & Gomez, 2015). These laws, for example, the Sarbanes Oxley Act 2002, were later enacted as the Public Company Accounting Oversight Board as well as the Accounting Standards (DiGabriele 2008; Simeunovic, et al., 2016). The forensic accounting practices necessitated and equipped auditors with forensic skills (DiGabriele, 2009; Ojo, 2012; Rezaee, et al., 2016).

Forensic practice is the tripartite practice of utilizing accounting, auditing and investigative skills to assist in legal matters. It is a specialized field of accounting that describes engagements that result from actual or anticipated disputes or litigation. Ehioghiren and Atu (2016) averred that forensic accounting practices encompasses three major areas, investigation, dispute resolution and litigation support. Forensic accounting practices have been identified as tools in detecting and implementing of white-collar investigations (Hansen, 2009). Degboro and Olofinsola (2007) described forensic accounting practice as the application of criminalist methods, and integration of accounting investigative activities and law procedures to detect and investigate financial crimes and related accounting misdeeds. According to Enofe, et al., (2016) forensic accountants play a role in litigation support services in the public sector and are relevant in documentation and reporting. It was observed that forensic accounting practices play a significant role in curbing crime and corrupt practices in any public sector since it

provides a mechanism to hold people accountable, such that those who manage resources in any fiduciary capacity do not easily abuse that trust without detection.

Investigative auditing fraud analytics and financial forensic skills are all used in forensic accounting practices to help in court proceedings (Enofe, et al. 2016). In addition, forensic accounting requires practitioners to be expert consultants during auditing with special investigative services skills that provide accounting facts in times of prosecution (Nigrini, 2020). It involves the application of special skills in accounting, auditing, finance, quantitative methods, law and research (Crain et al., 2019). It is the relationship of accounting, law and prosecution, and it includes legal assistance, investigation, and dispute resolution (Eze, 2019; Umar, et al., 2020).

There have been conscious efforts on the part of the Office of the Auditor General for the Federation to put in place Forensic Accounting practices in the auditing of the accounts of the Federal Government Ministries, Departments and Agencies. This has resulted in Forensic Audit from 2021 of the following Federal Government MDAs: Nigeria Immigration Service, Nigeria Custom Service, Foreign Affairs Ministry, Police Trust Fund and the Federal Government Staff Loans Board. In addition, the Office of the Auditor General for the Federation equally established a Forensic Laboratory for the Office in July 2021. It is therefore exigent to carry out an empirical study of this nature to examine the extent to which the Forensic practices undertaken by the Office of the Auditor General for the Federation has helped in fraud management.

Majority of establishments today including the public sector have put more effort into strengthening the forensic accounting system to increase their capacity to examine and manage fraud related issues and general misappropriation of assets. These efforts have led to the seeming improvement in due process, fraud prevention and improved management of public money (Gbegi, & Adebisi, 2015). However, despite the solidification of forensic accounting in government parastatals, there appears to be no considerable reduction in the level of corruption and fraud cases in the country giving the recent suspension of the Minister of Humanitarian Affairs in Nigeria for perceived contravention of Financial Regulations.

With the development of accounting knowledge, fraud has become increasingly complex with impressive outcomes as fraudsters have become more seriously innovative with adverse impacts (Herbert, et al., 2017).

The empirical studies reviewed have major gaps showing that even though there have been an increasing number of empirical literature (Ile & Odimmega, 2018; Khersiat, 2018; Dada & Jimoh, 2020) that have examined forensic accounting practices as a way of helping the organizations manage fraud, the results remained inconsistent and mixed. Moreover, the studies have used different variables and methodology to investigate fraud management but none of these studies used fraud investigation, fraud analytic support, financial forensics and fraud auditing as forensic accounting practices. Thus, it is essential to confirm and establish the relationship between forensic accounting practices

and fraud management in the context of these practices. In addition, most of the studies had been exploratory, while this current study fills the empirical gap.

This study identified some population gaps because most of the studies used private sector and financial institutions. This study is focused on public sector and the methodological gaps identified in this study is that most studies used ordinary least square (OLS) model as a tool for analysis while the current study will be using partial least square model (PLSM) to fill these gaps found in previous studies. The current study will be highlighting and focusing on the vital position which forensic accounting practices (forensic investigation, fraud analytic support, financial forensics and fraud auditing) play in fraud management in selected Federal Government Ministries in Nigeria.

The study also identified theoretical gaps in previous studies which used theories like fraud diamond theory, fraud triangle theory and pentagon fraud theory which only concentrated on individual and occurrence of fraud. However, the gap is that those theories have no institutional setting and element of corporate governance which will help us to nip fraud occurrence in the board. It is against that background that this study has identified a theoretical gap and will be making use of the principal agency theory as well as the fraud hexagon theory. The main objective of this study is to investigate the effect of forensic accounting practices on fraud management in selected federal government ministries in Nigeria. The specific objectives are to:

- i. examine the effect of fraud investigation on fraud management in selected federal government ministries in Nigeria.
- ii. evaluate the effect of fraud analytic on fraud management in selected federal government ministries in Nigeria.

### 1.1 Research Hypotheses

The following null hypotheses were formulated for this study:

**H<sub>01</sub>:** Fraud investigation has no significant effect on fraud management in selected federal government ministries in Nigeria.

**H<sub>02</sub>:** Fraud analytic has no significant effect on fraud management in selected federal government ministries in Nigeria.

## 2.0 Conceptual Framework

### Fraud Investigation

Okoye and Akamobi (2019) defined fraud investigation as an act of the investigation to find and gather evidence, to make a description of the criminal act that occurred and to find the suspect. In the advanced economies of the world, greater use of forensic accounting increasingly reduces the incidence. It is a modern preventive and detection fraud technique which is an advancement to the traditional technique.

According to Njanike and Dube (2019), fraud investigation is a way of identifying and disclosing fraud by using approaches, procedures, and techniques commonly used in a crime. An investigative audit requires an investigator to have the ability to prove fraud that occurred. The procedures and techniques that are used must be appropriate for the collection and testing of evidence related to the fraud case. Fraud is a legal term that

refers to an intentional misunderstanding of truth that aims to manipulate or commit fraud against another company or person (Koh, et al., 2015). With the increasing number of frauds occurring in the government sector, which resulted in state losses so significant, it made the tax authorities try to find effective ways to detect these frauds. The literature review explains that several factors can be used to detect fraud, namely forensic audits and investigative audits. Besides, in carrying out the audit process, there are also factors that can support the effectiveness of these activities, namely whistle-blowing.

Abdullahi and Mansor (2015) defined Fraud Investigation as an investigation which is carried out after the discovery of an initial indication of fraud. The investigation is conducted for further examination of more specific and in-depth auditing, which aims to reveal indications of state / regional losses and criminal elements. The investigative audit is the process of finding, collecting, and analyzing and evaluating evidence systematically by competent and independent parties who aim to disclose fraud. The objective of an investigative audit is activities that indicate fraud. This audit is carried out if there is information from the development of supervisory activities, public complaints, and requests from the leadership of the assignment object, requests from investigating agencies or law enforcement officials, and other sources.

Fraud investigation is described as a company's ability to detect and investigate fraud suspicions or allegations to determine whether fraud occurred and who perpetrated it, as well as to report findings that can be utilised in legal proceedings or to recover fraud damages (Albrecht & Hoopes, 2014). It acquires and collects all tangible and oral evidence in accordance with evidence regulations to assure admissibility, analyses the evidence, and presents the evidence in an understandable manner in a place of the firms' choosing. Firms that conduct thorough fraud investigations can produce evidence that can be used in a criminal or other disciplinary action, as well as proof that can be utilised to recover damages from an insurer. They can effectively provide anti-corruption, achieve excellent corporate goals and objectives, and potentially gain stakeholders' trust.

### **Fraud Analytics**

Sunder (2014) stated that fraud analytics is a more global approach consisting of using analytics in fraud detection, investigation, confirmation, and ultimately prevention. Indeed, as for Big Data Analytics, the opportunities offered by Fraud Analytics must be balanced with the need to protect the citizens' right to privacy and to personal data protection.

Winter and Davidson (2019) referred to fraud analytics as the use of advanced analytics (data mining, big data analysis, or artificial intelligence) to detect fraud. The use of advanced analytics in organisations without appropriate organisational change can lead to ethical challenges and privacy issues. While fraud analytics offers the promise of more efficiency in fighting fraud, public administrations face additional constraints, such as

the need to be trusted by the citizens and to comply with the legal framework. Whether they use traditional or advanced techniques, administrations consistently use more and more data and automatic processing and AI-based techniques to deliver public services.

Klievink, et al., (2017) stated that fraud analytics is the process of using data analytics in discovering the presence or existence of fraud. Fraud detection can be accomplished through the use of well-designed internal controls, supervision and monitoring and the active search for evidence of potential fraud. They stated further that the core principles of administrative law have to be considered as well, since fraud analytics take place in the context of the administrations' pursuit of their public service missions. As the use of such technologies could have a strong impact on the lives of their citizens, it is fundamental for public administrations to balance the opportunities they offer with the need to comply with these legal requirements.

Kemp (2014) viewed fraud analytics to be more efficiency in fighting fraud, public administrations face additional constraints, such as the need to be trusted by the citizens and to comply with legal requirements. Indeed, whether they use traditional or advanced techniques, administrations consistently use more and more (big) data to deliver public services. In this regard, they often need to process citizen's personal data, defined by the General Data Protection Regulation.

Wachter, et al., (2017) described fraud analytic as the in-depth examination of the meaning and essential features of available data, in order to identify significant information, using specific methods and techniques. It's an interdisciplinary domain which includes branches such as science computers (computer science), mathematical sciences, statistical, economic, psychology, law and other cognitive sciences. This careful examination of data identifies data gaps, strengths, weaknesses, dysfunction, vulnerabilities and risk factors that may constitute threats and finally suggests guidelines. Although on the field, there are several concepts of data analysis such as intelligence analysis, business analysis etc., they all have common components. The differences depend on the scope, nature of the data, analytical products, practical utility and applicability.

De Roux, et al., (2018) referred to fraud analytic as a system in which fraud prevention and detection of fraud through the help of Big Data Analytics. Fraud involves inclusively significant financial risks which may threaten profitability, and the image of an economic entity. In these circumstances, in which development of the IT systems play a central role in the creation of competitive companies, the amount of processed data has grown exponentially. Internal control team members should need to look at every transaction that takes place, but unfortunately this issue can no longer be manually performed, requiring the use of data analysis tools and programs. Since the companies usually operate with large volumes of data, it is absolutely necessary to implement such processes of continuous monitoring, in order to identify anomalies in the data stream or behavioral patterns, potentially fraudulent.

## 2.1 Empirical Review

Eze and Okoye (2020) investigated the effects of forensic accounting and fraud investigation in the Nigerian public sector with Imo state as a case study. The research design used was the descriptive survey. The study adopted structured questionnaire for data collection after validity and reliability test with z-test for the hypothesis testing. The result revealed a significant relationship between forensic accounting and fraud detection and prevention in the public sector. It was recommended among other things, that forensic accounting should be strengthened in the public sector and that the top-level management should be committed to the program while the anti-graft agencies like the EFCC and ICPC should be re-positioned to adopt forensic accounting techniques.

Yudha and Muhammad (2021) examined the effect of fraud investigation on Fraud Reduction in the Nigerian Banking Industry. A total of 5 banks were sampled. The study used questionnaire for data collection. The data was analyzed using SPSS. The findings of the study revealed that forensic accounting services reduce fraud in banking industry. The implication of this is that pragmatic policy options needed to be taken on internal control system and effective management of core banking operations like cash management, treasury operation loan processing and FOREX transaction must be diligently guided and subjected to forensic accounting. It was also recommended that maximisation of customer's interest should be major focus without contravention of regulations set out by Central Bank of Nigeria.

Ewa, et al., (2018) evaluated Forensic Accounting Techniques and Fraud Investigation/Detection in the Banking Sector in Nigeria. A survey research design was adopted. The population of the study consisted of some selected commercial bank. Data was analysed using simple linear regression analysis and Pearson product moment correlation test the relationship between recognition, promotion and job satisfaction. The result revealed the application of forensic accounting techniques significantly enhanced Fraud investigation/Detection of fraud in the banking system. It was recommended that commercial banks should mandatorily be required to acquire robust data mining software facilities as well as enhanced training on the application of data mining and its usefulness in the banking sector. Also, use of anonymous response hot lines be encouraged as well as extensive awareness put in place for the attention of the public as well as quick responses from the banks to queries.

Okafor and Agbiogwu (2016) conducted a study on the effect of fraud investigation on the management of Bank fraud in Nigeria. In their research work, they adopted non-probability sampling technique to select the five (5) commercial Banks used as population for the study. Based on the analysis of variance (ANOVA) the findings of their study revealed that possession of basic forensic skills significantly reduce the occurrence of fraud cases in the banking sector and that there is a significant difference between services of forensic accountants and External auditors, and that the presence of forensic accountants in Banks can aid in reducing fraud cases.

Njanike, et al., (2019) conducted research on the effectiveness of forensic auditing in detecting, investigating and preventing Bank frauds". The study dwelt on the effectiveness of forensic auditing in detecting, investigating and preventing Bank frauds. The researchers used questionnaires, personal interviews, and document review to gather data. Data for the research was gathered from forensic auditors from thirteen commercial banks, four building societies, and four audit firms in Harare, Zimbabwe. A sample of thirty forensic auditors was used from thirteen commercial Banks, four building sectors/societies and four audit firms in Zimbabwe. It was found that the forensic accounting departments suffer from multiple challenges, amongst them being the lack of material resources, technical know-how, interference from management, and unclear recognition of the profession. The study concluded that forensic auditors must be capacitated materially and technically to improve their effectiveness. In addition, the forensic auditors should create a constituted body that serves their interests and regulate the activities just like any other profession.

Anichebe and John (2020) assessed the extent to which the adoption of fraud analytic can assist in combating financial crimes in Nigeria's public sector. The researchers obtained the data for the study via a combination of administered questionnaires and personal interviews of 88 respondents drawn from selected government ministries. The study found a positive and significant relationship between fraud analytic and the reduction of financial crimes. The study recommended the need to establish clear cut standards and guidelines to strengthen the practice and adoption of forensic auditing in Nigeria's public sector.

Thomas (2021) examined forensic accounting and Big Data in Fraud Analytics: Identifying the Main Data Protection Challenges for Public Administrations in Nigeria. The study adopted survey research design with a sample size of 27 public companies. Questionnaires were utilised to gather data. Findings from the study indicated that the adoption of Fraud Analytic significantly and positively affect the prevention of frauds in public companies in Nigeria. The study recommended that any Fraud Analytics processing must be fair and transparent, and the data subjects must be informed about it.

Zardasht, et al., (2022) studied the effect of forensic accounting on fraud prevention, the moderating role of internal control effectiveness in Iraq. Quantitative research approach was used to obtain the data, and 230 responses were received from employees working for 110 Iraqi companies, all registered on the Iraqi Stock Exchange. This study used SPSS, to analyse the data. The study revealed that the fraud analytic has a significant impact on fraud prevention in Iraq. Nevertheless, the results showed that forensic accounting techniques don't considerably affect its use. Besides that, there seems to be an explanation - based on verification that internal control challenges processes appear negatively to mitigate the effects of community engagement for forensic accounting and fraud prevention in an organisation. The study recommended that effective internal control practice enhances the forensic accounting and fraud prevention link.



Dada and Audu (2021) examined relevance of forensic accounting in the prevention and detection of tax frauds in federally collected taxes in Nigeria. The survey research design approach was adopted for the study. Data was obtained via a structured questionnaire administered to a population made up of staff members of the Federal Inland Revenue Service (FIRS) and the four main professional accounting firms reputable for rendering forensic accounting investigation services in Nigeria. A sample size of 254 out of 394 respondents was selected using the purposive sampling technique. Reliability of data was premised on a test of internal consistency using the Cronbach Alpha Reliability approach while inferential and descriptive statistics were used to analyse the data. The study found that forensic accounting had a significant and positive effect on prevention and detection of tax frauds. The study recommended that the training routine of the FIRS staffs be further fortified so as to scale up their proficiency in forensic accounting while the government should consider setting up of witness protection schemes to further increase the confidence of expert witnesses and guarantee their safety.

Okoye (2019) appraised the impact of expert witness testimony on fraud prevention and detection in deposit money banks operating in Nigeria. The study employed the survey research design approach and data was obtained via a combination of personal interviews and administered structured questionnaires. The study showed that expert witness testimony has a statistically positive relationship with fraud detection and prevention. The study thereafter recommended that forensic accountants in the employment of deposit money banks should be empowered to ensure that fraud investigation is always followed through with expert testimony in courts of competent jurisdiction to serve as deterrent to fraud perpetrators.

This study used the principal agent model proposed by Karklins (2005) to substantiate the anti-corruption strategies. Karklins (2005) assumes: (i) a structure based on three pillars - corrupter, corruptee, third actor -placed in position of winner or loser; (ii) understanding the interactions between each actor within a succession of scenarios that will form the anti-corruption strategy. The bottom-up approach to the principal agent model would seem particularly promising as a society, being the disadvantaged party in a corruption transaction (Karklins, 2005) should have an inherent motivation to fight malfeasance in the public sphere.

However, the argument continues working under the paradigm that there is an actor in the domestic system willing and able to take the role of the principal. Such a premise gives way to the problem of collective action. Rothstein (2005, 2011) described this position as questioning “the underlying assumption in the principal-agent theory that all societies hold at least one group of actors willing to act like ‘principals’ and, as such, enforce such regimes”. The collective action problem posits that:

In societies ravaged by systemic corruption or simply in those where the issue of corruption does not stay restricted to the higher levels of government but can be found in everyday life (ubiquitous petty corruption), there may not be any actor willing to take

the role of the principal, as it is always more profitable to partake in corruption rather than spend private resources to fight it (Karklins 2005; Uslander 2008).

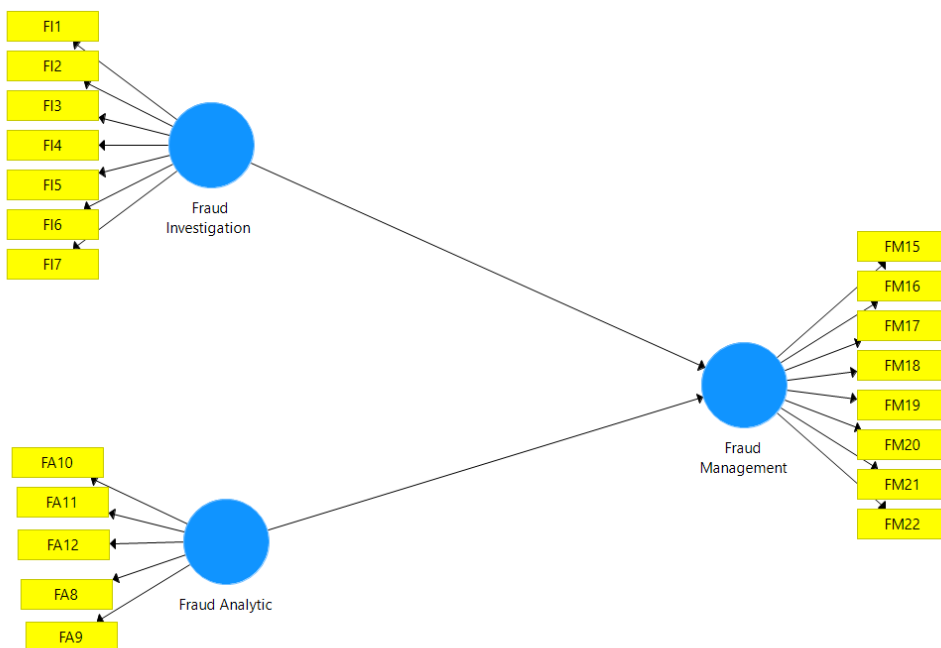
In addition, Jain's (2010) theory on corruption posited that corruption thrives on the existence of three central elements, namely: The possession of discretionary power, associated economic rent; and a weak regulatory system that offers a low probability of detection and/or penalty for the wrongdoing. The first two elements are considered as given in Jain's proposition. The discretionary power arises from the latitude vested on ruling authority to loosely take decisions and enact laws, the associated economic rents arise from the enormous economic and social benefits accruable to the individuals in a position of power. Jain posited that the forensic professionals and fraud investigators' mitigation in corrupt practices is at the third element that is, strengthening regulations to make it more difficult for corruption to be perpetrated without detection and to provide indisputable evidence of its occurrence where it inadvertently occurs. The theory proposed that any effective anti-corruption drive must be targeted at improving the regulatory system which will in turn increase Jain's 'probability of detection', consequently reducing the level of corruption.

The Forensic Accounting practices is on the third element of corruption, the detection, and penalty for wrongdoing. The theory further explicated that any increase in Jain's "probability of detection" will result in a decrease in the level of corruption. Therefore, as activities targeted to improve the probability of detection are adequately deployed (such as improved forensic accounting practices, countries should experience less corruption.

### **3.0 Methodology**

The study adopted a descriptive survey research design. The Population for this study consisted of all the 1550 staff of the Office of the Auditor General of the Federation. However, respondents for this study were selected using purposive sampling techniques. A sample size of three hundred and seventeen (317) was gotten after applying Taro Yamane formula. However, 10% of sample size was added to the sample and also administered with questionnaires to allow for attrition of the population size. Out of 349 questionnaires administered, 331 were duly completed and returned and was used for data analysis. Primary data was collected using 5-point Likert scale structured questionnaire for the study. The study employed the Partial Least Square Structural Equation Modeling (PLS-SEM) to model the regression analysis. The PLS path modeling method was developed by Wold (1982). The PLS algorithm is a sequence of regressions in terms of weight vectors. The weight vectors obtained at convergence satisfy fixed point equations. PLS-SEM is a non-parametric method that does not require that the data meet certain distributional assumptions. However, the parametric significance tests (e.g., as used in regression analyses) cannot be applied to test whether coefficients such as outer weights, outer loadings and path coefficients are significant. Instead, PLS-SEM relies on a nonparametric bootstrap procedure to test the significance of various results such as path coefficients, Cronbach's alpha, HTMT, and  $R^2$  values.

(Efron & Tibshirani, 1986; Davison & Hinkley, 2013). The model for the path analysis is specified thus:



**Fig.1: Theoretical Model on Effect of forensic accounting practices on fraud management**

**4.0 Results and discussion**

**Table 1: Descriptive Statistics**

variable	Mean	Median	Min	Max	SDV	Kurtosis	Skewness
FI	4.46	5.00	1.00	5.00	0.96	-1.59	-0.09
FA	3.95	4.14	1.00	5.00	0.97	0.90	-0.98
FM	4.51	5.00	1.00	5.00	0.89	0.20	-0.68

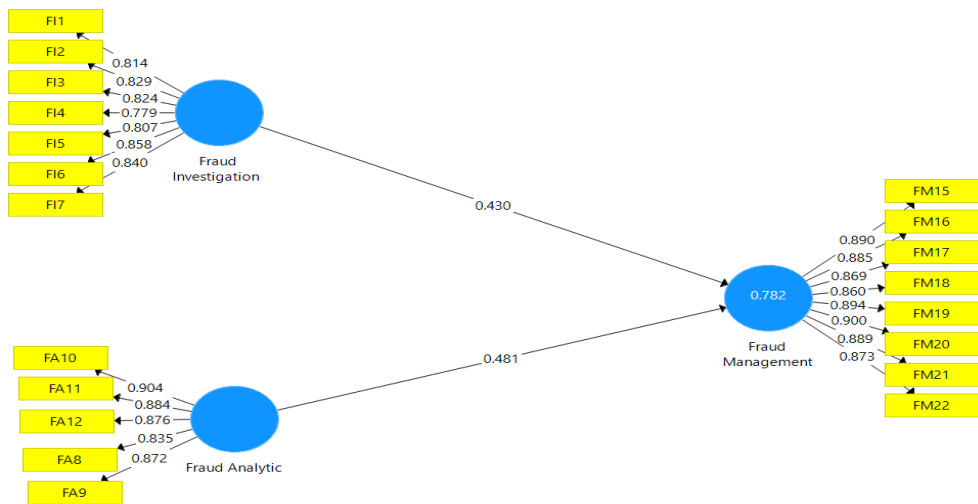
**Source: Researchers’ Output, 2023.**

Data on the study variables were described in Table 1 above in terms of the mean, minimum, maximum, standard deviation, skewness and kurtosis values. Fraud Investigation (FI) revealed an average value of 4.46 with a standard deviation value of 0.96. However, the minimum and maximum values stood at 1 and 5 respectively. Fraud analytic (FA) had minimum and maximum values of 1 and 5 respectively however, it

showed an average of 3.95 along with a standard deviation of 0.97. Furthermore, Fraud Management (FM) showed a minimum value of 1 and a maximum value of 5 with an average value of 4.51 accompanied with a standard deviation value of 0.89. All the skewness and kurtosis values were less than 1 which shows that there is a normal distribution of data.

**Assessment of Measurement Model**

In assessing the measurement model, the researcher began by assessing the item outer loadings. As a rule, loadings above 0.708 are recommended, as they indicate that the construct explains more than 50 percent of the indicator’s variance, thus providing acceptable item reliability (Hair, et al., 2019). However, Hair, et al., (2019) posited that low but significant indicator loading of 0.50 can be included hence justifying why indicators with loadings less than 0.708 and above 0.50 were not deleted from the model as seen in figure 2 below.



**Fig 2: Indicator Loadings**

**Table 2: Reliability of study scale**

S/N	Variables		Factor Loadings	Cronbach Alpha	Composite Reliability	Average Variance	No of Items
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						<b>Extracted (AVE)</b>	
<b>1</b>	<b>Fraud Investigation (FI)</b>	FI1	0.814	0.920	0.936	0.675	<b>7</b>
		FI2	0.829				
		FI3	0.824				
		FI4	0.779				
		FI5	0.807				
		FI6	0.858				
		FI7	0.840				
<b>2</b>	<b>Fraud Analytic (FA)</b>	FA8	0.835	0.923	0.942	0.765	<b>5</b>
		FA9	0.872				
		FA10	0.904				
		FA11	0.884				
		FA12	0.876				
<b>3</b>	<b>Fraud Management (FM)</b>	FM15	0.890	0.959	0.966	0.779	<b>8</b>
		FM16	0.885				
		FM17	0.869				
		FM18	0.860				
		FM19	0.894				
		FM20	0.900				
		FM21	0.889				
		FM22	0.873				

**Source: Researchers’ Output, 2023**

Composite reliability of Jöreskog’s (1971) was applied to test for internal consistency of the study. All the values fall within the Hair, et al., (2019) rating of good consistency. The Cronbach alpha value were above 0.60 which is the minimum threshold as recommended by Sekaran (2010). To test for the convergent validity, the average variance extracted (AVE) was used. All the latent variables showed values greater than 0.50 which indicates that the constructs explain at least 50 percent of the variance of its items. According to Henseler, et al., (2015) the Fornell-Larcker criterion does not perform well when explaining discriminant validity, particularly when the indicator loadings on a construct differ only slightly. As a replacement, they proposed the Heterotrait-Monotrait (HTMT) ratio of the correlations which is the mean value of the item correlations across constructs relative to the (geometric) mean of the average correlations for the items measuring the same construct (Voorhees et al., 2016). Discriminant validity problems are present when HTMT values are high than 0.90 for structural models (Henseler, et al., 2015).

**Table 3: Heterotrait-Monotrait Ratio (HTMT)**

	<b>FI</b>	<b>FA</b>	<b>FM</b>
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FI	1.000		
FA	0.047	1.000	
FM	0.058	0.462	1.000

Source: Researchers' Output, 2023

The variance inflation factor (VIF) was used to evaluate collinearity of the formative indicators. All the VIF values were less than 5 indicate the absence of critical collinearity issues among the indicators of formatively measured constructs (Hair, et al., 2019).

### Model Goodness of Fit (GoF)

Sequel to the need to validate the PLS model, there is a need to assess the goodness of fit of the model as Hair, et al. (2017) suggested. This study used the standardised root mean square residual's (SRMR). The choice of this index was based on the fact that the SRMR provides the absolute fit measure where a value of zero indicates a perfect fit. The study adopted Hu & Bentler (1999) suggestion that a value of less than 0.08 represents a good fit while applying SRMR for model goodness of fit. The study result indicates an SRMR value of 0.030. This indicates the model is fit.

### Assessing the Structural Model

Having satisfied the measurement model assessment, the next step in evaluating PLS-SEM results is to assess the structural model. Standard assessment criteria, which was considered include the path coefficient, t-values, p-values and coefficient of determination ( $R^2$ ). The bootstrapping procedure was conducted using a resample of 5000.

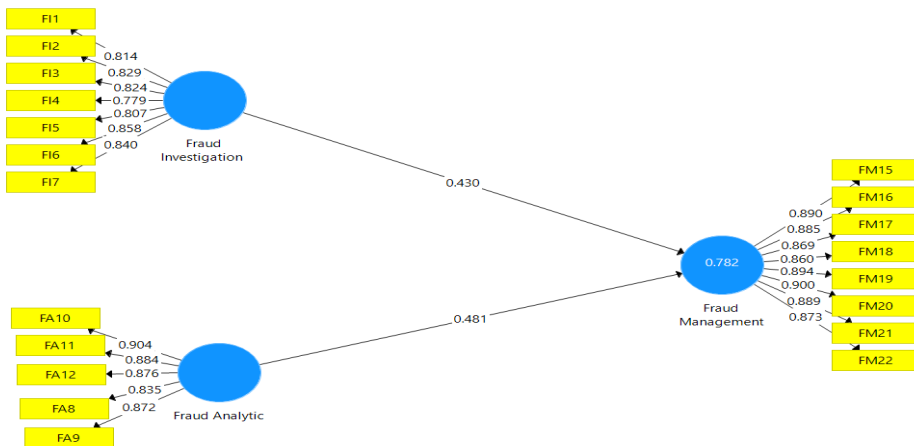


Fig. 3: Path Coefficients of the Regression Model.

The R-square value stood at 78% indicating that Forensic accounting practices proxied by fraud investigation and fraud analytic are responsible for 78% variation in fraud management. The remaining 22% variation could be explained by other factors not

included in the study. Based on Hair, et al., (2019), the r-square is considered moderate but doesn't negate the findings of the study. The result of the path analysis is presented in the table below:

**Table 4: Path Coefficients**

Hypothesis	Variable	Path Coefficient ***(Beta)	t-value	p-value	Findings
Ho1	Fraud Investigation -> Fraud Management	0.430	5.188	0.000	Rejected
Ho2	Fraud Analytic -> Fraud Management	0.481	5.607	0.000	Rejected

**Source: SmartPLS Output, 2023**

The result from the analysis indicates that fraud investigation has positive and significant effect on fraud management. The decision was reached based on the t-value of 5.188 which is greater than 1.964 and a beta value of 0.430 with a p-value of 0.000. The positive effect implies that an increase in fraud investigation activities is associated with an increase in the effectiveness or success of fraud management. This suggests that when organizations invest more resources, effort, or attention in fraud investigation, it leads to better outcomes in managing fraud-related issues. This finding is in agreement with that of Yudha and Muhammad (2021) who both found fraud investigation to be positive and significantly effect on fraud management.

The result from the analysis indicates that fraud analytic has positive and significant effect on fraud management. The decision was reached based on the t-value of 5.607 which is greater than 1.964 and a beta value of 0.481 with a p-value of 0.000. The finding suggests that an increase in the use or application of fraud analytics is associated with a positive impact on fraud management. This implies that employing fraud analytics techniques, tools, or strategies can contribute to more effective fraud management practices. This finding agrees with that of Anichebe and John (2020) who made similar findings about fraud analytic and fraud management.

**5.0 Conclusion and recommendations**

This study concludes that forensic accounting practices has positive and significant effect on fraud management in the under study federal government ministries in Nigeria. Based on the study's findings, it is recommended that organizations should ensure that adequate resources, including financial and human resources, are allocated to support fraud investigation efforts. This may involve dedicating skilled personnel, such as fraud investigators or forensic accountants, to handle fraud cases effectively.

The study recommends that organizations should utilizes sophisticated techniques to analyze vast amounts of data from various sources such as transaction records, customer information, and external databases. By applying advanced algorithms, statistical

models, and artificial intelligence, it can uncover hidden patterns, correlations, and anomalies that human analysts may overlook. This enables organizations to gain comprehensive insights into fraudulent activities and their underlying causes.

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