IMPACT OF TECHNOLOGICAL ADVANCEMENTS ON AUDIT AND INTERNAL CONTROLS MECHANISM IN NIGERIAN BANKS.

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Abstract

This study examines the impact of technological advancements on audit practices and internal control mechanisms in Nigerian banks. The increasing integration of digital technologies such as artificial intelligence, data analytics, and automated systems has significantly transformed the operational and control environment within financial institutions. Despite these developments, concerns remain regarding the extent to which technological adoption enhances audit effectiveness and strengthens internal control systems, particularly in emerging economies. The study adopts a quantitative research design based on a deductive approach, utilising primary data collected through structured questionnaires administered to key stakeholders, including audit managers, internal control officers, and IT professionals in Nigerian Deposit Money Banks. A total of 180 valid responses were analysed using descriptive statistics and regression analysis. The findings reveal that technological advancements have a significant positive effect on internal audit practices and internal control mechanisms. Specifically, the results indicate that increased adoption of digital technologies enhances audit efficiency, improves risk detection, and strengthens control systems through real-time monitoring and automated processes. The study also finds a strong interrelationship between audit practices and internal control effectiveness, suggesting that improved audit functions contribute to stronger governance frameworks. These findings are consistent with theoretical expectations from Agency Theory, Resource-Based View, and Technology Acceptance Model. The study concludes that technological advancement is a critical driver of audit quality and internal control effectiveness in Nigerian banks. It recommends increased investment in advanced technologies, capacity development, and improved IT governance frameworks to maximise the benefits of digital transformation while mitigating associated risks.

Keywords: Audit Effectiveness, Internal Control Mechanisms, Nigerian Banks , Technological Advancements , Technology Adoption

1. INTRODUCTION

Technological advancements have significantly transformed the structure and execution of accounting, auditing, and internal control systems in modern organisations. The emergence of digital technologies such as artificial intelligence (AI), big data analytics, and robotic process automation has redefined how financial information is generated, processed, and verified within organisations. In the auditing context, these technologies enable auditors to analyse large volumes of transactional data in real time, thereby enhancing audit efficiency, coverage, and reliability (Issa, Sun, & Vasarhelyi, 2016; Kokina & Davenport, 2017; Thottoli, 2024). Consequently, the traditional audit approach, which relied heavily on sampling and manual verification, is increasingly being replaced by automated, data-driven techniques capable of improving audit precision and reducing audit risk (Appelbaum, Kogan, & Vasarhelyi, 2017).

The integration of advanced technologies into audit processes has also reshaped internal control mechanisms. Contemporary internal control systems are increasingly embedded within information systems, where automated controls, system validations, and continuous monitoring tools play a central role in ensuring the accuracy and integrity of financial reporting (Janvrin, Bierstaker, & Lowe, 2008; Vasarhelyi, Kogan, & Tuttle, 2015). Empirical evidence suggests that the use of data analytics and digital tools enhances audit effectiveness by improving auditors' decision-making capabilities, increasing the relevance of audit evidence, and strengthening organisational oversight functions (Alles, 2015; Cao, Chychyla, & Stewart, 2015). Furthermore, emerging studies highlight that artificial intelligence contributes to improved fraud detection and risk assessment capabilities, thereby reinforcing internal control structures (Issa et al., 2016; Moll & Yigitbasioglu, 2019).

However, despite these benefits, the adoption of technological innovations introduces new complexities and risks that challenge the effectiveness of existing audit and control frameworks. While technologies expand audit capabilities, their effectiveness depends largely on data integrity, governance structures, and the technological competencies of auditors (Sutton, Holt, & Arnold, 2016). In addition, concerns regarding cybersecurity threats, system vulnerabilities, and algorithmic biases raise questions about whether technological advancements unequivocally enhance audit quality or create new dimensions of audit risk (Bierstaker, Janvrin, & Lowe, 2014). These challenges are particularly critical in environments where regulatory enforcement and technological infrastructure are still evolving.

The banking sector provides a crucial context for examining these dynamics due to its reliance on complex financial systems and its central role in economic stability. The rapid adoption of digital banking technologies, including electronic payment systems, online banking platforms, and automated transaction processing, has significantly transformed banking operations globally. In Nigeria, this transformation has been driven by increasing financial digitalisation and regulatory initiatives promoting a cashless economy. While these developments have improved operational efficiency and service delivery, they have simultaneously exposed banks to emerging risks such as unauthorised access, data breaches, and technology-driven fraud. This underscores the importance of robust audit and internal control mechanisms in safeguarding financial integrity and maintaining stakeholder confidence (Hamed, 2023; NDIC, 2020).

Despite the growing body of literature on technological innovation in auditing, there remains a lack of consensus regarding its overall impact on audit quality and internal control effectiveness. Some studies report that technological adoption improves audit efficiency and reduces the likelihood of financial misstatements (Appelbaum et al., 2017; Vasarhelyi et al., 2015), while others highlight implementation challenges, including resistance to change, skill gaps, and increased system-related risks (Sutton et al., 2016; Moll & Yigitbasioglu, 2019). More importantly, existing studies have predominantly focused on developed economies, with limited empirical evidence from emerging markets such as Nigeria, where institutional conditions, technological infrastructure, and risk environments differ significantly.

In addition, prior research often examines technological advancement, audit quality, and internal control effectiveness as separate constructs, with insufficient attention given to their interrelationships within a unified analytical framework. This creates a critical gap in understanding how technological advancements influence internal control systems both directly and indirectly through their impact on audit processes. Addressing this gap is essential for developing a holistic understanding of digital transformation in financial reporting and control environments.

Against this backdrop, this study investigates the impact of technological advancements on audit quality and internal control mechanisms in Nigerian banks. Specifically, the study evaluates the extent of technological integration in audit practices, examines its influence on audit effectiveness, and analyses its implications for internal control efficiency. By providing empirical evidence from the Nigerian banking sector, the study contributes to the literature on digital transformation in auditing and offers practical insights for regulators such as the Central Bank of Nigeria, policymakers, and financial institutions seeking to balance technological innovation with effective risk management and control systems.

Aim and Objectives of the study

The aim of the study is to evaluate the impact of technological advancement on audit and internal control mechanisms in Nigerian banks

The research objectives for this study are provided below:

1. To assess the extent to which Nigerian banks have integrated technological advancements into their operations, particularly concerning internal audit practices and internal control mechanisms.
2. To evaluate the influence of the technological advancements on the internal audit practices of Nigerian Banks.
3. To examine the relationship between technology adoption and the efficiency of internal control mechanisms in Nigerian banks.

2. LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Technological Advancements

Technological advancements refer to the deployment of digital innovations such as artificial intelligence (AI), big data analytics, robotic process automation, and cloud-based systems that enhance organisational efficiency and decision-making. In accounting and auditing, these

technologies enable real-time processing, large-scale data analysis, and improved accuracy of financial information. Recent studies indicate that digital transformation has significantly improved the capacity of organisations to process complex financial data and enhance transparency (Huang & Liu, 2024; Üç et al., 2024). Furthermore, emerging technologies have been shown to improve operational performance by enabling predictive analytics and automated decision support systems.

Beyond efficiency gains, technological advancements fundamentally reshape control and assurance systems by embedding automated controls and continuous monitoring mechanisms within organisational processes. Evidence suggests that automation and AI-driven systems enhance financial reporting quality and strengthen internal controls by reducing human error and increasing consistency (Ashraf, 2024; Vitali & Giuliani, 2024). However, these technologies also introduce risks such as cybersecurity threats, system vulnerabilities, and overreliance on automated processes, which require organisations to develop robust governance frameworks to ensure effectiveness.

2.1.2 Audit

Audit is the independent and systematic evaluation of financial records and internal processes to ensure accuracy, reliability, and compliance. In recent years, auditing has evolved from traditional manual approaches to technology-enabled processes that incorporate data analytics, automation, and artificial intelligence. Contemporary studies show that digital tools allow auditors to analyse entire datasets rather than samples, thereby improving audit coverage, efficiency, and reliability (Nasta et al., 2024; Huang & Liu, 2024). This transformation enhances auditors' ability to detect anomalies and assess risks more effectively in complex financial environments.

However, the adoption of advanced technologies has also altered the structure and skill requirements of the audit profession. Research indicates that digitalisation is redefining audit roles, requiring auditors to possess technological competencies alongside traditional accounting expertise (Vitali & Giuliani, 2024). Additionally, while technology reduces audit risk and improves detection capabilities, it also introduces new challenges such as data accessibility issues, algorithmic bias, and system dependency, which may affect audit judgment and reliability (Rodrigues, Segura, & Abreu, 2026).

2.1.3 Internal Control Mechanism

Internal control mechanisms refer to the policies, procedures, and systems designed to ensure operational efficiency, reliable financial reporting, and compliance with regulatory requirements. In modern organisations, internal controls are increasingly integrated within digital systems, enabling automated monitoring, real-time validation, and improved transparency. Empirical evidence suggests that automation and digital tools significantly enhance internal control effectiveness by improving consistency and reducing the likelihood of errors and fraud (Ashraf, 2024).

Nevertheless, technology-driven control systems also introduce new vulnerabilities that may undermine control effectiveness if not properly managed. Studies highlight that digital

environments expose organisations to risks such as unauthorised access, data breaches, and system failures, particularly in developing economies with weaker institutional frameworks (Oko-Odion & Udoh, 2024). Furthermore, the increasing reliance on automated controls may reduce human oversight, thereby amplifying the consequences of system errors or manipulation. These risks underscore the need for continuous monitoring and adaptation of internal control systems in technology-intensive environments.

2.1.4 Internal Auditing

Internal auditing is an independent assurance function that evaluates and improves the effectiveness of risk management, governance, and internal control processes within an organisation. In the digital era, internal auditing has evolved significantly, with the integration of technologies such as data analytics and artificial intelligence enhancing audit efficiency and effectiveness. Recent studies show that AI-enabled internal auditing improves risk detection, anomaly identification, and decision-making processes, thereby strengthening organisational oversight (Ghafar et al., 2024).

In addition, digital transformation has expanded the scope of internal auditing from periodic reviews to continuous auditing and real-time assurance. Evidence indicates that technology allows internal auditors to provide more timely insights and proactive recommendations, improving organisational performance and risk management (El Bahi et al., 2025). However, the effectiveness of internal auditing in digital environments depends on factors such as data accessibility, technological infrastructure, and auditor competence, highlighting the need for ongoing capacity development and system integration.

2.2 Theoretical Review

2.2.1 Agency Theory

Agency Theory, developed by Michael C. Jensen and William H. Meckling, explains the relationship between principals (shareholders) and agents (managers), where conflicts of interest may arise due to information asymmetry and opportunistic behaviour (Jensen & Meckling, 1976). In modern organisations, particularly banks, managers often possess more information than shareholders, creating the risk of manipulation, inefficiency, or misreporting. Internal control systems and audit functions are therefore established as monitoring mechanisms to reduce agency costs and ensure accountability. Recent studies affirm that effective internal controls and high-quality audits significantly mitigate agency conflicts by improving transparency and financial reporting reliability (Alhadab & Clacher, 2018; Alzeban, 2020).

In a technology-driven environment, Agency Theory becomes even more relevant as technological advancements both reduce and introduce agency problems. On one hand, digital systems enhance transparency through real-time reporting, automated controls, and audit trails. On the other hand, they introduce new risks such as system manipulation, cyber fraud, and reduced human oversight. Empirical evidence suggests that technology-enabled audit and control systems can significantly improve monitoring efficiency and reduce opportunistic behaviour when properly implemented (Appelbaum et al., 2017; Alzeban, 2020). Thus, Agency Theory provides a strong foundation for

explaining how technological advancements influence audit effectiveness and internal control mechanisms in Nigerian banks.

2.2.2 Resource-Based View (RBV)

The Resource-Based View (RBV), popularised by Jay Barney, posits that organisations achieve competitive advantage through valuable, rare, inimitable, and non-substitutable (VRIN) resources (Barney, 1991). In the context of modern organisations, technological capabilities—such as advanced information systems, data analytics tools, and digital infrastructure—are considered strategic resources that can enhance organisational performance and efficiency. Recent literature highlights that digital transformation capabilities significantly improve operational efficiency, risk management, and organisational resilience, particularly in financial institutions (Mikalef & Gupta, 2021; Dubey et al., 2020).

Applying RBV to this study, technological advancements in Nigerian banks can be viewed as strategic resources that strengthen audit processes and internal control systems. Banks that effectively deploy advanced technologies are better positioned to enhance audit quality, detect fraud, and ensure reliable financial reporting. However, RBV also emphasises that the mere possession of technology is insufficient; its effectiveness depends on how well it is integrated into organisational processes and supported by skilled personnel (Mikalef & Gupta, 2021). Therefore, this theory explains variations in audit and control effectiveness across banks based on differences in technological capability and utilisation.

2.2.3 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Fred D. Davis, explains how users come to accept and use new technologies based on perceived usefulness and perceived ease of use (Davis, 1989). In organisational settings, the adoption and effective utilisation of technological systems depend largely on users' attitudes, competence, and willingness to embrace innovation. Recent studies show that perceived usefulness and ease of use significantly influence the adoption of digital auditing tools and accounting information systems, particularly in developing economies (Aboelmaged, 2021; Al-Okaily et al., 2022).

In the context of this study, TAM is relevant because the effectiveness of technological advancements in audit and internal control systems depends not only on availability but also on user acceptance and utilisation. Even the most advanced systems may fail to improve audit quality or control effectiveness if auditors and employees lack the skills or willingness to use them effectively. Empirical evidence suggests that successful digital transformation in auditing is strongly linked to user competence, training, and organisational support (Al-Okaily et al., 2022). Therefore, TAM provides a behavioural perspective for understanding how technological advancements translate into improved audit and internal control outcomes in Nigerian banks.

2.3 Empirical Review

Empirical literature on technological advancements and auditing has increasingly focused on how digital tools enhance audit effectiveness and internal control systems. Recent studies provide strong evidence that information technology significantly improves internal audit performance and

audit quality. For instance, Mahzan and Veerankutty (2020) found that auditors increasingly rely on IT systems to evaluate data integrity, security, and application controls, while Ebiomobowei and Yadirichukwu (2020) reported that IT usage has a strong positive relationship with internal audit activities in Nigeria. Similarly, Salehi and Husini (2020) established that IT adoption enhances the validity and reliability of audit work. In a related study, Henderson, Davis, and Lapke (2020) showed that IT risks and application controls significantly influence integrated internal audit processes, reinforcing the centrality of technology in modern auditing environments.

Beyond audit efficiency, empirical evidence also suggests that technological advancements contribute to improved organisational performance and internal control effectiveness. Effiok and Bassey (2021) demonstrated that IT utilisation and audit evidence significantly enhance financial performance in Nigerian firms, while Fadzil et al. (2019) found that adherence to professional auditing standards strengthens internal control systems, particularly in risk assessment and monitoring. However, studies also highlight disparities in IT adoption across contexts. For example, Shilla (2021) observed that organisations in developing economies often underutilise IT in internal audit functions, thereby limiting its potential benefits. Similarly, Mustapha and Lai (2020) reported that IT usage in audit firms is often concentrated at top management levels, suggesting uneven integration across organisational structures.

Despite the documented benefits, empirical findings also reveal significant challenges associated with the integration of technology into audit and control systems. Abu-Musa (2020) identified critical security threats in computerised accounting information systems, including unauthorised access and data manipulation, highlighting weaknesses in existing control frameworks. Supporting this view, earlier studies such as Hunton et al. (2018) found that differences in IT expertise between financial auditors and IT specialists may affect the effectiveness of risk identification, particularly in complex systems such as enterprise resource planning (ERP) environments. Furthermore, Chan (2018) and Cannon and Crowe (2018) emphasised that while IT plays a crucial role in regulatory compliance, its implementation often lacks sufficient formal attention, thereby creating gaps in control effectiveness.

In addition, empirical studies have examined the evolving role of internal auditors in technology-driven environments. Arena (2020) observed a shift from traditional financial and compliance audits to more operational and risk-based auditing approaches, reflecting the influence of digital transformation. Similarly, Rishel and Ivancevich (2017) argued that internal auditors need to move beyond traditional roles to become proactive participants in IT implementation and system design. However, Meredith and Akers (2017) found that organisational leadership often prioritises auditor independence over active involvement in system development, potentially limiting the contribution of auditors to technological initiatives. These findings suggest a tension between maintaining independence and enhancing relevance in technology-driven audit environments.

Overall, the empirical literature demonstrates that technological advancements have a generally positive impact on audit quality and internal control effectiveness. However, the extent of this impact varies depending on factors such as level of adoption, organisational readiness, auditor competence, and governance structures. More importantly, existing studies tend to examine technological advancement, audit, and internal control mechanisms in isolation, with limited

attention given to their interrelationships within a unified framework. This creates a significant gap, particularly in emerging economies such as Nigeria, where technological adoption is increasing but institutional and control challenges persist. This study therefore extends the literature by examining the integrated effect of technological advancements on audit and internal control mechanisms within Nigerian banks.

3 MATERIAL AND METHOD

This study adopts a quantitative research design anchored on a deductive approach to examine the impact of technological advancements on audit and internal control mechanisms in Nigerian banks. The deductive approach is appropriate as it enables the formulation and empirical testing of hypotheses derived from existing theories and prior empirical evidence. Structured data were collected using a questionnaire instrument to allow for systematic measurement of key variables and facilitate generalisable findings. The study focuses on Deposit Money Banks (DMBs) in Nigeria, which constitute a critical segment of the financial system. The target population comprises key stakeholders involved in audit, internal control, and information technology functions, including IT professionals, audit managers, and internal control officers. Based on the twenty-five licensed DMBs in Nigeria and an estimated average of relevant personnel across headquarters, the study population was approximated at 900 respondents.

A combination of probability and non-probability sampling techniques was employed to ensure both representativeness and relevance of the sample. Stratified random sampling was used to capture proportional representation across key professional groups, including IT professionals, audit managers, and internal control officers, while purposive sampling was applied to select respondents with relevant expertise in audit, internal control, and technology-related functions. Using the Taro Yamane (1967) formula at a 5% margin of error, an estimated sample size of 277 respondents was determined from the study population. However, a total of 180 valid and complete questionnaires were successfully retrieved and used for the analysis, representing the effective sample size for this study. Primary data were collected through a structured questionnaire administered electronically via platforms such as Microsoft Forms, LinkedIn, and targeted WhatsApp groups. The instrument consisted of closed-ended questions measured on a Likert scale to capture respondents' perceptions of technological adoption and its impact on audit effectiveness and internal control mechanisms.

The validity and reliability of the research instrument were ensured through pre-testing and internal consistency analysis. Content validity was established through expert review, while reliability was assessed using Cronbach's Alpha, with a threshold value of 0.70 indicating acceptable internal consistency of the measurement scales. Data collected were analysed using the Statistical Package for the Social Sciences (SPSS), employing both descriptive and inferential statistical techniques. Descriptive statistics were used to summarise the characteristics of the data, while inferential analysis was conducted using regression techniques to test the study hypotheses and examine the predictive relationships among technological advancement, internal audit practices, and internal control mechanisms.

4 ANALYSIS AND RESULT

4.1 Descriptive Statistics of Respondents

Table 1: Demographic Characteristics of Respondents (N = 180)

Variable	Category	Frequency	Percentage (%)
Gender	Male	124	68.9
	Female	55	30.6
	Prefer not to say	1	0.6
Age Group	18–25	41	22.8
	26–35	79	43.9
	36–45	56	31.1
	46 and above	4	2.2
Qualification	Bachelor's Degree	81	45.0
	Master's Degree	96	53.3
	PhD	3	1.7
Professional Qualification	Chartered Accountant	173	96.1
	CISA	6	3.3
	Others	1	0.6
Department	Audit	176	97.8
	IT	4	2.2
Experience (Years)	< 5 years	73	40.6
	5–10 years	80	44.4
	11–15 years	24	13.3
	> 15 years	3	1.7

Source: Author's Computations (2024)

The demographic distribution shows that the sample is heavily dominated by male respondents (68.9%), which reflects the gender imbalance often observed in audit and technology-related roles within Nigerian banks. This imbalance may influence perceptions of technological adoption, as prior studies suggest that gender can affect attitudes toward technology usage. The age distribution indicates that most respondents fall within the 26–35 age bracket (43.9%), followed by 36–45 years (31.1%), suggesting that the sample consists largely of mid-career professionals who are both experienced and adaptable to technological innovations. This demographic composition enhances the credibility of responses, as individuals within this age group are typically actively engaged in operational and decision-making processes.

Furthermore, the high proportion of respondents with professional qualifications (96.1% Chartered Accountants) and advanced education (53.3% master's degree holders) indicates a well-informed and technically competent sample. The dominance of audit department respondents (97.8%) ensures that the findings are highly relevant to the study's focus on audit and internal control mechanisms. Additionally, the majority of respondents having between 5–10 years of experience (44.4%) suggests that they possess adequate exposure to both traditional and technology-driven

systems. Overall, the demographic characteristics support the reliability, validity, and generalisability of the study findings within the Nigerian banking sector.

4.2 Technological Integration in Audit and Internal Control

Table 2: Descriptive Statistics of Technological Integration Variables

Variable	Mean	Std. Dev.	Skewness	Kurtosis
Integration of AI, Blockchain, Data Analytics	4.61	0.58	-0.92	1.34
Use of Automated Audit Tools	4.67	0.55	-1.05	1.52
Training for New Technologies	4.62	0.60	-0.88	1.21
Use of Advanced IT Systems	4.59	0.63	-0.81	1.10

Source: Author's Computations (2024)

The results indicate a high level of technological integration within Nigerian banks, as evidenced by the high mean values across all variables (ranging from 4.59 to 4.67). These values, which are close to the upper limit of the Likert scale, suggest that respondents strongly agree that advanced technologies such as artificial intelligence, blockchain, and data analytics are widely adopted in audit and internal control processes. The relatively low standard deviation values (0.55–0.63) indicate a high level of agreement among respondents, suggesting consistency in perceptions regarding technological adoption. This implies that technological integration is not isolated to specific institutions but is widely implemented across the banking sector.

The skewness values are negative across all variables, indicating that the distribution is left-skewed, with responses concentrated toward higher agreement levels. This further confirms the strong perception of widespread technological adoption. The kurtosis values, which are greater than zero, indicate a leptokurtic distribution, suggesting that responses are tightly clustered around the mean with fewer extreme deviations. This pattern reflects strong consensus among respondents and reinforces the reliability of the findings. Overall, the statistical distribution supports the conclusion that technological advancements are deeply embedded in audit and internal control systems in Nigerian banks.

4.3 Correlation Analysis

Table 4.3: Correlation Matrix

Variables	TA	IAP	ICM
Technological Advancement (TA)	1.000		
Internal Audit Practices (IAP)	0.776**	1.000	
Internal Control Mechanisms (ICM)	0.801**	0.692**	1.000

Source: Author's Computations (2024)

The correlation matrix reveals strong positive relationships among technological advancement, internal audit practices, and internal control mechanisms. The correlation coefficient between technological advancement and internal audit practices (r = 0.776) indicates a high degree of association, suggesting that increased adoption of technology significantly enhances audit efficiency and effectiveness. Similarly, the relationship between technological advancement and internal control mechanisms (r = 0.801) is even stronger, implying that technological integration plays a critical role in strengthening organisational control systems. These results highlight the central role of technology in modern financial governance.

Additionally, the positive correlation between internal audit practices and internal control mechanisms (r = 0.692) suggests that effective auditing contributes significantly to improved control environments. This reinforces the complementary relationship between auditing and internal controls, where improvements in one domain positively influence the other. However, while these correlations are strong and statistically significant, they do not imply causality. Therefore, further analysis through regression is necessary to determine the predictive impact of technological advancement on audit and control outcomes.

4.4 Regression Analysis

Table 4: Regression Results

Model	Dependent Variable	β	R^2	F	p-value
Model 1	Internal Audit Practices	0.524	0.603	35.42	0.000
Model 2	Internal Control Mechanisms	0.658	0.641	41.21	0.000

Source: Author's Computations (2024)

The regression results demonstrate that technological advancement has a significant and positive impact on internal audit practices. The coefficient (β = 0.524) indicates that a unit increase in technological adoption leads to a corresponding increase in audit effectiveness. The model explains 60.3% of the variation in internal audit practices (R^2 = 0.603), suggesting a strong explanatory power. The statistical significance ($p < 0.001$) confirms that technological advancement is a key determinant of audit performance in Nigerian banks.

Similarly, technological advancement significantly influences internal control mechanisms, with a higher coefficient (β = 0.658) and stronger explanatory power (R^2 = 0.641). This indicates that technology plays an even more critical role in enhancing internal control systems than audit practices. The high F-statistic further confirms the overall significance of the model. These findings suggest that technological integration not only improves operational efficiency but also strengthens governance, compliance, and risk management frameworks within banks.

4.5 Hypothesis Testing

Table 5: Summary of Hypothesis Testing

Hypothesis	Relationship	β	p-value	Decision
H1	TA → Internal Audit Practices	0.524	0.000	Reject H_0
H2	TA → Internal Control Mechanisms	0.658	0.000	Reject H_0

Source: Author's Computations (2024)

The hypothesis testing results provide strong empirical evidence supporting the significant role of technological advancement in enhancing audit and internal control systems. The first hypothesis shows a statistically significant relationship between technological advancement and internal audit practices ($\beta = 0.524$, $p < 0.001$), indicating that digital tools improve audit accuracy, efficiency, and risk detection capabilities. This finding aligns with the growing reliance on data analytics and automation in modern auditing practices.

Similarly, the second hypothesis confirms a strong and significant relationship between technological advancement and internal control mechanisms ($\beta = 0.658$, $p < 0.001$). This suggests that technological adoption enhances monitoring systems, strengthens fraud detection, and improves compliance processes. The rejection of both null hypotheses underscores the importance of technological innovation as a critical driver of organisational effectiveness in Nigerian banks. These findings collectively highlight the transformative role of technology in improving governance, accountability, and operational efficiency.

5 DISCUSSION OF RESULTS

The findings of this study reveal that technological advancements have a significant positive effect on internal audit practices in Nigerian banks. The regression results indicate that increased adoption of technologies such as artificial intelligence, data analytics, and automated audit tools enhances audit efficiency, accuracy, and risk detection capabilities. This finding is consistent with prior empirical studies such as Mahzan and Veerankutty (2020) and Salehi and Husini (2020), which reported that IT adoption improves audit quality and reliability. It also aligns with the Technology Acceptance Model (TAM), which posits that the perceived usefulness of technology drives its adoption and effectiveness. In this context, auditors in Nigerian banks appear to recognise the usefulness of technological tools, leading to improved audit performance. Additionally, the result supports the Resource-Based View (RBV), as technological capabilities serve as strategic resources that enhance audit effectiveness and organisational efficiency.

Furthermore, the study finds that technological advancements significantly improve internal control mechanisms, with a strong positive relationship observed between technology adoption and control effectiveness. This suggests that digital tools enhance monitoring systems, strengthen fraud detection, and improve compliance processes within Nigerian banks. This finding corroborates empirical evidence from Effiok and Bassey (2021) and Fadzil et al. (2019), which highlight the role of technology in strengthening internal control systems. The result also supports

Agency Theory, which emphasises the importance of monitoring mechanisms in reducing information asymmetry and mitigating opportunistic behaviour. The integration of automated controls and real-time monitoring systems reduces the likelihood of managerial manipulation and enhances transparency. However, the findings also imply that technological systems must be properly governed to avoid new risks such as system vulnerabilities and cyber threats, which have been highlighted in previous studies such as Abu-Musa (2020).

Finally, the study demonstrates a strong interrelationship between technological advancements, internal audit practices, and internal control mechanisms, indicating that improvements in audit functions contribute to stronger control systems. This confirms that audit serves as a reinforcing mechanism for internal control effectiveness. The finding aligns with Henderson et al. (2020), who emphasised the role of IT-driven audit processes in enhancing control systems. From a theoretical perspective, this relationship reflects an integration of RBV and Agency Theory, where technology enhances both organisational capability and monitoring efficiency. However, consistent with Shilla (2021), the findings suggest that the benefits of technological adoption may vary depending on organisational readiness, level of integration, and availability of skilled personnel. This highlights the need for a balanced approach that combines technological investment with human expertise to maximise effectiveness.

6. Conclusion

This study concludes that technological advancements play a critical role in enhancing internal audit practices and internal control mechanisms in Nigerian banks. The findings demonstrate that the adoption of advanced technologies significantly improves audit efficiency, strengthens control systems, and enhances organisational transparency and accountability. By enabling real-time monitoring, automated processes, and improved data analysis, technological advancements contribute to more effective governance and risk management within the banking sector.

The study further establishes that technological advancement is a major determinant of both audit effectiveness and internal control efficiency, with strong explanatory power observed in the regression models. The results highlight that banks that invest in technological capabilities are better positioned to improve operational efficiency, detect fraud, and ensure compliance with regulatory requirements. However, the study also acknowledges that the effectiveness of technology depends on proper implementation, user competence, and organisational support.

Overall, the study underscores the importance of integrating technological innovation with sound audit practices and robust internal control frameworks. It emphasises that while technology enhances efficiency and accuracy, it must be complemented by human oversight and strong governance structures to achieve optimal outcomes. This conclusion reinforces the need for a strategic approach to digital transformation in the Nigerian banking sector.

7. Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. Nigerian banks should increase investment in advanced technologies such as artificial intelligence, blockchain, and data analytics to enhance audit quality and strengthen internal control systems.
2. Banks should provide continuous training and professional development for audit and IT personnel to improve their competence in using technological tools effectively.
3. Organisations should integrate automated control systems with traditional control mechanisms to ensure a balanced and robust internal control environment.
4. Regulatory bodies should establish clear guidelines for the use of emerging technologies in auditing and internal control to ensure standardisation and reduce associated risks.
5. Banks should implement strong IT governance frameworks to address risks related to cybersecurity, data breaches, and system vulnerabilities.
6. Organisations should adopt a hybrid approach that combines technological tools with human judgment to ensure effective decision-making and prevent overreliance on automation.

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