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An Evaluation of the Effect of Forensic Accounting Techniques on Financial Reports of Listed Manufacturing Companies in Nigeria

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ABSTRACT

This study aims to investigate the effect of forensic accounting techniques in analyzing the financial reports of listed manufacturing companies in Nigeria. The research employed a purposive sampling technique, selecting 152 respondents as the sample size. A simplified questionnaire was used to obtain accurate and validly quantifiable data, utilizing a 5-point Likert scale method continuum of 1 to 5. This study seeks to gain insight into how forensic accounting techniques can be applied to detect financial manipulations and irregularities in corporate financial reports. The study provides valuable insights into the current state of forensic accounting practices in Nigeria's manufacturing by exploring the perspectives of data mining techniques, data analysis techniques, and machine learning techniques on industry professionals. Data collected were analyzed using descriptive statistics and ordinary least squares. The result revealed that data mining techniques, data analysis techniques, and machine learning techniques have a positive and significant impact on financial information in Nigeria. The study concluded that listed manufacturing companies need to take crucial steps to maximize forensic accounting techniques and thereby improve financial information. The study recommended that forensic accounting techniques and processes should be improved to enhance the qualitative financial statement efficiency process.

Keywords: Forensic Accounting**,** Data Mining Techniques, Data Analysis Techniques, Machine Learning Techniques, Financial Information Manipulation.

JEL Codes: M42, C55, C45, C63, G01

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1.1 INTRODUCTION

Globally, the company primarily communicates its financial information to the public through financial statements. Which creditors, stakeholders, and investors use when making investment decisions. Importantly, the statutory auditors' true and fair view opinion on the financial statement is expected to add credibility to such financial reports (Bassey, 2018). This is then anticipated to boost the users of financial statement confidence. The quality of financial information organizations reveals significantly impacts financial reports' efficiency. ÖZCAN, (2019) stated that financial information manipulation is one of the issues most frequently discussed in the broader economic context. Although Nigeria aspired to be one of the world's biggest economies, this menace makes their financial reports wallow in the problems of scandals, frauds, and failures in both private and public sectors which contributed to the loss of confidence by the users of the financial statements. in the ability to contribute viable solutions to financial problems, its demand for forensic accountants. Dada and Jimoh, (2020) opine that the level of fraud, corruption, and other unethical behaviors in the private and public sectors is worrisome the study, therefore, revealed how to effectively prevent and manage the application of forensic accounting services.

Recently financial manipulation causes a loss of confidence for financial statement users in many federations, and Nigeria is not excepted which has caused financial criminality, poor financial management, and misuse of public funds which has increased continuously, no doubt that perpetrated is under the supervision of the internal auditors of an organization which suffices to say that independence of the internal auditors is not enough because is the employee (OKAFOR & OBIORA, 2022). the manipulation has caused oil bunkering, embezzlement bribery, looting, money laundering, fraud, tax evasion, and currency manipulation are examples of financial crimes (Okoye & Ndah, 2019). Financial crimes include subsidy fraud, advance fee fraud, identity fraud, bank fraud, mortgage fraud, embezzlement, credit card fraud, hedge fund fraud, consumer fraud, and occupational fraud (Ehioghiren & Atu, 2016). The occurrence of fraud and other financial crimes has increased today, and the advent of computerization and the accessibility of Internet services has only worsened the issue of financial crimes worse (Bassey, 2018). Consequently, this study seeks to establish the extent to which Forensic Accounting can help in preventing and detecting fraudulent activities before perpetrated and achieving qualitative financial statements that could aid stakeholders in making better investment decisions.

The trend of forensic accounting in the world made prior scholars study issues related to the effect of forensic accounting on the detection of financial information manipulation in different times and spaces. Atabay and Dinç, (2020) studied financial information manipulation and its effects on investor demands: the case of bist bank. the study focused on the perception of two main objectives. The first is to determine whether banks, which are Public Interest Entities, manipulate their financial statements, and the second objective is to reveal whether the detected financial manipulations affect investor decisions. Enofe *et al.* (2015) examined the impact of forensic audits on corporate fraud in Nigeria. The objective of the study is to determine the relationship between forensic audit and corporate fraud. Oyedokun & Emmanuel, (2016) investigate the techniques

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available in forensic accounting investigation and interrogate the justification for same. Eko *et al.*, (2020) evaluated the application of forensic accounting techniques in preventing/detecting fraudulent practices in commercial banks in Nigeria by specifically assessing the impact of commercial data mining, ratio analysis, and trend analysis techniques in fraud detection/prevention.

The objective of this study varies in its entirety from prior studies, as this intends to investigate the effectiveness of forensic accounting in achieving quality assurance in financial reporting in Nigeria. Specifically, to Deter and Determine the efficacy, and effectiveness of Forensic Accounting in improving the faithful representation and enhancing the value relevance of financial statements, using data mining techniques, data analysis techniques, and machine learning techniques as the predictor variables of forensic accounting that can accomplish the tasks of reducing the menace of financial information manipulations in both private and public sectors, with special focus on the southwestern states in Nigeria. the remainder of the research paper is structured as follows: a review of extant literature highlighting several concepts about forensic accounting, Data mining techniques, Data analysis techniques, Machine learning techniques, appropriate theoretical considerations, methodology of the study, data analysis, and discussion of findings and conclusion.

2. Literature Review and Hypothesis Development

2.1. Conceptual Review

2.1.1. Forensic Accounting (FA)

Dada and Jimoh, (2020) conceptualized forensic accounting as the application of financial skills and investigative mentality to unresolved issues, conducted within the context of the rules of evidence. Forensic Accounting (FA), is an expert in accounting, auditing, and investigation that are used to support judicial cases. According to Bhasin, (2017), "Forensic accounting consists of two key components: litigation services that recognize an accountant's function as an expert consultant, and investigation services that leverage a forensic accountant's expertise and may involve potential trial evidence." This suggests that in addition to financial accounting, a forensic accountant should also be knowledgeable about internal control systems, the law, other institutional needs, investigation expertise, and interpersonal skills. forensic accounting involves the application of accounting and auditing, financial and investigative skills, to be carried out when a lapse has been established to ascertain who is responsible, the reason for the action including the extent of the damage if any. Bassey, (2018) submitted that Forensic accounting is also defined as the application of accounting and auditing, financial and investigative skills, to unravel issues conducted within the context of the rules of evidence. This means that forensic accounting is quickly replacing the traditional method of manual way of auditing for preventing financial information manipulation.

The application of forensic accounting for the detection of financial manipulation influences faithful representation and enhances the relevance of the financial statement, forensic accounting

is highly objective in skill because human decisions can be influenced by situation subjective elements which are not based on figures alone (Ekanem, 2020). The forensic account gives accurate results as it functions based on a set of artificial bits of intelligence of programmed rules, and the development of models that could identify fraudulent practices and manipulation of financial information (Ozili, 2020). Akinadewo and Akinkoye, (2020) opined that the advent of forensic accounting is a confident retrieval of financial information in place and prevents personal bias to deter manipulations (Al-Qadi & Al-Dmour, 2022).

2.1.2 Data Mining Technique

Data mining Techniques (DMT) are defined as the process of finding anomalies, patterns, and correlations within large data sets to predict outcomes. Data Mining Techniques (DMT) can also be used by Companies to turn raw data into useful information (Oyedokun & Emmanuel, 2016). In addition, Data mining Techniques are described by Eko *et al.*, (2020) as software to look for patterns in large batches of data, an organization can learn more about their development and effective marketing strategies as well as increase sales and decrease costs. However, Data mining Techniques help in the extraction of hidden predictive information from a large database and also served as a powerful new technology with great potential to help Companies focus on the most important information and also the tool to predict future trends and behaviors allowing Businesses to make proactive knowledge-driven decisions (OKAFOR & OBIORA, 2022). The automated prospective analyses offered by data mining techniques move beyond the analyses of past events provided by retrospective tools typical of decision support systems.

Remarkable, because of the considerable effect Data mining techniques software is extremely helpful in detecting fraud as it has scripting capabilities and can search organizations' databases for anomalies and suspicious patterns that are symptoms of fraud. Some of the commercial data mining techniques software are Audit Command Language (ACL) and CaseWare (IDEA) Inventory Database for Environmental Analysis is a robust auditing and financial reporting platform of any organization to empower both the auditing and accounting department to strengthen accountability, transparency, and trust in improving the overall management of public funds from mismanagement (Tan *et al.*, 2016). Data mining techniques help Banks understand their customer base and the billions of transactions at the heart of the financial system, which can be applied to detect financial manipulation in any organization (Aggarwal & others, 2015). Data mining techniques helps financial services Companies get a better view of market risks, detect fraud faster before it causes the problem of unfaithful representation of financial statements, and also manage regulatory compliance obligations and get optimal returns on their marketing investments. DM is a powerful artificial intelligence (AI) tool, which can discover useful information by analyzing data from many angles or dimensions, categorizing that information, and summarizing the relationships identified in the database to aid audit work. Subsequently, this information helps make or improve decisions to avert manipulation.

Nigeria data mining techniques which are an artificially intelligent tool is still in its early stage and still developing, the accounting scandals during the few years have induced a crisis of non-

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confidence in financial reporting practices and the effectiveness of corporate governance mechanisms. Indeed, Forensic Accounting integrates accounting, auditing, and investigative skills to conduct investigations in a variety of manipulation that lead to fraud cases with the help of data mining this will be possible to detect and prevent fraud. Although SAS and IFRS encourage the application of technology in accounting with the development of global transactions of business, with the use of data mining we make the financial statement to gain faithful representation because data are automatically saved to Claud, and if it is manipulated on the financial statement when data mining on forensic investigate the transaction it will detect the manipulation before the publication of the financial information.

2.1.3. Data Analysis Techniques

Various definitions of data analysis techniques (DAT) have been suggested because data analysis techniques have several uses. Wang and Byrd, (2017) submitted that Data analysis techniques involve the systematic and structured process of examining, cleaning, transforming, and interpreting data to extract meaningful insights and support decision-making. it is also characterized by solving maintenance problems to avert manipulation of records and development of programs for the organization, Consequently, Data analysis techniques refer to the set of procedures and methods used to analyze and summarize data in order to discover patterns, relationships, and trends, and draw conclusions from the data (Saggi & Jain, 2018)(Saggi & Jain, 2018). Data analysis techniques encompass a variety of statistical and computational methods used to analyze and interpret data, including descriptive statistics, inferential statistics, data visualization, and machine learning algorithms (Ranjan & Foropon, 2021).

Furthermore, Data analysis techniques play a crucial role in detecting and mitigating financial information manipulation, which refers to intentional misrepresentation or distortion of financial data for fraudulent purposes. Data analysis techniques such as outlier detection, trend analysis, and statistical analysis can help identify unusual patterns or anomalies in financial data. For example, if there are significant deviations from expected trends or statistical norms in financial statements, it could indicate potential manipulation attempts (Saggi & Jain, 2018). Data analysis techniques, such as data mining and machine learning algorithms, can be used to identify patterns and relationships in large financial datasets. These patterns could highlight suspicious activities or unusual behaviors that may indicate financial manipulation, such as revenue recognition fraud or insider trading (Wang & Byrd, 2017; Ranjan & Foropon, 2021).

2.1.4. Machine Learning Technique

Sridhar, (2020) defined a Machine Learning Technique (MLT) as the use of algorithms and statistical models that allow computer systems to learn from and make predictions or decisions based on data without being explicitly programmed. Similarly, Machine learning techniques refer to the use of computational methods and algorithms that enable computer systems to automatically learn and improve from experience, data, and feedback, and make decisions or predictions based

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on that learning (Anwar *et al.*, 2019). Likewise, Machine learning techniques encompass a set of tools and methods that enable computers to automatically discover patterns, relationships, and insights from data, and use that knowledge to make predictions or decisions (Swathy & Saruladha, 2022).

Additionally, Machine learning algorithms can analyze large amounts of financial data in real-time, identifying patterns and anomalies that may indicate financial manipulation. By leveraging machine learning techniques such as anomaly detection, clustering, and classification, financial institutions can potentially detect fraudulent activities or financial manipulations earlier, mitigating potential losses. Similarly, Machine learning models can analyze historical transaction data to identify patterns of fraudulent behavior and develop predictive models that can flag suspicious transactions in real-time. This can help financial institutions detect and prevent financial manipulation, such as insider trading or market manipulation, by identifying abnormal trading patterns or unusual behaviors in trading activities.

2.1.5. Financial Information Manipulation

Financial information manipulation is a deliberate and illegal act committed by the organization (Adewoye & Olaoye, 2014). Financial manipulation could be seen as an intentional distortion of financial statements or documents of an organization for undue advantages. A financial manipulation is also an intentional act by one or more individuals among management staff or third parties which results in a misrepresentation of financial information (Nwanaka, 2022). Financial information manipulation has been existing for a long as a global phenomenon and it increases bit by bit every day which is a deliberate act that put monetary losses on both organizations, and the economy.

Various researchers in accounting and economists have concluded that financial information manipulation is mainly for low-profit distribution, reduction of the tax base, an increase of loan obtainment possibility, and maximization of firm value (Bezirci & Karahan, 2015). Olukowade & Balogun, (2015) explained the devastating effect of financial manipulation as reported of fraud in a generic term and embrace all the multifarious means that human ingenuity can devise, and resort to an individual to get an advantage over another in false representation. This also inline that fraud is an act or course of deception, deliberately practiced to gain unlawful or unfair advantage; at the detriment of another which means the modification made knowingly and willfully by businesses in accounting records and transactions, in financial statements, through addition and subtraction, for misleading financial information users, the immediate effect and overall perception of financial manipulation in many organizations hinged on the emphasis of Financial information manipulations made by businesses generally emerge in two forms: balance sheet covering and balance sheet window-dressing (Atabay & Dinç, 2020).

Conceptual framework

This study's conceptual framework was to establish the link between the independent variable and the dependent variable. The independent variable is forensic accounting (FA), proxied with Data

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Mining Techniques (DMT), Data Analysis Techniques (DAT), and Machines Leaning Techniques (MLT). Financial Information Manipulation (FIM) is the dependent variable.

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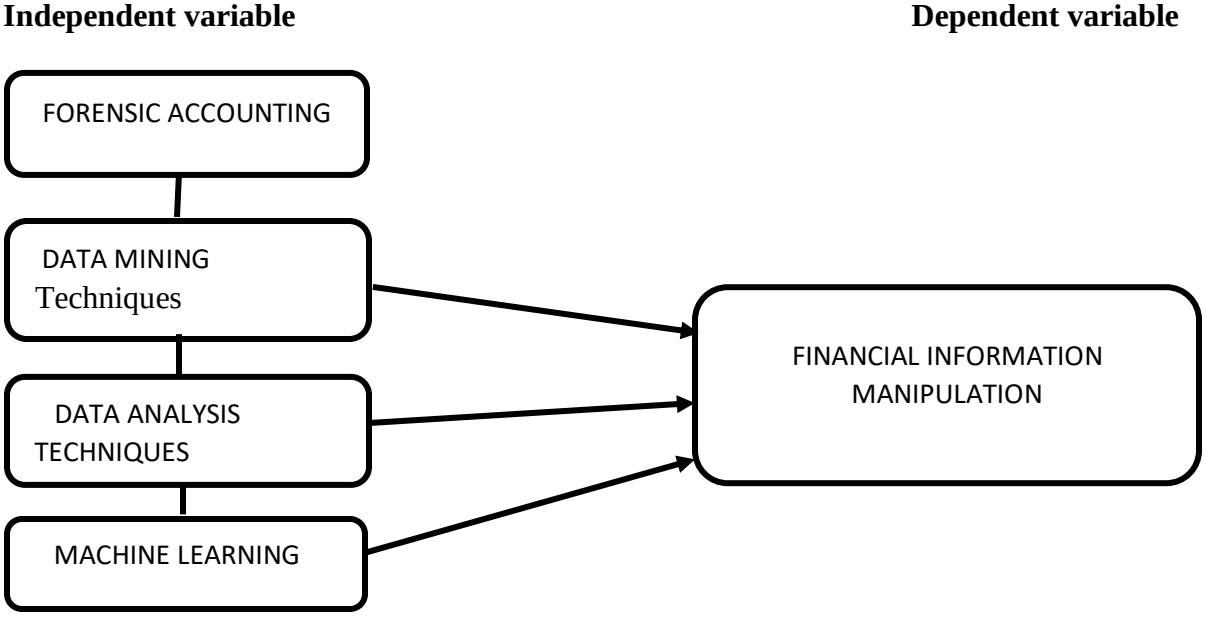

Conceptual framework to show the interaction between forensic accounting, Data mining technique, Data analysis technique, Machine learning technique, and financial information manipulation.

Figure 1: Conceptual Framework

Source: Author's Conceptualization (2022)

2.2 Theoretical Review

This study is anchored on forensic accounting theory (FA). Prior studies have used several theories to explain why forensic accounting skills are used to manage financial information manipulation, fraud, and crimes on the financial statement. However, this theory is propounded by Frank Wilson in the 1930s. When Wilson was working as a Certified Public Accountant (CPA) for the US

Internal Revenue Service, he was assigned to investigate the transactions of the infamous gangster Al Capone. Capone was known for his involvement in illegal activities, including violent crimes. However, forensic accounting theory stated that the techniques and methods used to detect fraud reflect the accounting and non-accounting decisions that were taken into consideration by the forensic investigator. Also, the central tenet of forensic accounting theory is that the selection of forensic detection techniques depends less on the forensic investigator's knowledge, experience, and training and more on the accounting and non-accounting considerations they made at the beginning, middle, and end of the fraud detection process (frank Wilson 1930).

Although, according to forensic accounting theory (Ozili, 2020) asserted the procedures and approaches chosen to look for creative accounting or financial reporting manipulations and the results of doing so reflect the accounting and non-accounting judgments that the forensic accountant or investigator took into account. An ethical goal of a forensic investigation exercise is to locate unresolved problems, uncover them, and provide solutions to prevent similar behavior from happening in the future. These corrective measures could involve monetary penalties, jail time, etc. An exercise in the forensic investigation should not fail the convicted company or the demise of the guilty person. Without this presumption, forensic investigators can try to bring about the destruction of the company or the person they are looking into for criminal suspicion. This assumption is essential because it eliminates the forensic investigator's personal bias or propensity for judgment and stops that prejudice from influencing the forensic investigation.

Finding evidence of a crime and making it appear credible in court are the main goals of forensic accounting. Investigating someone's finances, or even the finances of a whole company is a significant task that calls for the expertise of forensic accountants. Legal expertise and accounting expertise are combined by forensic accountants. They can evaluate businesses and assist in problem-solving. By doing this, businesses can avoid theft, fraud, manipulation, corruption, etc. A forensic accountant conducting an audit of a business should maintain objectivity. Although there are other applications for forensic accountants in firms, they are typically used by large businesses to conduct audits. Forensic accountants frequently support professional negligence claims when evaluating and commenting on other professionals' work. Also, to analyze lifestyle for spousal support, determine income available for child support, and determine equitable distribution, forensic accountants are involved in marital and family law.

Chabbra & Koli, (2018) asserted that due to the increasing fraud, there is a loss of trust in the reliability of the financial information used by the user or makers of the economic decisions. Forensic accountants have received training in conflict resolution and mediation procedures. They also settle cases involving disagreements in partnerships and corporations. Additionally, forensic accountants assist in settling instances involving contract disputes, construction defects, product liability, infringement of patents and trademarks, and responsibility resulting from contract breaches, Similarly, assist in managing a variety of insurance claims, including those involving property loss due to various risks, substantial loss policies, property loss due to various risks, and

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other forms of insurance claims. Additionally, insurance firms' claim settlement arrangements are made to address policyholders' needs.

Empirical Review

Academic researchers have been engaging in different studies on the effect of forensic accounting enhancement. Chaqiqi, (2021) X-trayed Readiness Analysis of Data Analytics Audit Implementation in Inspectorate General of the Ministry of Finance: An Indonesian Case. This study aims to measure the readiness of audit data analytics implementation reviewed from general to specific by using a qualitative method where the informants were selected based on purposive sampling involving 20 speakers consisted of auditor, supporting unit, auditee, and expert. This study uses the primary model. The results show that the Ministry of Finance Inspectorate General has resources readiness at a high level and other categories at a medium level. Specifically, based on two most important activities involving data analytics in Inspectorate General, namely tax audit and financial statement review, show that tax audit has a high level of resource readiness, and the others at a medium level, meanwhile the financial statement review has a high level of resources readiness and information system readiness the others at a medium level.

The finding further confirmed declarations by Afeef & Al Ali, (2017) in United Arab Emirates on Powerful Predicting Model for Financial Statement Fraud Based on Optimized XGBoost Ensemble Learning Technique. the study aims to develop a better Financial Statement Fraud (FSF) detection model by utilizing data from publicly available financial statements of firms in the MENA region. The study uses different Machine Learning techniques. empirical findings show that the XGBoost algorithm outperformed the other algorithms in this study, namely, Logistic Regression (LR), Decision Tree (DT), Support Vector Machine (SVM), AdaBoost, and Random Forest (RF). We then optimize the XGBoost algorithm to obtain the best result, with a final accuracy of 96.05% in the detection of FSF

Jacky and Sulaiman, (2022) examining the use of data analytics in external auditing: a content analysis approach in Malaya. This study examines the perceptions of interested stakeholders on the factors affecting the use of data analytics (DA) in financial statement audits. The study used as a framework to perform a direct content analysis of all the 50 responses. The analysis showed that a range of attributes, such as the usefulness of DA in auditing, authoritative guidance (auditing standards), data reliability and quality, auditors' skills, clients' factors and costs, were the factors perceived by stakeholders to be affecting the use of DA in external auditing. The finding of this study justifies the result of the survey by Chukwuma *et al.*, (2023) and Okolie *et al.* (2023) and Exploring the role of machine learning in detecting and preventing financial statement fraud: A case study analysis in America. the study examines the current state of forensic accounting in detecting financial statement fraud and to explore the potential benefits of a paradigm shift in forensic accounting that incorporates advanced data analytics, machine learning, and continuous monitoring. The study involves a combination of literature review and case study analysis. The case studies and the data analysis showed that the use of advanced data analytics, machine learning,

and continuous monitoring can improve the effectiveness and efficiency of detecting and preventing financial statement fraud.

Ashtiani and Raahemi, (2022) (Ashtiani & Raahemi, 2022) Intelligent Fraud Detection in Financial Statements Using Machine Learning and Data Mining: A Systematic Literature Review in Canada. systematic literature review (SLR) is undertaken on the study. The study found no statistically significant of the variable focus on exploring machine learning and data mining.

Edu, (2022) assessed the Positioning big data analytics capabilities towards financial service agility the study identifies how big data analytics BDA capabilities can be deployed to provide significant improvement for financial services agility. The study adopts survey data from 485 banking professionals' perspectives with BDA usage, IT capability development and financial service agility. The study show that distinctive BDA usage grounded on the concept of IT capability viewpoint proof that financial service agility could be enhanced provided enterprises develop technical capabilities alongside other relevant resources. The finding of this study justifies the result of the survey by Eko *et al.,* (2020) evaluated the application of forensic accounting techniques in preventing/detecting fraudulent practices in commercial banks in Nigeria by specifically assessing the impact of commercial data mining, ratio analysis, and trend analysis techniques in fraud detection/prevention. Similarly, the finding of the study on Fraudulent financial reporting and data analytics: an explanatory study from Ireland by Aboud and Robinson, (2020) suggests that whilst data analytics is widely used by businesses in Ireland there is an underutilization of data analytics as an effective tool in the fight against fraud. The study suggests there are barriers that may be preventing companies from implementing advanced data analytics to detect financial statement fraud and identifies how those barriers may be overcome.

(OKAFOR & OBIORA, 2022) analyze the impact of forensic audit and financial statement fraud of deposit money banks in Nigeria between the period 2016-2020. with the following objectives: Determine the effect of data mining on financial statement fraud of deposit money banks. in Ascertain the effect of computer-assisted audit techniques on financial statement fraud of deposit money bank. The research is survey-based, using primary information gathered using a questionnaire. The findings indicate that data mining significantly affects the financial statement fraud of Nigerian deposit money banks. Also, computer-assisted audit procedures significantly affect the financial statement fraud of deposit money banks in Nigeria. This was supported by Joseph *et al.,* (2016) nvestigated the Impact of Forensic Accounting in Fraud Detection and Prevention: Evidence from the Nigerian Public Sector, and found that fraud identification and prevention in Nigeria might benefit significantly from forensic accounting.

United Kingdom researcher Ozili, (2015) examined the influence of forensic accounting involves the process of understanding, identifying, detecting,9 and communicating fraud patterns and schemes to stakeholders to aid any investigation process or activity. A survey design was adopted for the study. The result showed the broad range of skills of the forensic investigator identified in the literature has consequences of further broadening the scope of forensic accounting education among tertiary institutions. which raises the question of whether students studying forensic

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accounting should study a broad range of subjects, such as auditing, financial analysis, psychology, criminology, and other subjects. Furthermore, a broad focus on forensic accounting education suggests that in-depth forensic education is unlikely to be effectively addressed during the academic institutions' annual or termly curriculum, either as a stand-alone course or as an integrated course.

KARUTI, (2020) Investigate forensic accounting and fraud control in county governments in Kenya: evidence from counties in mt. Kenya region. the study population is 415. And Analyses of both quantitative and qualitative data were conducted using a descriptive study methodology. The study found that county government personnel did not sufficiently enforce forensic accounting standards to counter the potential of fraud. This finding agreed with a study done by Özcan, (2018) who supported the engagement and usefulness of the Beneish Model in forensic accounting practices: Evidence from Turkey. Logistic regression analysis was used to examine the empirical variables. Based on a sample that includes 174 firms from 2005 to 2017. The classification results suggest that Beneish Model has superior performance in the detection of firms that committed financial statement fraud.

The study of Okoye and Ndah, (2019) x-trayed Forensic Accounting and Fraud Prevention in Manufacturing Companies in Nigeria. The study investigates the relationship between forensic accounting practices and the prevention of fraud in manufacturing companies in Nigeria while the specific objectives are to Determine the relationship between fraud investigation practices and the prevention of fraud in manufacturing companies and also the relationship between fraud litigation practices and the prevention of fraud in manufacturing companies. Data were collected from primary sources through the issue of fifty (50) structured questionnaires to the accounting staff of ten (10) manufacturing companies. The findings showed that there is a positive and statistically significant relationship between fraud investigation practices and the prevention of fraud in manufacturing companies. The findings also showed that there is a positive and statistically significant relationship between fraud litigation practices and the prevention of fraud in manufacturing.

Mishra *et al.*, (2021) examines the role of Forensic Audit in Controlling Financial Statement Fraud: A case study of Satyam Computers in Aligarh India. Secondary data taken from Banking, accounting, financial journals, and financial newspapers, have been used in this study. The result shows that financial statement fraud has to be considered a serious problem by financial regulators, enforcement agencies, and investigators and strict implementation of existing rules and regulations in the Indian corporate sector will go a long way in improving transparency in the financial statement. This will substantially improve corporate culture and ethics among Indian companies. Similar sentiments were echoed by Kurnaz *et al.*, (2019) who affirmed that forensic accountants are a positive relationship between internal control and forensic accounting field expertise and that the relationship between quality financial reporting and forensic accounting field expertise was

partially significant.

Halilbegovic *et al.*, (2020)sought to evaluate the application of the Beneish M-score model on small and medium enterprises in the Federation of Bosnia and Herzegovina. With a sample size of 4,580 small and medium enterprises, data was analyzed using audited financial statements in the period from 2008 to 2015. The study result describes the comparison of different industry sectors regarding the possible manipulators and serves as a solid foundation for further research in the area of forensic accounting. Study findings were similar to the work done by Afeef & Al Ali, (2017) who argued that engagement of The Auditors' Perception of the effect of Forensic Accounting to Mitigate Earnings Management in Jordanian Companies that revealed the forensic accounting (namely, Forensic culture and communication skills, Accounting skills, Knowledge in the field of controlling and auditing) affect earnings management, where the maximum effect was for knowledge in the field of controlling and auditing, while the least effect was for forensic culture and communication skills.

Igweonyia, (2016) focuses study on forensic accounting on fraudulent practices in Nigeria's public sector using a questionnaire and chi-square for data analysis shows that forensic accounting will significantly reduce the occurrence of fraud cases in the public sector. Similar sentiments were in line with an empirical study conducted by Akani & Ogbeide, and2017) on forensic accounting and fraudulent practices in the Nigerian public sector, it was revealed that there is a significant relationship between forensic accounting and the reduction of fraudulent practices in the Nigerian public sector.

Throckmorton *et al.*, (2015) argue that continuous reviews, reforms, and fines issued against curbing financial statement fraud will only be meaningful if such frauds are detected promptly. This finding concurred with assertions by Anning and Adusei, (2022) and (Jaswadi et al., (2022)) who acknowledged that forensic accounting results demonstrate that the majority of listed manufacturing and trading firms are likely to engage in financial statement manipulation in Ghana. The contribution of (KARUTI, 2020) underscores the significance of the research established that policies on forensic accounting were not properly enforced by county government employees to fight the threat of fraud in Kenya.

3. Methodology

The study adopted survey research design to collect information from the prospective respondent. A well-structured questionnaire was given to managers, auditors, chartered accountants, and directors of accounting companies and parastatals in Lagos state, Nigeria. The study uses purposive sampling techniques in selecting 152 respondents which is the sample size. the questionnaire raised was simplified to obtain accurate and validly quantifiable data, with a 5-point Likert scale method continuum of 1 to 5 with the following options: Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), Strongly Disagree (SD). The questionnaires were analyzed with descriptive and inferential statistics. This study's conceptual framework was purposed to establish the link between the independent variable and the dependent variable. The independent variable is forensic accounting (FA), proxied with Data Mining Techniques (DMT),

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Data Analysis Techniques (DMT), and Machine Learning Techniques (MLT). Financial information manipulation (FIM) is the dependent variable.

3.1 Reliability Test

The reliability of the study was accessed with Cronbach Alpha. For reliability test on financial information manipulation, 6 items were raised and the Cronbach Alpha is 0.753, 10 items under Data Mining Techniques registration were considered and the Cronbach Alpha is 0.822, 10 items were also considered under and the Data Analysis Techniques Cronbach Alpha is 0.769 and 10 items were considered under Machine Learning Techniques with the recorded Cronbach Alpha of 0.747. From the Cronbach Alpha result, it was discovered that all items are reliable and meet the threshold requirement of 0.7 therefore in explaining forensic accounting techniques on financial statement in Nigeria the research instrument is reliable based on the above result.

Table1: Reliability Test

Items	Variables Cronbach's Alpha
Data Mining Techniques (DMT)	82.2%
Data Analysis Techniques (DAT)	76.9%
Machine Learning Techniques (MLT)	74.7%
Financial Information Manipulation (FIM)	75.3%

Source: *Researcher's Computation*, (2023)

3.2. Model specification

The model for this study was developed in line with the following econometric model which is adopted to test the relationship between the dependent and independent variables.

$Y = (\beta 0 + \beta 1\ X1 + \beta 2X2 + \beta 3X3 \ldots\ldots\ \beta nXn + \mu \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ (1)$

Where;

Y = Dependent variables

X1 – Xn = Independent variables

β0 = Constant of the equation.

β1 – βn = Coefficients of Independent variables

μ = Error term

Specification for the study, this relationship model was adopted thus:

FA = Forensic Accounting (Independent Variable)

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FIM = Financial Information Manipulation (Dependent Variable)

∝ = Constant

β1 - β2 = Coefficients

DMT = Data Mining Techniques

DAT = Data Analysis Techniques

MLT = Machine Learning Techniques

β0 = Constant of the Equation.

β1, β2, β3, = Unknown Coefficient of the Variable.

μ = error term.

A-priori expectation = β1, β2, β3, > 0

Conceptual Framework of changes to Forensic Accounting (FA).

4. Data Presentation and Analysis

4.1. Descriptive Statistics

The Table 2 below present the descriptive statistics test for the study in order to determine the degree at which the distribution of sample data corresponds to normal distribution and access the series characteristics of the variables. The outcome of the descriptive revealed that the average value of financial information manipulation is 4.1678; it varies from a minimum of 2.75 to a maximum of 4.75. The standard deviation that measures the degree of variability stood at 0.45289. This showed high variability to its mean value. The Skewness recorded a value of -0.514 and therefore described as a long-left tail due to its negative value while the Kurtosis of -0.329 is known as Platykurtic distribution as its value is less than 3.

Remarkably, Data Mining Techniques (DMT) has its mean value of 4.4474 varies from a minimum of 2.00 to a maximum of 5.00. The standard deviation of data mining techniques registration stood at 0.70748 which showed a high deviation value from its recorded mean. Data Mining Techniques registration is negatively skewed with a value of -1.460 thus described as a long-left tail while the Kurtosis value of 2.634 is described as Platykurtic distribution because the variable is less than 3.

Also, Data Analysis Techniques (DAT) has an average value of 4.0658 varies from a minimum of 2.00 to a maximum of 5.00 The standard deviation of data analysis techniques showed the extent of its variability from its mean value and it recorded a value of 0.95370 implying that the degree of its variability to its mean is high. The Skewness showed that the variable is negatively skewed as the value stood at -0.736 thus described as has a long-left tail while the Kurtosis of -0.433 is known as Platykurtic distribution because it is less than 3.

Lastly, Machine Learning Techniques (MLT)has an average value of 4.0724, varies from a minimum of 2.00 to a maximum of 5.00. The standard deviation of machine learning techniques showed 0.78985 implying that the degree of its variability to its mean is high. Conversely, machine learning techniques Skewness stood at -0.130. This value shows that the variable is negatively skewed and therefore described as a long-left tail. The kurtosis of -1.382 is known as Platykurtic distribution as it has a value lower than 3.

Table 2 Descriptive Statistics

Variables	FIM	DMT	DAT	MLT
Mean	4.1678	4.4474	4.0658	4.0724
Minimum	2.75	2.00	2.00	3.00
Maximum	4.75	5	5	5
Std. Deviation	0.45289	0.70748	0.95370	0.95370
Skewness	-0.514	-1.460	-0.736	-0.130
Kurtosis	-0.329	2.634	-0.433	-1.382
Obs	152	152	152	152

Source: ***Researcher's Computation*****, (2023)**

4.2. Test of Variables

4.2.1. Multicollinearity Test

For the study to ensure that the model employed in the analysis has no multicollinearity problem, the study employed Tolerance value coupled with Variance Inflation Factor (VIF). The outcome of the tolerance value showed that data mining techniques is 0.901, Data analysis techniques has a tolerance value of 0.979 while the tolerance value for machine learning techniques is 0.919. However, since all the variables of the analysis have their tolerance values exceeding 0.10 the study concluded that multicollinearity problem does not present in the model. Moreover, the Variance Inflation Factor (VIF) for data mining techniques is 1.110, data analysis techniques have a variance inflation factor of 1.021 while the Variance Inflation Factor (VIF) for machine leaning techniques is 1.088. The outcome of these three variables presented indicated a value higher than 10 while the tolerance values in the rule of thumb are greater than 0.10 therefore, validated that multicollinearity problem does not exist in the model.

Table 3 Multicollinearity Test

Tolerance		VIF	1/VIF
DMT	0.901	1.110	0.901
DAT	0.979	1.021	0.979

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DMT	0.919	1.088	0.919
Means VIF	1.07		

Source: ***Researcher's Computation*****, (2023)**

4.2.2 Normality Test

Remarkably, the study used a combination of histogram normality test and P-P Plot to ensure that the distribution of data was normal. The results were presented in Figure 2 and Figure 3. Figure 2 displayed the distribution of responses of most respondents, which demonstrated a bean-shape, indicating normality distribution. In contrast, Figure 3 showed that the regression standardized residual line fit into the variables significantly based on the P-P Plot analysis.

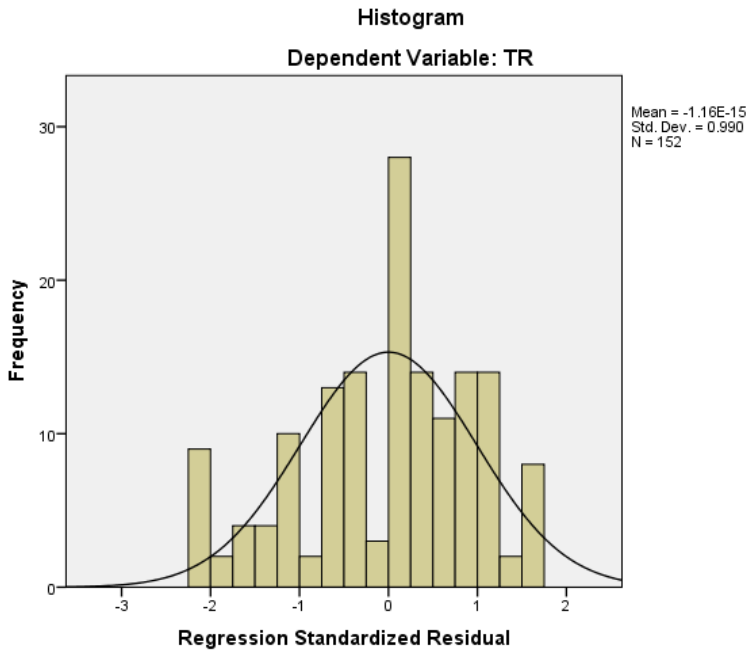

Figure 2: Histogram with Normal Curve

Source: ***Researcher's Computation*****, (2023)**

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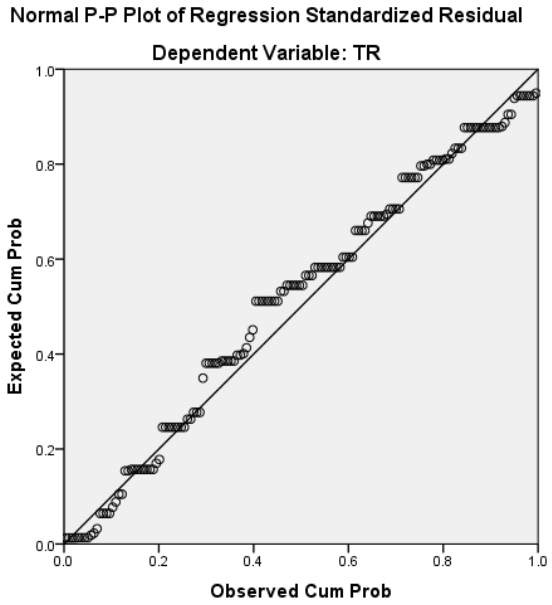

Figure 3: P-P Plot of Regression Standardized Residual

Source: ***Researcher's Computation*****, (2023)**

Table4: Post Estimation Test Results

Tolerance And VIF Value

Null Hypothesis	**Statistics**	**Probability**
	VIF	1/VIF
There is no issue of multicollinearity between the variables. (1/VIF>0.10)		1.07
Test for the overall Significance (F-Statistics)		
Null Hypothesis	**Statistics**	**Probability**
No significance in the model (P<0.05)	162.142	0.000

Source: ***Researcher's Computation*****, (2023)**

4.2.3. Correlation Matrix

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Reported in Table 5 is the outcome of the correlation matrix employed in the analysis of forensic accounting techniques on financial reports of listed manufacturing companies in Nigeria with specific focus on Lagos state, Nigeria. It was revealed that data mining techniques (DMT) exhibited significant positive correlation with financial reports with a coefficient 0.389. This implied that an increase in data mining techniques will lead to 0.389 unit increase in achieving qualitative financial statements. Data analysis techniques has significant positive correlation of 0.438 units implied that an increase in forensic accounting techniques will increase qualitative financial statements by 0.438 units. The correlation of forensic accounting techniques and financial statements is 0.554 which implied that a unit increase of machine leaning techniques will lead to 0.554 unit increase in achieving qualitative financial statements listed manufacturing companies in Nigeria. The correlation between other variables showed that the correlation between financial statements and machine leaning techniques is 0.143, correlation between data mining techniques and machine leaning techniques is -0.283 while the correlation between data analysis techniques and machine leaning techniques is -0.015.

Table 5: Correlation Analysis of Variables

	FIM	DMT	DAT	MLT
FIM	1.0000			
DMT	0.389**	1.0000		
	(0.000)			
DAT	0.438**	0.143	1.0000	
	(1.0)	(0.080)		
MLT	0.554**	-0.283**	-0.015	1.0000
	(0.000)	(0.000)	(0.853)	

Source: ***Researcher's Computation*****, (2023)**

4.3. Forensic Accounting Techniques on Financial Information

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Table 6 displayed the ordinary least square regression model, which revealed that the forensic accounting techniques account for 76% of the behavior of financial information in Nigeria. Additionally, the adjusted R2 value was 0.761990, indicating that variables not included in the model account for the remaining 24%. The F-statistics for the overall significance of the model was 162.1423, with a probability value of 0.000000, demonstrating that the model's goodness fit is significant.

In Nigeria, the use of data mining techniques has a strong positive impact on achieving qualitative financial statements, as indicated by a significant coefficient of 0.344523. This means that increasing the use of data mining techniques by one unit will result in a corresponding increase of 0.344523 units in the achievement of qualitative financial statements. Similarly, data analysis techniques have a positive impact with a significant coefficient of 0.176721, meaning that a one unit increase in the use of data analysis techniques will lead to a 0.176721 unit increase in achieving qualitative financial statements. Additionally, machine learning techniques also have a significant positive relationship with achieving qualitative financial statements in Nigeria, with a coefficient of 0.408163 indicating that a one unit increase in machine learning techniques will correspond to a 0.408163 unit increase in achieving qualitative financial statements.

The findings from this study showed the significant and positive relationship between data mining techniques and financial statements in Lagos State, Nigeria. The positive relationship implied that data mining techniques is helpful in boosting and increasing the qualitative financial statements through forensic accounting which enables the financial statements to have a strong positive impact in achieving qualitative financial statements, and services offered by the managers, director, auditors, and accountant. This thus enables the accurately, and recording all financial transactions, ensuring that the financial statements are complete and correct, and presenting the information in a clear and understandable manner. Additionally, having strong internal controls and effective auditing procedures can help ensure the accuracy and reliability of financial statements. The findings are in line with the study of Okafor and Obiora, (2022) analyze the impact of forensic audit and financial statement fraud of deposit money banks in Nigeria between the period 2016-2020. with the following objectives: Determine the effect of data mining on financial statement fraud of deposit money banks. The findings indicate that data mining significantly affects the financial statement fraud of Nigerian deposit money banks. Also, computer-assisted audit procedures significantly affect the financial statement fraud of deposit money banks in Nigeria.

This was supported by Joseph *et al.* (2016) and Kurnaz *et al.* (2019) investigated the Impact of Forensic Accounting in Fraud Detection and Prevention: Evidence from the Nigerian Public Sector, and found that fraud identification and prevention in Nigeria might benefit significantly from forensic accounting. The finding of this study justifies the result of the survey by Okolie *et al.* (2023) and Chukwuma *et al.* (2023) Exploring the role of machine learning in detecting and preventing financial statement fraud: A case study analysis in America, and found a positive significances. United Kingdom researcher Ozili, (2015) and Kenya researcher Karuti, (2020) Investigate forensic accounting. Found positive significances. This finding agreed with a study

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done by Özcan, (2018) who supported the engagement and usefulness of the Beneish Model in forensic accounting practices: Evidence from Turkey and also found positive significances. Similar sentiments were echoed by Throckmorton *et al*. (2015) who affirmed that forensic accountants are a negative relationship. The contribution of KARUTI, (2020) underscores the significance of the research established that policies on forensic accounting are not significant. Ashtiani and Raahemi,(2022) in Canada found no statistically significant of the variable focus on exploring machine learning and data mining.

The study revealed a positive and significant relationship between the use of forensic accounting techniques and financial information. Specifically, these techniques aid in the accurate recording of all financial transactions, with data mining techniques, data analysis techniques, and machine learning techniques in ensure completeness and correctness of financial statements, and present information in a clear and understandable manner. Furthermore, the implementation of robust internal controls and auditing procedures can enhance the precision and reliability of financial statements.

Table 6: Forensic Accounting Techniques on Financial Information in Nigeria

Variable	Coefficient	Std. Error	t-Statistic	Prob
DMT	**0.344523**	**0.026782**	**12.86374**	**0.0000**
DAT	**0.176721**	**0.019055**	**9.274333**	**0.0000**
MLT	**0.408163**	**0.023747**	**17.18806**	**0.0000**
C	**0.254841**	**0.182623**	**1.395444**	**0.1650**
R-squared	**0.766719**			

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Adjusted R-squared	**0.761990**
F-statistic	**162.1423**
Prob (F-statistic)	**0.000000**

Source: ***Researcher's Computation*****, (2023)**

4.4. Discussion of Findings

The findings of this study provide strong evidence that forensic accounting proxy through data mining techniques, data analysis techniques, and machine learning techniques significantly reduced financial report manipulation among listed manufacturing companies in Nigeria. The study found that the use of data mining, data analysis, and machine learning techniques reduced financial report manipulation by 82%, 76%, and 74% respectively. These results have significant implications for the practice of forensic accounting, as they suggest that these techniques can be effective tools for detecting and preventing fraudulent activities in financial reporting. Overall, the study highlights the potential of these techniques to improve the accuracy and reliability of financial reporting in Nigeria and beyond.

5. CONCLUSION AND RECOMMENDATIONS

In conclusion, the study demonstrates the potential of forensic accounting proxy through data mining techniques, data analysis techniques, and machine learning techniques in reducing financial report manipulation among listed manufacturing companies in Nigeria. with specific focus on Lagos State Nigeria. forensic accountants should consider using these techniques to detect patterns of manipulation and develop strategies to prevent such activities from occurring and policymakers and regulators should encourage the adoption of forensic accounting techniques to improve the accuracy and reliability of financial reporting in Nigeria and beyond.

The study recommended that:

1. Data mining techniques can be used to identify anomalies in financial data such as unexpected changes in revenue or expenses, which can be a red flag for potential manipulation.
2. Data analysis techniques can be employed to detect patterns of financial irregularities over time, allowing for early detection and prevention of fraudulent activity.
3. Machine learning algorithms can be trained on historical financial data to predict the likelihood of future financial fraud, enabling proactive measures to be taken to prevent such events.

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