

Evaluating The Empirical Applicability Of Auditing In Cloud Computing Environments: Evidence From Nigeria

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ABSTRACT: *This study conducted an empirical analysis of auditing in a cloud accounting environment in Nigeria, focusing on its prospects and challenges. A survey research design was adopted, enabling the researcher to describe a large population at a specific point in time by collecting data from a selected sample. The population of the study comprised staff of selected audit and accounting firms in Abuja, totaling 287 respondents. A sample size of 164 respondents was determined using Cochran's statistical formula. Data were analyzed using frequency tables and percentages to address the demographic characteristics of respondents and the research questions, while the independent samples t-test was employed to test the study's hypotheses. The findings revealed that there are no significant challenges associated with auditing in a cloud accounting environment in Nigeria. In addition, the study found that there are significant prospects for auditing within a cloud-based accounting system in the country. Based on these findings, the study recommends that, to fully harness the benefits of cloud computing, reliable internet services should be provided. Furthermore, continuous training and retraining of staff in the use of information systems should be encouraged to enhance efficiency and effectiveness in cloud-based auditing practices.*

Keywords: Applicability, Auditing, Cloud, Computing Environments.

INTRODUCTION

The adoption of cloud computing in accounting practices, particularly in Nigeria, is considered highly important due to its cost-effectiveness, as well as its ability to enhance efficiency in the reporting and delivery of financial information. It is also important to note that the credibility of financial data can directly or indirectly influence the decision-making of creditors and other economic agents, especially in relation to their perception of investment risks and returns (Iwuchukwu, Atimati, Ndukwe, & Iwuamadi, 2017). With the emergence of cloud computing, many organisations are now equipped with the necessary technological resources to deliver advanced services that are easily accessible to users and customers (Scholastica & Francisca, 2019). Undoubtedly, significant changes have occurred in accounting practices as a result of technological advancement. In fact, the use of computer-based applications for accounting functions, particularly financial reporting, represents one of the major innovations in the accounting profession (Imene & Imhanzenobeone, 2020).

Cloud computing has significantly improved traditional accounting processes, which were largely paper-based, time-consuming, and less efficient. In contrast, information technology-based systems enable faster, more accurate, and more efficient processing of financial data. Technological innovation, particularly computerisation, has become an integral part of accounting and business operations. Today, financial information can be accessed with relative ease, reducing the stress associated with manual processes such as inventory control and procurement systems. The introduction of cloud computing into accounting systems has helped organisations improve operational efficiency, particularly in resource management. It has also enhanced organisational flexibility, enabled adaptation to environmental changes, and contributed to increased profitability (Kuliya, Zaharaddeen, Kabir, & Abdulkadir, 2015). Traditionally, auditing in Nigeria was conducted outside cloud-based systems. However, with the emergence of cloud computing, it has become necessary to examine the challenges and benefits associated with auditing in this new technological environment. This forms the basis of this study, which seeks to conduct an empirical analysis of auditing in a cloud accounting environment in Nigeria, focusing on its prospects and challenges.

As the world continues to advance into a digital era, the adoption of cloud accounting is increasing rapidly, transforming how organisations manage financial information and business operations. Organisations are no longer required to install and maintain software on individual computers, as cloud systems allow access to updated financial information remotely and in real time (Thomas, 2016). Although cloud accounting is still a relatively new development, it is often perceived as an established practice due to its

growing acceptance among users. Despite its increasing popularity, particularly among accounting practitioners and small and medium-sized enterprises (SMEs) in Nigeria, several challenges still exist in adapting to cloud-based technologies. In developed economies, cloud computing has already become a standard tool that provides significant competitive advantages. However, in Nigeria, awareness and adoption remain relatively low, limiting the ability of firms to fully benefit from its potential (George, 2018). To remain competitive in the global economy, there is a need for greater emphasis on embracing cloud computing technologies and leveraging their advantages in accounting and business practices.

LITERATURE REVIEW

Overview of Audit

The term *audit* is a broad concept that generally refers to the careful and systematic examination of something. In accounting and finance, auditing specifically refers to the thorough inspection of an organisation's financial records. This process involves the examination of vouchers, verification of assets, and review of accounting entries to ensure accuracy and compliance. The individual responsible for carrying out this process is known as an auditor (Klein, 2016). The International Federation of Accountants (2001) defines auditing as an independent examination of the financial information of an entity, whether profit-oriented or not, regardless of its legal structure, size, or status, conducted with the aim of expressing an opinion on the financial statements.

Audit Quality

Audit quality is a complex concept that is widely debated in literature, although it remains difficult to define precisely (Knechel, 2013). This difficulty arises because auditing involves the application of professional judgment and testing procedures that are not directly observable by users of financial statements (Hussainey, 2019). DeAngelo (2011) defines audit quality as the market-assessed probability that an auditor will both detect material misstatements in a client's financial records and report them appropriately. The ability to detect errors is linked to the auditor's competence, while the willingness to report them is associated with auditor independence (Shafie, 2019).

Hussainey (2019) further describes audit quality as the degree of accuracy and reliability of information provided by auditors to investors. Suleiman, Yasin, and Muhamad (2018) identified three main perspectives of audit quality: its multidimensional nature, the influence of both internal audit firm characteristics and external environmental factors, and the evolution of research approaches that have shaped current understanding of audit quality.

Concept of Cloud Computing

According to Nigeria's cloud computing policy, cloud computing is defined as a computing model designed to provide ubiquitous, on-demand access to shared and configurable computing resources such as networks, servers, storage systems, applications, and services, which support the operations of firms, including SMEs and large organisations (National Information Technology Development Agency, 2019). Similarly, the National Institute of Standards and Technology (NIST) describes cloud computing as a model that enables convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort. Cloud computing therefore refers to the use of internet-based technologies and centralized remote servers to store data, manage applications, and provide computing services.

It is an advanced technological system that allows users to store files, transfer data, and run applications online. Cloud computing is beneficial to both service providers and users because it offers scalability, flexibility, and cost efficiency. It is considered a significant development in information technology, as computing resources can be scaled up or down based on demand without requiring continuous direct management by users (Ehioghren & Ojeaga, 2022). Cloud computing resources are typically delivered through data centres accessible via the internet. These resources may be deployed as public clouds (available to multiple organisations), private clouds (restricted to a single organisation), or hybrid clouds (a combination of both).

Cost Effectiveness of Cloud Computing

Cloud computing significantly reduces the cost associated with information management and eliminates the need for large capital investments in physical infrastructure and record-keeping systems. It helps organisations maintain minimal capital and operational expenditure, which is particularly beneficial for small and medium-sized enterprises (SMEs). It also allows businesses with seasonal or fluctuating demand to scale resources up or down as needed without investing in permanent infrastructure that may remain unused during low-demand periods.

Security Effectiveness of Cloud Computing

Cloud computing also enhances data security and protection of financial information. According to Haslinda *et al.* (2017), storing data on standalone desktop systems exposes organisations to risks such as virus attacks, system failures, or data loss. Additionally, physical systems are vulnerable to theft or damage. In contrast, storing financial information in the cloud reduces the

risk of permanent data loss, as information is securely backed up and accessible remotely. Even if local devices are compromised, data stored in the cloud remains safe and retrievable, ensuring continuity and reliability of financial records.

Theoretical Framework

This study is anchored on three theories, namely agency theory, stakeholder theory, and legitimacy theory.

Agency Theory

Jensen and Meckling (1976) developed the Agency Theory, which explains the nature of relationships that arise due to the separation of ownership and control in business organisations. According to the theory, the separation of ownership (shareholders) from management (directors) may create conflicts of interest between principals and agents. While shareholders (principals) appoint managers (agents) to run the organisation on their behalf, the differing interests between both parties may lead to agency problems.

To mitigate these issues, auditing plays a critical role in reducing information asymmetry by enhancing the credibility and reliability of financial reporting. Information asymmetry occurs when one party possesses more or better information than the other, particularly between managers and shareholders. In situations where managers fail to act in the best interest of shareholders, trust is undermined, leading to potential conflicts. Auditors are therefore engaged as independent third parties to strengthen accountability and align managerial actions with shareholder interests. Through effective audit quality mechanisms, auditors help ensure the integrity of financial statements and reduce the risk of misrepresentation. Consequently, Agency Theory provides an economic explanation for the importance of auditing in ensuring accountability and enhancing audit quality.

Stakeholder Theory

Stakeholder Theory, developed by R. Edward Freeman (1984), emphasises the relationship between an organisation and its various stakeholders. The theory posits that stakeholders include not only shareholders, but also employees, customers, suppliers, contractors, creditors, government agencies, regulatory bodies, and other interest groups that may be affected by the organisation's operations. According to this perspective, organisational value is collectively created and shared among all stakeholders, implying that firms have a responsibility to consider the interests of all parties rather than focusing solely on shareholders. Organisational performance is therefore assessed based on the extent to which the needs and expectations of stakeholders are satisfied.

Managers are expected to act in ways that ensure fair returns and equitable treatment for all stakeholder groups (Donaldson & Preston, 1995). In this context, auditors also play a broader accountability role by ensuring that financial statements are reliable and useful for all stakeholders in decision-making. The quality of audit reports influences stakeholder confidence and ultimately impacts organisational performance.

Legitimacy Theory

Legitimacy Theory, associated with Mark C. Suchman (1995), is widely applied in accounting and auditing literature. The theory explains how organisations seek to operate within the boundaries of societal norms, values, and expectations in order to maintain legitimacy and ensure survival. It suggests that organisations voluntarily disclose social and environmental information to demonstrate compliance with societal expectations and to maintain their "social contract" with the environment in which they operate. When organisations fail to conform to accepted social and moral standards, they risk losing legitimacy, which may result in sanctions, reputational damage, or even business failure.

Therefore, organisations are expected to justify their existence through responsible economic, social, and environmental practices that benefit society. Legitimacy Theory draws on elements of stakeholder theory and institutional theory, and it emphasises that organisational survival depends on maintaining legitimacy in the eyes of society. In this regard, voluntary disclosure of relevant information enhances transparency and strengthens audit quality. Consequently, this study is anchored on Agency Theory, as propounded by Jensen and Meckling (1976), due to its strong relevance in explaining auditing, accountability, and information asymmetry in organisations.

Empirical Review

Khan, Abdul, and Ntim (2019) examined the effect of board diversity and audit-related factors on firm performance in Pakistan. Board diversity was measured in terms of nationality and gender representation as proxies for audit quality. The study focused on firms listed on the Pakistan Stock Exchange (PSE-100 Index), selected based on sector representation and market capitalization. Using panel data covering 2008 to 2017, the study employed econometric techniques for analysis. The findings revealed that the presence of female board members positively influences firm performance; however, the number of female directors did not show a significant effect on performance.

Ezejiolor and Erhirhie (2018) investigated the impact of audit quality on the financial performance of deposit money banks in Nigeria. The study utilised secondary data obtained from the annual reports of listed banks, and regression and correlation analyses were used for data interpretation. The results showed that audit quality has a significant effect on the financial performance of Nigerian deposit money banks. The study recommended that banks should strengthen governance structures by appointing qualified directors with relevant experience and high ethical standards.

Similarly, Ogbodo and Akabuogu (2018) examined the relationship between audit quality and the financial performance of selected Nigerian banks. Audit quality was proxied by audit firm size and audit committee independence. Using data from sixteen listed deposit money banks between 2008 and 2017, the study applied regression analysis using SPSS. The findings revealed that audit firm size significantly affects return on assets, while audit committee independence has a significant impact on return on equity. The study recommended the engagement of reputable audit firms with strong professional credibility.

Abid, Shaique, and Anwar (2018) assessed whether Big Four audit firms consistently deliver higher audit quality in Pakistan. The study used secondary data from 183 firms listed on the Karachi Stock Exchange between 2009 and 2013. Audit quality was measured using earnings management proxies and audit firm classification (Big Four versus non-Big Four). The findings indicated no significant difference in earnings management between firms audited by Big Four and non-Big Four auditors, suggesting that audit firm size alone does not guarantee superior audit quality.

Tyokoso, U-ungwa, and Ojonimi (2017) examined the effect of audit quality on the performance of deposit money banks in Nigeria using secondary data from eight banks. Panel regression analysis was employed. The findings revealed that auditor tenure significantly affects Tobin's Q, while client importance has a negative and significant relationship with firm value. Audit firm size and auditor specialization showed mixed and largely insignificant effects. The study recommended an auditor tenure of at least three years to enhance bank performance.

Zayol and Kukeng (2017) reviewed literature on the effect of auditor independence on audit quality in Nigeria using an ex-post facto research design. The study identified a strong relationship between auditor independence and audit quality. It also highlighted key threats to auditor independence, including client importance, provision of non-audit services, audit tenure, and client affiliation. The study recommended further empirical investigation of these threats across various sectors of the economy, including manufacturing, transport, media, and education.

Motoke and Omwenga (2016) assessed the relationship between audit quality and financial performance of firms listed on the Nairobi Securities Exchange. The study utilised both primary and secondary data from nine listed companies and applied descriptive statistics and multiple regression analysis using SPSS. The findings revealed a positive and significant relationship between audit quality and financial performance. The study further noted that audit independence had a relatively weaker effect compared to other audit quality indicators. It was recommended that firms engage reputable audit firms with strong ethical standards and proven credibility.

METHODOLOGY

Research Design

Research design refers to the overall plan and structure that guides a study, serving as a roadmap for data collection, analysis, and interpretation. It provides a logical framework that enables the researcher to draw inferences about the relationship between variables under investigation (Njoku, 2014).

This study adopted the survey research design. The survey method was considered appropriate because it allows the researcher to obtain data from a representative sample of a large population at a specific point in time. It also enables the researcher to examine different components of the population using selected respondents, thereby ensuring representativeness and generalisability of findings.

Population of the Study

The population of the study comprised staff of selected audit and accounting firms in Abuja, totaling 287 respondents.

Sample Size Determination

For this research, the sample size was derived using Cochran's(1963:75)sample size formula. This is given as:

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

where:

n_0 =Representative sample for proportions

n = Sample Size

N =Population Size

e =Allowable sampling error taken at 5%=0.05

p =Proportion of success in the population from pilot survey = 0.50

q =proportion of failure in the population from pilot survey=0.50 However:

$$n_0 = \frac{Z^2 pq}{e^2}$$

where; Z^2 is the abscissa of the normal curve (1.96), q is 1- p and e is the (0.05).

Substituting these values into Equation 3.2, we have:

$$n_0 = \frac{Z^2 pq}{e^2} = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2} = 385 \dots\dots\dots(3.3) \text{ Substituting } n_0 = 385$$

from Equation 3.3 into Equation 3.1, we have:

$$n = \frac{385}{1 + \frac{(385-1)}{287}}$$

$$n = \frac{385}{1 + 1.3379790941}$$

$$n = \frac{385}{2.3379790941} = 164$$

Having applied the Cochran sample size derivation statistic, the value derived was one hundred and sixty-four (164); hence, the sample size for this study is one hundred and sixty-four respondents.

Sampling Technique

The study employed the simple random sampling technique. This method was adopted because it gives each member of the population an equal chance of being selected. It also reduces selection bias and enhances the validity and reliability of the study findings.

Instrument for Data Collection

Primary data were used for this study and were collected through a structured questionnaire designed using a five-point Likert scale. The questionnaire was selected because it allows the collection of large volumes of data from respondents within a short period. It also facilitates easy quantification, scientific analysis, and comparison with findings from other studies.

Validity of the Instrument

Validity refers to the extent to which an instrument measures what it is intended to measure. The validity of the research instrument was ensured through content validity. The questionnaire was reviewed by experts and other researchers to confirm that the items adequately captured the variables under investigation.

Reliability of the Instrument

The reliability of the instrument was assessed to determine the consistency of the responses. A test-retest method was employed, where the questionnaire was administered to the same group of respondents at different times. The Cronbach's Alpha reliability test was used to evaluate internal consistency, yielding a coefficient of 0.78, which was considered acceptable.

Administration of the Instrument

The questionnaire served as the primary instrument for data collection. It was divided into two sections. Section A captured demographic information of respondents, while Section B contained items designed to address the research questions. The instrument was structured using a five-point Likert scale ranging from 5 (Strongly Agree) to 1 (Strongly Disagree).

Method of Data Analysis

Data were analysed using frequency tables and percentages to describe the demographic characteristics of respondents and answer the research questions. In addition, the independent samples t-test was used to test the study hypotheses.

RESULTS AND DISCUSSION

In this section of the study, data obtained through the administration of structured questionnaires were analysed using frequency tables and corresponding percentages to present the demographic characteristics of respondents. The hypotheses formulated for the study were tested using the Ordinary Least Squares (OLS) technique, with regression analysis employed to determine the relationships between the variables. The Statistical Package for Social Sciences (SPSS) was used for data analysis. A total of 164 questionnaires were distributed to respondents, out of which 148 were duly completed and retrieved, representing a high response rate suitable for analysis.

Table1: Gender Distribution of the Respondents

Gender	Frequency	Percentage
Male	89	60
Female	59	40
Total	148	100

Source: Field Survey, 2026.

Table 1 shows that 60% of the respondents are male, while 40% are female. This indicates that male employees constitute a larger proportion of the respondents in the selected audit and accounting firms compared to their female counterparts.

Table 2: Age Distribution of the Respondent

Age(In Years)	Frequency	Percentage
18-25	25	17
26-35	29	20
36-45	78	53
46and above	16	10
Total	148	100

Source: Field Survey, 2026.

Table 2 shows that 25 respondents (17%) are between 18–25 years of age, 29 respondents (20%) fall within the 26–35 years age bracket, 78 respondents (53%) are between 36–45 years, while 16 respondents (10%) are aged 46 years and above. This indicates that the majority of the respondents are within the 36–45 years age category.

Table3: Respondent Years of Working Experience

Working Experience	Frequency	Percentage
1-3	11	7
4-6	29	20
6yearsandabove	108	73
Total	148	100

Source:FieldSurvey,2023.

Table3statisticallyshowsthatonly7%oftherespondents(representingtwpersons)have1- 3 years of working experience, 20% (representing 29 persons) have 4-6 years of working experiencewhile73%(representing 108 persons) have working experience that is 6years and above. This information showed that the majority of the respondents have acquired good working experience and therefore should have a good knowledge of the study variables.

Test of Hypotheses Hypothesis 1

Ho: There is no significant problems with auditing in a cloud accounting environment in Nigeria.

Table 4:

IndependentSamplest-test

	Levene's Test For Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal Variances Assumed	208.552	.000	3.095	27	.005	.36364	.11751	.12253	.60474
Equal variances not assumed			2.390	10.000	.038	.36364	.15212	.02469	.70258

FromTable4, the independent samplet-testgaveanf-value of 208.552andat-value of 2.390 and this is significant at .000. Since .000 is less than 0.05, this means that at .05 level of significance, the p-value of .000 is significant. This implies that there are no significant problems with auditing in a cloud accounting environment in Nigeria.

Hypothesis 2

Ho2: There are no significant prospects with auditing in a cloud accounting environment in Nigeria.

Table 5

Independent Samplest-test

	Levene's Test for Equality of Variances		T-testforEqualityofMeans						
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper

Equal variances assumed	66.336	.000	1.792	43	.080	.35897	.20034	-.04505	.76300
Equal variances not assumed			4.613	38.000	.000	.35897	.07782	.20144	.51651

From Table 5, the independent sample t-test gave an F-value of 66.336 and a t-value of 4.613 and this is significant at .000. Since .000 is less than 0.05, this means that at .05 level of significance, the p-value of .000 is significant. This implies that there is significant prospects with auditing in a cloud accounting environment in Nigeria.

IMPLICATIONS

The findings of this study indicate that auditing in a cloud accounting environment has become an established practice with significant future potential. The results further reveal that there are no major challenges hindering its adoption, while substantial prospects exist for its continued development in Nigeria.

This implies that auditors and accounting professionals must acquire relevant cloud computing competencies to remain effective and competitive in the evolving digital accounting environment. Continuous capacity building and technological upskilling are therefore essential for professional relevance in the field.

CONCLUSION

Based on the findings of the study, it is concluded that auditing in a cloud accounting environment does not present significant operational problems. Instead, it offers considerable opportunities and prospects for improved efficiency and effectiveness in audit practice within Nigeria.

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