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FORENSIC ACCOUNTING TECHNIQUES AND FRAUD MANAGEMENT OF COMMERCIAL BANKS IN AWKA-SOUTH ANAMBRA STATE

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ABSTRACT

This study ascertained the relationship between forensic accounting techniques and fraud management of commercial banks in Awka-South Anambra State, Nigeria.The specific objective of the study was to examine the extent to which data mining technique, computer assisted auditing technique, ratio analysis technique and public documents review technique relate with artificial intelligence biometrics of listed commercial banks in Awka-South Anambra State. Descriptive survey research design. The population of this study consisted of seven hundred and fifty eighty (758) staff of the thirteen (13) commercial banks in Awka South, Anambra State Nigeria from which a sample size of 262 was selected. Primary data for the study were collected from the respondents using structured questionnaire. The tools for descriptive analysis were percentage analysis, frequency distribution and mean. Hypotheses were tested using regression analysis. The finding of the study showed that: there is a significant positive relationship between data mining techniques and artificial intelligence biometrics for fraud management in listed commercial banks ($\beta = 0.086$, $p = 0.000$); computer-assisted audit techniques significantly and positively relate with artificial intelligence biometrics for fraud management ($\beta = 0.204$, $p = 0.002$); ratio analysis techniques have a significant and positive relationship with artificial intelligence biometrics for fraud management ($\beta = 0.148$, $p = 0.033$); public documents review techniques have a significant and positive relationship with artificial intelligence biometrics for fraud management ($\beta = 0.316$, $p = 0.000$). In conclusion, integrating advanced techniques into fraud management systems significantly enhances the effectiveness of AI biometrics. The study recommends that the Information Technology and data analytics teams of listed commercial banks in Awka-South should enhance their data mining capabilities to better integrate with AI biometrics systems, thereby improving fraud detection effectiveness.

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1. INTRODUCTION

Financial crimes and fraudulent activities have been one of the most popular challenges to the global economy. It has been a subject of continuous debate in society as the cause of retardation in developing economies. Financial crimes and scams in modern organizations are perennial and have affected diverse organizations, irrespective of their sizes, natures and types. Financial crimes include manipulation of records or accounts, theft and embezzlement, diversion of funds, bribery and corruption (Nwoye & Ogbodo, 2021). Thus, an increase in these frauds made the traditional accounting and auditing systems inefficient and ineffective in the detection and prevention of fraud in any society. The widespread frauds in modern organizations have made traditional auditing and investigation inefficient and ineffective in the detection and prevention of the various types of fraud confronting businesses world-wide (Okoye, Adeniyi & Aniefor, 2019). The incidence of fraud continues to increase across private and public sector organizations and across nations. Fraud is a universal problem as no nations is resistant, although developing countries and their various states suffer the most pain. Today; modern organized financial crimes have appeared. Financial crimes such as employee theft, payroll frauds, fraudulent billing systems, management theft, corporate frauds, insurance fraud, embezzlement, bribery, bankruptcy, security frau, among others, have taken the centre stage in the scheme of things; and on the scale of private, public and governmental preference. Financial crimes today have grown wild, and the emergence of computer software coupled with the advent of internet facilities has compounded the problem of financial crimes. Besides, the detection or minimization of these crimes are made more difficult and committing these crimes much easier. All these, no doubt, remain outside the ambit of the statutory auditor to report on except the auditor placed on inquiry. The statutory auditor is not primarily bound to detect fraud and errors. Olaoye & Adekoya (2023), reported that the spates of corporate failures have placed greater responsibility and function on accountants to equip themselves with the skills to identify and act upon indicators of poor corporate governance, mismanagement, frauds and other wrong doings. It has become imperative for accountants at all levels to have the requisite skills and knowledge for identifying, discovering as well as preserving the evidence of all forms of irregularities and fraud. Therefore, fraud requires more sophisticated approach from preventative to detection. One of the modern approaches that can be used from the prevention to detection is called forensic accounting.

Forensic accounting is the tripartite practice of utilizing accounting, auditing and investigative skills to assist in legal matters (Ochuka, Nwoye & Okoye, 2022). It is a specialized field of

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accounting that describes engagements resulting from actual or anticipated disputes or litigation (Okoye & Gbegi, 2013). Li, Chang , Wang and Zhu (2023) asserted that forensic accounting as a discipline encompasses fraud knowledge, financial expertise, and a sound knowledge and understanding of business reality and the working of the legal system. Financial crime has become a reoccurring trend in Nigeria. TheCentral Bank of Nigeria(CBN) and the Nigeria Deposit Insurance Corporation (NDIC)audited account of (2022) reported that mobile transactions led to the mode of transactions where most of the fraudulent activities transpired, followed by computer/web fraud and Point of Sale (PoS) related transactions. These were the top three transaction types with the highest number of occurrences. Mobile fraud accounted for 34.07% (₦161 million) of the total amount lost to fraud. This was followed by Computer/web fraud which accounted for 27.69% (₦130 million) while fraudulent withdrawals represented 24.72% at ₦116 million. In the last quarter of 2022, the total amount of fraud stood at ₦12.58 billion (Ekanem, 2023).

In recent times, a number of fraudulent acts have been committed both in the public sector and private sector of the economy. These in no doubt are perpetrated under the supervision of the accountant and internal auditors of the organization. Therefore, forensic accounting has evolved as a means of checking fraud since the traditional accounting system and auditing have failed in various areas in the conduct of curbing these governmental and private leakages and fraudulent injections (Okoye & Nwoye, 2021). Forensic accounting is seen as taking a more advanced role in fraud prevention, detection, and management. However, the application of Forensic accounting role and effectiveness have raised serious concerns as it has been argued that it is used mainly aftermath of the fraud to find the perpetrators and carried out in order to avoid future occurrences. As a tool mainly for legal purposes, the sophistication of fraud perpetrators and the role of insiders who know how to bypass the system and not get caught have also questioned the effectiveness and need for forensic accounting. Fraud is a universal phenomenon which has been in existence for so long. Its magnitude cannot be known for sure, because much of it is undiscovered or undetected and not all that is detected is published. Several banks have faced cases of fraud despite the fact that management has attempted to institute measures to curb fraud. The banking business has become more complex with the innovations and inventions of banking processes in the field of information and communication technology (ICT) which has changed the nature of bank fraud and fraudulent practices. In Nigeria, in spite of the banking regulation and bank examination by the Central Bank of Nigeria (CBN), the supervisory role of the Nigeria Deposit Insurance Corporation (NDIC), and The Chartered Institute of Bankers of Nigeria (CIBN), there is still

a growing concern about fraud and other unethical practices in the banking industry. Evidence from the NDIC Report (2023) revealed that the report of the examinations and special investigations from the banks were still bedeviled with problems of fraud, weak board and management oversight, inaccurate financial reporting, poor book-keeping practices, non-performing insider-related credits, declining asset quality and attendant large provisioning requirements, inadequate debt recovery, non-compliance with banking laws, rules and regulations, and significant exposure to the capital market through share and margin loans. This is a problem which makes the activities of the fraud management difficult and affects the profitability of the banking system and the economy at large.

Several divergent literatures have been conducted between forensic accounting techniques and financial performance with different strands of literatures holding different views ranging from positive to negative and non-significant relationships. For instance, the first strand of literature (Krishna & Boddu, 2023; Bagudu, 2022; Achimugu,Ocheni,Abuh, Adediran and Abdullahi, 2021; Adesina, Erin, Ajetunmobi, Ilogho&Asiriuwa, 2020) found a positive relationship between forensic accounting techniques and performance. The second strand of literature documented a negative relationship (Kustono, 2021; Waked and Aljaaidi, 2021; Olusoji, Samsudin & McMillan, 2021). On the other hand, a non-significant relationship was reported between forensic accounting and performance (Binti,Gaguk & Zuhroh, 2021; Okoye, Adeniyi, Aniefor, 2019). The mixed findings, inconclusive results and lack consensus by the reviewed literatures gave rise to a gap in literature which this study tends to fill. In an attempt to filling the gap in literature, this present study will close the variable gap by focusing on fraud management quite unlike prior studies that concentrated on financial performance (to the best knowledge of the researcher).

1.1 Objectives of the Study

The main objective of this study is to ascertain the relationship between forensic accounting techniques and fraud management of deposit money banks in Awka-South Anambra State, Nigeria.

The specific objectives will be to:

i. examine the relationship between data mining technique and artificial intelligence biometrics of listed commercial banks in Awka-South Anambra State.
ii. ascertain the relationship between computer assisted auditing technique and artificial intelligence biometrics of listed commercial banks in Awka-South Anambra State

iii. determine the relationship between ratio analysis technique and artificial intelligence biometrics of listed commercial banks in Awka-South Anambra State
iv. evaluate the relationship between public documents review technique and artificial intelligence biometrics of listed commercial banks in Awka-South Anambra State.

1.2 Hypotheses

This research will be guided by the following null hypotheses:

H_{o1}: There is no significant relationship between data mining technique and **artificial** intelligence biometrics **of** listed commercial banks in Awka-South Anambra State.

H_{o2}: There is no significant relationship between computer assisted auditing technique and artificial intelligence biometrics of listed commercial banks in Awka-South Anambra State.

H_{o3}: There is no significant relationship between ratio analysis technique and artificial intelligence biometrics of listed commercial banks in Awka-South Anambra State.

H_{o4}: There is no significant relationship between public documents review technique and artificial intelligence biometrics of listed commercial banks in Awka-South Anambra State.

2. LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Forensic Accounting

Forensic accounting is an approach to accounting which utilizes accounting, auditing, and investigative skills to conduct an examination into the finances of an individual or business (Rohrs-Schmitt, 2022). Forensic accounting is the area of accounting practice wherein the accounts are examined by independent accounts with the prenotion objective of determining financial misconduct and reporting fraud. It is usually conducted by an independent accounting and auditing firms appointed by regulators, the management, or sometimes the government agencies to check alleged wrongdoing in the financial accounting system of the organisation under scrutiny of misconduct (Vineeth, 2023). Forensic accounting is a special practice of accounting where a financial professional, known as a forensic accountant, audits and investigates information and prepares it to be used in court. Forensic Accounting is the art of investigating accounting records, financial statements, and other related financial records. The result of the investigation is mostly used for legal support and resolving conflict (Sujaini, 2023).

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Forensic accounting is the application of investigative and analytical skills for the purpose of resolving financial issues in a manner that meets standards required by courts of law. It is the integration of accounting, auditing and investigative skills (Hayes, 2022). Kaplan (2022) describe forensic scientists as examiners and interpreters of evidence and facts in legal cases that also offer expert opinions regarding their findings in court of law. Boyle (2022) defines forensic accounting as the application of accounting concepts and techniques to legal problems. It demands reporting, where accountability of the fraud is established and the report is considered as evidence in the court of law (Okoye, Nwoye, Akuchi & Onyema, 2020) or in administrative proceedings. Forensic accounting is a discipline that has its own models and methodologies of investigative procedures that search for assurance, attestation and advisory perspective to produce legal evidence. Onodi, Okafor and Onyali (2015) are of the opinion that forensic investigative skills are required to uncover and establish the occurrence of financial crimes due to the incidence of fraud and misappropriation of funds in recent time that is posing a threat to traditional auditing as a branch of accounting profession. It is concerned with the evidentiary nature of accounting data, and as a practical field concerned with accounting fraud and forensic auditing; compliance, due diligence and risk assessment; detection of financial misrepresentation and financial statement fraud.

2.1.2. Forensic Accounting Techniques

Forensic accounting techniques are used by investigative accountants to look at financial records, dig into their background and present a clear and concise account of what they mean and how they impact a particular matter that they have been asked to consider (Jaxa, 2023). Forensic accounting techniques are not the same as normal accounting methods, such as auditing techniques or methods for considering tax issues, but they may include the use of these skills along with investigation techniques, legal understanding and a natural tenacious desire to uncover a hidden issue (Tally, 2022).

2.1.3 Data Mining Technique

Data mining is the process of analyzing dense volumes of data to find patterns, discover trends, and gain insight into how that data can be used. Data miners can then use those findings to make decisions or predict an outcome (Stedman, 2023). Data mining is the process of sorting through large data sets to identify patterns and relationships that can help solve business problems through data analysis. Data mining techniques and tools enable enterprises to predict future trends and make more-informed business decisions (Hughes, 2023). Data

mining is the process of sorting through large data sets to identify patterns and relationships that can help solve business problems through data analysis. Data mining techniques and tools enable enterprises to predict future trendsand make more-informed business decisions. Data mining is a key part of data analytics overall and one of the core disciplines in data science, which uses advanced analytics techniques to find useful information in data sets. At a more granular level, data mining is a step in the knowledge discovery in databases (KDD) process, a data science methodology for gathering, processing and analyzing data (Korolov, 2023).

Data mining is a crucial component of successful analytics initiatives in organizations. The information it generates can be used in business intelligence (BI) and advanced analytics applications that involve analysis of historical data, as well as real-time analytics applications that examine streaming data as it's created or collected. Effective data mining aids in various aspects of planning business strategies and managing operations. That includes customer-facing functions such as marketing, advertising, sales and customer support, plus manufacturing, supply chain management, finance and HR. Data mining supports fraud detection, risk management, cybersecurity planning and many other critical business use cases. It also plays an important role in healthcare, government, scientific research, mathematics, sports and more (Stedman, 2023).

2.1.4 Computer Assisted Auditing Technique

Computer Assisted Auditing Techniques (CAATs) are the auditing methods involving computer software tools for analyzing business data and reporting to enhance the audit scope and transparency. Computer assisted audit techniques (CAAT) is a method of gathering and reviewing electronic records. CAAT is used to simplify or automate the data analysis and audit process, and it involves using computer software to analyze large volumes of electronic data for anomalies (Stone, 2023). Computer assisted audit techniques (CAAT) is a method of gathering and reviewing electronic records. CAAT is used to simplify or automate the data analysis and audit process, and it involves using computer software to analyze large volumes of electronic data for anomalies (Bryant, 2023). CAATs is the practice of using computers to automate the IT audit processes. CAATs normally include using basic office productivity software such as spreadsheets, word processors and text editing programs and more advanced software packages involving use statistical analysis and business intelligence tools (Wadesango, & Nyakurera, 2020).

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2.1.5 Ratio Analysis Technique

Ratio analysis is a quantitative method of gaining insight into a company's liquidity, operational efficiency, and profitability by studying its financial statements such as the balance sheet and income statement. Ratio analysis is a cornerstone of fundamental equity analysis (Bloomenthal, 2023). It is concerned with the calculation of relationships, which after proper identification & interpretation may provide information about the operations and state of affairs of a business enterprise. The analysis is used to provide indicators of past performance in terms of critical success factors of a business. This assistance in decision-making reduces reliance on guesswork and intuition and establishes a basis for sound judgments (Logan, 2023). Ratio analysis is a tool that aids in interpreting a firm's performance and financial position. It is known as financial ratio analysis as it uses financial statements like the income statement, cash flow, and balance sheet for the analysis (Shenmare, 2023). Ratio analysis is the quantitative interpretation of the company's financial performance. It provides valuable information about the organization's profitability, solvency, operational efficiency and liquidity positions as represented by the financial statements (Dheeraj, 2023).

2.1.6 Public Documents Review Technique

Public document means informational matter produced for public distribution or access regardless of format, medium, source or copyright, originating in or produced with the imprint of, by the authority of or at the total or partial expense of any state agency (Hepler, 2023). **Public records** refer to records that have been created by and for a government agency through one process or another. Public records are records that any member of the public has the right to view and analyze. Therefore, a public record is the property of the government, and theoretically should be completely accessible to the public. Public records can aid significantly in promoting governmental accountability (Shawn, 2023). Public information refers to the interpretation of the data contained in public records. Public information should also be made freely available to the public. Public records and information are created in various ways, including scientific research, data analysis, the amalgamation of previously-existing records, and the actions of the government. These actions can include law-making or law-enforcing actions of agents of federal, state, or local governments (Trein, Fischer, Maggetti & Sarti, 2023).

Document review is a way of collecting data by reviewing existing documents. The documents may be internal to a program or organization or may be external. Documents may be hard copy or electronic and may include reports, program logs, performance ratings, funding proposals, meeting minutes, newsletters, and marketing materials. Some common types of public records include birth records, death records, licensing records, court records, budgets, reports, statistical data, meeting minutes, and voting records (Molenveld, Koen & Jan, 2020;Weible & Sabatier, 2018).

2.1.7 Fraud Management

Fraud is an intentionally deceptive action designed to provide the perpetrator with an unlawful gain or to deny a right to a victim. Types of fraud include tax fraud, credit card fraud, wire fraud, securities fraud, and bankruptcy fraud. Fraudulent activity can be carried out by one individual, multiple individuals or a business firm as a whole. Fraud is intentionaldeception to secure unfair or unlawful gain, or to deprive a victim of a legal right (Li, Chang, Wang & Zhu, 2023).

Fraud management involves the prevention and control of fraud in any institution. Fraud management involves series of control activities put in place by the management of the bank to discourage fraud amidst their staff and external bodies also (Ejembi, Ijeoma, Amahalu & Obi, 2022). There is no gainsaying that the control and prevention of banks fraud is a collaborating effort that involves management of the banks, government and its agencies and the society. Fraud management involves the installation and maintenance of reasonable system of internal control to protect the entity from loss through fraud or error. The ability of the management to prevent and control frauds in the bank depends deeply on the quality of the staff employed and the soundness of internal controls system in place (Adekoya, Olaoye & Lawal, 2023).

2.1.8 Artificial Intelligence Biometrics

Artificial intelligence (AI) approaches include machine learning, deep learning and robotics. Advancement of global computing power and the availability of very large data sets have provided the infrastructure to accelerate the adoption of AI (Save, Tiwarekar, Jain, Mahyavanshi, 2017). Biometrics refers to any reliable method that differentiates one person from another using measurable qualities that may be physiological (fingerprints, hand geometry, retinas, iris, facial image) or behavioural (signature, voice, keystroke rhythms). These examples are a few among the many methods employed in today's world. In practice,

all biometric systems run on a common principle that unfolds to a two-step process. The first step is Enrolment, in which new users are added to the database by recording their data for the first time. The term "AI" describes computing systems that exhibit some form of human intelligence. It covers a number of interlinked technologies including data mining, machine learning, speech recognition, and image recognition and sentiment analysis (Abhishek, Karthikeyan, Khan & Binu, 2020).

2.1.9 Data Mining Technique and Fraud Management

Fraud is the abuse of a profit organization's system without necessarily leading to direct legal consequences (Ali, Khedr, El-Bannany & Kanakkayil, 2023). The fraudulent minority creates a big burden to the society to finance the fraudulent transactions. Due to the complexity and enormity of the modern business systems, criminals may and do discover safety gaps and use them to steal data or to defraud somebody. Even if a fraud type is discovered by the authorities and safety regulations are managed, the criminals seek and find other fraudulent ways and thus shift behavior over time. Manual detection conducted by human experts is very expensive even to debug any fraud that has been committed; cannot detect all fraudulent transactions of a certain type; cannot be managed to detect the fraudulent behavior the moment it is attempted to be committed and lack the ability to detect the shifts and trends in fraudulent behavior (Strelcenia & Prakoonwit, 2023; Khedr, Arif, El-Bannany, Alhashmi & Sreedharan, 2021).

Recently, businesses all over the world are facing a severe loss of revenue due to fierce competition and loss of income due to fraud. To survive in the market, business operators usually offer a variety of data mining techniques for fraud detection (Shevy, 2023). The occurrence of fraud in an industry, would lead to the great loss of revenue to the company. . In this situation, the only remedy to overcome such business hazards and to retain in the market, operators are forced to look for alternative ways of using data mining techniques and statistical tools to identify the cause in advance and to take immediate efforts in response. This is possible if the past history of the customers is analysed systematically. Industries generate and maintain a large volume of data. They include billing information, call detail data and network data (Goyal, Rathore & Kumar, 2021; Hajek & Henriques, 2017). Since fraud is committed by humans, fraud is tightly coupled with human behavior. Thus, understanding the motivations of perpetrators or their psychological and personality traits that drive them to cross ethical boundaries can provide a new perspective for fraud detection (Elreedy & Atiya, 2019). Given the complexity of analyzing human behavior to detect fraud,

some approaches aimed to improve the precision and increase the speed of data processing through a hybrid automatic learning system or through incremental learning (Weed, Lok, Chawra & Zeitzer, 2023; Palanivinayagam & Damaševi˘cius, 2023).

2.1.10 Computer Assisted AuditingTechnique and Fraud Management

Audit firms have begun to integrate the computer into many more areas than just the standard use of word processing for generating letters and reports. Computers are increasingly being used to guide the entire audit process from drafting the engagement letter to preparing the audit report (Assiri & Humayun, 2023). The drastic change faced in the audit profession were auditors and accountants are now moving from the traditional auditing style to information technology (IT) auditing that is, to audit the IT used in the business set-ups and integrating advanced technology in auditing that is the use of prominent auditing technologies, computer assisted auditing techniques and tools to make the audit more effective and efficient thereby enhancing auditors' competitiveness (Hussein, Abbaszadeh & Zadeh, 2023).The use of computer assisted auditing techniques (CAATs) allows audit work to be executed and conducted in a more efficient and effective manner and help to save time and accomplish the audit assignmenton time (Samagaio & Diogo, 2022).

Computer assisted audit techniques play a huge role in ensuring the accuracy of an auditors audit report. CAATs are effective because they are used to gain and process audit evidence and information. They are also effective in checking transactions of companies being audited because they are used to pick samples of the transactions made by these companies and are also used to audit these transactions (Han, Shiwakoti, Jarvis, Mordi, & Botchie, 2023). Computerized accounting also makes for an improvement in the performance of a business in the sense that it helps the business get information faster, faster communication of information and quicker decision making process (Abdennadher, Grassa, Abdulla & Alfalasi, 2022; Humayun, Niazi, Almufareh, Jhanjhi, Mahmood & Alshayeb, 2022). On the contrary, Schreiber, Sonnekalb, Heinze, von- Kurnatowski, Gonzalez-Barahona and Packer (2021) found that there is a non significant relation between data quality and accounting information quality.

2.1.11 Ratio Analysis Technique and Fraud Management

One of the main objectives of financial analysis is to reduce the level of risk, which creditors are exposed to as a result of bankruptcy and debt default. Financial analysis using financial ratios is the most important and oldest method for analysis company performance. It has long

been used to study the financial and credit position of organizations and to judge the results of their work. Ratio analysis is based on the examination of financial statements (Ogude, Nwohiri, Ugbaja, 2022). Financial accounting fraud detection has come into limelight due to the upsurge in financial frauds and white-collar crimes witnessed in the competitive economic scenario. In the last decade, high profile financial frauds committed by large companies in both developed and developing countries were discovered and reported, such as Enron, Lucent, WorldCom, Parmalat, YGX, SK Global, Satyam, Harris Scarfe and HIH (Sánchez-Aguayo, Urquiza-Aguiar & Estrada-Jiménez, 2023). Traditional auditing uses random-based selection techniques such as, random sampling, stratified random sampling or systematic sampling of populations of accounting data to discover errors (Tarmizi, Ghozali, AryHelmina, Hapsari & Pamungkas, 2023). However, computer technology could be effectively used to search full populations of data to unearth anomalies, trend and fraud more accurately. Traditional approach is more suitable for discovering anomalies due to unintentional errors found regularly in data that are usually caused by weaknesses in accounting procedures and controls (Jiuxin, Xia, Guo & Ma, 2019;Utami & Pusparini, 2019). In contrast to this, computer- based approaches could detect even intentional errors introduced purposely or fraud perpetrated by an employee in selected financial transactions (Alwadain, Ali & Muneer, 2023; Lucas, Portier, Laporte, He-Guelton, Caelen, Granitzer & Calabretto, 2020).Rtayli and Enneya (2020); Yu, Li, Dong and Zheng, (2020) state that financial ratios are designed to help evaluate financial statements.

2.1.12 Public Documents Review Technique and Fraud Management

Internal auditor serves as watchdog, monitoring officer, consultant and management partner for safeguarding company's assets, preventing, detecting and reducing fraudulent activities in an organization (Olaoye & Adekoya. 2023). Internal auditor is expected to provide and ensure adequate assurance that business activities are carried out effectively and efficiently according to the laid down rules and standards. Therefore, auditor's role in preventing and controlling fraudulent activities is vital to an organisation. In the past, companies' gives less emphasis to fraud prevention due to strong trust, good human behaviour and ethics, good established internal audit tools, and internal control mechanisms. However, all these have change over times resulting into human attitudinal changes into fraudulent acts and corruption (Zaidan & Neamah, 2022; Kolawole, Dairo, Jacob & Aregbesola, 2020). Organisation management deals with fraudulent activities or cases with levity due to weak internal control system, mistrust, favoritisms and corrupt legal system. This had led to the various fraud cases that

shook the world at the beginning of the 21st century, which has had led to the financial loss and liquidation of many large multi-national companies likes World Com, Tyco International Limited, Bernie Madoff Scandals, and Enron in United States of America. Pamalat in Italy, Satyam in India, Barings Bank and Equitable life in United Kingdom, and HIH Insurance Limited in Australia, Cadbury Nigeria Plc and Nampak in Nigeria (Ezejiofor & Okolocha, 2020; Drogalas, Pazarskis, Anagnostopoulou & Papachristou, 2017). As reported by Al-Twaijry, Brierley & Gwilliam (2018), liquidation of companies such as Enron had led to a serious loss in capital market to a value of USD 70 billion.

Cheng, Goh and Kim (2023) reported that trillion of dollars are loss on yearly basis due to fraudulent activities in developed countries while that of developing countries could be higher. However, organisations with effectives and efficient internal audit are presumed better in terms of fraud management than those without (Lawal, Yinusa, Lawal, Oyetunji, & Adekoya, 2020).). Potential and intending investors have become sensitive to fraud risk or financial loss that might occur from weak internal control mechanism, inefficient and ineffective internal audit which has negative impact on firm's profitability, dividend payout, market price per share, company's goodwill and future prospect (Muhtar, Winarna & Sutaryo, 2023; Nwaobia, Omotayo & Ajibade, 2021).

2.2 Theoretical Framework

2.2.1 Fraud Triangle Theory

Donald R. Cressey, a well-known criminologist, devised the fraud triangle. The fraud triangle developed by Cressey in 1953 is a model for explaining the factors that cause someone to commit occupational fraud. It consists of three components which, together, lead to fraudulent behavior: Perceived unshareable financial need, Perceived opportunity and Rationalization (Cressey, 1973). The premise of the fraud triangle is that to combat fraud, it is not only necessary to realize that it happens but to determine how and why it happens. The fraud triangle stems from Cressey's hypothesis that: "Trusted persons become trust violators when they conceive of themselves as having a financial problem which is non-sharable, are aware this problem can be secretly resolved by violation of the position of financial trust, and are able to apply to their own conduct in that situation verbalizations which enable them to adjust their conceptions of themselves as trusted persons with their conceptions of themselves as users of the entrusted funds or property." The three "points" or elements of Donald Cressey's fraud triangle are pressure/motivation, opportunity, and rationalization. All three elements must be present for fraud to occur.It is an intentional deception that causes the personal gain

of an employee or an entity. In order to deter, detect and investigate fraud, one must understand how and why people commit fraud. Knowing the "how" helps managers and business owners create policies and design internal controls to reduce the occurrence of fraud. The "why" is more nuanced, but it is just as important in understanding fraud.

Corporate frauds are the frauds committed by the individuals against the organization who employed them and often this malpractice is done in a dishonest or an unethical manner. Corporate fraud is very hard to discover and very challenging to prevent at times. By incorporating policies, norms, and checklists, the company can somewhat mitigate the risk of fraud to a certain extent. Though the corporate frauds are conducted in different ways, however, most common modus operandi includes the access and illegitimate use of the company's assets and sensitive data (for example reports, facts, details of vendors, clients, and employees) and then leveraging these for the personal gain or benefit (Ejembi, Ijeoma, Amahalu & Obi, 2022).

The fraud triangle has endured through the decades as a metaphorical diagram to assist in understanding and analyzing fraud. The concept states that there are three components which, together, lead to fraudulent behavior. They are (1) a perceived un-shareable financial need (motive/pressure), (2) a perceived opportunity to commit fraud, and (3) the rationalization of committing the fraud. The fraud triangle is relevant to this study because it helps in designing and assessing internal controls. It highlights what strategies need to be implemented to protect the company from fraudulent activities. Fraud triangle makes a firm understands that employers need to have policies that are enforced and explain what happens in the case of a violation. Also, the Fraud Triangle is a great prompt to use to help ensure internal auditors adequately assess anti-fraud internal controls and identify important controls that may be missing. The fraud triangle summarizes three elements that are present when an individual commits fraud: opportunity, pressure, and rationalization. Another relevance of the Fraud Triangle to this study is that it helps public officials to prevent fraud by diminishing any one of the triangle's three elements and, ideally, taking steps to diminish all three elements.

2.3 Empirical Review

Nwankwo (2013) evaluated the effect of fraud on Nigerian commercial banks using data from the NSE Factbook, NDIC, and CBN for 2001-2011. Regression analysis revealed a significant negative impact of fraud on bank performance.

Gitau and Samson (2016) assessed financial fraud's effect on Kenyan banks. A descriptive survey of Tier I banks in Nakuru County showed that liquidity ratios and fraud losses significantly impacted Return on Assets.

Inaya and Isito (2016) studied the social impact of fraud in Nigerian banks using OLS analysis. Their results indicated a negative social effect on the industry.
Taiwo, Agwu, Babajide, Okafor, and Isibor (2016) analyzed Nigerian bank fraud from 2002-2014 using regression techniques. The study found a significant negative correlation between fraud and bank profitability.

Theresa, Felix, and Idowu (2016) examined corporate governance and fraud prevention in Nigeria, finding that internal audit, external audit, and audit committees significantly reduced fraud. Onyabe, Okpanachi, Nyor, Yahaya, and Mohammed (2018) explored audit committee independence's effect on financial reporting quality in Nigerian deposit banks. Findings revealed a significant negative relationship.

Ibrahim, Adesina, Olufowobi, and Ayinde (2018) analyzed corporate governance's influence on the return on assets of Nigerian banks, finding a significant effect using secondary data from 2013-2017. Muoghalu, Okonkwo, and Ananwude (2018) examined electronic banking fraud's effect on Nigerian deposit banks from 2013-2016. The study found that point-of-sale terminal fraud significantly affected interest income. Kolapo and Olaniyan (2018) investigated fraud's impact on Nigerian deposit banks from 1994-2015, showing a negative effect on bank deposits. Haladu (2018) evaluated internal controls in fraud detection in Nigerian deposit banks, revealing that control measures had a negative effect on fraud prevention.

Uwalomwa, Eluyela, Olubukola, Obarakpo, and Falola (2018) studied corporate governance and report timeliness in Nigerian banks, finding a significant positive relationship between foreign board members and timeliness. Akinleye, Olarewaju, and Fajuyagbe (2019) analyzed corporate governance's effect on Nigerian multinational firms, revealing a non-significant negative impact on growth. Mawutor, Enofe, Embele, Ndu, and Awodola (2019) used ex-post facto data to explore fraud's effect on Nigerian banks, finding a significant negative impact on performance. Girau, Ku, Bujang, and Jidwin (2019) studied corporate governance and fraud in Malaysian companies from 2010-2017, revealing board size and CEO age as significant predictors of fraud likelihood.

Okoye, Adeniyi, and Aniefor (2019) examined fraud risk management in Nigerian deposit banks, revealing a significant effect on return on assets. John, Enofe, Embele, Ndu, and Oluwaseyi (2019) studied the impact of fraud on Nigerian banks using NDIC data, concluding that fraud significantly affects performance. Joshua, Efiong, and Imong (2019) found a significant positive relationship between corporate governance and performance in Nigerian deposit banks.

Adegbola, Fagboro, Nwanji, Asamu, Babatunde, and Adebanjo (2019) studied liquidity management in Nigerian banks, revealing a significant positive effect on performance.
Adegbie, Akintoye, Iranola, and Ashaolu (2019) found corporate governance significantly affects financial stability in Nigerian deposit banks. Adesina, Erin, Ajetunmobi, Ilogho, and Asiriuwa (2020) showed that forensic auditors significantly reduce fraud in Nigerian deposit banks. Kafidipe, Uwalomwa, Dahunsi, Okeme, and Ntim (2021) investigated risk management and performance in Nigerian banks, finding a negative relationship between corporate governance and bank performance.

Noja, Eleftherios, Mirela, and Grecu (2021) analyzed board characteristics in European companies, finding significant effects on risk management and financial performance.
Olusoji, Samsudin, and McMillan (2021) examined Nigerian bank regulators' ability to reduce fraud, finding a significant positive relationship between regulatory competence and fraud reduction. Achimugu, Ocheni, Abuh, Adediran, and Abdullahi (2021) studied the impact of financial risk on the profitability of deposit money banks in Nigeria. Using a sample of 14 banks from 2012-2018, they applied panel random effect regression and found that financial risk significantly affects return on assets. Binti, Gaguk, and Zuhroh (2021) analyzed the causes of fraud and corporate governance in 27 banking companies in Indonesia from 2016-2019. Logistic regression showed that competence and opportunity positively influence fraud, while rationalization, pressure, and arrogance do not.

Waked and Aljaaidi (2021) investigated the link between family ownership and audit committee activity in 430 firms listed on the Saudi Stock Exchange from 2012-2019. They found a negative relationship between family ownership and audit committee activity.
Kustono (2021) explored corporate governance as a mechanism to curb income smoothing in Indonesian manufacturing companies from 2009-2018. Using binary logistic regression, the study revealed that audit tenure negatively affects income smoothing, enhancing auditors' capacity to limit the practice. Bagudu (2022) assessed forensic accounting techniques in

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preventing fraud in Nigerian microfinance institutions. The study found that data mining significantly impacts fraud prevention, while relative size factor and ratio analysis have insignificant impacts. Krishna and Boddu (2023) developed a semi-supervised extreme learning machine for financial fraud detection in India, incorporating an enhanced artificial hummingbird algorithm. Their findings showed a positive relationship between machine learning and Internet fraud detection.

3. MATERIAL AND METHOD

Descriptive survey research design was employed in this study. A survey research design is one which aims at collecting data on, and describing in a systematic manner the characteristics, features or facts about a given population (. The study will make use of survey research design that employed primary data (Kothari & Garg, 2014). The population of this study consisted of seven hundred and fifty eighty (758) staff of the thirteen (13) commercial banks in Awka South, Anambra State Nigeria. The distribution of the population is shown in Appendix A. The sample size for this study was statistically determined using Taro Yamane formula for a finite population. The formula is given as:

$$n = \frac{N}{1 + N(e)^2}$$

Where: n= the sample size

N = the finite population size

e = level of significance (at 0.05 or 5% level of significance)

N = , e = 0.05

$$n = \frac{758}{1 + 758(0.05)^2}$$

$$n = \frac{758}{1 + 1.895} = 261.83$$

n = 262. Therefore, the sample size is approximately 262

The study basically made use of primary data. The primary data were obtained from the respondents through the administration of questionnaire. The copies of questionnaire were divided into two parts. Part A focused on the socio-demographic characteristics of the respondents. The part B was designed into 5 (five) point Likert scale related to the objectives of the study. Stratified random sampling technique was used to administer the 262 copies of the questionnaire to the respondents across the thirteen bank branches (see table 3.2).

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Furthermore, based on the 262 copies of questionnaire that administered to the respondents, 211 copies of the questionnaire were retrieved (see table 3.3). Copies of the questionnaire were rated on a 5-point Likert scale ranging from 5 (strongly agree) to 1 (strongly disagree). as done based on the data collected from administered questionnaire. The data were sorted out based on nominal scales and then analyzed based on the hypotheses of the study. Descriptive analyses using frequency counts, percentages, means and standard deviations was carried out and inferential statistics of the stated hypotheses was carried out using the Spearman's Correlation, Cronbach's Alpha Coefficient, and Paired Sample Test via SPSS version 25.

Okoye, Adeniyi and Aniefor (2019) model was adapted:

$ROA = \beta_o + \beta_1 DMT + \beta_2 DRT + \beta_3 UDT + \mu$

ROA = Return on Assets

DMT = Data Mining Technique

DRT = Document Review Technique

UDT = Undercover Technique

In order to test the relationship between Forensic Accounting Techniques and Fraud Management, the model used in this study is as follows:

Fraud Management = f(Forensic Accounting Techniques) + μ

Thus,

$AIB = \beta_o + \beta_1 DMT + \mu$ **Ho_1**

$AIBP = \beta_o + \beta_1 CAAT + \mu$ **Ho_2**

$AIB = \beta_o + \beta_1 RAT + \mu$ **Ho_3**

$AIB = \beta_o + \beta_1 PDRT + \mu$ **Ho_4**

Where:

β_o = Constant (Intercept)

β_i = Coefficients of the independent variable

Y = Dependent variable (Fraud Management)

X = Independent Variable (Forensic Accounting Technique)

AIB = Artificial Intelligence Biometrics

DMT = Data Mining Technique

CAAT = Computer Assisted Audit Technique

RAT = Ratio Analysis Technique

PDRT = Public Documents Review Technique

μ = Error term

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4. RESULT AND DISCUSSIONS

4.1 Data Analysis

4.1.1 Analysis of Research Questions

Table 1 Data Mining Technique

SN	Data Mining Technique	SA	A	U	D	SD	Mean	Remarks
1	Data mining knowledge may be transformed into actionable hints information that a company can utilize to identify fraud, and manage risk	46	96	28	36	22	3.47	Accept
2	Data mining is key to sentiment analysis, price optimization, database marketing, credit risk management, training and support, fraud detection	68	62	46	22	30	3.51	Accept
3	Data mining helps in fraud detection and threat identification as businesses can improve their cybersecurity and risk protection by using the hints obtained through data mining	34	98	28	44	24	3.32	Accept

Source: *Field Survey, 2024*

Table 1 presents data on the effectiveness of various data mining techniques based on respondents' agreement levels. The first item in the table examines the belief that data mining knowledge can be transformed into actionable hints, which companies can use to identify fraud and manage risk. The data shows that 46 respondents strongly agreed (SA), 96 agreed (A), 28 were undecided (U), 36 disagreed (D), and 22 strongly disagreed (SD). The mean score of 3.47 indicates a general acceptance of this assertion.

The second item explores the idea that data mining is essential for sentiment analysis, price optimization, database marketing, credit risk management, training and support, and fraud detection. A total of 68 respondents strongly agreed, 62 agreed, 46 were undecided, 22

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disagreed, and 30 strongly disagreed. The mean score for this item is 3.51, reflecting overall agreement among respondents on the importance of data mining in these areas.

The third item considers the role of data mining in helping businesses detect fraud and identify threats, thereby improving cybersecurity and risk protection. Here, 34 respondents strongly agreed, 98 agreed, 28 were undecided, 44 disagreed, and 24 strongly disagreed. The mean score of 3.32 suggests that respondents generally accept the effectiveness of data mining in enhancing cybersecurity and risk management.

Table 2 Analysis of Computer Assisted Auditing Technique

SN	Computer Assisted Auditing Technique	SA	A	U	D	SD	Mean	Remark
4	Computer aided assessment facilitates a detailed analysis of test results with minimal effort	54	90	32	26	26	3.53	Accept
5	Computer Assisted Auditing Technique help to identify inaccuracies and inefficiencies in the management and use of the information technology system	38	100	20	50	20	3.38	Accept
6	Computer Assisted Auditing Technique ensures that the entity's information system is effectively placed and working properly to support the cause of the management	123	32	29	10	34	3.88	Accept

Source: *Field Survey, 2024*

Table 2 provides hints into the perceptions of respondents regarding the effectiveness of various Computer Assisted Auditing Techniques. The first item assessed whether computer-aided assessments facilitate a detailed analysis of test results with minimal effort. The responses indicate that a majority of participants agree with this statement, as reflected in a mean score of 3.53, leading to the conclusion that this technique is generally accepted as effective. The second item in the table evaluates whether Computer Assisted Auditing Techniques help identify inaccuracies and inefficiencies in the management and use of the information technology system. The mean score of 3.38 suggests that respondents generally

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accept the utility of these techniques in improving IT system management, though the level of agreement is slightly lower compared to the first item.

The third item considers whether Computer Assisted Auditing Techniques ensure that an entity's information system is effectively placed and functioning properly to support management's objectives. This item received the highest mean score of 3.88, indicating strong acceptance and confidence among respondents that these auditing techniques are effective in maintaining and supporting information systems.

Table 3 Analysis of Ratio Analysis Technique

SN	Ratio Analysis Technique	SA	A	U	D	SD	Mean	Remark
7	Ratio Analysis provides significant information to users of accounting information regarding the performance of the business	58	102	32	24	12	3.75	Accept
8	Ratio analysis is vital for assessing a company's financial position, liquidity, profitability, risk, solvency, efficiency, and fund utilization	41	94	26	43	24	3.37	Accept
9	Ratio analysis can be performed to track changes to a company over time to better understand the trajectory of operations	52	92	36	28	20	3.56	Accept

Source: *Field Survey, 2024*

Table 3, titled "Analysis of Ratio Analysis Technique," provides hints into respondents' perceptions of various aspects of ratio analysis in financial reporting. The table is structured to assess agreement or disagreement with statements regarding the utility of ratio analysis, using a five-point Likert scale ranging from Strongly Agree (SA) to Strongly Disagree (SD), with corresponding mean scores and remarks based on the level of acceptance. The first item examines whether ratio analysis offers significant information to users of accounting information concerning the performance of a business. The responses indicate a relatively strong agreement, with 58 respondents strongly agreeing, 102 agreeing, 32 undecided, 24 disagreeing, and 12 strongly disagreeing. The mean score of 3.75 suggests that the majority

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of respondents believe that ratio analysis is indeed a valuable tool in providing crucial performance-related information, leading to an overall remark of "Accept."

The second item assesses the importance of ratio analysis in evaluating a company's financial position, liquidity, profitability, risk, solvency, efficiency, and fund utilization. Here, 41 respondents strongly agree, 94 agree, 26 are undecided, 43 disagree, and 24 strongly disagree. The mean score of 3.37 reflects a general consensus that ratio analysis is vital for these purposes, though the level of agreement is slightly lower compared to the first item. Despite some disagreement, the remark remains "Accept," indicating that the technique is broadly recognized as essential in financial assessment.

The third item focuses on the role of ratio analysis in tracking changes in a company over time to better understand the trajectory of its operations. The distribution of responses shows that 52 respondents strongly agree, 92 agree, 36 are undecided, 28 disagree, and 20 strongly disagree. With a mean score of 3.56, the data suggests that most respondents acknowledge the usefulness of ratio analysis for monitoring a company's operational trends over time, resulting in an "Accept" remark.

Table 4 Analysis of Public Documents Review Technique

SN	Public Documents Review Technique	SA	A	U	D	SD	Mean	Remark
10	Document reviews can be as a valid resource when conducting research or evaluations with the intent to discover or validate information	71	76	32	33	16	3.67	Accept
11	Document reviews can be used to verify compliance or ensure certain quality standards are met	38	104	52	22	12	3.59	Accept
12	Documentation help teams stay organized and on track by providing a clear understanding of project requirements, progress, and any potential risks.	58	70	40	44	16	3.48	Accept

Source: *Field Survey, 2024*

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Table 4, titled "Analysis of Public Documents Review Technique," provides a detailed examination of respondents' views on the effectiveness of using public document reviews in research and evaluations. The table evaluates agreement levels on several statements related to the technique, using a five-point Likert scale ranging from Strongly Agree (SA) to Strongly Disagree (SD). The mean scores and remarks in the table reflect the overall acceptance of each statement.

The first item in the table explores the perception that document reviews are a valid resource for conducting research or evaluations aimed at discovering or validating information. The responses indicate a strong level of agreement, with a mean score of 3.67. This suggests that the majority of respondents recognize the importance of document reviews as a reliable method for uncovering or confirming information during research or evaluations. Consequently, the remark for this item is "Accept," highlighting the technique's perceived value.

The second item assesses the usefulness of document reviews in verifying compliance or ensuring that certain quality standards are met. The responses reflect a favorable opinion, with a mean score of 3.59. This score indicates that respondents generally agree that document reviews are effective tools for compliance verification and quality assurance. The remark of "Accept" further underscores the acceptance of this technique as a reliable method for these purposes.

The third item considers the role of documentation in helping teams stay organized and on track by providing a clear understanding of project requirements, progress, and potential risks. The responses suggest a moderate level of agreement, with a mean score of 3.48. While this score is slightly lower than the previous items, it still indicates a positive perception of the utility of documentation in project management. The remark of "Accept" confirms that the respondents acknowledge the importance of documentation in maintaining organization and clarity within teams.

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Table 5 Analysis of Fraud Management (via Artificial Intelligence Biometrics)

SN	Fraud Management (via Artificial Intelligence Biometrics)	SA	A	U	D	SD	Mean	Remark
13	AI-driven biometric systems in our organization effectively enhance fraud detection capabilities.	56	103	18	37	14	3.66	Accept
14	Our organization regularly updates and improves AI biometric technologies to stay ahead of potential fraud threats.	111	39	30	12	36	3.78	Accept
15	The implementation of AI biometrics has increased the overall security and integrity of our organization's operations.	56	78	22	44	28	3.39	Accept

Source: *Field Survey, 2024*

Table 5 provides an analysis of fraud management in organizations via artificial intelligence (AI) biometrics. Each item in the table explores a different aspect of AI-driven biometric systems, focusing on their effectiveness, updates, and impact on organizational security. The responses are categorized under five options: Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), and Strongly Disagree (SD), with a corresponding mean score that determines the general sentiment or acceptance of each statement.

The first statement examines whether AI-driven biometric systems effectively enhance fraud detection capabilities within the organization. According to the table, 56 respondents strongly agree, while 103 agree, indicating broad support for the effectiveness of these systems. A smaller number are undecided (18), disagree (37), or strongly disagree (14), showing that only a minority have reservations. The mean score of 3.66 suggests that the majority of respondents accept the claim, affirming the role of AI biometrics in improving fraud detection.

The second statement evaluates the regular updates and improvements made to AI biometric technologies to ensure the organization stays ahead of potential fraud threats. In this case, 111 respondents strongly agree, and 39 agree, showing overwhelming support for the statement.

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Meanwhile, 30 respondents are undecided, 12 disagree, and 36 strongly disagree. The mean score of 3.78 reflects a high level of agreement among the respondents, suggesting that organizations prioritize keeping their AI biometric technologies updated to prevent fraud effectively.

The final statement considers whether the implementation of AI biometrics has increased the overall security and integrity of organizational operations. Here, 56 respondents strongly agree, 78 agree, 22 are undecided, 44 disagree, and 28 strongly disagree. Although a significant number of respondents support the idea, there is also a notable group that disagrees or remains undecided. The mean score of 3.39, while still above the midpoint, indicates slightly less enthusiasm compared to the previous statements, but the overall remark remains "Accept." This suggests that most respondents believe AI biometrics contribute to operational security, though there may be some concerns or areas for improvement.

4.2 Test of Hypothesis

4.2.1 Hypothesis I

H_{o1}: There is no significant relationship between data mining technique and artificial intelligence biometrics of listed commercial banks in Awka-South Anambra State.

Table 6 Result of Regression Analysis for Test of Hypothesis I

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	9.938	.669		14.854	.000
	Data Mining Technique	.086	.063	.091	2.374	.000
R^2 = .608			Prob(F) = .000			

a. Dependent Variable: Artificial Intelligence Biometrics for Fraud Management

Source: SPSS Version 25 Output, 2024

Table 6 shows the relationship between data mining technique and artificial intelligence biometrics. The $R^2 = 0.608$ means that 60.8% of the variance in the dependent variable (Artificial Intelligence Biometrics for Fraud Management) is explained by the data mining technique. It signifies a moderately strong relationship, indicating that data mining plays a significant role in predicting AI biometrics effectiveness in fraud management.

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The coefficient for Data Mining Technique is 0.086. This value indicates the direction and strength of the relationship between the data mining technique and artificial intelligence biometrics. A positive coefficient (0.086) suggests that as data mining techniques improve, the effectiveness of artificial intelligence biometrics in fraud management also increases, although the effect size is modest. The p-value being 0.000 is highly significant, as it is less than 0.05. This means we reject the null hypothesis, concluding that there is a statistically significant relationship between data mining techniques and AI biometrics. Thus, using data mining techniques can improve the effectiveness of AI biometrics in fraud detection and management. The alternate hypothesis was therefore accepted that there is a significant positive relationship between data mining techniques and artificial intelligence biometrics for fraud management in listed commercial banks ($\beta = 0.086$, $p = 0.000$).

Nwankwo (2013) highlighted the critical role of fraud detection techniques in improving the performance of banks, noting that robust data analysis methods are essential. Bagudu (2022) corroborated this by emphasizing that data mining has a positive and significant impact on fraud prevention in microfinance institutions. Conversely, while some studies, such as Krishna and Boddu (2023), have shown promising results in financial fraud detection using advanced algorithms, others suggest that the effectiveness of these techniques can be variable and context-dependent, thus indicating a need for continual refinement and integration with other fraud detection tools.

4.2.2 Hypothesis II

H_{o2}: There is no significant relationship between computer assisted auditing technique and artificial intelligence biometrics of listed commercial banks in Awka-South Anambra State.

Table 7 Result of Regression Analysis for Test of Hypothesis II

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	8.626	.709		12.159	.000
	Computer Assisted Audit Technique	.204	.064	.208	3.191	.002
R^2 = .543		Prob(F) = .002				

a. Dependent Variable: Artificial Intelligence Biometrics for Fraud Management

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Source: SPSS Version 25 Output, 2023

Table 7 showed the relationship between computer-assisted auditing technique and artificial intelligence biometrics of listed commercial banks in Awka-South Anambra State. The R^2 = 0.543 indicates that 54.3% of the variance in the dependent variable (AI Biometrics for Fraud Management) is explained by the computer-assisted auditing technique. This is a moderately strong relationship, showing that computer-assisted audits have a substantial impact on AI biometrics.

The coefficient for Computer Assisted Audit Technique is 0.204. This shows a stronger positive relationship compared to the data mining technique. A coefficient of 0.204 suggests that improvements in computer-assisted audit techniques are associated with increased effectiveness of AI biometrics for fraud management. The p-value is 0.002, which is less than 0.05, making the relationship statistically significant. Therefore, the null hypothesis is rejected, indicating that there is a significant positive relationship between computer-assisted auditing techniques and AI biometrics. Thus, improvements in audit technologies enhance AI's effectiveness in fraud management. The alternate hypothesis was therefore accepted that computer-assisted audit techniques significantly and positively relate with artificial intelligence biometrics for fraud management (β = 0.204, p = 0.002). Computer-assisted auditing techniques are crucial for enhancing fraud detection, as supported by studies like Theresa, Felix, and Idowu (2016), which found significant relationships between audit tools and fraud prevention. However, research by Muoghalu, Okonkwo, and Ananwude (2018) indicates that the impact of these tools can vary, with some technologies showing limited effectiveness in specific areas like automated teller machines and mobile banking. This suggests that while computer-assisted auditing techniques can significantly improve fraud detection, their effectiveness may be influenced by the specific context and technology used, highlighting the need for targeted applications and continuous evaluation.

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4.2.3 Hypothesis III

H_{o3}: There is no significant relationship between ratio analysis technique and artificial intelligence biometrics of listed commercial banks in Awka-South Anambra State.

Table 8 Result of Regression Analysis for Test of Hypothesis III

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	9.251	.755		12.246	.000
	Ratio Analysis Technique	.148	.069	.141	2.141	.033
R^2 = .620		Prob(F) = .033				

Source: SPSS Version 25 Output, 2024

Table 8 examines the relationship between ratio analysis technique and artificial intelligence biometrics. The R^2 value of 0.620 means that 62% of the variance in AI biometrics is explained by the ratio analysis technique. This is a relatively strong relationship, indicating that ratio analysis techniques significantly contribute to the effectiveness of AI biometrics in fraud detection. The coefficient for Ratio Analysis Technique is 0.148. This implies a positive relationship, meaning that an improvement in ratio analysis techniques corresponds with an increase in the effectiveness of AI biometrics, though the effect size is smaller than that of computer-assisted auditing techniques.The p-value is 0.033, which is less than 0.05, making this relationship statistically significant. Therefore, we reject the null hypothesis and conclude that there is a significant relationship between ratio analysis techniques and AI biometrics. The alternate hypothesis was therefore accepted that ratio analysis techniques have a significant and positive relationship with artificial intelligence biometrics for fraud management ($\beta = 0.148$, $p = 0.033$). Ratio analysis techniques have shown mixed results in their impact on fraud detection. Gitau and Samson (2016) reported that liquidity ratios and fraud losses had a significant impact on financial performance, suggesting that ratio analysis can be an important tool for identifying financial anomalies. However, Bagudu (2022) found that ratio analysis had a positive but insignificant impact on fraud prevention in microfinance institutions. This discrepancy suggests that while ratio analysis is a valuable tool, its effectiveness may vary depending on the specific context and may need to be complemented with other fraud detection methods.

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4.2.4 Hypothesis IV

H_{o4}: There is no significant relationship between public documents review technique and artificial intelligence biometrics of listed commercial banks in Awka-South Anambra State.

Table 8 Result of Regression Analysis for Test of Hypothesis IV

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	7.433	.664		11.193	.000
	Public Documents Review Technique	.316	.060	.330	5.264	.000
R^2 = .509		Prob(F) = 0.000				

a. Dependent Variable: Artificial Intelligence Biometrics for Fraud Management

Source: SPSS Version 25 Output, 2024

Table 9 shows the relationship between public documents review technique and artificial intelligence biometrics. The $R^2 = 0.509$ means that 50.9% of the variance in AI biometrics is explained by the public documents review technique. While this is lower than some other techniques, the relatively strong coefficient suggests that public documents review plays a critical role in fraud management. The coefficient for Public Documents Review Technique is 0.316, which is the highest among the tested techniques. This suggests a strong positive relationship between public document reviews and AI biometrics, indicating that improvements in public document review processes greatly enhance the effectiveness of AI biometrics in managing fraud. The p-value of 0.000 indicates that the relationship is highly significant, and we can confidently reject the null hypothesis. There is a strong and statistically significant relationship between public document review techniques and AI biometrics. The alternate hypothesis was therefore accepted that public documents review techniques have a significant and positive relationship with artificial intelligence biometrics for fraud management ($\beta = 0.316$, $p = 0.000$). like Uwalomwa et al. (2018), which found that thorough reviews can enhance financial reporting quality and reduce fraud. However, some studies, such as those by Onyabe et al. (2018) and Adesina et al. (2020), suggest that while document reviews are important, they alone may not be sufficient to prevent fraud and should be integrated with other techniques. This indicates that while public document review

techniques are essential, their effectiveness in detecting fraud is enhanced when used in conjunction with other tools and methods.

CONCLUSION AND RECOMMENDATION

In this study which examined the influence of various techniques—data mining, computer-assisted auditing, ratio analysis, and public documents review—on the effectiveness of artificial intelligence (AI) biometrics for fraud management in listed commercial banks in Awka-South, Anambra State. Each technique was evaluated to determine its significance and contribution to enhancing AI biometrics, with results indicating varying degrees of impact. The analysis reveals a significant positive relationship between data mining techniques and the effectiveness of AI biometrics in fraud management. Thus, while data mining contributes to improved fraud detection, its impact is less pronounced compared to other techniques. This may be due to the inherent complexity and data requirements of data mining, which can limit its effectiveness if not adequately integrated with other fraud management tools. In addition, the higher coefficient reflects the substantial role that these techniques play in improving AI biometrics, likely due to their ability to process and analyze large volumes of data more effectively than manual methods. This strong impact underscores the importance of incorporating computer-assisted auditing into fraud management strategies to leverage AI's full potential.

Furthermore, ratio analysis techniques also demonstrate a significant positive effect on AI biometrics for fraud management, though with a smaller coefficient. While this technique contributes to the effectiveness of AI biometrics, its impact is moderate compared to computer-assisted auditing. The smaller effect may be attributed to the more traditional and less dynamic nature of ratio analysis, which might not fully harness the capabilities of AI in detecting sophisticated fraud patterns. Finally, public documents review techniques exhibit the strongest positive relationship with AI biometrics. The high coefficient suggests that this approach significantly enhances the effectiveness of AI biometrics in identifying fraudulent activities. The strong impact can be attributed to the rich and diverse information available in public documents, which provides valuable inputs for AI systems to detect irregularities and fraud more accurately.

In summary, while all four techniques positively influence AI biometrics for fraud management, their effectiveness varies. Computer-assisted auditing and public documents review techniques have a more pronounced impact, highlighting the importance of integrating

advanced technology and comprehensive data sources in fraud detection efforts. Data mining and ratio analysis, while still valuable, show less influence, indicating that these methods may need to be combined with other approaches to optimize AI biometrics in combating fraud. In conclusion, integrating advanced techniques into fraud management systems significantly enhances the effectiveness of AI biometrics.

Based on the findings made, the study therefore recommends the following:

1. The Information Technology and data analytics teams of listed commercial banks in Awka-South should enhance their data mining capabilities to better integrate with AI biometrics systems, thereby improving fraud detection effectiveness.
2. The auditing departments in listed commercial banks should invest in and expand their use of computer-assisted auditing tools to leverage their significant impact on improving AI biometrics for fraud management.
3. Financial analysts in listed commercial banks should incorporate ratio analysis techniques as a supplementary tool alongside AI biometrics to enhance overall fraud detection strategies.
4. Compliance and audit teams in listed commercial banks should intensify their review of public documents, integrating this technique with AI biometrics to maximize its effectiveness in detecting fraudulent activities.

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