



TECHNOLOGY-BASED FORENSIC AUDITING AND FINANCIAL CRIME DETECTION: AN EMPIRICAL ANALYSIS OF DEPOSIT MONEY BANKS IN NIGERIA

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Cite this article:

Oluwatosin Adejoke Osanyinbola (2024), Technology-Based Forensic Auditing and Financial Crime Detection: An Empirical Analysis of Deposit Money Banks in Nigeria. African Journal of Accounting and Financial Research 7(2), 121-132. DOI: 10.52589/AJAFR-0Q6DVLDM

Manuscript History

Received: 28 Jan 2024

Accepted: 17 Apr 2024

Published: 13 May 2024

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ABSTRACT: *The advent and rapid rate of technological development have prompted various fields of study to receive a new touch. One of those fields of study that has been revamped by the technological revolution is accounting. This study examined technology-based forensic auditing and financial crime detection: an empirical analysis of deposit money banks in Nigeria. The research design adopted in the study is the survey design. The survey design was adopted because the data for the study was extracted through the primary method of distributing questionnaires to the respective respondents. The population of the study is made up of the accounting staff of some selected deposit money banks in Abuja, Nigeria. The total population is made up of 58 persons. The method that was used in collecting data for the study was the questionnaire instrument. The questionnaire was distributed to the respondents to extract specific information in line with the objectives of the study. The method of data analysis that was used in this study is multiple linear regression with the application of the Ordinary Least Squares (OLS) technique. The findings of the study reveal that technology-based forensic auditing contributes significantly to financial crime detection in selected deposit money banks in Nigeria. The implication of this finding is that deposit money banks have already embraced and started applying technologically based forensic auditing in their financial crime explorations. It is therefore the recommendation of the study that auditors should stay abreast of the updates of other technological forensic auditing tools and step up their financial intelligence skills by embedding textual analysis in audit engagement to sharpen their skepticism for proper audit evidence and also favorably influence the technological forensic audit quality.*

KEYWORDS: Forensic, Technology, Accounting.



INTRODUCTION

The advent and rapid rate of technological development have prompted various fields of study to receive a new touch. One of those fields of study that has been revamped by the technological revolution is accounting. The accounting field is made up of diverse dimensions and auditing remains one of the most significant dimensions given its role in organizational performance and financial crime (fraud) detection. In this present era of rapid technological improvement, auditing and fraud investigation with dependable computer forensic skills is an indispensable tool for forensic accountants and auditors to detect significant financial misstatements and errors that could have gone undetected thereby reducing the quality of audit reports (Ugochukwu & Okenwa, 2021). Every tool that will ensure the usefulness of the information made available to diverse users must be ensured. In all firms worldwide, the auditors' report determines the reliability of the corporate annual financial report; therefore, the availability of technology is utilized and adopted by audit firms especially when carrying out independent forensic audits (Knežević, 2015).

According to Gbegi et al. (2018), despite widespread praise for firms' adherence to financial reporting standards, public trust in auditors' reports is declining globally. This could be due to the tragic failures of businesses that were thought to be doing well after external auditors reported on their financial health. The reason for this failure was that the audit report that is meant to add credibility to financial reports has shortcomings that can adversely affect investors (Okenwa & Nwoye, 2021). It is becoming a significant concern that financial statement report quality is declining and it poses a threat to the entire accounting profession, which has lagged in updating and acquiring the requisite technological skills necessary to help professional accountants complete their set objectives. It is believed that engaging forensic technology in the audit process will improve the quality and standard of the auditor's report issued by the audit firms. Due to the volume of records kept by organizations, especially deposit money banks, ranging from financial statements to sustainability reports, engaging technological forensic auditing as part of audit techniques will enable auditors to search for irregularities and provide more analytical reports (Akpan & Akpan, 2021). Also, there is less likelihood that fraud and material misstatement will go unnoticed (Gandía & Huguet, 2021). With the expansion of audit techniques to the use of forensic audit technology, there is significant potential in improving the audit report quality as it avails auditors the use of computer technology in the procedure of examining evidence using technological and scientific methods, and also creates and evaluates ideas that can be used in a court of competent jurisprudence to respond to inquiries in the case of litigation and also enlighten the jury as expert witnesses. The Deposit Money Banks in Nigeria are one of the organizations that host a huge amount of financial data. It is believed that these firms are one of the primary beneficiaries of technology-enabled forensic auditing in detecting financial crimes or irregularities.

Empirical studies that delved into the impact of technological forensic audit and fraud detection especially in Nigeria are scarce and generally unexplored. Previous studies mainly concentrate on audit firms' characteristics such as size, auditors' expertise, auditors' skepticism, and audit fee as determinants of audit report quality (Fujianti & Satria, 2020; Jayeola et al., 2020; Salehi et al., 2019; Subianto, 2018; etc.). This study seeks to fill this gap in the literature as it explores the disaggregated dimensions of technological forensic auditing techniques and how they impact fraud detection. It is based on this premise that this study is aimed at carrying out an



empirical analysis of technological forensic auditing and financial crime detection in Nigeria, with a focus on selected deposit money banks.

LITERATURE REVIEW

Technological Forensic Audit

Technological forensic audit refers to the use of technical solutions for the retrieval and analysis of enormous and complicated data sets that can be utilized to meet litigation concerns, investigation needs, regulatory needs, and requirements related to financial crime (Bhusahan, 2015; Easwaramoorth, 2016). A subfield of forensic science is called computer forensics and it deals with the recovery and examination of data from digital devices, frequently in the context of computer crime (Paransanthi, 2016). Also, Bhusahan (2015) explained that computer forensic specialists are responsible for the preservation, gathering, and analysis of data and other evidence found on computers to ascertain the relevant facts. Fenu and Solinas (2016) and Galvan and Battiato (2016) described computer forensics as the process of investigating a computer system used for accounting, financial reporting, and/or financial transaction purposes to determine the cause of the incident.

The mainstay of any digital forensic investigation is computer tools as they remove the barrier that limits the expertise of auditors (Bhat et al., 2021). Professional accountants, such as auditors and forensic accountants, urgently need to digitally upgrade their existing forensic accounting abilities to successfully soothe the rising tension in the corporate financial reporting environment. This action is expedient to prevent dreaded speculations among fearful investors whose value of investments is rapidly declining (Ugochukwu & Okenwa, 2021). The development of efficient and trustworthy computer forensics is primarily responsible for a positive change in auditing practice in countries like the United States of America and other developed countries. Using computer forensics, any type of evidence can be preserved by analyzing information through electronic means. It equally aids in the understanding of a series of events, storing, classifying, and validating information. Technology like data analytics enables forensic accountants and auditors to spend less time sifting through boxes of paperwork and more time investigating matters of concern. Textual analysis on the other hand as a technique is useful in predicting outcomes by identifying anomalies, trends, and correlations in huge data sets (Akpan & Akpan, 2021). Organizations can easily transform raw data into meaningful information if it is analyzed in summary. According to Bassey (2018), by employing software to search for patterns in big amounts of data, forensic auditors can learn more about their clients, and predict if the existing work plan will be executed and cost effective.

Robotic Process Automation (RPA)

The robotic process automation differs from Artificial Intelligence as RPA cannot learn from data patterns and make judgments. RPA is commonly used by accounting and auditing firms to collect audit evidence when the data are in different organizational systems that are not integrated. Areas such as reconciliations, audit confirmations, generation of emails, and so on can be facilitated using RPA. RPA is somewhat expensive to implement but can provide financial as well as non-financial benefits (Jerry, 2018).



Textual Analysis (TA)

Textual analysis refers to a variety of ways to collect data from written sources for use in data analysis, business intelligence, or research, among other things (Loughran & McDonald, 2016). Textual analysis is the method used to describe and interpret the characteristics of information and the main purpose of textual analysis is to describe the content, structure, and functions of the messages contained in texts. According to Kumar et al. (2016), textual analysis comprises a variety of techniques that aim to extract meaningful information from documents. It is done by identifying and examining patterns in the unstructured data of various types of documents. In the study of Loughran and McDonald (2016), the techniques used in textual analysis are content analysis approach, dictionary approach, and machine learning approach. In the study, the process of assessing documents to discern their subjective undertone is known as textual analysis. Auditors can only offer a clean audit opinion in their report when they have no substantial reservations about anything related to the financial statements. It can then be said that the threshold for a modified audit opinion is lowered when auditors are unable to determine whether audit evidence is adequate, which can easily be done through textual analysis.

Data Analytics

The process of evaluating datasets to make inferences about the information they contain using specialized tools and software is known as data analytics (DA). It entails data structure exploration, finding trends and clusters, noticing local patterns, assessing model output, and presenting results. Data quality assessment and familiarization with the structure and features of the data are crucial for exploratory data analysis for auditors (Mara Stats, 2019). When an investigation on information is to be carried out, data analysis is capable of presenting the condensed version of a client's financial information which is mostly oversimplified to obscure substantial underlying variation and this obscurity can easily be revealed and observed when it is analyzed. Analyzing full data sets for abnormalities and trends that can be investigated further to establish audit evidence entails the use of audit data analytics. Typically, this procedure analyzes entire populations of data as opposed to the much more typical audit approach, which just looks at a small subset of the information.

Financial Crime Detection

The fact that fraud cannot be eliminated does not guarantee that it should be ignored, for it can be controlled to reduce losses. Then, this control for fraud brings about fraud deterrence and detection. Fraud deterrence involves the proactive identification and removal of the causal and enabling factors of fraud. It is based on the premise that fraud is not a random occurrence but occurs when the conditions are right for it to occur. Its purpose is that it proactively deters financial misrepresentation to ensure more accurate financial reporting and, in turn, increases investor confidence (George, 2017). From time to time, there are ugly developments in organizations in the area of financial crime and irregularities. Through some intentional or unintentional mechanisms, there are cases of poor or falsified financial reports, firm embezzlements, or fund diversions. Financial crime detection is the strategic identification of these financial fraud-related activities (Anderson, 2020). This detection is made available through manual, forensic, or technological means. Leonard (2019) posited that financial crime detection repositions firms to maintain financial integrity and enhance financial performance.



Ugochuckwu and Okenya (2021) investigated if the use of forensic digital tools effectively predict tendencies of material misrepresentation in Nigerian financial regimes before and after the implementation of IFRS. Using secondary data, data obtained from 50 manufacturing companies in Nigeria were evaluated utilizing pre- and post-IFRS annual reports from the years 2006 to 2016 using digital forensic techniques such as Probit Model e-enabled spreadsheets. The Mann-Whitney U test and the Multiple Regression Analytical tool were used to examine pertinent hypotheses. The analysis' findings demonstrated that the proper use of digital forensic techniques can accurately forecast the likelihood of substantial falsification in the pre- and post-IFRS Financial Statements of certain manufacturing enterprises sampled in Nigeria. Vaijayanthi (2017) discovered that the retrieved documents can be automatically categorized into several useful groups using clustering methods via textual analysis. Word groups known as descriptors are used to characterize the contents of cluster documents and the seized digital devices can provide precious information and evidence about facts if well analyzed. Likewise, Basse (2018) focused on computer forensic accounting as it affects the management of fraud in microfinance institutions in Cross River State. Data collected from both primary and secondary sources were analyzed using the ordinary least square technique. The regression results showed that the estimated coefficients of the regression parameter are all negative signs. The study revealed that audit failures over decades have prompted a paradigm shift in accounting and thus concluded that forensic accounting plays a significant role in the prevention of crimes and corruption.

Ellull and Buttigieg (2021) evaluated how data analytics (DA) can be applied to Maltese external public sector audits to increase the value that can be gained from them. They also examined DA's application in Malta's National Audit Office here, including its descriptive, diagnostic, predictive, and prescriptive aspects (NAO). The research employs a hybrid methodological strategy where semi-structured interviews were used to acquire empirical data, and NAO auditors from every audit unit were given questionnaires to be completed. The results show that although the NAO has begun to incorporate data analytics into its operations, the usage of DA by the office is still modest. According to the report, data analytics implementation will be advantageous for every unit within the NAO.

Fedyk et al. (2022) explored how artificial intelligence (AI) affects audit quality and efficiency. The study used a unique dataset of more than 310,000 individual resumes with specific information for the 36 top audit firms to determine which audit firm employed AI workforce in the auditing industry. Importantly, the company's AI division is consolidated, with personnel concentrating on a small number of teams and areas. Our findings demonstrate that even if the benefit does not become apparent for some years, investing in AI improves audit quality, lowers costs, and eventually replaces human auditors.

Al-Ateeq et al. (2022) investigated the effects of perceived benefits and perceived accessibility of components of the technology acceptance model (TAM), on the adoption of big data analytics in auditing and the subsequent effect on audit quality. A questionnaire poll was conducted with Jordanian offices and linked external audit firms. SEM, or structural equation modeling, was used to analyze the measurement model and test the study's assumptions. The research reveals that, without mediating the actual usage of data analytics, perceived usefulness and perceived simplicity of use have a direct impact on audit quality. However, the application of big data analytics has been proven to moderate the connection between perceived usefulness and audit quality.



Gandía and Huguet (2021) studied textual analysis and sentiment analysis applications in accounting. After introducing the terms textual analysis and sentiment analysis and highlighting their relevance to accounting, the prior research on the application of these ideas in finance and accounting as well as the steps that should be taken when using this textual analysis methodology were reviewed. The paper then recommended using textual analysis to uncover hidden clues that might conflict with the intermediary's stated public position in the audit reports or opinions. Furthermore, the potential advantages of incorporating textual analysis into auditing were examined by Liu, Y. (2019), and they specifically examined how textual analysis will enhance knowledge of the annual report review procedure, audit fee determination, and internal control risks. The study uses the strong and weak modal word lists from Loughran and McDonald (2011) to gauge the strength of the initial SEC comment letters based on their modal usage. The study identifies a favorable correlation between the more abnormally negative tone of earnings in press releases is associated with higher audit fees, demonstrating that the abnormal tone of press releases can be a signal of the client's business. The study also found an association between the intensity of the comment letter and the likelihood of restatement of the reviewed 10-K filing.

Theoretical Reviews

Two theories were reviewed in this study, namely Strain Theory and the Theory of Inspired Confidence.

Strain Theory: The strain theory was propounded by Robert K. Merton (1938). This theory states that social structures in society may encourage citizens to commit fraud. When the goals of society become significant to an individual, achieving them becomes more important than the means adopted, as there is usually an encouragement to strive for monetary success with little or no emphasis placed on the legitimate means of achieving them.

Theory of Inspired Confidence: Limperg (1932) propounded the theory of inspired confidence and the theory assumes that the necessity for expert and independent examination as well as the need for an expert and independent judgment backed by the examinations are the sources of the auditor's broad function in the society as a confidential agent. This necessitates auditors to prepare and carry out their audit in ways that will reduce the possibility of substantial misstatements going unnoticed (Amahalu, 2020). The theory provides a link between the financial report that users desire, which is a credible and reliable financial report, and the audit procedures' ability to meet those needs. It equally observes the evolution of these public (stakeholder) needs and audit methods through time. The theory is significant to forensic audit technology because it links stakeholders' needs for financial information reliability to audit techniques' capacity to meet these needs. This is because changes in the needs of stakeholders might result in changes in auditing procedures and the auditor's function. The auditor must perform the audit in such a way that any external stakeholder's expectations are not jeopardized. As a result, when audit techniques progress, auditors should strive to meet the public's realistic expectations. Also, the fact that audit firms are investing heavily in cutting-edge technical advances to boost the effectiveness and efficiency of the audit process (Albawwat & Frijat, 2021) implies that they aim to inspire the confidence of the public in audit practice.



METHODOLOGY

Research Design

Given the nature of this study, the research design adopted in the study is the survey design. The survey design was adopted because the data for the study was extracted through the primary method of distributing questionnaires to the respective respondents.

Population of the Study

The population of the study is made up of the accounting staff of some selected deposit money banks in Abuja, Nigeria. The total population is made up of 58 persons and the distribution according to the bank is displayed in Table 1 below:

Table 1: Population of the Study

Quoted Deposit Money Bank Abuja Branch	Accounting Department
Zenith Bank	14
First Bank	12
United Bank for Africa (UBA)	15
Fidelity Bank	9
Sterling Bank	8
Grand Total	58

Source: Field Survey, 2024.

Sample Size Determination

Given that the population size of the study is relatively small, the researcher therefore did not go further to derive a sample size for the study. There are various sample size statistics like the Cochran, Yaro Tamane, Wimmer-Dominick sample size calculator, etc., but none was utilized because of the modest population size.

Method of Data Collection

The method that was used in collecting data for the study was the questionnaire instrument. The questionnaire was distributed to the respondents to extract specific information in line with the objectives of the study.

Technique of Data Analysis

The method of data analysis that was used in this study is multiple linear regression with the application of the Ordinary Least Squares (OLS) technique. This method is most appropriate when there is an analysis of the impact of some independent variables on a dependent variable, and this is applicable to this study.



Model Specification

In this research, technological forensic auditing measured with robotic process automation, textual analysis, and data analytics represents the independent variables while financial crime detection is the dependent variable. The model below is specified thus:

$$FCD = b_0 + b_1RPA + b_2TXA + b_3DA + U$$

By definition:

FCD = Financial Crime Detection

RPA = Robotic Process Automation

TXA = Textual Analysis

DA = Data Analytics

b_0 = The Intercept

b 's = Structural Coefficients

U = Stochastic Error Term

RESULTS AND DISCUSSION

Test of Hypotheses

Test of Hypothesis One

H₀₁: Robotic process automation does not contribute significantly in detecting financial crime in selected deposit money banks in Nigeria.

Result Presentation and Analysis

Dependent Variable: Financial Crime Detection

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15.44626	12.54416	1.231351	0.2532
RPA	0.587644	0.839643	3.699874	0.0038
R-squared	0.057695	Mean dependent var	20.50000	
Adjusted R-squared	-0.060093	S.D. dependent var	31.50397	
S.E. of regression	32.43674	Akaike info criterion	9.973317	
Sum squared resid	8417.136	Schwarz criterion	10.03383	



Log likelihood	-47.86658	Hannan-Quinn criter.	9.906930
F-statistic	0.489823	Durbin-Watson stat	1.264008
Prob(F-statistic)	0.503846		

Source: Author's Computation Using E-views Software.

The regression output shows that the probability value for robotic process automation (RPA) yielded 0.0038. Since this value is less than 0.05, we reject the null hypothesis and therefore conclude that robotic process automation contributes significantly to detecting financial crime in selected deposit money banks in Nigeria.

Test of Hypothesis Two

H₀: Textual analysis does not contribute significantly in detecting financial crime in selected deposit money banks in Nigeria.

Result Presentation and Analysis

Dependent Variable: Financial Crime Detection

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.062281	13.78142	0.077081	0.9405
TXA	1.134649	0.516481	2.196886	0.0393

R-squared	0.776282	Mean dependent var	23.90000
Adjusted R-squared	0.698317	S.D. dependent var	29.44090
S.E. of regression	24.66162	Akaike info criterion	9.425230
Sum squared resid	4865.563	Schwarz criterion	9.485747
Log likelihood	-45.12615	Hannan-Quinn criter.	9.358843
F-statistic	4.826307	Durbin-Watson stat	0.712972
Prob(F-statistic)	0.000281		

Source: Author's Computation Using E-views Software.

The regression output shows that the probability value for textual analysis (TXA) yielded 0.0393. Since this value is less than 0.05, we reject the null hypothesis and therefore conclude that textual analysis contributes significantly in detecting financial crime in selected deposit money banks in Nigeria.



Test of Hypothesis Three

H₀₃: Data analytics does not contribute significantly to detecting financial crime in selected deposit money banks in Nigeria.

Result Presentation and Analysis

Dependent Variable: Financial Crime Detection

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.420150	11.22126	-0.750375	0.4745
DXA	1.581826	0.464180	3.407784	0.0093

R-squared	0.692107	Mean dependent var	22.90000
Adjusted R-squared	0.581120	S.D. dependent var	30.05347
S.E. of regression	20.35842	Akaike info criterion	9.041722
Sum squared resid	3315.721	Schwarz criterion	9.102239
Log likelihood	-43.20861	Hannan-Quinn criter.	8.975335
F-statistic	11.61299	Durbin-Watson stat	0.964005
Prob(F-statistic)	0.009253		

Source: Author's Computation Using E-views Software.

The regression output shows that the probability value for data analytics (DXA) yielded 0.0093. Since this value is less than 0.05, we reject the null hypothesis and therefore conclude that data analytics contributes significantly to detecting financial crime in selected deposit money banks in Nigeria.

CONCLUSION AND RECOMMENDATIONS

CONCLUSION

The findings of the study reveal that technology-based forensic auditing contributes significantly to financial crime detection in selected deposit money banks in Nigeria. The implication of this finding is that deposit money banks have already embraced and started applying technologically based forensic auditing in their financial crime explorations. The conclusion drawn from this finding is that the use of a technologically based forensic auditing mechanism is efficient, effective, and much better than manual techniques. The advent of ICT in this area is indeed a welcome development.



RECOMMENDATIONS

The following recommendations were made based on the findings of the study:

- i. Auditors should stay abreast of the updates of other technological forensic auditing tools and step up their financial intelligence skills by embedding textual analysis in audit engagement to sharpen their skepticism for proper audit evidence and also favorably influence the technological forensic audit quality.
- ii. Audit firms should ensure they engage the latest versions and updates on robotic process automation and train more personnel on its use.
- iii. Audit firms should strategically employ the usage of software applications that can permit data analytics to redeem the credibility image of the auditors' report.

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