

## Effect of artificial intelligence on audit practices: empirical evidence from auditors in Southern Nigeria

Kenny Eosa Orumwense<sup>1\*</sup>, Joy Ogbebor<sup>2</sup>

<sup>1,2</sup>Department of Accounting, University of Benin, Benin City, Nigeria

\*Corresponding author: [esosagabriel@gmail.com](mailto:esosagabriel@gmail.com)

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### Abstract

**Purpose:** This study examines the effect of artificial intelligence (AI) on audit practices. This study aims to determine whether AI will affect auditing practices in any way. This investigation was supported by the Task-Technology Fit (TTF) theory.

**Methodology:** Using a structured questionnaire and a research survey design, data was gathered from primary sources. The study's sample size consisted of 316 auditors from audit firms in southern Nigeria. Multiple regression analysis was used to determine the kind and strength of correlations between the study variables.

**Results and conclusion:** Findings show that the p-value of 0.0391 was less than 0.05, the results demonstrated that machine learning (ML) significantly affects auditing practices (AUP). A p-value of less than 0.05 indicates that expert systems (ES) have a substantial impact on auditing practices (AUP), and a p-value of less than 0.05 indicates that natural language processing (NLP) has a significant impact on auditing practices (AUP). The results of the study demonstrated that artificial intelligence (ML, ES, and NLP) significantly and favorably impacted auditing practices.

**Implication of findings:** To improve efficiency, accuracy, and fraud detection skills, audit firms and regulatory agencies should proactively incorporate Artificial Intelligence (AI) techniques into audit practices. To automate regular audit processes, analyze vast amounts of financial data in real time, and more successfully discover abnormalities or dangers than using traditional approaches, technologies like machine learning, expert system, and natural language processing should be implemented.

**Keywords:** Artificial intelligence, Audit quality, Emerging market, Machine learning, Natural language processing, Nigeria.

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### 1. Introduction

The integrity of a financial system is safeguarded by auditors, who are essential in maintaining financial accuracy and transparency. According to Felix et al. (2022) stated despite auditors' enormous economic influence, the auditing industry has encountered a number of difficulties, such as antiquated instruments, inadequate infrastructure, and weak governance, which has, for the most part, impeded financial monitoring over time. By thoroughly reviewing financial records to guarantee compliance with pertinent laws and standards, effective audit methods are crucial for lowering governance risks and enhancing accountability.

In places with inadequate internal controls, auditing is especially important for improving financial discipline and combating fraud. Despite the significance of auditing, the Nigerian auditing process has frequently been characterized by inefficiencies, including manual documentation, a high risk of human error, a limited adoption of audit technologies, inadequate information technology infrastructures, low digital literacy among auditors, and so forth. These inefficiencies are further exacerbated by inadequate integration of audit technology, which frequently has financial implications (Musa, 2024).

With the use of huge data and increased processing power, artificial intelligence (AI) has evolved from symbolic reasoning to machine learning, simulating human cognitive functions including learning and reasoning (Goodfellow, Bengio, & Courville, 2016). The need for businesses to increase accuracy and automate decision-making has sped up AI adoption even more. By boosting predictive analytics,

automating processes, and increasing decision-making accuracy across a range of industries, artificial intelligence (AI) has had a substantial impact on worldwide corporate operations (Manyika et al., 2017). According to a Statista analysis cited by Vanguard News, the Nigerian artificial intelligence market is expected to develop at a high compound annual growth rate (CAGR) and reach about \$4.64 billion by 2030.

According to a recent worldwide survey conducted by Ipsos on behalf of Google, 70% of Nigerians have used generative AI online, this is significantly higher than the global average of 48%. According to the report "Our Life with AI: From Innovation to Application," 87% of Nigerians are excited about the potential of AI and believe that its benefits outweigh its potential. As a result, Nigeria is one of the nation's most enthusiastic about the adoption and potential of AI worldwide (Ibeh, 2025).

Even though AI is being adopted quickly, there are ethical, technological, and legal issues that need to be considered when integrating it into auditing procedures. These issues include algorithmic prejudice, data privacy issues, and role displacement. With an emphasis on technologies like machine learning, expert systems, and natural language processing, this study investigates how AI may improve auditing practices. 316 audit firms in the southern region of Nigeria make up the study's targeted sample, which was chosen using Yamane sampling techniques to guarantee sufficient representation.

Research on the impact of artificial intelligence (AI) on audit practices has shown mixed results. Some studies indicate a strong positive correlation between AI use and improved audit performance, while others find minimal or insignificant effects. For instance, Owonifari et al. (2023) noted that AI tools like data mining and machine learning notably enhanced audit practices among Nigerian auditors. In recent studies, Aly, Elguoshy, and Metwaly (2023) found that machine learning algorithms such as SVM, Naïve Bayes, and K-means have proven effective in detecting intentional misstatements and reducing restatements for UK publicly listed firms. Ensemble models like Random Forest and Bagging demonstrated superior performance in identifying financial fraud among some Turkish organisations. Additionally, machine learning tools have been noted to reduce reporting errors across emerging trending markets and businesses.

Some studies dispute the optimistic views on AI in auditing, it has been shown by Khorsheed, Ismael, and Mahmud (2024), who found no significant relationship between AI usage and improvements in audit efficiency, fraud detection, or compliance. Despite some contributions to the field, empirical studies that concurrently address machine learning, expert system, and natural language processing in AI are limited. Existing studies, like those by Aly et.al, (2023) and others, often lack a cohesive integration of these elements within the context of auditors in Nigeria. This fragmented approach highlights the need for a comprehensive framework to address the influence of AI dimensions in auditing practices, filling a significant gaps in literature.

The broad objective of this study is to examine the effect of AI on audit practices. Specifically, this study sought to:

- i. examine the influence of machine learning (ML) on audit practices;
- ii. evaluate the impact of expert system (ES) on audit practices; and
- iii. assess the effect of natural language processing (NLP) on audit practices.

Hypotheses of this study are stated in null form:

H1: Machine learning (ML) has no significant influence on auditing practices.

H2: Expert system (ES) has no significant impact on auditing practices.

H3: Natural Language Processing (NLP) has no significant effect on auditing practices.

## 2. Literature review

### *Conceptual review*

This section provides a conceptualization of the dependent variable (audit practices), and the independent variables artificial intelligence and its dimensions (machine learning, expert system, and natural language processing), empirical review and theoretical framework.

### *Auditing*

Auditing is a systematic and independent examination of an organization's financial records to ensure its financial statements are accurate and fair (Antipova, 2023). It aims to provide stakeholders with reasonable assurance that financial information is free from significant misstatements caused by fraud or error (International Auditing and Assurance Standards Board, 2020). Auditing process involves not only verification of records but also the evaluation of internal controls, compliance with regulations, and adherence to corporate governance principles. Auditing serves as a social function that improve the credibility of financial report and maintains trust in financial systems among investors, creditors, and the public. The concept of auditing has progressed alongside increases in organizational complexity and technology, maintaining its core definition based on independence, evidence-based judgment, and ethical rigor (Leocádio et al., 2024).

### *Conceptualizing artificial intelligence*

Artificial Intelligence (AI) is a computer science field focused on creating systems that perform tasks requiring human intelligence, including reasoning, learning, and decision-making (Metcalfe, Askay & Rosenberg, 2019; Russell & Norvig, 2021). It includes technologies such as machine learning, natural language processing, computer vision, expert system and robotics, enabling machines to analyze data and predict outcomes with minimal human input (Goodfellow, Bengio, & Courville, 2016). AI's foundations were established in 1956 at the Dartmouth Conference, with key contributions from figures like John McCarthy and Marvin Minsky (McCarthy, 2007).

AI has significantly evolved from rule-based expert systems in the 1980s to deep learning and neural networks in the 21st century, resulting in major advancements in automation (LeCun, Bengio, & Hinton, 2015). It is categorized into three types: Narrow AI, designed for specific tasks; General AI, which mimics human cognitive abilities; and Super intelligent AI, theoretically surpassing human intelligence (Bostrom, 2014). The impact of AI is notable in sectors such as healthcare, finance, education, and manufacturing, where it enhances efficiency, reduces costs, and improves decision-making accuracy (Brynjolfsson & McAfee, 2017). AI is becoming However, though AI presents numerous benefits, it also raises concerns regarding data privacy, algorithmic bias, ethical dilemmas, and the potential displacement of human labour (Jobin, Ienca, & Vayena, 2019; Hasani et al., 2023). These challenges necessitate careful regulatory frameworks and responsible AI governance to ensure that AI advancements align with societal well-being and ethical standards.

In Nigeria, AI adoption is experiencing a rapid upsurge, positioning the country as a key player in Africa's technological evolution. The Nigerian AI market is projected to reach a valuation of \$1.40 billion by 2025, with an anticipated compound annual growth rate (CAGR) of 27.08%, resulting in a market size of \$4.64 billion by 2030 (Statista, as cited in Asalu, 2025). AI has become a revolutionary force in industry, automating procedures, increasing accuracy and efficiency, improving decision-making, cutting costs,

and fostering innovation across a variety of industries, including manufacturing, finance, healthcare, and auditing.

Its importance cannot be over emphasized as it virtually cut across all facet of life, for example, Gbenga and Olabisi (2025) carried out a study on the AI the impact of Artificial Intelligence (AI) adoption on Petroleum Profit Tax (PPT) administration in Nigeria. The study looks into the level of AI deployment, the types of AI technologies now in use, their perceived efficacy, simplicity in usage, associated problems, and their impact on tax compliance and revenue collection. Hauwa et al. (2025) examines the role of Computer assisted auditing techniques (CAATs) have been identified as a necessary and sufficient conditions for an effective and qualitative audit report. This study analyzed the determinants of adoption of computer assisted auditing techniques with focus on auditors practicing in Kano, Nigeria. The study recommends that audit firms should invest in technological tools and train auditors on computer tools.

The study recommends that audit firms should invest in technological tools and train auditors on computer tools. Also, the regulatory bodies should consider computer proficiency as part of the regulatory checks. This adoption and usage of CAATs will help the auditors to produce an effective and qualitative audit report. Adeola (2025) examined the effect of Technology Organization Environment (TOE) framework in business strategy on decision making of small and medium enterprises (SME) in Lagos-Nigeria. Using the TOE framework, the research explored how technological, organizational, and environmental factors influence business strategy.

#### ***Measurement of AI and audit practices***

##### ***Machine Learning (ML) and Audit Practices (AUP)***

Machine Learning (ML), a key subset of artificial intelligence (AI), refers to algorithms that learn from data to make predictions or decisions without explicit programmatic instructions. In auditing, ML enables auditors to analyze large datasets, detect anomalies, predict risk areas, and automate repetitive procedures, thus enhancing efficiency and effectiveness in audit practices. ML techniques such as classification, clustering, and predictive modelling align well with the analytic needs of modern audit practices. Machine Learning (ML) is widely conceptualized within the artificial intelligence literature as the methodological development of algorithms that improve their performance through experience with data, without being explicitly programmed for each task (Sarker, 2021). ML facilitates the transition from retrospective, rules-based analysis to forward-looking probabilistic assessments (Chami, 2024). The construct of ML, therefore, extends beyond technological novelty; it represents a cognitive and procedural reconfiguration of traditional auditing, aligning computational power with professional judgment and regulatory compliance.

##### ***Expert systems (ES) and audit practices (AUP)***

An Expert System (ES) in auditing is a branch of artificial intelligence that emulates the decision-making ability of a human expert. It is a computer-based system that uses a knowledge base of facts, rules, and procedures accumulated by human audit experts, coupled with an inference engine that applies logical reasoning to solve complex audit problems (O'Leary, 2023). An expert system is a computer program that uses knowledge and inference procedures to solve problems that are difficult enough to require significant human expertise for their solution (Russell & Norvig, 2016).

A software development environment called an expert system makes it possible to create expert or knowledge-based systems. Amponsah & Ali (2023) conducted a systematic review of AI technologies (including expert systems and decision support systems) and observed that: "The deployment of Expert

Systems in auditing improved the assessment of risks associated with financial reporting.” Similarly, recent empirical research in the *Warith Scientific Journal* (2024) concluded that: “There is a statistically significant effect of expert systems on audit quality,” indicating a positive impact of AI techniques on external audit outcomes and investor decision processes.

### *Natural language processing (NLP) and audit practices (AUP)*

Natural Language Processing (NLP) is a subfield of artificial intelligence that enables computers to interpret, process, and analyze human language both structured and unstructured text data. Natural Language Processing (NLP) is a multidisciplinary field at the intersection of linguistics, computer science, and artificial intelligence, concerned with enabling machines to understand, interpret, and generate human language (Khan & Khan, 2024).

In audit practices, NLP enhances auditors’ ability to extract meaningful information from narrative documents such as contracts, financial disclosures, emails, and regulatory texts. It supports tasks such as textual analysis, risk interpretation, compliance review, and fraud detection where language comprehension is vital. Conceptually, NLP enhances auditing by integrating narrative and discourse analysis into the audit process, thus complementing numerical analysis with linguistic insight (Faccia, McDonald & George, 2023),

### *Theoretical framework*

Task–Technology Fit (TTF), Theory as a Theoretical Foundation for AI in Audit Practices. The Task–Technology Fit (TTF) theory provides a robust theoretical foundation for examining the effectiveness of Artificial Intelligence (AI) in modern audit practices. Originally developed by Goodhue and Thompson (1995), the theory posits that information technology is more likely to improve individual or organizational performance when the capabilities of the technology align with the tasks users must perform. In other words, performance gains occur when the functionalities of a technology appropriately support the requirements of specific job tasks.

Within the context of auditing, tasks such as risk assessment, transaction testing, fraud detection, audit planning, and continuous monitoring are increasingly complex due to large data volumes, real-time transactions, and sophisticated financial instruments. Traditional audit tools often struggle to process such complexity efficiently. AI technologies such as machine learning, data analytics, natural language processing, expert system and robotic process automation offer advanced capabilities that align closely with these auditing tasks, thereby fulfilling the core premise of the Task–Technology Fit theory.

### **3. Methodology**

This section outlines the research methodology employed in this study. It provides a comprehensive explanation of the research design, targeted population, sample size and sampling techniques, model specification and method of data analysis. This study adopts survey research design; survey research design is a quantitative research approach that involves systematically collecting data from a sample of individuals using structured instruments such as questionnaires or interviews. The source of data for this study’s analysis is primary source; this entails the drafting and distribution of questionnaires to the study’s sample.

The population of this study consists of one thousand five hundred (1500) audit firms licensed by the Institute of Chartered Accountants of Nigeria as on 22nd February, 2023 (Ebimobowei, 2025). The

sample size three hundred and sixteen (316) audit firms from which auditors were carefully selected, using Yamane (1967) for the determination of sample size in a finite population, stated as:

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

Where: n = sample size; N = population size (finite population); e = desired level of significance, (in this case is 5%).

$$n = 1500 / (1 + 1500(0.05)^2) \text{----- (2)}$$

$$n = 1500 / (1 + 3.75) = 316 \text{----- (3)}$$

From the audit firms, auditors were randomly selected, thus making a total of three hundred and sixteen (316) auditors for the study. The reliability of the research instrument was evaluated using the Cronbach's Alpha coefficient, by distributing the instrument to thirty (30) auditors who filled the instrument and returned them. The questionnaires were analyzed using Cronbach's Alpha statistics and yielded coefficients of 0.751(75.1%) for AUP; 0.701(70.1%) for NAL; 0.815(81.5%) for ES; and 0.694 (69.4%) for ML. This showed that the instruments are reliable. Multiple regression analysis was applied to determine the nature and strength of associations between the independent variables (ML, ES, and NLP) and the dependent variable (AUP). The hypotheses were tested at 5% significant level, providing a robust basis for drawing conclusions within the study's empirical framework.

### Model specification

This study's model was adapted from the study of Abdullah and Almaqtari (2024) which focused on AI, big data analytics, cloud computing, and deep learning advancements. The modified model of this study used machine learning, expert system, and natural language processing is stated in its functional form below;

$$AUP = f(AI) \text{----- (4)}$$

$$AUP = f(ML, ES, NLP) \text{----- (5)}$$

$$AUP = \beta_0 + \beta_1ML + \beta_2ES + \beta_3NLP + \epsilon \text{----- (6)}$$

Where;

AUP = Audit Practice, ML = Machine Learning, ES = Experts System, NLP = Natural Language Processing,  $\beta_0$  - Slope  $\beta_1, \beta_2, \beta_3$ - Coefficients  $\epsilon$  - Error term.

## 4. Results and discussion

**Table 1: Regression Output**

Variable	Coefficient	Std. Error	t-Statistic	P-value.
C	0.317077	0.281800	1.125183	0.2689
ML	0.104659	0.038010	2.753451	0.0391
ES	1.565604	0.084960	18.42750	0.0000
NLP	0.834664	0.073729	11.32063	0.0000
R-squared	0.763235	Mean dependent var		3.044167
Adjusted R-squared	0.759788	S.D. dependent var		1.034520
S.E. of regression	0.207451	Akaike info criterion		-0.203405
Sum squared resid	1.377148	Schwarz criterion		-0.027458
Log likelihood	7.661286	F-statistic		279.4639
Durbin-Watson stat	1.776610	Prob(F-statistic)		0.000000

**Source:** Researcher's computation 2025.

### *Discussion of findings*

The result of table 1 revealed that the independent variables (ML, ES and NLP) are good explainers of the dependent variable (AUP) because the independent variables explained 76.3% variation in the dependent variable. This was endorsed by the R-bar square of 75.9%. The result of the f (probability) of 0.0000 revealed that at least one of the independent variables (ML, ES and NLP) have significant influence on the dependent variable. The DW statistic of 1.77 approximately 2 revealed that the result showed absence of serial autocorrelation, meaning that the result is not spurious. A unit increase in Machine Learning (ML) will positively increase Audit Practices (AUP) by 0.105 units and significant. Also, a unit increase in Expert Systems (ES) will increase Audit Practices (AUP) by 1.565 unit and was significant. Lastly, a unit increase in Natural Language Processing (NLP) will increase Audit Practices (AUP) by 0.835 unit and was significant

The result of the study revealed that Artificial Intelligence (ML, ES and NLP) has positive impact on auditing practices (AUP) and all the dimensions; machine learning (ML), experts' systems (ES) and Natural language processing (NLP) have significant on auditing practices (AUP). The finding of this study is in consonance with Owonifari, et al. (2023) who reported a significant positive relationship between AI tools such as machine learning (ML) and data mining and audit practice enhancement among Nigerian auditors, which this study revealed. Furthermore, the finding of this study is in line with Omemgbeoji and Ofor (2024) who examined the influence of Artificial Intelligence specifically machine learning automation and robotic process automation on firm effectiveness in Nigerian manufacturing companies and found that a significant positive relationship between machine learning automation and firm effectiveness. The study underscores the importance of model transparency in effective ML adoption in auditing. However, this study is not in line with Khorsheed et al. (2024) who found no significant effect of machine learning on perceived auditing outcomes such as efficiency, fraud detection, and compliance.

### **5. Conclusion**

The study has shown that AI positively and significantly impacts Nigerian audit practices, boosting quality through machine learning, expert systems, and language processing, thus enabling better risk assessment and efficiency, but adoption is slower in Nigeria firms, highlighting needs for auditor training and investment in technology to overcome challenges like potential bias and job displacement. This is in line with studies that AI improves audit quality and decision-making, requiring continuous learning and ethical vigilance from Nigerian auditors to harness benefits like better data analysis, while addressing risks like lack of transparency and potential job losses.

From the study the following were recommended AI through Machine Learning (ML), Expert System (ES) and Natural Language processing (NLP) should be practiced, adopted and automated in audit procedures to enhance risk assessment, accuracy in financial audit procedures. Natural language processing (NLP) should be adopted/ automated in audit procedures to enable continuous auditing and boost fraud detection. In view of the findings of the study, the following recommendations were made:

- i. The study recommends that the application of artificial intelligence in auditing firms should be encouraged as the effectiveness of audit practices depends on it.
- ii. Also, the use of artificial intelligence should be encouraged as it ensures audit quality in terms of accuracy, reliability and timely financial reporting.

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