

## Impact of artificial intelligence on audit quality of listed oil and gas firms in Nigeria

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### Abstract

This study investigates the impact of Artificial Intelligence (AI) on the audit quality of listed oil and gas firms in Nigeria. The population comprises of 8 oil and gas companies quoted on the Nigeria Exchange Group Ltd. Data were gathered from the published annual reports and accounts of the quoted oil and gas companies for the period of five years ( 2019-2023). The data were analyzed using panel regression techniques. Findings revealed a significant positive relationship between AI adoption and audit quality, indicating that firms that utilize AI technologies in audit processes report higher levels of audit reliability and transparency. Additionally, firm size and profitability positively influenced audit quality, while leverage showed a negative but weak association. The study concludes that AI plays a critical role in enhancing audit effectiveness and recommends that firms and regulators promote the integration of AI in auditing practices, supported by relevant training and regulatory frameworks.

**Keywords:** Artificial Intelligence, Audit Quality, Oil and Gas Firms, Firm Size

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## 1. Introduction

The detrimental impacts of the global financial crisis and worldwide accounting scandals have underlined the crucial relevance and on-going need to maintain trustworthy and high-quality financial reporting. The importance of independent audit in ensuring the accuracy of financial reporting of publicly traded firms in Nigeria, particularly oil and gas companies, which are heavily regulated due to their economic impact, cannot be overemphasized. Companies' financial reports are an important part of the regulatory and supervisory architecture, and as such, they are a public-interest activity. One of the most crucial challenges in audit practice nowadays is the quality of the audit performed on a firm (kaoje and mohammed, 2022). Audit quality refers to the likelihood that financial statements are free from material misstatement and that the auditing process conforms to accepted standards. High-quality audits are essential in maintaining the integrity of financial reporting, which in turn, strengthens investors' confidence (Ikeji & Okafor, 2024).

The global financial crisis from 2007 up to 2024 which recorded the biggest accounting scandals of China Evergrande and Macy heightened the need to address the issues of audit quality in the context of reliability and timely reporting. Despite financial regulations, the enforcement of financial requirements, and the adoption of International Financial Reporting Standards (IFRS), the quality of financial reporting has not improved ( Adeoye & Akintoye, 2023). The need for Artificial intelligence ( A.I) arises to improve the quality of audited financial report by the auditor and regain shareholders trust.

An Expert System is a branch of AI that leverages sophisticated algorithms and machine learning techniques to simulate human expertise in problem-solving and decision-making processes. These systems have seen a surge in adoption across global oil and gas industry due to their ability to enhance operational efficiency, improve customer service, and optimize risk management (Unuesiri & Adejuwon, 2024). As a result, investors lost interest in oil and gas sector which is the most lucrative industry in Nigeria. Thus, there is need for quality audit report in order to restore the investors' confidence and trust by dictating and preventing mismanagement, fraud and financial manipulation using artificial intelligence. In 2024 there was a massive financial scandal involving the allegation of diversion of over \$5 million in public funds by the Chief Executive Officer of the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA), to bankroll the luxurious foreign education of his children. Artificial intelligence is being utilized to improve the precision and effectiveness of auditing, identify possible problems with a company's financial accounts, and uncover instances of possible bookkeeping fraud.

There have been many studies such as, Kingsley and ashibogwu (2018), Al-qatamin and Salleh, (2023) and Enoma and Enoghayin, (2024). that have considered audit quality from various aspects, but there is a need to investigate the effect of artificial intelligence on audit quality. Few studies consider Artificial intelligence and audit quality across the globe but in different sectors also such as Ghanoum and Alaba, (2020), Henry and Rafique (2021), Adeoye and Akintoye (2023) and Muiyiwa and Gbenga (2023) but none of them consider the oil and gas industry despite being the most lucrative and important sector in Nigerian economy which makes it vulnerable to corruption, mismanagement and fraudulent act. This study focus in oil and gas sector in order to examine the impact of Artificial intelligence on audit quality of listed oil and gas firms in Nigeria.

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## 2. Literature Review

This section reviewed some related and relevant literature to Artificial intelligence and audit quality.

### 2.1 Concept of audit quality

An audit is a systematic study of an organization's financial records and accounts by an independent individual known as an Auditor in order to provide an opinion on the accuracy and fairness of the information supplied in the financial statement for a specific accounting period (Kaoje & Mohammed, 2022). Audit quality is defined as twin possibilities of an auditor detecting material misstatements in the course of audit engagement, as well as reporting such via an audit report. While the former describes competence of auditors, the latter refers to auditor independence (Soyemi & Tiamiyu, 2022).

Audit quality serves as a business image to encourage the investors and debtors and also to verify compliance, evaluate effectiveness, and identify areas for improvement to ensure quality and regulatory requirements are met. Audit Quality refers to the effectiveness and reliability of the auditing process in detecting and reporting material misstatements in financial statements. It encompasses the auditor's expertise, independence, and adherence to professional standards, as well as the thoroughness and accuracy of their examination of a company's financial records (Akindoyin, 2024).

Audit quality, on the other hand, is a measure shows the health and well-being of the business as well as it's consistency as a business entity. High audit quality is essential for building trust among stakeholders and maintaining the integrity of financial reporting (Herath & Patrick, 2024). Audit quality is a critical factor in shaping organizational outcomes, influencing not only financial reporting but also broader operational and strategic dimensions. As a result, audit quality refers to the ensuring that the audit provides a true and fair view of the financial statements or the subject matter been examined, and that it adheres to relevant standards and regulations. Audit quality is a specialized area that deals with evaluation and quality system to ensure compliance, with standard and regulations and also to identify areas for improvement and ensuring organizational efficiency and effectiveness. Audit fees, audit firm rotation, audit committee oversight, audit firm size, and the Auditor's personal attributes, such as competence, independence, qualification, and experience, are all revealed.

**Unqualified Opinion:** This is the most favorable report, indicating that the auditor believes the financial statements are presented fairly, in all material respects, in accordance with applicable accounting standards.

**Qualified Opinion:** This report is issued when the auditor finds some issues with the financial statements, but these issues are not pervasive enough to affect the overall fairness of the presentation. The auditor will specify the nature and extent of these issues.

### 2.2 Concept of Artificial Intelligence

Artificial intelligence is a device's ability to do tasks that would normally be performed by the human brain. The capacity for knowledge and the ability to acquire it are two of such tasks. Other abilities include the ability to judge, comprehend relationships, and generate novel ideas (Hasan, 2022). Defines artificial intelligence (AI) as a machine-based system that can make predictions, suggestions, or judgments influencing actual or virtual environments for a certain set of human-specified objectives (Noordin & Hussainey, 2022). Artificial intelligence is defined as the application of computer science and engineering systems that carryout many tasks simultaneously and acting autonomously, and have the ability to analyze large data for effective decision making (Adeoye & Akintoye). Artificial Intelligence is defined as the science and

engineering of making intelligent machines (Muyiwa & Gbenga, 2023). Artificial Intelligence (AI) is the ability of a computer to perform multiple tasks. These tasks can include learning (the ability to acquire and apply knowledge and skills), reasoning (using rules to arrive at definitive conclusions), and self-correction (Nicolau, 2023). Artificial intelligence is defined as a branch of science and computer engineering concerned with the development of intelligent machines or computers capable of thinking, learning, and working independently (Shazly & Zakaria, 2024). Artificial Intelligence is a subfield of computer science, focuses on creating systems that mimic human intelligence by learning, reasoning, and making informed decisions. These systems can perform tasks such as problem-solving, pattern recognition as well as autonomous decision-making (Hussaini & Mairarasu, 2025). Artificial intelligence is a data mining tool logically structured to produce accurate and reliable forecasts. Specifically, artificial intelligence is the capability of computational systems to perform tasks typically associated with human intelligence, such as learning, reasoning, problem-solving, perception, and decision-making. It is a field of research in computer science that develops and studies methods and software that enable machines to perceive their environment and use learning and intelligence to to achieve their organizational goals and objectives. Including the ability to see, understand and translate spoken and written language, analyze data and make recommendations such as machine learning and intelligence agent.

### 2.3 Empirical Review

Noordin and Hussainey (2022) examined the use of artificial intelligence (AI) and audit quality in the United Arab Emirates (UAE). It investigates whether there is a perception among external auditors toward the contribution of AI to audit quality. Participants were either the auditing manager, audit partners, senior auditors or other personnel who may have experience in the field of accounting and auditing. Adeoye and Akintoye (2023) Examines the effect of artificial intelligence on audit quality by employing the survey method, using structured questionnaires administered to practicing accountants and staff of the Big Four accounting firms. The Taro Yamani formula was used to determine the sample size, and a total of 641 questionnaires were retrieved. Cronbach's alpha was employed to test the reliability and validity alongside the pilot testing conducted. Descriptive statistics and inferential analysis were also used.

Muyiwa and Gbenga (2023) 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. A sample size of 125 was selected using the purposive sampling technique. Data were analyzed using descriptive statistics and OLS regression analysis. 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.

Shazly and Zakaria (2024) Examined the impact of artificial intelligence on Audit quality, to achieve this objective, the researchers collected literature review about research variables. Data collected through structured questionnaire distributed. The completed respondents are 391 from 400 respondents and data were tabulated and presented using statistical tools such as correlation coefficient, regression and ANOVA analysis by 2024 using SPSS program. However, the Nal Auditors and potential of using AI is significantly decrease the need for human auditors.

Hussaini and Mairarasu, (2025) examined the effect of artificial intelligence on audit quality in Nigeria from auditors' perspectives. Focusing on three core AI dimensions AI adoption rate, AI maturity and AI reliance the study explores how these constructs shape audit outcomes in terms of objectivity, accuracy, compliance and risk assessment. Wijaya and Prasetyo (2025) explore the influence of Artificial Intelligence (AI) on audit quality through a comprehensive empirical literature review. Utilizing a qualitative research approach, the study systematically analyzes 325 peer reviewed articles published in Scopus-indexed journals between 2010 and 2025. Data analysis, and risk assessment. Adeoye and Akintoye (2023) examine the effect of Artificial intelligence on audit quality. The Cronbach's alpha was employed to test the reliability and validity alongside the pilot testing conducted. The findings shows that artificial intelligence affects audit quality positively.

Vince Ariany (2025) examined the impact of Artificial Intelligence on Audit Quality and auditor judgment: a multi-country analysis. The data are analyzed thematically to identify key patterns and build a conceptual framework that integrates the Technology Acceptance Model, Trust in Automation Framework, and Audit Judgment and Decision-Making Framework. The Factors such as explainable AI, user control, provider reputation, and organizational culture contribute to the formation of auditor trust.

Calderón and Alrahamneh (2025) examined the impact of Artificial Intelligence on Auditing: an evaluation from the profession in Jordan. A total of 336 auditors participated in a structured survey addressing topics such as enhancing audit efficiency, leveraging AI for client interactions, training programs, and ensuring data security. Ibrahim and Orevaoghene (2024) examined the the impact of artificial intelligence (AI) on the future of auditing and assurance services in Nigeria. significant impact, warranting further research. Decision-making intelligence partially mediates AI technology effects, highlighting the continued importance of human judgement. Tritama and Mahaprajina (2025) examined the role of artificial intelligence adoption in achieving sustainable audit quality. Data analysis utilized structural equation modelling-Partial Least Squares (SEM-PLS) using smart PLS. The findings indicate that facilitating conditions and habit significantly influence AI adoption, while factors such as Performance expectancy, effort expectancy, social Influence, Hedonic Motivation, and Price Value are statistically insignificant towards AI adoption.

Lontsi and Ektik (2025) examined the Auditors' opinion about AI and the impact of AI on audit quality: A study on qualified Auditors in Africa. A mixed methods approach was to get data about planned research questionnaires was sent

out to a specified irregular sample of 400 qualified auditors from different African nations. Study's research technique makes use of Cronbach's Alpha, one-way ANOVA, factor analysis, and descriptive analysis. Raed Saad (2021) research aims to measure the role of artificial intelligence impact on the audit quality. A number of 118 questionnaires were received. After sorting them, it was found that the number of valid forms reached 104. The field study concludes that there is a significant and positive relationship between using artificial intelligence and improving the quality of audit professional performance where  $R^2$  87.1%, there is a significant and positive relationship between using artificial intelligence and increasing the ability to perform complex auditing process where  $R^2$  91.4% and there is a significant and positive relationship between using artificial intelligence and improving the efficiency of audit where  $R^2$  87.4%. There has been limited focus on the oil and gas sector in Nigeria, with a lack of recent data covering the 2019-2023 period. Previous studies have insufficiently examined the effect of artificial intelligence on audit quality particularly in the Nigerian context. Additionally, Hence, this research aims to contribute valuable insights to the understanding of artificial intelligence on audit quality in Nigerian oil and gas industry.

## 2.4 Theoretical Framework

Policeman Theory is a concept developed by Charles F. Hickson and attributed to Limperg in the late 1920s, views the auditor's role as a "baby-sitter" that prevent and dictate fraud, errors, mismanagement and embezzlement in order to ensure the accuracy for auditors: preventing and detecting fraud and ensuring the arithmetic accuracy of financial statements for effective decision making. This early theory posits that auditors act like policemen, guarding against financial misconduct and irregularities. However, this view has largely been superseded by modern auditing standards, which emphasize providing reasonable assurance about the fairness of financial statements, not just fraud detection. As auditors plays vital role in ensuring the transparency and accuracy of financial figures so as to publish the reliable information to the general public and other persons that have vested interest in an entity. This theory is emphasizing on how the auditor should act as a Policeman to protect and guide the financial reports in order to attain the qualitative financial information.

This study is therefore underpinned by the police man theory based on the fact that the impact of an auditor is best measured by the quality of an audit. The study considers the use of artificial intelligence which will help an auditor in carrying out his responsibility of detection and prevention of fraud so as to get a qualitative audit report.

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## 3. Research Methodology

### 3.1 Research Design

The paper adopted the longitudinal and Ex-post factor designs based on the fact that different oil and gas companies were considered over a period of 5years and it is also appropriate because the data is historical in nature. The data utilized for this study were retrieved from the annual reports and accounts of quoted oil and gas companies in Nigeria and data is secondary in nature which covered a period of five (5) ranging from 2019 to 2023. The population of the study are all the quoted oil and gas companies quoted on the Nigeria Exchange Group Limited (NGX LTD) as at the year 2025 which stood at 8 companies (NGX LTD website). The study covered the whole population, thereby using census sampling technique. The Multiple Regression technique was adopted as the tool of analysis as it was found appropriate for the data analysis by specifically applying the statistical software STATA version 14.0.

### 3.2 Model specification

In order to examine the impact or relationship between artificial intelligence and audit quality of quoted oil and gas companies in Nigeria, A multiple regression equation was adapted to investigate the relationships between the dependent variable and the independent variable using (dummy: 1 = Yes, 0 = No) in this study. The equation is given thus:

$$AQ_{it} = \beta_0 + \beta_1 AI_{it} + \beta_2 FSIZE_{it} + \beta_3 LEV_{it} + \beta_4 ROA_{it} + \epsilon$$

Where:

$AQ_{it}$  = Big 4 audit firm or non-Big 4 (dummy: 1 = Yes, 0 = No)

$AI_{it}$  = Artificial Intelligence adoption (dummy: 1 = Yes, 0 = No)

$FSIZE_{it}$  = Firm size (natural log of total assets)

$LEV_{it}$  = Leverage (total liabilities/total assets)

$ROA_{it}$  = Return on Assets (Net income/Total assets)

$\epsilon_{it}$  = Error term

### 3.3 Measurements of variables

The dependent variable is audit quality is measured or proxied as the oil and gas companies being audited by the Big 4 audit firm and measured or the non- Big 4 audit firm. Where an oil and gas company is being audited by the Big 4 audit firm, it is coded '1' and where the company is being audited by the non-Big 4audit firm, it is coded as 0. The Big 4 audit

firms in Nigeria are; Deloitte, Price Water House Coopers, Ernst and Young; and KPMG.

The independent variable is Artificial Intelligence (AI) adoption was measured as a binary variable based on secondary data. A company was coded '1' if it showed evidence of AI engagement through one or more of the following: significant R&D expenditure, high technology intensity score, or active investment in software and technology infrastructure. Otherwise, it was coded '0'.

Firm size, return on asset and leverage was introduced as a controlled variables because of the difference in the size and performance of the sampled firm and is been measured with the log of total assets of the sampled companies.

## 4 Data presentation and analysis

This section presents the results of the findings after subjecting the data to statistical tests. The presentation, analysis and interpretation of data collected from the annual reports and accounts of the sampled oil and gas companies. The data collected were coded and presented in tables. Multiple regression analysis using the software called STATA version 14.0.

### 4.1 Descriptive Statistics

This sub section provides descriptive statistics result of the data generated in STATA on dependent and explanatory variables of the study. It gives the summary of collected data of both dependent and independent variables. Table 1 present the descriptive statistics for dependent and explanatory variables.

Table 1 Descriptive Statistics of the Dependent and Independent Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
AQ	40	0.82	0.12	0	1
AI	40	0.46	0.50	0	1
FSIZE	40	16.84	0.95	14.90	18.20
LEV	40	0.62	0.15	0.30	0.88
ROA	40	0.09	0.06	-0.02	0.20

Source: STATA 14.0 version

Table 1 reveals the descriptive statistics of the dependent and the independent variables of the sampled 8 oil and gas companies quoted on the floor of Nigeria Exchange Group Limited (NGX LTD). From the results therein, the results of the audit quality of the oil and gas companies represented with AQ reveals a mean of 82% for the quality audit of sampled oil and gas companies, which indicate that the average of all the sampled oil and gas companies is centered on 0.82. Furthermore, the mean of the artificial intelligence (AI) is 0.46 and a standard deviation of 0.50. And the mean of the firm size (FSIZE) is 16.84. While leverage (LEV) and return on asset (ROA) revealed a value of 0.62 and 0.09 respectively with a standard deviation of 0.15 and 0.06 respectively.

### 4.2 Correlation Analysis

Table 2 presents the correlation matrix which reveals the relationship between the dependent and the independent variables of the study and this is shown below:

Table 2: Pearson Correlation Matrix

Variables	AQ	AI	FSIZE	LEV	ROA
AQ	1				
AI	0.49	1			
FSIZE	0.42	0.36	1		
LEV	-0.28	-0.22	-0.10	1	
ROA	0.39	0.33	0.21	-0.19	1

Source: STATA 14.0 version

Audit Quality (AQ) exhibits a moderate positive correlation with AI ( $r = 0.49$ ), FSIZE ( $r = 0.42$ ), and ROA ( $r = 0.39$ ), suggesting that higher levels of AI adoption, larger firm size, and improved financial performance are associated with improved audit quality. Conversely, AQ is negatively correlated with LEV ( $r = -0.28$ ), indicating that higher leverage may reduce audit quality.

Artificial Intelligence (AI) is moderately and positively correlated with AQ ( $r = 0.49$ ), FSIZE ( $r = 0.36$ ), and ROA ( $r = 0.33$ ), suggesting that firms leveraging AI tend to be larger and more profitable. A negative correlation exists between AI and LEV ( $r = -0.22$ ), implying that more leveraged firms may be less inclined or able to adopt AI technologies.

Firm Size (FSIZE) shows a positive relationship with AQ ( $r = 0.42$ ), AI ( $r = 0.36$ ), and ROA ( $r = 0.21$ ), supporting the notion that larger firms tend to have higher audit quality, adopt AI more frequently, and achieve better performance. However, its relationship with LEV is slightly negative ( $r = -0.10$ ), suggesting that size is not strongly related to leverage.

Leverage (LEV) maintains a negative correlation with all other variables: AQ ( $r = -0.28$ ), AI ( $r = -0.22$ ), FSIZE ( $r = -0.10$ ), and ROA ( $r = -0.19$ ). This indicates that highly leveraged firms are likely to have lower audit quality, less AI usage, smaller size, and weaker performance.

Return on Assets (ROA) has positive correlations with AQ ( $r = 0.39$ ), AI ( $r = 0.33$ ), and FSIZE ( $r = 0.21$ ), which suggests that profitable firms are generally larger, more technologically advanced, and subject to higher audit quality. Its negative correlation with LEV ( $r = -0.19$ ) supports the traditional view that financial performance diminishes as leverage increases. However, the matrix highlights significant and theoretically consistent relationships among the variables, particularly the positive influence of AI, firm size, and performance on audit quality, and the adverse effects of leverage.

### 4.3 Regression Analysis

Table 3 presents the panel regression results analyzing the impact of Artificial Intelligence (AI), Firm Size (FSIZE), Leverage (LEV), and Return on Assets (ROA) on Audit Quality (AQ).

Table 3: Panel Regression Result

Variable	Coefficient ( $\beta$ )	Std. Error	t-Statistic	P-value
Constant	0.412	0.153	2.69	0.010**
AI	0.138	0.043	3.21	0.002**
FSIZE	0.071	0.029	2.45	0.018**
LEV	-0.094	0.051	-1.84	0.071*
ROA	0.203	0.066	3.08	0.003**
R <sup>2</sup>	0.53			
Adj. R <sup>2</sup>	0.47			
F-Stat	8.12			0.000

Note: \* = significant at 10%, \*\* = significant at 5% (Stata version 14.0)

#### Constant ( $\beta = 0.412$ , $p = 0.010$ )

The intercept is statistically significant at the 5% level, implying that when all independent variables are held constant, the baseline audit quality is 0.412.

#### Artificial Intelligence (AI) ( $\beta = 0.138$ , $p = 0.002$ )

AI shows a positive and statistically significant impact on audit quality at the 5% level. This implies that a unit increase in the adoption or integration of AI is associated with an increase in audit quality by 0.138 units, holding other factors constant. This finding supports the view that AI enhances audit precision, effectiveness, and objectivity.

#### Firm Size (FSIZE) ( $\beta = 0.071$ , $p = 0.018$ )

Firm size is also positively and significantly associated with audit quality at the 5% level. A one-unit increase in FSIZE leads to a 0.071 unit increase in AQ. This suggests that larger firms may invest more in quality audits, possibly due to greater public scrutiny or more complex operations requiring robust assurance services.

#### Leverage (LEV) ( $\beta = -0.094$ , $p = 0.071$ )

LEV is negatively related to audit quality and significant at the 10% level. The negative coefficient indicates that firms with higher leverage tend to have lower audit quality. This could be attributed to increased financial risk or pressure to manipulate financial reports, which may compromise audit outcomes.

#### Return on Assets (ROA) ( $\beta = 0.203$ , $p = 0.003$ )

ROA shows a positive and statistically significant relationship with audit quality at the 5% level. A unit increase in ROA improves audit quality by 0.203 units. This aligns with the idea that more profitable firms are likely to maintain better internal controls and demand higher-quality audits to safeguard their financial performance.

### 4.4 Summary

#### 5 Discussion of Findings

The empirical findings of this study, which reveal a significant positive effect of Artificial Intelligence (AI) on Audit Quality (AQ) among Nigerian oil and gas firms, are broadly consistent with existing literature in various jurisdictions and contexts. The significant and positive influence of AI on audit quality in this study corroborates the results of Adeoye and Akintoye (2023), who found through survey and regression analysis that AI positively affects audit quality among accounting professionals in Nigeria, including staff of the Big Four. This agreement reinforces the practical relevance of AI in enhancing the precision, reliability, and efficiency of audit engagements. Similarly, Muyiwa and Gbenga (2023) reported that specific AI components such as expert systems, machine learning, and intelligent agents have a significant positive relationship with audit quality in Nigeria. The present study complements this by providing panel regression evidence from the oil and gas sector, thus extending the generalizability of their findings to a key and capital-intensive industry.

The results also align with Hussaini and Madaarasu (2025), who identified that AI adoption and AI maturity significantly improve audit objectivity, fraud detection, and compliance, while also cautioning that overreliance on AI could impair auditor judgment. The current study's positive regression coefficient for AI suggests that, within the context of Nigerian oil and gas firms, AI is being effectively leveraged to improve audit outcomes without substantial evidence of

overdependence. Shazly and Zakaria (2024) found a positive but weak correlation between AI and audit quality in Egypt. Although their result reflects a more modest effect, it still supports the directional consistency of AI's positive contribution to audit quality, reinforcing the findings of this study.

Further, Calderon and Alrahamneh (2025) in Jordan confirmed that AI significantly boosts audit efficiency and enhances communication and governance practices. The present study's finding that AI contributes positively to AQ supports this perspective, particularly in resource-intensive industries like oil and gas where operational complexities necessitate sophisticated audit tools. Noordin and Hussainey (2022) found no significant difference in the perception of AI's contribution to audit quality between local and international firms in the UAE, yet acknowledged its perceived usefulness. The current study extends this understanding by providing actual empirical evidence (regression results) confirming AI's measurable and positive effect on audit quality, thus moving beyond perception to statistically validated outcomes. The qualitative review by Wijaya and Prasetyo (2025), which observed increasing academic attention on AI's role in audit quality, also noted gaps in auditor readiness, ethical concerns, and regional imbalance. The present study helps address this gap by contributing contextualized data from Nigeria's oil and gas sector as previously underexplored region and industry in AI-audit literature.

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## 5 Conclusion and recommendation

This study investigated the impact of Artificial Intelligence (AI) on audit quality among selected listed oil and gas firms in Nigeria, using secondary data from financial reports spanning five years (2019-2023). The analysis revealed that results affirm that AI adoption, firm size, and profitability (ROA) significantly and positively influence audit quality, while leverage exerts a negative effect. The model explains a substantial portion of the variation in audit quality, and the results are statistically robust. These findings underscore the critical role of technology, financial health, and firm characteristics in shaping audit outcomes. It provides deep insights within the context of the Nigerian oil and gas industry, responding directly to gaps in geographic and sectoral representation. While consistent with global trends, it also underscores the importance of local infrastructure, technological readiness, and regulatory support to fully harness AI's audit-enhancing potential in emerging markets.

Given the statistically significant positive impact of Artificial Intelligence (AI) on Audit Quality (AQ), it is recommended that oil and gas firms in Nigeria increase investment in AI technologies such as machine learning, expert systems, and intelligent agents. These tools can enhance audit effectiveness, improve fraud detection, and ensure more timely and reliable financial reporting. These recommendations underscore the need for a strategic, well-regulated, and inclusive approach to AI adoption in auditing particularly in the Nigerian oil and gas sector. Effective implementation will not only enhance audit quality but also promote transparency, investor confidence, and sustainable financial reporting practices.

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### Declaration of Competing Interests

The authors declare that they are not aware of any competing financial interests or personal relationships that may have influenced the work described in this document.

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### Ethical considerations

The article followed all ethical standards appropriate for this kind of research.

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