Forensic Accounting and Fraud Management in Nigeria

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Abstract

The study evaluated forensic accounting techniques on fraud management in the public sector MDAs in Nigeria. Arising from the rise in corruption in Nigeria evidenced in the Transparency International latest corruption perception index of Nigeria and the fact that the public sector constitutes a larger part of the economy in Nigeria, the study was undertaken to ascertain the operation-ability of forensic accounting techniques in public sector accounting departments. The study investigated Data mining, accounting ratios and trend analysis tools to detect or to prevent fraudulent activities in MDAs. Survey research design was adopted for the study. The study applying multiple regression analysis technique (OLS) revealed the adoption of forensic accounting tools (data mining, accounting ratios and trend analysis) will significantly enhance ability to detect and or prevent fraud in MDAs. Also revealed knowledge gap in the application of these preventive control techniques and the usefulness of trend analysis as a technique for detecting fraudulent practices in public service operations. It is thus recommended to develop the human capital of MDAs by making professional qualification and knowledge of information technology mandatory requirements for staff working in the accounts department and robust IT facilities in each MDA.

1. Introduction

It is a common perception in Nigeria that government Ministries, Departments and Agencies (MDAs) are among the most vulnerable sectors in fraudulent practices with weak anti-corruption laws and management, (Ewa, Adesola, & Kankpang, 2019). In its 2004 Report to the Nations on Occupational Fraud and Abuse, Association of Certified Fraud Examiners (ACFE) stated that ministries, departments and agencies of government (MDAs) amongst others were the most represented sectors in the occupational fraud cases (1,483) analysed, (ACFE, 2004). According to ACCA and EY (2020) the magnitude of fraudulent and financial crimes is huge globally.

Ewa, Adesola, and Eseneyen (2020) revealed in their recent study 'forensic accounting impact on fraud detection/prevention in the banking sector' in Nigeria a 'significant relationship between application of forensic accounting techniques and fraud detection and prevention'. The study showed ratio analysis, data mining and trend analysis techniques as being considered significant in preventing or detecting fraudulent

practices in the banking sector. Ministries, departments and agencies (MDAs) of government or private sector organizations' daily operational activities are evaluated, monitored and measured in monetary terms (financial statement). This covers personnel, production, capital, recurrent and overhead expenditure recognition. The recording of these transactions may be clouded with fraudulent intentions by employees towards satisfying personal ambitions. Financial statements are the window by which a succinct and comprehensive worth or health of entities are appraised. It is the channel for appraising organizations for investment and policy decision matters. The growing trend of personnel manipulating financial statements to hide their pathways so as to protect their infamous activities for personal or management interest (making an otherwise unprofitable proposal look profitable to influence investment decision) is a matter of concern necessitating essential mechanism or controls that will arrest this cancerous behaviour in the system as they will always try to compromise the accounting system. These sinister motives impact negatively in the organizations' survival. These motives are often perpetrated through various methods or schemes, be it in revenue recognition or expense classification or recognition.

As various techniques are being adopted by fraudsters to commit fraud, organizations are also deploying anti-fraud techniques (forensic accounting techniques) in detecting these fraudulent patterns. In Nigeria, the Public Sector comprising MDAs drives economic growth as it plays a leading role in capital formation. Fraud causes reputational damage and so why this damage can affect any organization, virtually all sectors of the Nigerian state are exposed to it because they all depend on public funds to be profitable and solvent. The consequence of these criminal acts has affected Nigeria's corruption perception ranking which has resulted in drop in investment in Nigeria which has an attendant adverse effect on economic growth.

1.1. Research Problem

The recent evolutions on telecommunication facilities, fraudsters are continuously developing new techniques and skills to outwit organizations' internal control systems. Also with the introduction of electronic banking services which is online real time, it is pertinent and essential to put in operation control processes to ensure fraudulent activities are identified and blocked real time. As Wall and Fogarty (2016) stated, fraud mitigation remains crucial and thus implementation of robust internal control applications, auditing effect and regulatory policies are essential. Therefore there arises the need to advance methodologies that will prevent or detect the fraudulent practices. In view of the fact that these fraudulent activities take place in the presence of both Internal and External Auditors unnoticed catechizes the vexed interrogation of the capacity of the auditors and the accounting system application tools the MDAs are operating. Are the facilities sufficient, effective and do the operatives have capacity? Therefore, exposing and addressing these dishonest activities and unlawful financial flows entails setting up relevant and effective control mechanisms that can track and expose these illicit acts. Earlier research on this area considered responses from participants drawn from deposit money banks operating in Nigeria. This study is replicating the previous study that focused on participants drawn from banks but now considered participants recruited from the public sector of the Nigerian economy with a view to validating the earlier result and findings.

1.1.1. Research Objective

Arising from continuous invention of new fraudulent schemes and or tricks to outwit the organizations' internal controls, this study is to evaluate the impact of forensic accounting techniques in preventing/detecting fraudulent practices in MDAs in Nigeria.

Specifically to:
a) Determine the extent data mining technique detect or prevent fraudulent practices in MDAs.
b) Determine the extent of the application of ratio analysis technique (RAS) in preventing or detecting fraudulent schemes in MDAs.
c) Determine the extent the use of trend analysis technique (TRD) can detect or prevent fraudulent practices in MDAs.

1.2. Research Problem

The following questions are postulated to address the research objectives:
i. To what extent does data mining technique detect/prevent fraudulent practices in MDAs.
ii. To what degree does the use of ratio analysis technique (RAS) prevent/detect fraudulent schemes in MDAs.
iii. To what magnitude does the use of trend analysis technique (TRD) detect/prevent fraudulent practices in MDAs.

1.3. Research Hypothesis

The research hypothesis is:

H_{01}: *The utilization of data mining technique in the accounting system of MDAs has no substantial effect in preventing/detecting fraudulent acts.*

H₀₂: *The application of ratio analysis (RAS) technique has no significant effect in preventing or detecting fraudulent financial practices in the MDAs in Nigeria.*

H₀₃: *The adoption of trend (TRD) analysis technique in financial analysis of MDAs has no significant effect in preventing or detecting fraudulent activities in the organizations.*

2. Literature Review

2.1. Theoretical Framework

Fraud is defined by different authors in different ways according to their circumstances. While some define fraud as a trick with intent to obtain someone else assets, the Black's Law Dictionary defined fraud as:

> *...all multifarious means which human ingenuity can devise, and which are resorted to by one individual to get an advantage over another by false suggestions or suppression of the truth. It includes all surprise, trick, cunning, or dissembling, and any unfair way by which another is cheated.*

It thus involves deception, confidence and trickery. The study is based on the Fraud Diamond Theory and the Fraud Triangle Theory.

2.1.1. The Fraud Diamond Theory

The Fraud Diamond Theory is an off shoot of the fraud triangle theory. David Wolfe and Dana Hermanson fused 'the element of capability—personal traits and abilities' that play a major role as to if fraud will actually happen or not. The theory which was propounded by Wolfe and Hermanson (2004) considered the four perceptions as triggering elements that must be contemporaneous for fraud to occur. The fraud theory model which was propounded by Cressey highlighted certain elements or features that increase the probability of fraud occurring in any given situation but the theory didn't provide perfect guidance. The fraud diamond theory therefore is an improvement over the fraud triangle theory to address the other precipitating factors not addressed by the fraud triangle model. This is the introduction of a fourth perceived element (capability) that must exist in the system for fraud to occur. Thus, in addition to addressing incentive, opportunity and rationalization, Wolfe and Hermanson added the individual capability or capacity of the fraudster as an essential ingredient that can propel fraud to occur. They reasoned that although there may be opportunity, pressure and rationalization for fraud to occur, without the right capabilities by the fraudster in place the fraud will not occur.

2.1.2. Fraud Triangle Theory

Classic Fraud Theory elucidates the motives behind fraud as a triangle of perceived opportunity, pressure and rationalization. The term 'Fraud Triangle' is credited to Edwin Sutherland who in his book *White Collar Crime* in 1949 is credited to have coined the term 'Fraud Triangle'. He is thus adjudged as the primary contributor to the model. Cressey (1953) in his attempt to render explanation as to what causes, enthuse or motivates people to commit fraud or crime propounded the theory. Arising from extensive talk with convicted swindlers in prisons, he discovered that for every fraud to occur three elements must be present − motivation or pressure, rationalization and opportunity. He observed that deception or crime will take place only when the individual is under pressure or there is a motivating factor on the fraudster. This factor may be great financial need, unrealistic target on an employee from the organization, organizations' rewards systems like performance bonus or penalty for individuals not achieving set targets. Nevertheless even with the pressure to commit fraud, without the presence of the enabling environment − opportunity, the fraud will not occur. Therefore, clear opportunity like weak internal control, absence of proper accountability or lack of supervision for the swindler to gain access or control over the resources to be defrauded must be present. Also weighing the disproportionality between the cost or repercussion of the fraudster being caught and the benefit accruable from the crime, although there may be pressure and opportunity for fraud to occur, the theory postulated that without rationalization which is justification for a given action, fraud will not materialize. Rationalization finalizes the precipitating factors that must be contemporaneous for fraud to occur. This is self-justification for deviant behaviour like justifying the criminality by advancing probable reason(s) why the action(s) is necessary and justifiable as being acceptable or normal.

2.2. Forensic Accounting

Forensic accounting which is the utilization of accounting, auditing and investigative skills to support in litigation, expert determination and investigation of suspected fraudulent practices, irregularities or impropriety disputes involves the use of investigative tools as well as investigative mindset carried out within the environment of rules of evidence in resolving complex financial issues. It incorporates financial expertise, fraud awareness and sound knowledge and understanding of business operations and the functioning of the prevailing legal system in a given organization or entity. Forensic accounting objective is the support for the propagation of the necessary data about governance and ethical policies to interested parties within and outside the organization with a view of maintaining a good image of their respective organizations to its stakeholders and also building up effective communication process and transparency.

2.2.1. Forensic Investigative Tools

Forensic accounting techniques or tools assist investigators in discovering and examining unexpected or unusual patterns and relationships in financial system. As fraud is the intentional misappropriation of organization's funds by employees, agents or customers, financial analysis has been a useful investigative technique when the subject matter of the investigation is more likely to be reflected in the records and financial statements of the organization. As the objective of analytic procedure is identification of unexpected relationship that does not make sense, various tools are applied to streamline emphasis of investigation on certain sections of the organizations' accounts that might have been affected by fraudulent plots. These investigative procedures are deployed to detect and or examine connections of financial data that do not appear realistic as well as other abnormal or exceptional one-off transactions or events. Abnormal or unusual transactions patterns may likely indicate errors or illegal acts or fraud. These forensic accounting analysis tools or technique include:

2.2.1.1. Trend Analysis

Trend analysis involves matching features (revenue, expenditure, assets and liability heads) of financial statements with a common base item. Trend analysis may be vertical trend analysis or horizontal trend analysis. The process of performing the same analysis on a disaggregated basis by an organization or by geographical basis often gives the forensic accounting investigator a deeper insight into which branch or unit of the organization is driving an unusual relationship or whether one segment of the entity is an outlier. Arising from the criticism of horizontal and vertical trend analysis that is commonly applied by organizations, Enyi (2019) proposed a combination of horizontal and vertical trend analysis which he named relational trend analysis (RTA).

2.2.1.2. Data Mining

Data mining concept gained prominence in the 1990s. It is widely applied in organizations to enhance their performances and gain competitive edge over their peers (Hormozi & Giles, 2004). The technique helps in extracting and analysing various data patterns, information or trends from large databases. These are queries or searches performed within accounts or other clients data to identify anomalous individual items. This involves scanning transaction listings, identifying gaps in check runs, identifying duplicate invoice numbers as well as payment vouchers numbers. Also identifying payroll payments made to the same payee within the query period, matching return dates and credit memos to test for proper cut-off. It also covers comparing recent invoice prices with costs on the archived inventory records, filtering of transactions to identify all new suppliers, nonstandard journal entries under dispute and grouping customers' accounts by balance size or employees by overtime pay. The technique applies; decision trees, neural networks and Bayesian belief networks.

2.2.1.3. Financial Ratios

Ratio analysis accesses the correlation among different financial statement transaction items and between these items. Ratio analysis also accesses relationship among nonfinancial data. These computed ratios are compared either on a historical basis or on an industry basis or against a defined benchmark. Ratio analysis is only a guide for further inquiry as when unanticipated changes occur, source documents and related accounts are examined in more details.

2.2.1.4. Reasonableness Testing

This is a technique of benchmarking the results recorded in the financial statements against an independent expectation. Here the forensic accountant benchmarks the individual transaction items against a defined external benchmark standard and any unusual fluctuations identified when comparing this independent view with the amount recorded in the financial statements is investigated. This tool makes use of regression analysis technique which will yield an explicit prediction based on solid inputs to establish the prediction on which to make comparison.

2.3. Empirical Review

Many researchers have dwelt on accessing the position of forensic accounting in business and its impact at detecting and or preventing fraudulent practices both in Nigeria and globally. Ewa et al. (2020) in their study revealed a significant positive relationship exist between forensic accounting techniques application and fraud detection/prevention in the banking sector in Nigeria. Izedonmi and Ibadin (2012) study which investigated forensic accounting and financial Crimes by assessing at some rudimentary and common financial crimes in enterprises operating in Nigeria revealed the motive for financial crimes hinges around elements of pressure, opportunity and rationalization that the fraudsters are exposed to.

Zachariah, Masoyi, Ernest, and Gabriel (2014) study which is on utilization of forensic auditing tool in fraud management suggested the engagement of forensic auditors in Nigeria by redrafting the country's Audit Act to make it mandatory for forensic auditors in each audit team. Njanike, Dube, and Mashayanye (2009)

study found the lack of technical capacity, essential working resource materials, management meddling on audit assignments as well as non-recognition of the profession as impediments.

About enhancing capacity, Okafor and Agbiogwo (2016) study opined the need to rejig and improve accountants' skills as it improves their efficiency and effectiveness in service delivery. Enofe, Omagbon, and Ehigiator (2015) study opined that frequent utilization of forensic audit services will considerably assist fraud detection, prevention and reducing dishonest activities.

Okoye and Gbegi (2013) study showed forensic accountants creditably assisted in reviewing the extent and methodology of audit examinations when the risk of management fraud was considered high by means of introducing special audit procedures. The study suggested enhanced training and the use of forensic accountants from the planning stage of an audit of high risk enterprises. Bassey (2018) study revealed vigorous application of litigation support and forensic examination services by forensic accountants by Microfinance banks significantly reduced scams and plated an important part in crime deterrence and corruption.

Modugu and Anyaduba (2013) found substantial compromise among the interested parties on the proficiency of forensic accounting service in monitoring fraudulent practices, enhancing the feature of financial reports as well as upgrading in the quality of internal control systems in the organizations.

Enofe, Agbonkpolor, and Edebiri (2015) study highlighted the urgent necessity for fraud examiners or investigators in the banking sector in Nigeria as the study found forensic accounting as an essential ingredient to checkmate financial misconducts. Ezejiofor, Nwakoby, and Okoye (2016) study on impact of forensic accounting in combating fraud in the banking sector revealed its effectiveness as a tool to contain financial delinquencies and transparency in the banking sector. On their path, Enofe, Okpako, and Atube (2013) study revealed the level of fraud incidences being positively affected by the application of forensic accounting services by studied organizations.

Onodi, Okafor, and Onyali (2015) which applied survey research design method found a significant relationship between the forensic investigative application and corporate fraud deterrence. But Alabdullah, Alfadhl, Yahya, and Rabi (2014) study which also adopted survey research method to gather respondents found significant relationship between audit firms detecting fraudulent activities in auditee financial records and application of forensic accounting techniques in their work programme.

Arising from the frightening percentage of reported financial statements frauds globally, Gupta and Gill (2012) examined data mining framework for fraud prevention and detection and proposed a framework whose features should include the various financial ratios that measure profitability, liquidity, safety and efficiency as well as incorporate behavioural characteristics. In their study of data mining technique for fraud detection and prevention, Sheela and Sandip (2011) opined the technique is a potent device employed by many organizations to improve their operations and competitive advantage. Kirkos, Spathis, and Manolopoulos (2007) study which explored the efficacy of decision tree, neural networks and Bayesian Belief Networks in identifying fraudulent financial statements found reliance between falsification and debt to equity, net profit to total assets, sales to total assets, working capital to total assets ratios and Z score under Bayesian model. Mousa (2016) study found logistic regression model tool as the leading data mining tool adopted by many entities in detecting financial fraud. In their study, Onuorah and Ebimobowei (2012) found a robust influence of forensic accounting applications on the extent of fraudulent activities taking place in the banks examined. Materials and method

3. Research Design

The study implemented a survey research design towards ascertaining the extent forensic accounting techniques application prevent or will detect fraudulent practices in MDAs in Nigeria. Respondents were drawn from among accountants, auditors, Information Technology (IT) specialists and related disciplines working in the MDAs in Nigeria. The population is drawn from among professionals working in the south-south geopolitical zone of Nigeria public service. Purposive sampling was adopted to ensure that only knowledgeable respondents were recruited in the study. The choice of purposive sampling is that the researcher uses his dexterity and prior understanding to choose respondents (Ogunbameru, 2003) based on their specialty. Three hundred and fifty (350) respondents were chosen from the population of the study. A five-point Likert scale (to a very large extent (TAVLE)– 5points, to a large extent (TALE)– 4points, not to a large extent (NTALE)– 3points, not to a very large extent (NTAVLE)– 2points and to no extent at all (TNEAA) – 1point was applied in grading the responses and logically reflected the grade of the ranking. Two hundred and fifty one (251) (72%) questionnaires were returned.

Since this study is a perception based research, primary data were collected from the responses extracted from respondents via the questionnaire which was designed to draw responses from participants. The choice is centred on the theory that the finest method to gather information as to what is happening around is to ask questions (Patton, 1990). The questionnaire is divided into Section A and Section B. Section A comprises the demographic data of respondents while section B comprises belief questions that produced answers on the relationship between use of forensic accounting techniques and fraud prevention and detection in the public sector in Nigeria. The questionnaire was prepared so as to enable respondents select from the five optional plausible responses to each belief question.

3.1. Techniques of Data Analysis

The study tested the application of forensic accounting techniques on fraud prevention and detection in the Public Sector in Nigeria by using multiple regression analysis model and descriptive statistics. The model is considered appropriate as the research focus is on examination of the relationship between forensic accounting techniques and fraud prevention.

3.2. Model Specification

The model specification examining forensic accounting techniques as tools in detecting or preventing fraudulent practices is specified as:

$$FRP = f(DM, RA, TRD)$$

It is stated econometrically as:

$$FRP = \beta_0 + \beta_1 DM + \beta_2 RA + \beta_3 TRD + \mu$$

Where:

β_0 = Unknown Constant term to be estimated.
FRP = Fraud Prevention and detection.
DM = Data Mining Technique.
RA = Ratio Analysis Technique.
TRD = Trend Analysis Technique.
μ = Stochastic error term.
$\beta_1 - \beta_3$ = Unknown coefficients to be estimated.
$\beta_0, \beta_1, \beta_2, \beta_3 \geq 0$

Table 1A. Presents a summary of analysis of commercial data mining technique result.

S/N	Belief Questions	TAVLE	TALE	NTALE	NTAVLE	TNEAA
1	Your MDA has facility that can query or search accounts entries or clients' data to identify anomalies	14	35	3	171	28
2	Your MDA has scanning facility software that can scan transaction listing	9	31	10	197	3
3	Your MDA has facility that can identify gaps in check runs	4	29	11	195	4
4	Your MDA has facility that can identify duplicate numbers in invoice and payment voucher numbers	11	32	9	2	197
5	Your MDA has facility that can identify duplication in payroll payment within a query period	16	31	9	193	2
6	Your MDA has facility to compare recent invoice prices with archived inventory records data	7	29	13	5	195
7	Your MDA has facility to filter transaction to identify new suppliers, profile of customer by account balance and profile staff by overtime earned	5	30	14	5	195

Source: 2021 Field survey analysis.

Table 1A presents a summary of the analysis of respondents' responses to belief questions as to application of commercial data mining technique in the MDAs, Table 1B summary of analysis of respondents' responses on the application of ratio analysis technique, Table 1C highlights a summary of respondents' responses on the use of Trend analysis technique and Table 1D presents a summary of responses of respondents on the ability of the variables in Tables 1A, B and C in detecting or preventing fraudulent practices in the MDAs.

Table 1B. Presents a summary of analysis of ratio analysis technique result.

S/N	Belief Questions	TAVLE	TALE	NTALE	NTAVLE	TNEAA
1	It is a mandatory requirement in your establishment that when unexpected changes are observed in the accounts during ratio analysis, source documents and related accounts are examined in more details.	13	19	18	3	198
2	Your establishment is mandatorily required to carry out ratio analysis routinely and compare on historical, industry and benchmark basis.	6	16	20	6	202
3	Ratio analysis is mandatorily adopted for monitoring of line, sector and units income and expenditures heads in your establishment.	8	13	21	5	204

Source: 2021 Field survey analysis.

Table 1C. Presents a summary of analysis of trend analysis technique result.

S/N	Belief Questions	TAVLE	TALE	NTALE	NTAVLE	TNEAA
1	It is mandatory for your agency to analyses by departments and location yearly capital vote expense heads with a base year over a 4 year period	11	17	21	3	198
2	It is mandatory for your MDA to carry out analysis of its financial statements line items with a base year over a 4 year period	7	25	15	3	200
3	It is mandatory for your treasury department to analyse revenue heads yearly against budgeted estimates over a 4 year period	9	14	20	6	202

Source: 2021 Field survey analysis.

Table 1D. Presents a summary of analysis of fraud prevention/detection result.

S/N	Belief Questions	TAVLE	TALE	NTALE	NTAVLE	TNEAA
1	How would you rank your organization in the application of data mining technique for preventing and detecting fraud in the system?	6	29	13	198	5
2	There is no possibility of fraudulent practices in your establishment not been discovered?	17	27	9	195	3
3	My establishment is very equipped to track double payments and ghost workers payments	13	23	15	195	5
4	My establishment is very equipped to prevent duplication of payments.	13	27	13	2	194
5	My establishment has controls embedded in the system to detect fraud	5	28	20	195	1
6	My establishment has ability to trace over invoicing in the accounts department	7	34	14	195	1
7	My establishment has in many occasions prevented and or detected fraudulent infractions in the system in the cause of carrying out the analysis	4	22	22	5	197
8	My establishment highly utilizes ratio analysis in preventing and or detecting fraudulent practices in the system	6	17	21	196	11
9	My establishment is able to track abnormalities between periods following ratio analysis	8	17	16	195	14
10	My establishment highly utilizes trend analysis technique in preventing or detecting fraudulent practices in the system	9	15	23	4	200
11	My establishment is able to discover unusual expenditure patterns in its trend analysis of its operations	6	18	22	4	200
12	My establishment is able to track abnormalities in our trend analysis	6	21	21	3	200

Source: 2021 Field survey analysis.

4. Data Presentation

4.1. Data Analysis

In Table 2, while the mean values of the raw data revealed 14.2430, 4.5259, 4.5857 and 24.0797 for DM, RA, TRD techniques and FRP respectively, minimum values of showed 10.0, 3.0, 3.0 and 19.0 for DM, RA, TRD and FRP and maximum values of 33.0, 15.0, 15.0 and 55.0 for DM, RA, TRD and FRP respectively. The standard deviation for each of the variables is 6.53550 for DM, 3.12319 for RA, 3.27347 for TRD and 10.10157 for FRP. The result shows the absence of forensic accounting tools in the administration of financial control of the MDAs.

Pearson product moment formula was adopted in computing the inter-variable correlations. These correlation coefficients are given in Table 3 showed the three independent variables correlated significantly with the dependent variables. The inter-correlations among the independent variables are also significant.

Although this phenomenon is not desirable in a multiple regression analysis, it validates our assertion that they are all elements of one variable called forensic accounting technique. The significance of their correlation

with the dependent variable suggests that they may be significant predictors of fraud prevention and detection. The result implies a significant agreement in their variations.

Table 2. Shows the descriptive statistics result on the effect of Data Mining (DM), Ratio Analysis (RA), and Trend Analysis (TRD) Techniques on fraud Prevention/Detection (FRP).

Description	N	Minimum	Maximum	Mean	Std. Deviation	Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Gender	250	1.00	2.00	1.196	0.398	0.377	0.307
Qualification	245	1.00	5.00	3.988	1.189	–1.151	0.310
Age range	248	1.00	4.00	2.726	0.972	–0.469	0.308
DM	251	10.00	33.00	14.243	6.536	1.014	0.306
RA	251	3.00	15.00	4.526	3.123	2.182	0.306
TRD	251	3.00	15.00	4.586	3.273	1.634	0.306
FRP	251	19.00	55.00	24.079	10.102	1.763	0.306

Source: Researchers' computation (2022) from SPSS 20.0.

Table 3. Highlights inter correlation among the variables.

Description	Variables	FRP	DM	RA	TRD
Pearson Correlation	FRP	1.000	0.904	0.931	0.934
	DM	0.904	1.000	0.883	0.861
	RA	0.931	0.883	1.000	0.872
	TRD	0.934	0.861	0.872	1.000
Sig. (1-tailed)	FRP	1.000	0.000	0.000	0.000
	DM	0.000	1.000	0.000	0.000
	RA	0.000	0.000	1.000	0.000
	TRD	0.000	0.000	0.000	1.000
N	FRP	251	251	251	251
	DM	251	251	251	251
	RA	251	251	251	251
	TRD	251	251	251	251

Source: Researchers' computation (2022) from SPSS 20.0.

The adjusted R-Square value of 0.935 in Table 4 meant about 93.5percent of the variation in ability to prevent and or detect fraudulent practices in the MDAs is accounted for by DM, RA and TR techniques with a tolerable standard error of 2.57058 while 6.5 percent of the variation is explained by the variables not captured in the model thus outside study variables of DM, RA and TRD. The relative contribution of each of the independent variables to the prediction of fraud prevention and detection measurement is estimated and tested for significance using the t-test as computed in Table 5. Although the t-statistics are not the same for DM (5.112), RA (9.902), TRD (12.135) (independent variables), they all have positive influence on the dependent variable (Fraud prevention and detection) as performance criteria. The Durbin Watson (DW) test of 1.832 is below 2.0 indicating non-autocorrelation detected in the sample.

Table 4. Highlights model summary and analysis of variance (ANOVA).

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
				R Square Change	F Change	df1	df2	Sig. F Change	
0.967	0.936	0.935	2.571	0.936	1204.532	3.00	247	0.000	1.833
Source of variation	Sum of Squares	Df	Mean Square	F	Sig.				
Regression	23878.256	3.00	7959.419	1204.532	0.000				
Residual	1632.150	247	6.608						
Total	25510.406	250							

Source: Researchers' computation (2022) from SPSS 20.0.

Table 5. Highlights test for significance of regression constant and coefficients.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	8.107	0.431		18.793	0.000		
DM	0.295	0.058	0.191	5.112	0.000	0.186	5.380
RA	1.242	0.125	0.384	9.902	0.000	0.172	5.804
TA	1.341	0.111	0.435	12.135	0.000	0.202	4.953

Source: Researchers' computation (2022) from SPSS 20.0.

Test of hypotheses

Hypothesis 1:

H_O1: *The deployment of data mining (DM) technique in the accounting system of MDAs has no significant effect in preventing or detecting fraudulent activities in MDAs in Nigeria.*

H_A1: *The deployment of data mining (DM) technique in the accounting system of MDAs has significant effect in preventing or detecting fraudulent activities in MDAs in Nigeria.*

Decision rule: Accept Ho1 if probability of t-stats is greater than 0.05 percent else reject H_O. From the result data mining (DM) technique has probability of 0.00 which is less than the test significance of 0.05. Therefore, this postulation that the application of DM technique has no significant effect in preventing or detecting fraudulent financial practices in public sector MDAs in Nigeria is hereby rejected. Contrary to the assumption, the result indicates that the application of DM technique has a significant effect in preventing or detecting fraudulent activities in the public sector MDAs. This result conform with (Gupta and Gill (2012); Sheela and Sandip (2011) and Mousa (2016)).

Hypothesis 2:

H_o2: *The application of ratio analysis (RA) technique has no significant effect in preventing or detecting fraudulent financial practices in MDAs in Nigeria.*

H_A2: *The application of ratio analysis (RA) technique has a significant effect in preventing or detecting fraudulent financial practices in MDAs in Nigeria.*

Decision rule: Accept Ho2 if probability of t-stats is greater than 0.05 percent else reject H_O2. From our result RA has a probability of 0.00 which is less than the test significance of 0.05. Therefore, this postulation that the application of RA technique has no significant effect in preventing or detecting fraudulent financial practices in MDAs in Nigeria is hereby rejected as the result shows that the application of RA technique has a significant effect in preventing or detecting fraudulent financial practices.

Hypothesis 3:

H_o3: *The adoption of trend (TRD) analysis technique in financial analysis of MDAs has no significant effect in preventing or detecting fraudulent activities in the organizations.*

H_A3: *The adoption of trend (TRD) analysis technique in financial analysis of MDAs has significant effect in preventing or detecting fraudulent activities in the organizations.*

Decision rule: Accept Ho3 if probability of t-stats is greater than 0.05 percent else reject H_O. From the model result TRD has a probability of 0.00 which is less than the test significance of 0.05. Therefore, this postulation that the application of TRD technique has no significant effect in preventing or detecting fraudulent financial practices in MDAs in Nigeria is hereby rejected as the result indicates that the application of TRD technique has a significant effect in preventing or detecting fraudulent financial practices.

5. Discussion of Findings

The descriptive statistics in Table 2 shows that the mean responses of 14.2430, 4.5259, 4.5857 and 24.0797 for DM, RA, TRD and FRP series respectively which indicates an average responses to the individual variables belief statements that clustered between strongly agreed (SA) to strongly disagree (SD). This showed the level of awareness of the respondents to the forensic accounting techniques examined as well as their perception of fraud prevention and detection. The mean response evaluating data mining technique is 14.2430 with minimum score of 10.00 and maximum score of 33.00. On evaluating ratio analysis technique, the mean response showed 4.5259 with minimum score of 3.00 and maximum score of 15.00. Similarly, evaluating trend analysis technique, the mean response stood at 4.5857 with minimum score of 3.00 and maximum score of 15.00. The result highlights the reservation of respondents on availability of forensic accounting services in MDAs. This is in agreement with Ewa et al. (2020). In their ability in detecting or preventing fraudulent practices in MDAs, mean response stood at 24.0797 with minimum score of 19.00 and maximum score of 55.00. The result affirms the conviction of respondents of the efficacy of forensic accounting tools in fraud detection and prevention in MDAs.

The standard deviation of each of the variables is 6.53550 for DM, 3.12319 for RA, 3.27347 for TRD and 10.10157 for FRP. The Kurtosis in Table 2 showed values of 1.014 for DM, 2.182 for RA, 1.634 for TRD and 1.634 for FRP respectively. Also, the kurtosis values for the respondents' demography variables stood at 0.377 for gender, -1.151 for qualification and -0.469 for age range. Since if the values for kurtosis are greater than 1, the distribution is outside the range of normality, the result thus implies the three variables are leptokurtic.

Table 3 revealed positive and significant relationships between DM, RA TRD and FRP as is evidenced by their correlation coefficients of 0.904, 0.931 and 0.934 and their probability values of 0.000, 0.000 and 0.000. The result implies the use of forensic accounting tools will drastically prevent and or detect fraudulent schemes and practices in the financial system of MDAs. This confirms various studies on the impact of forensic accounting in fraud prevention and detection (Bassey, 2018; Enofe, Agbonkpolor, et al., 2015; Enofe et al., 2013; Ewa et al., 2020; Ezejiofor et al., 2016; Onodi et al., 2015).

The econometric linear model result as stated in Table 4 which shows the adjusted R square value of 0.935 or 93.5 per cent indicates that the variation in fraud detection and prevention is explained by the three variables DM, RA and TA while 6.4 per cent of the variation may be explained by variables not considered in the study. The result also showed all three variables are significant and positively relate to fraud prevention and or detection. The F-change of 1204.532 attests to the high value of the adjusted R-squared. This thus demonstrates the high predictive power of the model.

The result of the study also showed that a one per cent increase in DM will lead to 0.295 per cent increase in increase in fraudulent financial schemes prevention and or detection with p-value (000). Also a one per cent increase in the use of RA will lead to a 1.242 per cent increase in detecting or preventing fraudulent schemes with p-value (000) while a one per cent increase in TA will also lead to 1.341 per cent increase in detecting or preventing fraudulent schemes in MDAs financial system with p-value (000).

6. Conclusion/Recommendation

The study underscored the importance forensic accounting techniques would play in mitigating fraudulent financial practices in the public sector financial system and complementary contribution of these techniques in curbing fraudulent activities. Also, the study revealed the lack of human capital and dearth of infrastructure for providing forensic accounting services in the public sector It is thus recommended to:

i. Further research on forensic accounting and fraud prevention should exploit other variables such as, relative size factor (RSF), relational trend analysis and Benford's law technique.
ii. Government agencies and departments should be equipped with latest IT infrastructure and software programmes laced with data-mining capabilities.
iii. Public sector MDAs should recruit multi-task professional accountants with good knowledge in information technology as part of the faculty members in both the accounts and audit departments.

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