Application of Artificial Intelligence and Audit Quality in Nigeria

Dagunduro, Muyiwa E[1]., Falana, Gbenga A[2]., Adewara, Yinka M[3]., & Busayo, Temitayo O[4].
[1234]Department of Accounting
College of Social and Management Sciences
Afe Babalola University, Ado-Ekiti (ABUAD)
Ado-Ekiti, Ekiti State, Nigeria;
E-mails: dagundurome@pg.abuad.edu.ng[1], falanaga@pg.abuad.edu.ng[2] ;
olayinkaadewara@pg.abuad.edu.ng[3] busayoto@pg.abuad.edu.ng[4]
ORCID 0000-0002-1177-7101[1], ORCID 0000-0001-8512-6769[3], ORCID 0000-0003-0507-4394[4]

ABSTRACT

This study examined the effect of artificial intelligence on the quality of audit practice in Nigeria. Specifically, examined how expert systems, machine learning, and intelligent agents affect audit quality in Nigeria. The study employed a survey research design. The population of this study comprised 178 practicing accounting firms in Nigeria with the application of artificial intelligence. A sample size of 125 was selected using the purposive sampling technique. Data was obtained from primary sources using a well-structured questionnaire. Data were analysed using descriptive statistics and OLS regression analysis. The result of the study indicated that expert systems, machine learning, and intelligent agents exhibited a significant positive relationship to audit quality in Nigeria. Thus, the study concluded that the application of artificial intelligence positively influences the quality of auditors' reports. With the positive impact made by artificial intelligence, in the coming decades, intelligent systems will take over more and more decision-making tasks from humans. The study recommended constant training of accountants and audit personnel on the use of AI techniques for the improvement of audit quality. Audit firms in Nigeria should invest in machine learning tools to further improve audit quality in the country. Also, the use of intelligent agents that assist in the classification of detecting objects into different categories should be increased among audit firms in Nigeria.

Keywords: Artificial Intelligence, Expert Systems, Machine Learning, Intelligent Agents, Audit Quality.
        JEL Classification: M42, M49, C451.

1. INTRODUCTION

As a result of financial scandals in major corporations, such as Enron, WorldCom, and other world-class companies; audit quality has gained increased concerns. The aftermath of these scandals has led to the identification of a perceived expectation gap in audit quality as many users of audited financial statements have different expectations of the audit function culminating in a call for changes in the auditing profession so as to ensure improved audit quality (Kida, 1980).

The auditor has the duty to confirm whether the financial statements submitted are the true and fair view and express opinions on the financial report, based on auditor's regulations, and also required to provide an opinion regarding the firm's ability to survive in a period of not more than one year from the date of the audited report (Jeong, & Rho, 2004). This suggests that independent auditors have been charged with the responsibility of safeguarding investors when there are doubts about the continuity of a company (Johnson et al. 2002). This is in line with the rationale that the audit profession evaluates the going-concern assumption and provides stakeholders of financial statements with an early warning of potential financial problems. The audit opinion may provide particularly useful information, given the auditor's intimate knowledge of the client's activities and future plans (Jose & Ramon, 2015).

Audit firms are increasingly using artificial intelligence (AI) to combine and convert data from multiple sources and extract better decision-relevant information in complicated contexts to generate economic benefits (Joseph & Gaba, 2020). In this worldwide mega-trend, which also involves sophisticated intelligent agents, machine learning, expert system, business intelligence, and data mining methods (Gepp & Salijeni, 2018), AI can be thought of as an umbrella phrase. By enabling the decrease of inaccuracies and errors in the accounting information displays, artificial intelligence has enabled significant improvements in the quality of audit reports through the integration of emerging technologies like expert systems, cloud computing, business intelligence, machine learning, data mining, and the like. This, in turn, has prompted several large accounting companies to contemplate integrating AI to efficiently and effectively carry out their audit assignments (Zhang et al. 2018; Feng & Xie, 2019; Yi & Fan, 2020; Xuan et al., 2020).

Despite the technological evolution over the past years, the aim of the audit profession remains to provide independent third-party opinions on the truth and fairness of the financial statement of an organization and the compliance of this information with the applicable standards (Awotomilusi et al., 2022; Omoteso, 2012). Kokina & Davenport (2017), opined that auditing is particularly suitable for applications of data analytics and artificial intelligence because it has become challenging to incorporate the vast volumes of structured and unstructured data to gain insight into the financial and non-financial performance of companies (Falana et al., 2023).

It is in line with this, this study examined the effect of artificial intelligence on audit quality in Nigeria. Specifically in three dimensions: expert systems, machine learning, and intelligent agents. Previous studies have stressed and focused on the demonstration of the impact of artificial intelligence on the auditing and accounting decision-making process. However, it is obvious from existing kinds of literature that the majority of the work done on AI and Auditing in Nigeria focused attention on the big 4 accounting firms without any recourse to small and medium-scale audit firms. The significance of this study is that it will explore the effects of AI-based systems in enhancing the quality and effectiveness of the auditing process by exploring the interaction of the auditing process with AI tools.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1 Conceptual Review
2.1.1 Audit Quality
The quality of an audit report comprises two terms; audit, and quality. Conventionally, an audit is regarded as the process of validating or confirming that the financial statement gives a true and fair view in all material respect. It was prepared according to the generally accepted accounting statutes and standards (Adekoya et al., 2021). Quality is defined as the ability of an auditor to make an absolute obligation and sound judgments and a total commitment to delivering sound judgments and audit opinions. It means ensuring that all the right steps are taken consistently in the course of the audit (Nwanyanwu, 2017).

Audit quality is defined as the extent to which an auditor's independence, integrity, and objectivity impact auditors' opinions on the quality of financial statements (Baah & Fogarty, 2018). From a firm's perspective, the audit firm is a continuous process that recognises crucial matters that affect the quality of audit, and performance, analyses conditions, formulates responses, and monitors and strengthens performance (Martin, 2013). Auditors and other stakeholders agreed that the most critical audit quality determinants are the auditor's characteristics (Christensen et al., 2016).
Audit quality is the process of systematic examination of a quality system carried out by an internal or external auditor of an organisation. The auditor's firm size, auditors' tenure, auditors' fees, Joint audit and Audit report lag are measures of audit quality. The purpose of an audit is to enhance the degree of confidence of intended users of the financial statements and that is achieved by auditors gathering sufficient and appropriate audit evidence in order to express an opinion on whether the financial statements are prepared, in all material respects, in accordance with the applicable financial reporting framework (Jose & Ramon, 2015).

Some studies focus on how AI is being used in auditing. For instance, Schulenberg (2007) investigated how AI is being used in auditing through "Cognitive Auditing". Cognitive auditing is a computerized process that uses AI to help auditors find errors and issues in financial reports. IBM created cognitive auditing, which employs machine learning algorithms to assist auditors in identifying mistakes and anomalies in financial reporting Schulenberg (2007). Another study (Gentner et al. 2018) confirmed that AI is being used in auditing to help auditors find errors and issues in financial reports faster.

It is also being used to help auditors identify patterns in data and make predictions or decisions. (Nwakaego & Ikechukwu 2015) mentioned that AI is revolutionizing the auditing process and AI-enabled auditing software can carry out complex audits much more efficiently and accurately than humans can. It can also analyze large volumes of data much more quickly and effectively than a human auditor can. This means that AI can play a much more vital role in the auditing process and is likely to become increasingly important in the years to come. Chassignol et al. (2018) focused on the use of AI in helping auditors to identify and prevent fraud.

2.1.2 Artificial Intelligence

Artificial Intelligence (AI) is a term first coined by John McCarthy, a renowned computer scientist, in 1955-56 at the Logic Theorist program initiated by Allen Newell, Cliff Shaw, and Herbert Simon presented at the Dartmouth College Artificial Intelligence Conference to showcase how machines can be made to mimic the problem-solving skills of humans (Havard Business School, 2017). McCarthy defined AI as the science and engineering of making intelligent machines (Akinadewo, 2021). Also, AI which stands for the use of computerized systems to complete tasks ordinarily completed by human intelligence is quickly becoming a topic of interest (Sotoudeh et al., 2019). The first AI-based project occurred over sixty years ago when scientists attempted to design software that could translate between the Russian and English languages (Ilachinski, 2017).

2.1.1.1 Expert Systems

Artificial intelligence programmes known as "expert systems" were first used in the 1980s. They have since attained a level of expertise that allows them to replace humans who are experts in a given area of decision-making. Expert systems are the most popular artificial intelligence technology because they are simple to use. They include software applications that mimic the way experts in a particular field think. (James,2014). They are frequently created using shells for expert systems. A software development environment called an expert system shell makes it possible to create expert or knowledge-based systems. The expert system claims that software can be created for any issue where a decision must be made from a defined set of options and is supported by logical reasoning. Therefore, an expert system could be used in any field where a person or group has specialized knowledge that is required by others. (Taghizadeh, et al., 2018).

2.1.1.2 Machine Learning

Machine learning is an area of computer science that studies learning computer algorithms that use statistics for determining patterns in a huge amount of data and making accurate predictions for unknown future events. Machine learning techniques have been used in many different fields, such as education, health, biology, and finance (Dogan & Birant, 2021). The term "machine learning" was described by Arthur Samuel in 1959 and was defined as "a field of study that gives computers the ability to learn without being explicitly programmed". Tom M. Mitchell gave a more comprehensive description of machine learning in 1997, stating that it is concerned with creating computer programmes that can automatically get better over time. Both meanings referred to computers' capacity to recognize patterns and trends in historical data and, by improving their learning capabilities, make accurate predictions about the future.

The goal of machine learning is to locate the model that offers the most reliable and precise forecast of future data. In order to accomplish that, algorithms are used to create mathematical models based on sample data. (training data). The effectiveness of the model's predictive power is then assessed. (Cho et al., 2020). These are some common uses of machine learning that we see every day. A large number of data points pertaining to a certain set of circumstances can be analysed via machine learning to discover which ones are important. The outcomes can then be predicted by comparing the findings to another set of data that is similar. (Shimamoto, 2018).

Due to advancements in machine learning, artificial intelligence, big data usage, blockchain, and other technologies, accounting and auditing will experience more substantial changes in the very near future and will be supported to a greater extent by automation (Türegün, 2019). Machine learning has multiple applications in auditing; it is already used by leading accounting services firms. Machine Learning functions are constantly being introduced into audit practice, such functions include but are not limited to automation of manual audit tasks, analysis of the complete volume of data including all sales and purchase records, general ledger and all other ledgers, journal entries, bank transactions, financial reports, authorities, and limits, to flag transactions that differ materially from the standard. Identification of exceptions and potential problems or errors, including duplicate expense claims, unauthorized expenditure, incorrect amounts, and suspicious suppliers or invoices reading of contracts and leases to pinpoint key clauses and numbers, assess risk and highlight any anomalies, and so on.

2.1.1.3 Intelligent Agents

A software activity that performs a set of operations on behalf of a user/another programme with some degree of independence or autonomy and in doing so employs some knowledge or representation of the user's goals or desires is considered to be an intelligent agent, (Eno et al., 2019). When it comes to dealing with the information overload that has resulted from the development of a fully networked business environment, intelligent agent technology is widely regarded as one of the most promising approaches currently available.

Most of the time, users fill out a standard information profile or use a graphical user interface (GUI) to reach their goals.An intelligent programme then receives this data. The data used by the intelligent agent app is transmitted over the internet or some other established network. The programme can autonomously navigate its way across the internet or any other type of network. For access to the supplier hubs. Storefronts and directory assistance might help. At last, the agent has access to the original databases or other storage media containing the financial data. Locate the requested data, carry out the requested transaction, and provide feedback to the user in order to establish the agent's agency autonomy, reasoning capacity, and reasoning process (Shaher, 2020).

2.1.2.1 Artificial Intelligence and Audit Quality

During the audit process, artificial intelligence is a key component of making predictions about the financial trouble that could happen. People say that the audit process is a way to find mistakes in the financial statements of a company.On the other hand, artificial intelligence is when new technologies are used to make business operations more efficient and effective.Hansen (1992) says that machine learning models have a big impact on how predictions and decisions are made during an audit, which in turn would reduce the financial distress that could occur in the financial statements. On the other hand, Chang and Hwang (2020) pointed out that the financial stress in the audit process can be solved by using big data techniques, such as the binary model and life test methods, to predict the financial stress in the company. The results showed that the variables selected performed well in the prediction process. (Chang, & Hwang, 2020).

The Audit evidence is important key information that the auditors seek while they intend in performing an audit of the financial statements of the company that assures the auditors that the information is presented fairly in the statements. Ivy, et al., (2020) documented the importance of the development of effective as well the practical governance over the methodology of using AI such that a result in ethical decision-making can be achieved thus with attaining the appropriate audit evident the audit is capable of making an ethical judgment and decisions for the financial statements. Ivy et al., (2020) On the contrary, Al-Sayyed, et al. (2021); Zayed, and Thammatucharee, (2021) Supported the impact of AI in the audit evidence and decision-making to be effective where they suggested that there is a necessity to develop the skills and knowledge with appropriate actions taken by the auditors such that the ethical decision making in the attainment of the audit evidence can be appraised, while Sánchez et al., (2019) criticized the ethical aspects and provided a situation where the auditors failed to be ethical in offering opinions after attaining the audit evidence of the financial statements, they offered an opinion different than that presented in the statements to avoid bankruptcy for the companies being audited, so they ended up suggesting that different tools should be used such that the auditor's behaviors can be tracked in the areas of opinions offered and the detection of any dishonesty.

2.2   Theoretical Framework

This study hinged on Agency theory.   The Agency theory was propounded in 1976 by Jensen and Meckling, this is one of the major theories used in auditing. It is this theory that translates the relationships between managers and investors. The agent is the manager or another person appointed to act on behalf of investors who represent the principal. The ideal thing is for managers to act in the best interest of the investors but in some cases, the agents fail to act in the best interest of the investors. As a result, auditing is important since it assures the investors that the managers are upholding the interests of the investors Commerford et al., (2019). The responsibility of auditors in such a case is to provide guidelines to investors while playing oversight roles. At the same time, the audit reports guide investors in making a purchase, sell, or hold decisions Shogren et al., (2017). The growth in the size of companies leads to a growth in the volume of data required to be audited. As a result, auditors must continue to provide timely and reliable information to investors. The provision of this information must continue to meet the reliability standards which require auditors to significantly peruse the financial reports (Blair & Stout, 2017)

AI systems are expected to provide a strategic advantage in the attainment of these objectives. First, AI enables remoteness, which is the analysis of financial statements from different locations (Blair & Stout, 2017). Usually, remoteness arises from the separation of the source of information and users. With AI systems carefully and effectively deployed, auditors could have remote access to the financial data of clients and remotely audit and carry out financial analysis on clients' data. Another way through which AI is expected to facilitate the agency theory is by eliminating the effects of the complexity of handling financial information and reports. Since information has become complex over the past years, users find it difficult to attain a high-value assurance of the quality of the financial reports at hand. At the same time, AI supports agency theory by eliminating the conflict of interest. The release of financial reports resembles a situation where directors are reporting their performance Blair et al., (2017).

The directors are, therefore, likely to report skewed performance. On the other hand, investors prefer to receive an accurate report reflecting the financial performance of the company. The use of AI systems will invariably facilitate the audit of financial reports, thus eliminating the conflict of interest.

2.3   Empirical Review

Extant literature about the adoption of artificial intelligence and its relevance to the quality of audit practices, by several researchers using different analytical methods has been studied. Monal et al., (2022) examined the effect of AI on the development of the accounting and auditing profession. Secondary data sources were collected for the research while the population of the study includes 359 practicing accounting firms in Bahrain. The data were analysed by means of quantitative content analysis, whereby it was manually coded according to an inductively developed set of categories. The result found that the adoption of AI will lead to a new era of creativity and innovation that will lead to the development of the field of accounting and auditing.

Awotomilusi et al. (2022) evaluated the adoption of cloud computing on the efficacy of accounting practices in Nigeria. to achieve this, the study distributed a structured questionnaire among deposit money banks in Nigeria. Data were analyzed using frequency and ordinary least square regression. From the findings, the study discovered that cloud computing exhibited a significant positive relationship with the efficacy of accounting practices in Nigeria. In addition, other variables employed in the model also revealed that technological advancement and security efficiency depicted a significant relationship with the efficacy of accounting practices in Nigeria. Cost-effectiveness, however, revealed a significant negative relationship.

Hassan (2022) examined the use of AI in accounting and auditing. The reviewed literature was analysed using a semi-systematic method, namely, a narrative review. The research concluded that the accounting and auditing field needs to transform in response to the threats posed by disruptive technologies in the economic industry. Research into the use of AI in accounting and auditing requires the participation of experts from many different fields. Greater efficiency, productivity, and accuracy are anticipated from the more widespread adoption of AI in the accounting and auditing professions.

Onwughai (2022) evaluated the impact of the adoption of artificial intelligence and machine learning technologies on the accounting functions of business organizations. In order to collect information from respondents and examine previous academic and professional works on the topic, a survey questionnaire and qualitative literature review were used. This research demonstrated that although AI will be used to replace most programmable and monotonous accounting activities, it will also open up new opportunities for the ambitious accounting professional to advance into a more strategic and rewarding career path than just being a bookkeeper. Akinadewo (2021) investigated the relationship between Artificial Intelligence (AI) and Accountants' Approach to Accounting Functions. The study used the research design method of a structured questionnaire. The targeted population and the sample size were 205, which comprises accountants with experience in systems application for accounting and other financial transactions functions. A purposive sampling technique was adopted to determine the respondents. The results of the analysis revealed that artificial intelligence has a significant positive impact on accountants' approach to accounting functions.

Sharma et al. (2021) examined the perception and acceptance of artificial intelligence technology in accounting-by-accounting professionals and others. Relevant literature was been studied and the data has been collected through structured questionnaires from accounting professionals, businessmen, educators, and students. The partial least square structural equation modeling has been used in Smart PLS to analyse the data. The study shows that insecurity, attitude towards use, and perceived ease of use affect moderately the intention to use artificial intelligence accounting and it will be the future of accounting but privacy and security are the major issues of concern. The study conducted by Vardia et al., 2021 in India examined the effect of digitalization on the audit profession in India. The aim of this exploratory study is to know the level of understanding and to analyse the effect of digitalization on the auditing profession. Chi-Square was applied to study the respondents. The findings revealed that digitalization has significantly influenced the working methods and process of auditing.

Artificial intelligence (AI) and its role in supporting and improving the efficiency of AIS were studied by Hashem and Alqatamin (2021), and their findings were compared to non-financial performance benchmarks. Using a quantitative methodology, this study adopted a questionnaire as its primary data collection tool, which was sent out via email to 409 middle and upper-level managers, department heads, and accountants working in Jordan's industrial sector during the 2020/21 fiscal year. According to the study's qualitative findings, AI is a crucial resource for spotting fraud and avoiding potential dangers. Significant obstacles to the widespread use of artificial intelligence include a lack of regulatory requirements, concerns over data privacy and security, and a dearth of appropriate personnel and technological resources. The results also demonstrated that one's perspective on AI plays a crucial mediating role between the two variables of AI's perceived usefulness and the intention to adopt it in financial services.

Taha (2021) assessed the advantages and disadvantages of automation in the accounting sector. This article used a qualitative research approach to look at how financial educators, workers, students, and business managers feel about the future of accounting jobs in light of increasing automation. This study will rely heavily on a thorough literature review of related research articles for its data, as these will present findings on the felt effects of computerization. Consulting positions and those needing basic analytical skills are predicted to disappear as corporations adopt robotic bookkeeping systems, according to a new study. Marija Mitevska (2021) investigated how Artificial Intelligence can help the sector of accounting and audit deal with Covid 19. This directed attention to the problems that arise in the field of accounting and audit due to the effect of the pandemic and how they can be fixed or eliminated with the use of artificial intelligence. Secondary data was utilized Deployment of secondary evidence. The results showed that the system of artificial intelligence is of enormous use in the time of the pandemic.

Kwarbai and Omojoye (2021) looked into how AI would affect the Nigerian accounting industry. A survey research strategy was used for this investigation. Accountants in Nigeria who work for one of the "Big Four" accounting firms (KPMG, Deloitte, PricewaterhouseCoopers, or Ernst & Young) make up the sample for this research. The research concluded that AI has had significant effects on the Nigerian accounting industry. Rahman (2021) examined the importance and challenges of adopting artificial intelligence (AI) in the banking industry in Malaysia and examined the factors that are important in investigating consumers' intention to adopt AI in banking services.

This qualitative research was carried out using in-depth interviews with officials in the banking industry to understand the importance and challenges of adopting AI in the banking industry. In the quantitative study, a total of 302 completed questionnaires were received from Malaysian banking customers. The data were analysed using Smarts 3.0. The qualitative results revealed that AI is an essential tool for fraud detection and risk prevention. The absence of regulatory requirements, data privacy and security, and lack of relevant skills and IT infrastructure are significant challenges to AI adoption.

Zhang and Ziong (2020) provided a comprehensive review of current developments in big data, machine learning, artificial intelligence, and blockchain utilized in general business practice and by specialized practitioners in the accounting profession worldwide. This paper explores the evolution of the accounting profession following these recent technological developments and assesses the impact of future developments. The research work adopted the review of relevant literature. The paper reflected how all these technologies and the associated requirements of job candidates will affect the desired capabilities of accounting graduates and provides further discussion regarding what higher institutions and their accounting graduates can do to adopt such changes.

Lehner et al. (2020) identified the ethical challenges of using artificial intelligence (AI)-based accounting systems for decision-making. This research is rooted in the hermeneutics tradition of interpretative accounting research, in which the reader and the texts engage in a form of dialogue. To substantiate this dialogue, the authors conduct a theoretically informed, narrative (semi-systematic) literature review spanning the years 2015–2020. This review's narrative is driven by the depicted contexts and the accounting/auditing practices found in selected articles are used as samples instead of the research or methods. In the study, the thematic coding of the selected papers the authors identified five major ethical challenges of AI-based decision-making in accounting: objectivity, privacy, transparency, accountability, and trustworthiness. Using Rest's component model of antecedents for ethical decision-making as a stable framework for our structure, the authors critically discuss the challenges and their relevance for future human-machine collaboration within varying agencies between humans and AI.

Almufadda & Almezeini 2020 investigated some essential questions that might interest auditors regarding the impact of artificial intelligence (AI) applications on the auditing profession by reviewing a selective bibliography of papers published mainly between 2016 and 2020. The findings of this work showed that the application of AI to audit practice is still limited to the Big 4 accounting firms. Shaher (2020) examined the effect of artificial intelligence technologies on audit evidence, from the point of view of certified auditors in IT companies in Jordan. A descriptive research design was adopted in the study among 314 auditors. A structured questionnaire was used to obtain the data needed for the study. The Findings of the study showed that AI technologies have a significant effect on audit evidence.

In addition, in light of the Corona pandemic, Abdul & Eitedal 2020 conducted a study to determine the effect that AI has had on the accounting and auditing industry. A mixed method of description and analysis was used. A questionnaire was used to collect information from the accountants and auditors who work for the business owners of accounting and auditing firms in the Gaza Strip; 170 were distributed and 155 were returned, for a response rate of 42%.

According to the study's findings, AI has a major bearing on the development of accounting and auditing systems in the wake of the Corona pandemic; on the improvement and development of the quality of professional performance of accountants and auditors; on the increase in the ability to complete complex accounting and auditing work; on the improvement and development of the efficiency of accounting and auditing cadres; and on the improvement and development of accounting and auditing cadres..

In 2020, Al-Blooshi and Nobanee assessed the effectiveness of AI in the realm of finance. In this research, relevant articles were assessed using a systemic content analysis methodology. Various pieces of writing, including online discussions, have been compiled. This study focuses on widely-read peer-reviewed publications found in databases like Scopus and SSRN, which are subsequently ranked for their quality and impact. The highest-ranked papers were chosen because they not only represented the highest quality of reviewed and validated work, but also the state of the art at the time of publication. Articles on finance and AI are searched for using a combination of keywords like "corporate finance," "artificial intelligence," "digital finance," "financial and AI," and so on. The study found that AI is being used by businesses all over the world to spot outliers. It's a tool for finding the best ways to put money to work. Algorithmic trading, another application of AI insecurity, uses proprietary algorithms to speed up automated trading by integrating data on fluctuating market dynamics and price levels.

Another study on Artificial Intelligence and Accounting functions: Evaluating Nigerian Accounting Firms conducted (Abiola & Solomon 2020) in Nigeria investigated the impact of AI on the performance of accounting operations. A descriptive research design was used and means were determined using regression analysis. The study found a significant effect of AI on the efficacy of accounting functions and job security.

Eno et al., (2019) investigated artificial intelligence: opportunities, issues, and applications in banking, accounting, and auditing in Nigeria. This research employed both a qualitative and quantitative research design. The study adopted a descriptive survey research design, employing secondary quantitative data. The findings revealed the future roles of banks going forward and the impacts AI could have on auditing systems.

Similarly, Aneta Zemankova (2019 examined the effects of artificial intelligence on the efficiency and integrity of the audit process. The main results of the paper include an overview of essential audit tasks proving the significance of artificial intelligence in audit, as well as the main implications of using blockchain in audit, especially increased efficiency and integrity and reduced probability of errors, but also creating a new generation of auditing, based on continuous assurance. Finally, the practical result of this paper is a summary of the Big4 latest developed artificial intelligence tools and innovations. The literature review was conducted in Greece with the big 4 accounting firms.

However, Odoh et al. (2018) examined the effect of artificial intelligence on the performance of accounting operations among accounting firms in South East Nigeria. A descriptive research design was adopted in the study, among 185 accountants and managers in accounting firms in Anambra and Enugu state. A structured questionnaire was used to obtain the information needed for the study. Data collected were analysed using descriptive statistics and regression analysis.

The study hypotheses were tested using linear regression at a 5% level of significance. The result of the study showed that Expert system and Intelligent agent has a significant effect on the performance of the accounting function of accounting firms in South East Nigeria. The authors concluded that the application of artificial intelligence positively influences the performance of accountants in performing their duties.

In Nigeria, there are a limited number of studies examining the relationship between AI and the quality of audit practices, and the majority of these studies focused attention on the big 4 accounting firms without any recourse to small and medium-scale audit firms' practitioners. The hypotheses are therefore stated as:

Ho_1: expert systems do not have a significant effect on the quality of audit practices in Nigeria.
Ho_2: machine learning does not have a significant effect on the quality of audit practices in Nigeria.
Ho_3: intelligent agent does not have a significant effect on the quality of audit practices in Nigeria.

3. METHODS

The study employed a survey research design. The population of this study comprised 178 accounting firms in Nigeria with the use of artificial intelligence. A sample size of 62 was selected using the purposive sampling technique. Data was obtained from primary sources using a well-structured questionnaire. The study adopted a purposive sampling method for sample size determination was adopted as the researcher intends to select members of the population that have incorporated any of the AI variables into the auditing process as part of the sample size. The sample size of 125 which represents about 70% of the population was considered adequate for this study in order to obtain reliable data. Data were sourced from primary sources using a well-structured questionnaire and four (5) questionnaires were administered per firm, with a total number of 375 questionnaires administered for data collection. Data collected were analysed using descriptive statistics and OLS regression analysis.

4. DATA ANALYSIS AND DISCUSSION OF FINDINGS

4.1. Descriptive Statistics

Table 2 represented the characteristic distribution of the variables and it shows that the average distribution of audit quality is 4.008475; it varies from a minimum of 2.750000 to a maximum of 5.000000. The variability of the distribution given by the standard deviation is 0.613354. This value shows that audit quality has a higher deviation rate from its mean value. Audit quality skewed negatively with a recorded value of -0.198410 while its kurtosis of 2.130986 is platykurtic distribution. Expert systems on the other hand have an average value of 4.061017 while the value of its standard deviation is 0.870729. This implied that the expert systems have a higher deviation rate from the recorded mean value. The data for the variable is negatively skewed while the kurtosis value of 2.852451 is platykurtic relative to its normal distribution.

In the same way, machine learning has a mean value of 3.935593, varying from a minimum of 1.000000 to a maximum of 5.000000. The variability of the standard deviation is fair with a value of 1.151421. Data for the variable is negatively skewed with a value of -1.159749 and had a kurtosis value of 3.695964 which is greater than 3 and as such known as leptokurtic distribution. Image recognition has a mean value of 4.115254 and the standard deviation of 0.849332 is high relative to the recorded mean value. Intelligent agents are negatively skewed with a value of -1.222217 and kurtosis of 5.275598 is known as leptokurtic distribution.

Table 1: Descriptive Statistics

Variable	AQ	ES	ML	IA
Mean	4.008475	4.061017	3.935593	4.115254
Median	4.000000	4.000000	4.000000	4.000000
Maximum	5.000000	5.000000	5.000000	5.000000
Minimum	2.750000	2.000000	1.000000	1.000000
Std. Dev.	0.613354	0.870729	1.151421	0.849332
Skewness	-0.198410	-0.706394	-1.159749	-1.222217
Kurtosis	2.130986	2.852451	3.695964	5.275598
Observations	295	295	295	295

Source: Author's Computation (2023)

4.2. Test of Variables

4.2.1 Reliability Test

Cronbach Alpha test was used to test the reliability of the study and the result is presented in table 1. The Cronbach Alpha reliability test for audit practice using 7 items is 0.742, using 8 items, expert systems have a Cronbach Alpha of 0.732, machine learning has 6 items and the Cronbach Alpha is 0.702 while intelligent agents have 6 items and Cronbach Alpha is 0.713. All the tested items under audit quality, expert systems, machine learning, and intelligent agents have Cronbach Alpha that is above 0.7 specified benchmarked.

Table 2 Cronbach Alpha Test Results

S/N	Variable	No. of Items	Cronbach's Alpha
1	Audit Quality (AQ)	7	0.742
2	Expert Systems (ES)	8	0.732
3	Machine Learning (ML)	6	0.702
4	Intelligent Agents (IA)	6	0.713

Source: Author's Computation (2023)

4.2.2 Linearity Test

Reported in Table 3 is the correlation matrix between artificial intelligence and audit quality in Nigeria. The correlation coefficient of the data expert system is 0.552. This showed that artificial intelligence created through expert systems increases audit practice in Nigeria. The correlation between machine learning and audit quality is positive and significant with a coefficient value of 0.661, which implied that an increase in artificial intelligence created through machine learning will increase audit quality in Nigeria. Intelligent agents have a significant positive correlation of 0.470 with audit practice in Nigeria. This implied that an increase in image recognition of artificial intelligence will increase audit practice in Nigeria by 0.470 units. In the same vein, other explanatory variables in the model showed no evidence of a multicollinearity problem as the highest correlation coefficient value of 0.661 does not exceed 0.7 benchmarks.

Table 3 Correlation Analysis of Study Variables

	AQ	ES	ML	IA
AQ	1.0000			
ES	0.552**	1.0000		
	(0.000)			
ML	0.661**	0.357**	1.0000	
	(0.000)	(0.000)		
IA	0.470**	0.005	0.258**	1.0000
	(0.000)	(.933)	(0.000)	

Source: Author's Computation (2023)

4.2.3 Multicollinearity Test of Variables

The study conducts the multicollinearity tests as provided in Tables 4a and 4b using the tolerance and variance inflation factor (VIF) In Table 4a tolerance value for the expert system is 0.863, machine learning has a tolerance value of 0.805 while the tolerance value for an intelligent agent is 0.923. The Variance Inflation Factor (VIF) result recorded a value of 1.159, 1.242, and 1.084 for expert systems, machine learning, and intelligent respectively. The outcome of this result indicated that the multicollinearity problem does not occur as tolerance values of all variables are above 0.1 while the VIF values are less than 10. This outcome is also supported by table 4b that variables in the model have no problem with multicollinearity.

Table 4a: Tolerance and VIF Value

Variable	Tolerance	VIF	1/VIF
ES	0.863	1.159	0.863
ML	0.805	1.242	0.805
IA	0.923	1.084	0.923
Mean VIF		1.162	

Source: Author's Computation (2023)

Table 4b Post Estimation Test Results

Breusch-Godfrey Serial Correlation LM Test		
Null Hypothesis	Statistics	Probability
There is no Serial Correlation (P>0.05)	185.1799	0.1346
Heteroskedasticity Test: Breusch-Pagan-Godfrey		
Null Hypothesis	Statistics	Probability
no heteroskedasticity of the residuals (P>0.05)	5.568803	0.1346
Tolerance and VIF Value		
Null Hypothesis	VIF	1/VIF
Absence of multicollinearity among the variables (1/VIF >0.10)		1.162

Source: Author's Computation (2023)

4.3. Artificial Intelligence and Audit Quality in Nigeria

Table 5 presented the OLS result on artificial intelligence and audit practice in Nigeria. The table showed that the coefficient of multiple determination R^2 is 0.671972 while its adjusted value is 0.668590. It indicates that about 67% of expert systems, machine learning, and intelligent agents are explained by audit quality in Nigeria and the remaining 33% are incorporated in the error term. The F-statistics of 198.7064 and its p-value of 0.000000 showed the whole model put together is statistically significant and also revealed that the model is of good fit.

The individual coefficient of the model revealed that expert systems have a coefficient of 0.283319, t-statistics of 11.12635, and p-value of 0.0000 suggesting that a unit increase in the coefficient of expert systems will increase audit quality by 0.283319 units. Machine learning has a coefficient of 0.209601 units, t-statistics of 3.026383, and p-value of 0.0027 implying that a unit increase in the coefficient of machine learning will lead to a 0.209601 unit increase in audit quality in Nigeria. Intelligent agents have a coefficient of 0.100757, t-statistics of 3.227322, and p-value of 0.0013. The result implied that a unit increase in the coefficient of intelligent agents will lead to a 0.100757 unit increase in audit quality in Nigeria.

The implication of the coefficient values is therefore relevant for consideration. For instance, an expert system is significant and positively related to audit quality in Nigeria. This result agrees with the studies conducted by Taghizadeh, et al*.,* (2018), Odoh et al*.,* (2018), Al-Shaer and Zaman (2018), Chen, *et al*., (2018), James (2014), Vardia *et al*., (2021) among others who are of the view that expert systems software can be developed for any problem that involves a selection from among a definable group of choices where the decision is based on logical steps. Hence any area where a person/group has special expertise needed by others is a possible area for an expert system increases the audit quality of an auditor. It also showed that expert systems techniques and tools enable an auditor to make a more informed opinion which helps in boosting the audit quality of an audit firm.

Also, the relationship between machine learning and audit practice is significant and positively related. The outcome of this study is consistent with the work of Monal et al*.,* (2022), Almufadda and Almezeini (2020), Matonti (2018), Cho et al., (2020), Abiola and Solomon 2020),

Blair and Stout (2017) among others who believed that machine learning uses statistics for determining patterns in a huge amount of data and making accurate predictions for unknown future events and in the process improve audit quality of an audit firm. It also implied that the use of machine learning to automate audit tasks, analyze the volume of data, identification of exceptions and potential problems or errors, assess risk, and highlight od anomalies among others have improved the audit quality of audit firms in Nigeria.

Intelligent agents also revealed a significant positive relationship with audit quality in Nigeria. This result is similar to the findings in the works of Shaher (2020), Abdul and Eitedal (2020), Eno et al., (2019), and Akinadewo (2021) among others that opined that intelligent agents assist in the classification of detected objects into different categories by determining the category to which an image belongs helps to improve audit quality of audit firms in Nigeria.

Table 5 OLS Regression on Artificial Intelligence and Audit Quality in Nigeria

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ES	0.283319	0.025464	11.12635	0.0000
ML	0.209601	0.069258	3.026383	0.0027
IA	0.100757	0.031220	3.227322	0.0013
C	0.892487	0.140799	6.338740	0.0000
R-squared	0.671972			
Adjusted R-squared	0.668590			
F-statistic	198.7064			
Prob (F-statistic)	0.000000			

Source: Author's Computation (2023)

4.4. Discussion of Findings

The study evaluated artificial intelligence and audit quality in Nigeria using audit firms with the application of AI as a case study. The empirical result indicated that expert systems, machine learning, and intelligent agents contribute in no small measure to improving audit quality in Nigeria. The findings implied that the use of artificial intelligence enables auditors to deliver a valid audit opinion and make a more informed decision that focuses on audit quality improvement.

5. CONCLUSION AND RECOMMENDATIONS

The research showed that using AI to make audit reports better was a good idea. Due to the benefits of AI, intelligent systems will slowly replace humans in decision-making roles over the next few decades. Accounting professionals have been using technology for a long time to improve their work and add more value to what they do for businesses. But this is a chance to rebrand, reengineer, and greatly improve the quality of auditors' reports, businesses, and investment decisions, which is the whole point of the profession.

The elimination of boring, repetitive tasks that can be performed by machines to improve the

efficiency and effectiveness of accounting and auditing processes It was therefore recommended that:

i.   There is a need for training and re-training of accountants and audit personnel on the use of expert system techniques for sound and quality improvement of audit practice.

ii. Audit firms in Nigeria should develop and spend more on machine learning to further improve audit quality in the country.

iii. Also, intelligent agents that assist in the classification of detecting objects into different categories should be increased among audit firms in Nigeria.

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