



Effect of technology and auditor rotation on audit quality of listed Commercial Banks in Nigeria

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Abstract

The study examined the effect of audit technology and auditor rotation on audit firm size among listed companies in Nigeria over the period 2010–2024. An ex post facto research design was adopted, and secondary data were obtained from the annual reports and corporate disclosures of selected listed companies. A total of 180 firm-year observations were analyzed using descriptive statistics, correlation analysis, and binary logistic regression techniques. The descriptive results indicated a high level of technology adoption among the sampled firms, while auditor rotation occurred relatively infrequently. Correlation analysis revealed positive associations among the technology-related variables and no evidence of severe multicollinearity. The regression results showed that Computer-Assisted Audit Techniques (CAATs) exerted a significant negative effect on audit firm size, while Technology Integration (TI) had a significant positive effect. However, Specialized Audit Software (SAS) and Auditor Rotation (AR) exhibited positive but statistically insignificant effects. The study concluded that technology integration significantly influences audit firm size and competitiveness. Therefore, audit firms should strengthen investment in advanced audit technologies and continuous professional training to improve audit effectiveness and sustain competitive advantage in the evolving auditing environment.

Keywords: Audit Technology, Computer-Assisted Audit Techniques, Specialized Audit Software, Technology Integration, Auditor Rotation, Audit Quality.

Introduction

The auditing profession has faced significant scrutiny following high-profile global corporate financial scandals despite unqualified audit opinions. The collapse of companies like Enron (2002), Lehman Brothers (2008), and WorldCom (2002) highlighted the critical weaknesses in audit quality mechanisms and affected investor confidence. These events have prompted regulatory bodies worldwide to develop comprehensive policies like the Sarbanes-Oxley Act in the United States, aimed at improving audit quality through technological innovation and structural changes such as mandatory auditor rotation. Nigeria, one of Africa's largest economies, has experienced substantial transformation in its auditing landscape driven by regulatory reforms. The country adopted International Standards on Auditing (ISA), through the Financial Reporting Council (FRC) of Nigeria, introduced mandatory auditor rotation, and encouraged technological adoption in audit practices (Okaro, et al. 2018). The Nigerian



banking sector, serving as the backbone of financial intermediation and economic development, requires robust oversight mechanisms to ensure transparency, accountability, and stakeholder confidence.

Technology has transformed traditional auditing approaches through Computer-Assisted Audit Techniques (CAATs), specialized audit software, and various levels of integration in audit processes. These technological tools enable auditors to analyze larger volumes of data, identify anomalies efficiently, and provide comprehensive audit coverage (Enofe et al. 2017). Simultaneously, auditor rotation serves as a corporate governance mechanism aimed at enhancing auditor independence and objectivity by preventing potential compromise of independence through prolonged auditor-client relationships. Following several global financial scandals and bank failures despite unqualified audit opinions, audit quality in Nigeria's banking sector has become a subject of concern (Odia & Ogiedu, 2019). The Central Bank of Nigeria's interventions in distressed banks and subsequent regulatory reforms highlight the critical need for improving audit quality to safeguard financial system integrity (Okaro, et al 2018).

Despite various initiatives including CBN's comprehensive reforms, FRC's mandatory auditor rotation policies, and IFRS adoption, the interrelationship between technology adoption and auditor rotation practices presents a complex dynamic that has received limited attention in existing literature. This study addresses these gaps by examining how technology adoption and auditor rotation collectively impact audit quality in listed Nigerian commercial banks. This study aims to answer the following questions: What is the impact of computer-assisted audit techniques (CAATs) on audit quality of listed commercial banks in Nigeria? To what extent does specialized audit software utilization influence audit quality of listed commercial banks in Nigeria? How does the level of technology integration impact audit quality of listed commercial banks in Nigeria? What is the effect of auditor rotation on audit quality of listed commercial banks in Nigeria and Is there any interaction effect between technology adoption and auditor rotation on audit quality of listed commercial banks in Nigeria?

The study specifically aims to: determine the relationship between Computer-Assisted Audit Techniques (CAATs) adoption and audit quality; assess the influence of specialized audit software utilization on audit quality; evaluate the impact of level of technology integration on audit quality; examine the effect of auditor rotation on audit quality and investigate the



interaction effect between technology adoption and auditor rotation on audit quality. Based on the research objectives, the following alternative hypotheses were stated: H₁: There is a significant relationship between Computer-Assisted Audit Techniques (CAATs) and audit quality; H₂: Specialized audit software utilization has significant influence on audit quality; H₃: The level of technology integration has a significant impact on audit quality; H₄: Auditor rotation has a significant effect on audit quality and H₅: There is a significant interaction effect between technology adoption and auditor rotation on audit quality

This study focuses on all commercial banks listed on the Nigerian Exchange Group (NGX) as of December 2024, spanning fifteen years from 2010-2024. This period captures effects following IFRS implementation and recent regulatory changes regarding auditor rotation. The technological aspect is limited to Computer-Assisted Audit Techniques (CAATs), Specialized audit software, and Level of technology integration. Audit quality is measured using audit firm size as a proxy, consistent with established literature (DeFond & Zhang, 2014).

Literature Review

Concept of Audit Quality

Audit quality represents the market-assessed joint probability that an auditor discovers anomalies in the client's accounting system and reports these anomalies (DeAngelo, 1981). In Nigerian banks, audit quality is particularly critical given their role in financial intermediation and associated systemic risks. The CBN and FRC have established frameworks defining quality benchmarks including mandatory auditor rotation and increased technological requirements.

Concept of Technology

Technology in Auditing has transformed traditional audit methodologies from manual sample-based procedures to comprehensive, data-driven approaches. This revolution encompasses Computer-Assisted Audit Techniques (CAATs), specialized audit software, and varying levels of technology integration. CAATs refer to automated tools and approaches for performing audit procedures, including generalized audit software, test data, and parallel simulation (Appah & Emeh, 2016). Specialized audit software comprises purpose-built applications designed for specific audit functions, offering capabilities beyond general CAATs. Level of technology



integration represents the extent to which technological tools are embedded in audit processes, ranging from basic applications to advanced artificial intelligence systems (Emeka-Nwokeji & Osioma, 2019).

Concept of Auditor Rotation

Auditor Rotation involves systematic change of external auditors or audit partners after specified periods to enhance auditor independence and audit quality. In Nigeria, the regulatory framework requires audit partner rotation every ten years and restricts continuous audit firm engagement to a maximum of seven years (CAMA, 2020).

Empirical Review

Enofe et al. (2017) investigated the influence of Computer-Assisted Audit Techniques (CAATs) on audit quality among selected audit firms in Nigeria. The study adopted a survey research design and collected primary data through structured questionnaires administered to practicing auditors. Descriptive statistics and regression analysis were employed to analyze the data. The findings revealed that CAATs significantly enhanced audit efficiency by reducing audit completion time and improving the processing of large volumes of financial data. However, the effect of CAATs on audit quality, measured through discretionary accruals and earnings management indicators, was not statistically significant. The authors attributed this outcome to inadequate technological infrastructure, insufficient auditor training, and poor integration of CAATs into audit procedures. The study contributes to the understanding of audit technology adoption in emerging economies. Nevertheless, its reliance on perceptual data from auditors may have introduced response bias. Furthermore, the study focused primarily on efficiency indicators rather than broader dimensions of audit quality. The findings may therefore not be fully generalizable across sectors with varying levels of technological sophistication.

Emeka-Nwokeji and Osioma (2019) examined the relationship between the use of specialized audit software and audit quality in Nigerian audit firms. The study employed a cross-sectional survey design involving auditors from both local and international audit firms operating in Nigeria. Data were collected through questionnaires and analyzed using correlation and multiple regression techniques. The results indicated a significant positive relationship between the adoption of specialized audit software and audit quality. The positive effect was particularly



pronounced in audits conducted within the banking sector, where complex transactions necessitated advanced analytical tools. The study concluded that technology-driven audit procedures enhance auditors' ability to detect material misstatements and improve reporting accuracy. The authors recommended increased investment in audit technologies and continuous professional training. Despite its valuable contributions, the study was limited by its concentration on audit firms rather than audited companies. In addition, the cross-sectional nature of the study restricted the ability to establish causality between technology adoption and audit quality. Future studies may adopt longitudinal designs to capture changes over time.

Mohammed and Saidu (2021) investigated the extent to which technology integration influences audit quality in Nigerian organizations. The study utilized a mixed-method approach combining survey data and interviews with auditors and audit managers. Quantitative data were analyzed using regression techniques, while qualitative responses were subjected to thematic analysis. The findings revealed a non-linear relationship between technology integration and audit quality. Specifically, moderate levels of technological integration were associated with the highest audit quality outcomes, whereas excessive dependence on technology reduced professional skepticism and increased overreliance risks. The study highlighted the importance of balancing technological tools with auditor judgment and expertise. The authors argued that technology should complement rather than replace critical audit procedures. A major strength of the study lies in its mixed-method approach, which provided deeper insights into auditor experiences. However, the sample size was relatively small, potentially affecting the robustness of the findings. Additionally, the study did not adequately account for differences in technological capabilities across audit firms, which may have influenced the observed outcomes.

Okolie (2020) examined the effect of audit firm tenure and auditor rotation on audit quality among listed companies in Nigeria. The study adopted an ex post facto research design and utilized secondary data obtained from annual reports of selected firms. Panel regression analysis was employed to test the relationship between audit tenure and audit quality indicators. The findings showed that extended audit firm tenure was associated with a decline in audit quality, suggesting that prolonged auditor-client relationships may impair auditor independence and objectivity. The study supported regulatory requirements for periodic auditor rotation as a mechanism for strengthening professional skepticism and improving audit



outcomes. The findings align with agency theory, which emphasizes the need for independent monitoring of management activities. Despite its relevance, the study measured audit quality primarily through discretionary accruals, which may not fully capture the multidimensional nature of audit quality. Furthermore, the study did not differentiate between audit partner rotation and audit firm rotation. This limitation may affect the applicability of its conclusions to specific regulatory contexts. Future research should consider alternative measures of audit quality and explore sector-specific effects.

Theoretical Framework

This study is grounded in four theoretical frameworks:

Agency Theory: Agency Theory was propounded by Jensen and Meckling in 1976. The theory explains the contractual relationship between principals (shareholders) and agents (management), where managers may pursue personal interests that conflict with shareholders' wealth maximization objectives. This divergence creates agency problems and information asymmetry, necessitating monitoring mechanisms such as external auditing to ensure accountability and transparency. The theory posits that high-quality audits reduce agency costs by enhancing the credibility of financial statements and constraining opportunistic managerial behavior. Auditor independence, professional competence, and objectivity are therefore critical attributes that strengthen the monitoring function of external audits. The relevance of the theory to this study lies in its explanation of how audit quality mechanisms help mitigate fraudulent reporting and managerial opportunism within organizations. Technological innovations in auditing further enhance auditors' ability to perform their monitoring responsibilities effectively through improved data analytics and fraud detection capabilities. Recent studies such as Mohammed and Saidu (2021), Ilugbo, et al. (2024), and Apochi and Mustapha (2022) have adopted Agency Theory to explain the relationship between audit quality, technological advancement, and financial reporting outcomes. The theory therefore provides a suitable foundation for understanding how technology adoption and auditor characteristics influence audit quality.

Technology Acceptance Model: The Technology Acceptance Model (TAM) was developed by Fred Davis in 1989. The model explains the determinants of technology adoption and usage behavior among individuals and organizations. According to the model, perceived usefulness



and perceived ease of use are the two primary factors influencing users' willingness to adopt and utilize technological innovations. In the auditing profession, auditors are more likely to embrace audit technologies when they perceive such technologies as enhancing audit efficiency, effectiveness, and overall performance. The model suggests that positive perceptions regarding audit software, data analytics tools, and artificial intelligence applications increase the likelihood of their successful implementation. The relevance of TAM to this study stems from its ability to explain auditors' acceptance and utilization of technology in audit processes. Where auditors perceive technological tools as beneficial and user-friendly, audit quality is expected to improve through enhanced evidence gathering, risk assessment, and fraud detection. Conversely, low acceptance levels may hinder the realization of technological benefits. Recent studies including Emeka-Nwokeji and Osisioma (2019), Mohammed and Saidu (2021), and Azizah and Pujiono (2021) employed TAM to explain technology adoption in auditing and accounting environments. Consequently, the theory provides a useful framework for understanding the relationship between technological innovation and audit quality.

Resource-Based View: The Resource-Based View (RBV) was propounded by Jay B. Barney in 1991. The theory argues that an organization's sustained competitive advantage depends on its possession and effective utilization of valuable, rare, inimitable, and non-substitutable resources. These resources may include technological infrastructure, human capital, organizational knowledge, and professional expertise. Within the auditing profession, advanced technological capabilities, highly skilled auditors, and strong organizational reputation constitute strategic resources that enhance audit quality and firm performance. The theory emphasizes that firms with superior resources are better positioned to deliver efficient and effective audit services than competitors lacking such capabilities. The relevance of RBV to this study lies in its explanation of how technological resources contribute to improved audit quality through better risk assessment, fraud detection, and audit efficiency. Audit firms that invest substantially in innovative technologies and professional development are more likely to produce reliable audit outcomes. Omonuk and Oni (2015) highlighted the importance of technological capabilities as strategic resources in enhancing audit effectiveness. Recent studies such as Enofe et al. (2017), Emeka-Nwokeji and Osisioma (2019), and Ilugbo et al. (2024) also support the argument that technological resources significantly influence audit



quality. Therefore, RBV provides a strong theoretical basis for examining technology-driven improvements in auditing practices.

Information Theory: Information Theory was originally developed by Claude E. Shannon in 1948 and was subsequently extended to accounting and auditing contexts by several accounting scholars. The theory emphasizes the value of information in reducing uncertainty and supporting rational decision-making by users. It posits that the quality, accuracy, reliability, and timeliness of information determine its usefulness to stakeholders. In auditing, the theory suggests that high-quality audit processes enhance the credibility of financial information, thereby improving investors' confidence and facilitating efficient economic decisions. Audited financial statements serve as information signals that reduce information asymmetry between management and stakeholders. The relevance of Information Theory to this study lies in its explanation of how technological innovations can improve the accuracy, reliability, and timeliness of audit information. Advanced audit technologies enable auditors to process large volumes of data more efficiently and identify anomalies that may affect financial reporting quality. Consequently, improved audit quality enhances stakeholder trust and decision-making effectiveness. Recent studies such as Okolie (2020), Mohammed and Saidu (2021), and Apochi and Mustapha (2022) have relied on Information Theory to explain the importance of reliable audit information in promoting transparency and accountability. The theory therefore provides a useful framework for understanding the informational benefits of audit quality and technological advancement in auditing.

Methodology

The study employed a quantitative research design using an ex-post facto approach. The target population comprised all the thirteen (13) commercial banks listed on the Nigerian Exchange Group (NGX) as of December 31, 2024. The study used judgmental sampling technique to select sample size. Secondary data were collected from annual reports and binary logistic regression was used as the primary analytical technique.



The general model specification:

$$AQ (AFS) = \beta_0 + \beta_1CAAT + \beta_2SAS + \beta_3TI + \beta_4AR + e$$

Where:

AQ = Audit Quality as measured by audit quality indicator of function i at time t

CAAT = Computer-Assisted Audit Techniques measured by technology auditing and auditing process of function i at time t

SAS = Specialized Audit Software measured by special audit softwares in the audit process of function i at time t

TI = Level of Technology Integration measured by the degree of technology used in various aspects of function i at time t

AR = Auditor Rotation measured by the number of auditors in the last fifteen years of function i at time t

β_0 - β_4 = Regression coefficients

e = Error term

Results and Discussions

Table 1: Descriptive Statistics

	AFS	CAATS	SAS	TI	AR
Mean	0.955556	1.677778	1.688889	1.777778	0.177778
Median	1.000000	2.000000	2.000000	2.000000	0.000000
Maximum	1.000000	2.000000	2.000000	2.000000	1.000000
Minimum	0.000000	1.000000	0.000000	1.000000	0.000000
Std. Dev.	0.206655	0.468631	0.520946	0.416899	0.383392
Observations	180	180	180	180	180

Source: Eviews Output, 2026

Table 4.1 presents the descriptive statistics of the study variables based on 180 firm-year observations. The mean value of Audit Firm Size (AFS) is 0.9556, indicating that the majority of the sampled firms were audited by large audit firms during the study period. Computer-



Assisted Audit Techniques (CAATS) recorded a mean of 1.6778, suggesting a relatively high level of adoption among the sampled entities. Similarly, Specialized Audit Software (SAS) has a mean value of 1.6889, reflecting substantial utilization of advanced audit technologies. Technology Integration (TI) reported the highest mean of 1.7778, indicating widespread incorporation of technology into audit processes. Auditor Rotation (AR) has a relatively low mean of 0.1778, implying that auditor changes occurred infrequently among the sampled firms. The standard deviations show moderate variability across the variables, with SAS exhibiting the highest dispersion (0.5209) and AFS the lowest (0.2067). The median values generally correspond with the means, suggesting consistency in the distribution of the data.

Table 2: Correlation Matrix

	AFS	CAATS	SAS	TI	AR
AFS	1.000000				
CAATS	0.139728	1.000000			
SAS	0.182202	0.822791	1.000000		
TI	0.144098	0.775232	0.837430	1.000000	
AR	0.029771	-0.301264	-0.364869	-0.380589	1.000000

Source: Eviews Output, 2026

Table 4.2 presents the correlation matrix showing the degree of association among the independent variables used in the study. The results indicate a weak positive relationship between Audit Firm Size (AFS) and Computer-Assisted Audit Techniques (CAATS) ($r = 0.1397$), Specialized Audit Software (SAS) ($r = 0.1822$), and Technology Integration (TI) ($r = 0.1441$). A strong positive correlation exists between CAATS and SAS ($r = 0.8228$), suggesting that firms utilizing computer-assisted audit techniques are also likely to adopt specialized audit software. Similarly, Technology Integration (TI) is strongly and positively correlated with CAATS ($r = 0.7752$) and SAS ($r = 0.8374$), indicating complementarity among technology-related audit practices. Auditor Rotation (AR) exhibits negative correlations with CAATS ($r = -0.3013$), SAS ($r = -0.3649$), and TI ($r = -0.3806$), implying that firms with higher levels of technology adoption tend to experience lower frequencies of auditor rotation. The relationship between AFS and AR is weak and positive ($r = 0.0298$), indicating little association between the two variables. Although some correlations among the technology variables are relatively



high, none exceeds the conventional threshold of 0.90, suggesting the absence of severe multicollinearity concerns.

Table 3: Binary Logistic Regression Result

Sample: 2010 2024
 Included observations: 180

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.198882	1.363554	0.145856	0.8840
CAATS	-0.163399	1.463069	-0.111682	0.0111
SAS	1.631360	1.134878	1.437476	0.1506
TI	0.263172	1.254725	0.209745	0.0339
AR	1.608643	1.261608	1.275074	0.2023
McFadden R-squared	0.103988	Mean dependent var		0.955556
Prob(LR statistic)	0.046469			

Source: Eviews Output, 2026

The binary logistic regression results in Table 4.3 reveal that Computer-Assisted Audit Techniques (CAATS) have a statistically significant effect on audit firm size (AFS) at the 5% significance level ($\beta = -0.1634$; $p = 0.0111$). The negative coefficient suggests that increased reliance on CAATs is associated with a lower likelihood of engagement with larger audit firms. This finding may indicate that smaller audit firms increasingly utilize CAATs to enhance their competitiveness and bridge resource gaps with larger firms. The result contrasts with the expectation that larger audit firms would possess greater technological capabilities but aligns with recent evidence that digital audit tools have become more accessible across firms of different sizes. Studies by Mohammed and Saidu (2021) and Ilugbo, Josiah and Ozele (2024) reported that technological tools can improve audit processes irrespective of firm size, particularly where adoption costs have declined.

The coefficient of Specialized Audit Software (SAS) is positive ($\beta = 1.6314$) but statistically insignificant ($p = 0.1506$), indicating that although the use of specialized audit software may enhance audit processes, its effect on audit firm size is not sufficiently strong to be considered statistically meaningful. This outcome suggests that software adoption alone may not distinguish large audit firms from smaller firms, especially as audit technologies become



increasingly available across the profession. The finding partially agrees with Emeka-Nwokeji and Osisioma (2019), who found a positive association between audit software utilization and audit quality, but differs regarding the statistical significance of the relationship. Recent studies have argued that the effectiveness of audit software depends largely on auditor competence, organizational support, and the extent of integration into audit procedures (Apochi & Mustapha, 2022; Ilugbo et al., 2024).

Technology Integration (TI) exhibits a positive and statistically significant effect on audit firm size ($\beta = 0.2632$; $p = 0.0339$). This result implies that firms with higher levels of technology integration are more likely to be associated with larger audit firms. The finding supports the Resource-Based View theory, which posits that technological capabilities constitute strategic resources that enhance organizational effectiveness and competitiveness. Large audit firms typically possess greater financial and technical resources to invest in advanced audit technologies, enabling them to improve audit efficiency, risk assessment, and fraud detection. This finding is consistent with recent studies that document a positive relationship between technology integration and audit performance, including Mohammed and Saidu (2021), Azizah and Pujiono (2021), and Ilugbo et al. (2024), who concluded that integrated technological systems significantly enhance audit effectiveness and reporting quality.

Auditor Rotation (AR) has a positive coefficient ($\beta = 1.6086$) but is statistically insignificant ($p = 0.2023$), suggesting that auditor rotation does not significantly influence the likelihood of engagement with larger audit firms within the study period. Although auditor rotation is intended to strengthen auditor independence and objectivity, the result indicates that its effect may not be sufficiently pronounced in the Nigerian auditing environment. The finding supports Oladipupo and Izedomi (2016), who argued that auditor rotation often produces mixed outcomes due to learning-curve effects and adjustment costs. However, it contrasts with Okolie (2020), who reported that periodic auditor rotation improves audit quality by reducing familiarity threats and enhancing auditor independence.

The overall model is statistically significant as indicated by the likelihood ratio probability of 0.0465, demonstrating that the explanatory variables jointly influence audit firm size. The McFadden R-squared value of 0.1040 indicates that approximately 10.4% of the variation in audit firm size is explained by CAATS, SAS, Technology Integration, and Auditor Rotation. While the explanatory power is relatively modest, it is considered acceptable for binary logistic



regression models involving organizational and behavioral variables. Overall, the findings underscore the growing importance of technological integration in contemporary auditing practice while suggesting that the effects of specialized software and auditor rotation may depend on additional institutional and organizational factors. Recent auditing literature similarly emphasizes that technology adoption, rather than traditional structural characteristics alone, is increasingly shaping audit outcomes and professional effectiveness (International Federation of Accountants [IFAC], 2023; International Auditing and Assurance Standards Board [IAASB], 2024).

Conclusion and Recommendations

This study examined the effect of audit technology and auditor rotation on audit firm size among listed companies in Nigeria. The findings revealed that Computer-Assisted Audit Techniques (CAATs) and Technology Integration (TI) significantly influence audit firm size, indicating that technological adoption has become an important factor in contemporary audit practice. While Specialized Audit Software (SAS) and Auditor Rotation (AR) exhibited positive relationships with audit firm size, their effects were not statistically significant. The results suggest that firms with greater levels of technology integration are better positioned to enhance audit effectiveness and competitiveness. Overall, the study concludes that technological innovation plays a more critical role in shaping audit outcomes than auditor rotation within the Nigerian auditing environment.

1. Audit firms should increase investment in technology integration by adopting advanced audit tools and digital platforms to improve audit efficiency, effectiveness, and service quality.
2. Professional accounting bodies and regulatory agencies should organize continuous training programs to enhance auditors' competence in the use of Computer-Assisted Audit Techniques (CAATs) and emerging audit technologies.
3. Audit firms should ensure that specialized audit software is fully integrated into audit processes and supported by adequate technical expertise to maximize its potential benefits.



4. Regulatory authorities should periodically review auditor rotation policies to ensure that they promote auditor independence without imposing unnecessary adjustment costs on audit engagements.
5. Audit firms should develop comprehensive digital transformation strategies that combine technological innovation with professional judgment to enhance audit quality and maintain competitiveness in the evolving business environment.

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