

EFFECT OF INFORMATION COMMUNICATION TECHNOLOGY ON AUDIT QUALITY OF LISTED NIGERIAN CONSUMER GOODS FIRMS

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Abstract

This study investigated the effect of information communication technology on audit quality of listed consumer goods firms in Nigeria. The study focused on the effect of hardware and software on audit quality of listed consumer goods firms in Nigeria for a 12 years period spanning from 2011 to 2022. The entire population of the study is 21 listed consumer goods while the sample size of 10 listed consumer goods firms was selected. The study was built on the longitudinal panel research design and employed the use of secondary data which was gathered from the annual financial statements of sample firms. The study employed descriptive statistics, correlation analysis, hausman specification tests, variance inflation factors analysis and regression tests using the E-views 10 software. The study employed discretionary accrual as the proxy for measuring audit quality. The study found that both ICT hardware and ICT software had positive and significant effect on audit quality. The study concluded that ICT was significant in determining audit quality in the consumer goods industry of Nigeria. The study recommended that consumer goods firms should explore and adopt robust audit software solutions that are specifically designed to enhance audit quality. These may include advanced data analytics tools, artificial intelligence (AI)-enabled auditing software, and other technological solutions that can automate routine audit tasks and provide deeper insights into financial data.

Keywords: Information Communication Technology, Hardware, Software, Audit Quality and discretionary accrual

INTRODUCTION

In the dynamic landscape of business and finance, the integration of Information Communication Technology (ICT) has become a pivotal force reshaping the operational paradigms of organizations worldwide (Barde *et al.*, 2019). This transformative wave has extended its influence to the realm of audit practices, particularly within the listed Nigerian consumer goods firms. The intersection of Information Communication

Technology and audit processes has given rise to a multifaceted impact on the quality of audits conducted in this sector. As technology continues to evolve, its role in financial auditing becomes increasingly intricate, promising improved efficiency, accuracy, and transparency (Wada, 2021).

Sun and Vasarhelyi (2018) stated that Information Communication Technology hardware refers to the physical components and devices that

form the infrastructure for information processing, storage, and communication. While, Information Communication Technology software comprises the intangible programmes, applications, and instructions that enable hardware to perform specific tasks and functions. Software plays a crucial role in managing, processing, and manipulating data. These tangible elements enable the functioning of computer systems and electronic communication. Odoma (2019) posited that the world has become a global village with the internet, smart phones, neural networks and Artificial intelligence aggressively minimizing the effects of time and space, bringing together computers and communication systems and resulting in new ways of communicating, processing, storing and distributing enormous amounts of information. Barde, et al (2019) Advancement in chip, satellite, radio, and optical fiber technology allow billions of people across the globe to communicate digitally in real time regardless of physical distance. Many firms in contemporary times employ some form of ICT tools as a way to achieve and maintain the relevant competence needed not only to survive but to thrive. The need for ICT facilities is cuts across all sizes of businesses and organizations. Even small-scale retail outlets now employ ICT as a means of increasing sales, reducing costs and eliminating wastage. The use of ICT does not necessarily mean installing servers and operating websites. It could be as simple as having an email address, an online catalogue, or just having a simple online presence. Sadr and Gudarzi (2012) argued that contemporary business environment is very dynamic and undergoes rapid evolution as a corollary of technological innovation, increased awareness and demands from customers. Matthew and Ibikunle (2012) were of the opinion that ICT

infrastructural layout of a firm was a suitable tool used for rating a modern business firms. They further posited that Banks in particular adopt information and communication technology to improve the efficiency and effectiveness of services offered to customers, improve business processes, as well as to enhance managerial decision making and workgroup collaboration. ICT is the application of ICT tools to the operations of an organization by using computers, software, telecommunications and technological gadgets to carry out activities in an organization that could alternatively be done manually or without these tools mentioned above. One reason why ICT is attached so much relevance is that it allows a low margin of errors and it is one of the fastest ways to get work done in the office and outside the office.

Information Communication Technology (ICT) plays a crucial role in enhancing the efficiency, accuracy, and reliability of audit processes. The hardware and software components employed in the audit process are integral to harnessing the benefits of technology for comprehensive financial examinations. The integration of these ICT tools not only enhances the effectiveness of audits but also aligns with the evolving landscape of technology in the financial domain (Thottoli, & Thomas, 2022). The goal of an audit is to enable the professional give an independent opinion on a subject matter as specified in the details of the audit engagement. Audit quality is a measure of how well an auditor can achieve this goal. De Angelo (1981) stated that audit quality can be seen as the measure of how well the external auditor will detect and report any matter of significant interest in the accounting records and system of the client. This largely depends on the level of skills that

the auditor can demonstrate in order to properly understand the financial status of the client and on the auditor's independence to carry out objective analysis and reporting on the subject matter. Accountants, as described in the code of professional conduct, perform an essential role in society. It is believed that to carry out a successful audit, there are many basic characteristics of an audit. Therefore, the quality of an audit exercise is perceived to be better if the auditor can demonstrate some basic characteristics. These characteristics are demonstrated through the application of resources, values, ethics, knowledge and experience of the auditor IAASB, (2013). Resources used in auditing may go a long way in determining the quality of the output.

The application of ICT has proved to be useful in many sectors of the economy. There is need to understand how the use of ICT affects the quality of audit in Nigeria. In contemporary times, there has been significant effort by researchers to identify the true nature of relationship between ICT and audit quality. These efforts include Agbola (2022), Wada (2021) and Semiu *et al.*, (2014). These research efforts mainly employed the use of empirical analysis and primary data to make findings and conclusions. There is limited research effort that seeks to understand the effect of ICT on audit quality in Nigeria using quantitative secondary data and scientific statistical analysis. This study filled the observed methodology gap using secondary data which is analyzed using regression techniques on the E-views 10 software. In order to achieve the objectives of this study; two hypotheses were formulated as follows:

Ho₁: ICT hardware has no significant effect on the audit quality of listed consumer goods firms in Nigeria.

Ho₂: ICT software has no significant effect on the audit quality of listed consumer goods firms in Nigeria.

LITERATURE REVIEW

Conceptual Framework

Information and Communication Technology (ICT)

Philip and Omolade (2017) defined Information and Communication Technology (ICT) as the automation of procedures, internal controls, and information management using computers, software's and related equipment that ensure effective and efficient progression of activities. It is a terminology that mainly covers the introduction of electronic technology for the information needs of a business at all levels. Sun and Vasarhelyi (2018) stated that ICT was an acronym that denoted the use of computerized equipment for communication and also management of information. The use of computer related equipment can be to collect, store, prepare, analyse, interpret and present information. They went further to posit that every human activity employs some form of ICT tool in its operations. They went further to state that ICT tools had two different categories which are software tools and hardware tools.

This study defined ICT as the summary of all computer related technologies which an organization adopts for the purpose of managing information and data in line with the firm's basic operations and objectives. This study views ICT as the tangible ICT tools (hardware) and intangible ICT tools (software). The study believes that it is the combination of these two categories that makes ICT. To use software, there is need for hardware which the software needs to be operated on and vice versa.

Information and Communication Technology Software

Information and Communication Technology (ICT) software constitutes the intangible and programmatic aspect of computing systems, playing a crucial role in instructing hardware to perform specific tasks. It encompasses a diverse range of applications, operating systems, development tools, and utilities that collectively enable the functionality and interactivity of digital devices (Davies *et al.*, 2018). The concept of ICT software extends beyond mere programs; it encapsulates the algorithms, code, and digital instructions that govern the behavior of hardware, shaping the entire computing experience.

At the core of ICT software are operating systems, serving as the foundational software layer that manages hardware resources and provides a user interface. Examples include Microsoft Windows, macOS, Linux, and Android. Operating systems facilitate communication between hardware components, manage memory and storage, and provide a platform for running applications. Application software represents the programs designed to perform specific tasks for end-users (Kacanski, 2016). This category includes a vast array of software applications tailored to diverse needs, such as word processors (e.g., Microsoft Word), spreadsheet software (e.g., Microsoft Excel), presentation software (e.g., Microsoft PowerPoint), graphic design tools, and specialized industry-specific applications.

Information and Communication Technology Hardware

Information and Communication Technology (ICT) hardware constitutes the tangible and physical components that collectively form the backbone of computing systems. It encompasses a diverse range of devices and equipment designed to facilitate the processing,

storage, transmission, and retrieval of digital information. The evolution of ICT hardware has been instrumental in shaping the technological landscape, ushering in unprecedented advancements in computing power, connectivity, and user accessibility. At the core of ICT hardware are computing devices, which include personal computers, laptops, servers, mainframes, and more. These devices serve as the primary engines for executing complex computational tasks. Over the years, advancements in processor architecture, memory capacities, and graphical processing units (GPUs) have led to significant improvements in computational efficiency and overall system performance.

ICT hardware encompasses a wide array of networking components that enable the seamless exchange of data between devices. Routers, switches, and hubs form the infrastructure for local area networks (LANs) and wide area networks (WANs), facilitating efficient communication and data transfer. Cables, both wired and increasingly wireless, connect these devices and contribute to the creation of interconnected systems. In the era of interconnectedness, communication devices form an essential category of ICT hardware. Smartphones, tablets, and other mobile devices serve not only as communication tools but also as portable computing devices (Sun & Vasarhelyi, 2018). These devices enable users to access information, communicate, and perform a myriad of tasks on the go.

Advancements in ICT hardware continually introduce innovative technologies. Quantum computing, for instance, represents a paradigm shift in computational capabilities, harnessing the principles of quantum mechanics to perform complex calculations

exponentially faster than traditional computers. Wearable devices, augmented reality (AR), and virtual reality (VR) technologies further expand the scope of ICT hardware applications (Wada, 2021).

Audit Quality

Audit quality refers to the overall effectiveness, reliability, and credibility of an audit process and the resulting financial statements, it is a multidimensional concept that encompasses the auditor's performance in conducting an examination of an entity's financial information and providing assurance on the accuracy and fairness of the presented financial statements (Bala, 2020). The assessment of audit quality involves various factors that collectively contribute to the integrity and trustworthiness of the audit outcome. McMullen and Raghunandan (2016) expressed audit quality at the degree of assurance that users of audit opinion can get that a particular audit was properly carried out. Since the aim of an audit is to provide reasonable assurance on financial statements, the quality of audit is the likelihood that financial statements contain no material misstatements which were not detected by the auditor. Geiger and Rama, (2006) posited that audit quality is not exclusively about auditing standards but also concerned about the quality of people, their training and ethical standards. The Financial Reporting Council posits that the skills, personal qualities of audit partners and staff, and the training given to audit personnel are prominent considerations that determine audit quality (Francis & Wang, 2014). Quality audit is the process of systematic examination of a quality system carried out by an internal or external quality auditor or an audit team. It is an important part of an organization's

quality management system and is a key element in the ISO quality system standard,

Discretionary Accrual

According to Matsunga (2016), discretionary accrual is a total accrual that is not readily visible and is instead managed by the business. The Jones (1991) model's primary flaw, according to Dechow *et al.*, (1995), is the assumption that non-discretionary accruals are only collected revenues. Total revenues are not accounted for in non-discretionary accruals, per the Jones (1991) model. The modified Jones model is then shown to be superior to the Jones (1991) model in identifying instances of revenue manipulation by Dechow, *et al.*, (1995). The modified Jones model regresses total accruals on gross property, plant, and equipment while accounting for changes in accounts receivable to compute non-discretionary accruals. As a result, it is assumed that the model is more powerful than previous models for calculating discretionary accruals. As a result, it is believed that the model outperforms other models in estimating discretionary accruals.

According to previous studies, the modified Jones model operates more effectively than other models of discretionary accrual. For instance, the effectiveness of five discretionary accrual models, such as those developed by Healy (1985), DeAngelo (1986), Dechow and Sloan (1991), Jones (1991), and Dechow *et al.*, (1995), was examined. According to the outcomes of the empirical tests, The Jones and modified Jones models were the most effective in detecting earnings management. Both the original Jones model from (1991) and the updated Jones model were developed as time series. Instead of utilizing the time series model, the cross-

sectional Jones model, which is claimed to be more accurate at calculating accruals. Because no alternative models are currently available for calculating discretionary accruals, the modified cross-sectional Jones Model is thought to be the most successful. However, the approach has been criticized for being prone to measurement mistakes, particularly when calculating discretionary accruals for enterprises in a diverse industry. Yet, the model beats others in that it predicts discretionary accruals with low inaccuracy (Bello & Yero, 2011).

Firm Size

Firm size refers to the size of the business unit. It may also be defined as the number of operations carried out by a single company (Falope & Ajirole, 2019). Because of the economies of scale phenomena, firm size is most critical to its success. Modern businesses strive to increase their intensity in order to get a competitive advantage over their competitors by lowering production costs and increasing market share. Larger businesses may manufacture things at significantly lower prices than smaller businesses. The volume or collection of a business's capacity to create and wherewithal, or the amount and diversity of value that a corporation may deliver to its consumers at the same time, is referred to as its size. According to this notion, company size is a factor in determining business profitability, and various experts have shown a positive link exists between the size of a corporation and its profitability.

According to Akinyomi and Olagunju (2013), firm size refers to the size of the firm and the activities of the commercial organisation. In today's environment, due to economies of scale, the size of a corporation plays a highly crucial part in competing with competitors through

cost reduction and taking and holding more possibilities. According to this notion, company size is a factor in determining business profitability, and various experts have shown a positive link exists between the size of a corporation and its profitability. According to Akinyomi and Olagunju (2013) Company size has been identified as an important element in explaining organisational profitability, and a number of research have attempted to investigate the influence of firm size on profitability. Jasch (2013) agreed, stating that because large enterprises have a larger market share, they may earn more. As a result of these circumstances, large enterprises function in more profitable environments with rivalry. In corporate finance Empirical researchers also regard firm size to be a significant and fundamental firm characteristic, and they detect the size effect - company size matters in affecting the dependent variables in many scenarios.

Empirical Review

Agbola (2022) investigated the effect of ICT Infrastructure on Audit and Assurance Performance in Nigeria. The study was focused on developing the knowledge on how the application of digital tools in the Nigerian business environment influences the ability of auditors to fulfill their engagement objectives. The study was structured in the characteristics of an exploratory research design. The study did not employ the use of any statistical tool in its analysis to determine its findings and conclusions. The study failed to give a time scope and did not limit its area of audit interest to any particular sector of the Nigerian economy. The study relied on the use of literary works to gather relevant information for carrying out the research. The empirical analysis revealed that ICT had a significant and positive effect on the quality of audit and

assurance in Nigeria. The study consequently concluded that ICT was a significant determinant in the quality of audit and assurance services carried out in Nigeria. The study recommended that there should be increased adoption of ICT tools to improve audit processes.

Thottoli and Thomas (2022) examined the effect of the relationship between characteristics of information communication technology (ICT, adoption, confidence, competency and training) and auditing practices in India. The study was built on the survey research design and employed the use of questionnaires to gather relevant research data. The study sample was made up of 89 practicing chartered accountants within the Kerala region. The study employed the use of SPSS to analyze the data gathered. The findings confirmed that there is a positive relationship between three components of ICT factors on audit practice, namely, ICT adoption, ICT competency and ICT training, whereas the factor, ICT confidence has a negative relationship with audit practice. Thus, the availability of ICT-competent staff, their practical ICT knowledge, sufficient and adequate ICT training assist audit firms from doing audit by implementing customized audit software for audit practice. The study concluded that ICT was a useful tool in promoting improved audit quality. The study recommended improved ICT adoption by auditors in order to meet up with the widespread adoption of ICT tools.

Wada (2021) studied the impact of ICT Tools on Audit of Corporate Organizations in Nigeria. The study was built on the exploratory research design and was devoid of statistical analysis. The study relied on the use of empirical analysis to gather data, analyze and

draw conclusions on the research objectives. The study measured audit quality based on choice of audit procedures. The study found that application of ICT tools had a significant effect on the quality of audits. The study concluded that the deployment of ICT techniques was influential in determining the success and quality of an audit. The study recommended that auditors should be technologically equipped in order to handle future challenges as more corporations deployed and implement ICT tools. The study also recommended auditor must play active role in the implementation phase of a corporation to ensure that controls systems are not compromised.

Kacanski (2016) attempted to study the relationship between communication techniques and audit quality in Denmark. The study focused on a population of Danish subsidiaries of the big 4 audit firms. The study gathered relevant information by carrying out interviews. The results highlight that superior auditors tend to experience prevalent trust in ICT tool over subordinate auditors, where such conditions reduce the opportunity for experiencing comfort by subordinates, while superiors still perceive comfort due to being comfortable with procedures that are administered by the tool. The study concluded that the use of ICT tools will guarantee superior audit quality within the study sample. The study failed to proffer recommendations based on its findings.

Semiu *et al.*, (2014) attempted to evaluate the perception of influence of technology tools implementation on audit processes in Nigeria. The study is an exploratory research and provides an empirical analysis of input supplied by a sample of 173 professional auditors across 67

companies from 5 major sectors of the Nigerian Stock Exchange. The study employed the use of qualitative techniques such as Analysis of Variance (ANOVA) to test the research hypothesis. The study found that there was no significant effect of ICT tools on the quality of audit exercises. The study concluded that any additional usefulness of ICT in the audit process is neutralized by the improved functionality of systems due to ICT usage. The study argued that auditors will always demonstrate professionalism in audit engagements regardless of ICT tools employed. The study recommended that management of firms should escalate the adoption of ICT within their firms.

Benjamin *et al.*, (2020) investigated the effect of electronic-auditing by internal auditors for the improved economic value of listed companies in Nigeria. The study adopted a survey research design. The sample size of the study consisted of 24 companies selected from the eleven industrial subsectors (Agriculture, Conglomerates, Construction, Consumer goods, financial services, Services, Health Care, ICT, Industrial goods, Natural Resources and Oil and Gas sectors) among the 161 listed companies on the Nigerian Stock Exchange as at 30 November 2019. The sample frame of this study is 5,012 respondent units, and the sample size is 501, comprising 401 internal auditors and 100 top management staff. A validated structured questionnaire with a five-point Likert-type scale was administered, and 78.443% response rate was achieved. Random sampling technique was adopted in the selection of the 24 companies with about two companies representing each sector. The research instrument was subjected to content validity and reliability test, which yielded Cronbach's alpha coefficient value of 0.80. The findings

revealed that electronic-auditing had a positive and significant effect on the economic value of listed companies in Nigeria. The study recommended that management of listed companies in Nigeria should strengthen the internal auditors through regular training and recognise the internal audit function alongside the external auditors as a critical component of good corporate governance that can assist the audit committee and board of directors of organisations in improving the economic value of listed companies in Nigeria.

Oladejo *et al.*, (2021) evaluated the attributes of internal audit practice and its influence on reporting quality of selected firms. Secondary data of nine (9) years range (2010 to 2019) were obtained from the financial reports of (4) four food and beverages firms purposively selected out of the twenty-three (23) listed on the Nigeria Stock Exchange as of December 2020. The internal Audit practice is the independent variable in this study and it is measured by three factors (Internal Audit fee, Technical Proficiency of internal auditor, and Firm Size). The dependent variable is the financial reporting quality. Mean ranking analysis was used to evaluate determinants of Internal Audit attributes in the selected firms while regression analysis was employed to measure the influence of internal audit quality on the financial reporting quality of sampled firms at 95% confidence level. The overall results ($R^2 = 0.8481$; $F\text{-values} = 21.51$ and $P\text{-Value} = 0.000$) revealed that all the identified internal quality attributes (Internal Audit fee, Technical Training Proficiency, and Firm Size) were significantly related to internal audit practice and positively influence the financial reporting quality and performance of selected sampled food and beverages firms in Nigeria.

Nwanyanwu (2017) examined the influence of audit quality practices on financial reporting in Nigeria, drawing evidence from auditing firms. Data were collected through questionnaire. Univariate, bivariate and multivariate analyses were performed using descriptive statistic, Pearson Product Moment Coefficient of Correlation and stepwise multiple regression. Findings indicate a statistically significantly positively strong relationship between the measures of audit quality (auditor independence, technical training and proficiency and engagement performance) and financial reporting (measured in terms of reliability of financial report). Auditor independence has the highest explanatory power of variations in reliability of financial report of 47.9%. In addition, the regression model with only auditor independence produces the highest value of reliability of financial report. Given the existence of technical training and proficiency and engagement performance, auditor independence is a prime audit quality in financial reporting. Accounting practitioners should imbibe the ethics of independence to achieve credibility and reliability required of financial reports.

Theoretical Framework

Technology Acceptance Model (TAM)

The Technology Acceptance Model, popularly known as technology acceptance model (TAM), was proposed by Davis (1989). According to Wikipedia (2019) the model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it. These factors were summarized as Perceived usefulness which was defined by Fred Davis (1989) as the degree to which a person believes that using a particular system would enhance his or her performance and

secondly, Perceived ease of use which is seen as the degree to which a person believes that using a particular system would be free from effort. This makes sense as the developments in the ICT tools and uses are always bringing out useful solutions to relevant problems and these solutions are relatively easy to implement. Davis (1989) proposed the TAM to focus in the reason the users accept or reject the information technology and how to improve the acceptance, off erring, this way, a support to foresee and explain the acceptance. The model TAM was designed to comprehend the causal relation between external variables of user's acceptance and the real use of computer, trying to understand the behaviour of this user through the utility knowledge and use facility perceived by him (Davis, 1989). The reason this theory is relevant to this study is that it seeks to describe why the development of ICT has enjoyed widespread acceptance across the world and despite the ever-changing ICT climate, all participants and users are eager to keep up with the rapidly evolving phenomena

Agency Theory

Agency theory was mainly introduced by Jensen and Meckling (1976). The agency theory is a set of principles that used to explain and resolve issues in the relationship between business principals and their agents. Most commonly, that relationship is the one between shareholders, as principals, and company executives, as agents. There is the high likelihood that agents will make decisions on costs that the principal will bear in pursuit of their objectives. There is also a likelihood that when this occurs, the view of the principal and agent might differ as to some intricacies in the operations of the agent on behalf of the principal. An agent may sometimes carry

out activities that might ultimately be to the detriment of the company and stakeholders to satisfy their selfish need (Abubakar, et al, 2015). According to Fields et al (2001), when agents have greater access to the information as compared to the principals, the issue of information asymmetry arises. This emerges as the agent has access to information that is superior to the information accessible to the principal (Bala, et al, 2020). Agency theory focuses on the principal agent problem that arises in such relationships. It holds that managerial behavior can be opportunistic and fuelled by self-interest (Davis, et al, 2018). The agency theory also assumes that the costs of agent's activities are to be paid by the principal whom the agent acts on behalf and that the agent. Guo, et al (2015) argued that an agent's ability to satisfy the principal is largely dependent on the finance allocated to the agent for said purpose. This means that the agent's ability to function on behalf of a principal is somewhat limited to the resources which the principal has made available for use. This gives the motivation for using audit fees as proxy for measuring audit quality.

Innovation Diffusion Theory (IDF)

This is the theoretical framework that underpins this research work. Odoma (2019) describes this as a theory that seeks to explain how, why, and at what rate new ideas such as the use of ICT spread. This theory was made popular by Rogersin (1962). Rogers initially proposed that four main pillars affect the spread of new technology; these are the innovation itself, communication channels time, and a social system. Rogers (1983) explained the process of technological diffusion as one which is dictated by uncertainty reduction behaviour amongst potential adapters during the introduction of

technological innovations. To counter this uncertainty, potential adopters are motivated to seek additional information, particularly from their workplace peers (Brancheau & Wetherbe, 1990). Rogers (1983) singled out the following five characteristics of innovations that consistently influence the adoption of new technologies. First, Relative advantage that is the degree to which an innovation is perceived to be an enhancement of the current offerings. Secondly, Compatibility that refers to the extent to which an innovation is perceived to fit together with potential adopters' habits and practices. Third, Complexity that refers to the degree to which an innovation is perceived being complicated to use. Fourth, Observability that is the degree to which results of an innovation are observable to others. Fifth, Triability that refers to the degree to which an innovation may be sufficiently tested prior to adoption. Having witnessed the comparative advantage presented by adoption of latest technological advancements, then observing how compatible these changes are with existing systems and how easy it is to understand the trends which have led to public demonstration of the positive results of these trends coupled with been easily tested, the Nigerian economy quickly joined the rest of the world in adopting the developments of ICT in order to reap all the perceived benefits. As regards information systems, Moore & Benbasat (1991) built on the work of Rogers, amongst others and expanded the array of innovation characteristics to seven. Three out of these seven characteristics were directly lifted from the work of Rogers. These three are relative advantage, compatibility and triability. The remaining four are ease of use, results demonstrability and visibility. The innovation diffusion theory is significant to this study as it helps to understand

why people and even entire nations gravitate towards the assimilation of ICT and how it helps boost the financial attractiveness of such nations to foreign investors.

Innovation Diffusion Theory provides a valuable lens for understanding how the adoption of ICT in auditing processes unfolds. The theory's focus on stages of adoption, adopter categories, perceived advantages, compatibility, trialability, observability, communication channels, and social system factors helps explain the dynamics underlying the integration of technology in the audit profession and its impact on audit quality.

METHODOLOGY

This study is fitted into the ex post facto research model. The entire population of

this study is made up of all the 21 listed consumer good firms listed on the Nigerian exchange group for a period of 12 years spanning from the year 2011 to 2022. The Convenience Sampling Technique was employed by this research to choose the sample size. The operational sample size for this study is ten (10) consumer goods firms listed on the Nigerian Exchange Group. To carry out the necessary analysis to fulfil the study objectives Descriptive statistics, Variance Inflation Factors, Correlation Analysis, Hausman Specification Tests and Random Effect regression were all computed with the related data using the E-views software.

The regression model used to test the hypotheses was adopted from Agboola (2022). as stated below:

$$DAC = \alpha_0 + \beta_1 ICTS + \beta_2 ICTH + \beta_3 FSZ + \epsilon \text{ ----- (i)}$$

Where;

DAC = Discretionary Accruals

ICTS = ICT Software

ICTH = ICT Hardware

FSZ = Firm Size

β = coefficient of parameter estimate

ϵ = error term

t = time

For this study, the Apriori expectation posits that a growth in ICT will have a positive and significant effect on the audit

quality of listed consumer good firms in Nigeria. The table below shows a summary of the proxies used to represent the variables used in the study.

Table 1: Measurement of Variables

S/n	Proxy	Type	Measurement	Source
1	Discretionary Accrual (DAC)	Dependent	$DAC = \Delta Rev - \Delta Rec + \Delta PPE$ TA	Modify Jone Model (1995)
2	ICT Software	Independent Variable	Book value of firm's software	Sun and Vasarhelyi (2018)
3	ICT Hardware	Independent Variable	Annual Depreciation for Computer and related equipment	Sun and Vasarhelyi (2018)
4	Firm size (FSZ)	Control	Measure as natural log of total Asset	Alade (2018)

Source: Researchers Compilation (2023)

RESULT AND DISCUSSION

Descriptive Statistics

In order to have glimpse of the data used in the study, a first pass at the data in form of descriptive statistics was carried

out. This gives us a good idea of the patterns in the data used for the analysis. The summary statistics is presented in Table 2.

Table 2: Descriptive Analysis Result

	DAC	ICTH	ICTS	FSZ
Mean	0.445245	2931953.	70799553	6.129485
Median	0.500000	1019354.	4801452.	6.008322
Maximum	0.979408	72252000	6.09E+08	8.589689
Minimum	0.000000	40446.00	-9234.000	4.606876
Std. Dev.	0.298096	8679052.	1.35E+08	0.814931
Skewness	-0.201353	7.060816	2.238310	0.946456
Kurtosis	1.488979	53.65746	7.277635	4.088668
Jarque-Bera	12.22678	13828.00	190.0940	23.84158
Probability	0.002213	0.000000	0.000000	0.000007
Sum	53.42938	3.52E+08	8.43E+09	735.5382
Sum Sq. Dev.	10.57446	8.96E+15	2.16E+18	79.02933
Observations	120	120	120	120

Source: Author's Computation Using E-views 10 (2023)

The table above shows the results of the descriptive statistics of the variables of the study. The mean values for discretionary accrual, ICT hardware, ICT software and firm size was 0.445245, 2931953, 70799553 and 6.129485 respectively. This indicates that the variables of interest demonstrated an increasing trend throughout the study period. The skewness values for ICT hardware were 7.060816 and this indicates that there was a significant and positive skewness in the series. The skewness values of 2.238310 and 0.946456 represent ICT software and firm size respectively. These are positive values and they indicate that both series were positively skewed. The kurtosis values of 1.488979, 53.65746, 7.277635 and 4.088668 respectively represent discretionary accrual, ICT hardware, ICT software and firm's size. This indicates that the values are leptokurtic because the values are all higher than 3 except for discretionary accrual. In interpreting the probability values, the null hypothesis states that the data is not normally

distributed. The decision rule is to reject the null hypothesis if the corresponding probability value is higher than the 0.05 level of significance. The probability values of 0.0022678, 0.000000, 0.000000 and 0.000007 representing DAC, ICTH, ICTS and FSZ. All the probability values were all below the value of 0.05. This indicates that the variables were not normally distributed.

Correlation Analysis

Table 3 presents correlation values between dependent and independent variables and the correlation among the independent variables themselves. These values are generated from Pearson Correlation output. The Table contains correlation matrix showing the Pearson correlation coefficients between the dependent and independent variables and among the independent variables of the study. Table 3 shows the correlation between the dependent variable, DAC and the independent variables of ICTH, ICTS, and FSZ among the independent variables themselves

on the other hand. Generally, a high correlation is expected between dependent and independent variables while a low correlation is expected among independent variables. According to Gujarati (2004), a

correlation coefficient between two independent variables of 0.80 is considered excessive, and thus certain measures are required to correct that anomaly in the data.

Table 3: Correlation Analysis Result

Covariance Analysis: Ordinary

Date: 11/19/23 Time: 18:09

Sample: 2011 2022

Included observations: 119

Balanced sample (listwise missing value deletion)

Correlation Probability	DAC	ICTH	ICTS	FSZ
DAC	1.000000 ----			
ICTH	0.089006 0.3357	1.000000 ----		
ICTS	0.259246 0.0044	-0.096930 0.2943	1.000000 ----	
FSZ	-0.229280 0.0121	0.431554 0.0000	-0.104471 0.2582	1.000000 ----

Source: Author's Computation Using E-views 10 (2023)

The table above indicates the results of the correlation analysis of the study. The results show that ICT hardware had a weak and positive correlation with discretionary accrual. This is shown by the 0.08, correlation value. The results also show that ICT software has a weak and positive correlation with the discretionary accrual variable. This is evidenced by the 0.25 and the P-value correlation value which is positive and less than 0.5. Also, there exerts a positive and significant relationship between property plant and equipment's and firms' size to the tune of 64%, meaning that the higher the firm size the higher the property plant and equipment's. Other association between and within the variables of studies are weak, thus, signifies absence of possible multicollinearity.

Multicollinearity Test (VIF)

Multicollinearity is a statistical concept where several independent variables in a model are correlated. Multicollinearity occurs when one or more independent variants have a stronger influence on others and this condition is a violation of the linear regression model, that so it may affect the validity of the outcome in any analysis.

Multicollinearity tests are performed to test whether there is a strong correlation between independent variables that may result in misleading results. In Table 3, the coefficient for the highest correlation is 0.431554 (between ICTH and FSZ). Therefore, the low degree of correlation between independent variables indicates that multicollinearity

is not a problem in the sample database. However, collinearity diagnostics tests were performed using the variance inflation factor (VIF) to further confirm the absence of multicollinearity problem

between independent mutations. The results of the collinearity diagnostic test are presented in Table 4 below:

Table 4: Multicollinearity Test (VIF)

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.081249	5.150254	NA
ICTH	0.930781	2.165853	1.946104
ICTS	0.224404	3.805892	1.969573
FSZ	15.095735	7.743395	1.972964

Source: E-View 10 Output (2023)

***Decision rule:** Centered VIF less than 10 indicates the absence of multicollinearity, while VIF uncentered over 10 is a sign of multicollinearity. Table 4 above shows the absence of multicollinearity between independent variables, as all independent variables (ICTH, ICTS and FSZ) have value less than 10.

Heteroskedasticity Test

A heteroskedasticity test was performed as a diagnostic check to verify the robustness of the estimates. Heterogeneous variance occurs when the standard error of the variable being monitored is not constant over time. Heteroscedasticity violates linear regression modelling assumptions and can affect the validity of analytical results. On the other hand, heteroscedasticity does not cause any

bias in the coefficient estimates, but it reduces the precision, and less precise coefficients are more likely to be estimated. The estimates are far from the correct population values that have been removed.

***Decision Rule: At 5% level of Significance**

While heteroskedasticity is assumed to be absent in the test's null hypothesis, it is assumed to be present in the alternative hypothesis. In the event that the P value is less than 5% level of significance, the null hypothesis must be rejected.

Hypothesis

H₀: The Error Variances are all Equal (Homoskedastic)

H₁: The Error Variances are not Equal (Heteroskedasticity)

Table 5: Heteroskedasticity Test

Panel Cross-section Heteroskedasticity LR Test

Null hypothesis: Residuals are homoscedastic

Equation: UNTITLED

Specification: DAC ICTH ICTS FSZ C

	Value	df	Probability
Likelihood ratio	167.72477	10	0.0541
LR test summary:			
	Value	df	
Restricted LogL	-14.57336	115	
Unrestricted LogL	19.28903	115	

Source: E-View 10 Output (2023)

Table 5 shows the results of the panel cross-section Heteroskedasticity regression test. The decision rule for the panel cross-section Heteroskedasticity test is stated thus:

The null hypothesis of the test states that there is no Heteroskedasticity, while the alternate hypothesis states that there is Heteroskedasticity. The null hypothesis is not to be accepted if the P value is greater than 5% level of significance. From the result in table 5 above with a ratio value of 167.72477 and a corresponding probability value of 0.0541 which is greater than 5%, the study therefore posits that, there is no reason to reject the null hypothesis. Consequently, based on the diagnostic probability 0.0541 the null hypothesis is not rejected, thus there is homoskedasticity, indicating that residuals are homoskedastic and as such the samples give a true reflection of the population.

Hausman Test

The Hausmann specification test is a model specification test used in panel data analysis to select between fixed and

random effects models. However, the datasets utilized in this investigation were panel, both fixed and random effects regressions was performed. A Hausmann specification test was then used to choose between the fixed-effects and random-effects regression models. This test determined if the error term was connected to the regressor. As a result, the decision rule for the Hausmann specification test is presented at a 5% level of significance:

H_0 : Random effect is more appropriate for the Panel Regression analysis

H_1 : Fixed effect is more appropriate for the Panel Regression analysis

As previously stated, if the p-value is less than 0.05, the null hypothesis is rejected. According to the null hypothesis, fixed effects are best suited for panel regression analysis (that is, the preferred model is the random effects). Similarly, if the p-value is less than 0.05, the null hypothesis is rejected. As a result, fixed effects are best suited for panel regression analysis (meaning we reject the random effects model).

Table 6: Hausman Test.

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	7.867177	3	0.0488

Source: E-View 10 Output (2023)

The result of the Hausman test appended in the table above provide sufficient evidence not to reject this null hypothesis at 5% level of significance as can be seen that the probability value (0.0488) of the test is less than the critical value of 0.05.

Therefore, the study upholds that difference in coefficients is systematic and hence, the fixed effect model is the most appropriate models for the study.

Test of Research Hypotheses**Table 7: Fixed Regression Result**

Dependent Variable: DAC
Method: Panel Least Squares
Date: 11/19/23 Time: 18:30
Sample: 2011 2022
Periods included: 12
Cross-sections included: 10
Total panel (unbalanced) observations: 119

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.078169	0.213296	5.054799	0.0000
ICTH	8.48E-09	3.26E-09	2.599090	0.0106
ICTS	5.55E-10	1.91E-10	2.910515	0.0043
FSZ	-0.113712	0.034919	-3.256480	0.0015
R-squared	0.558003	Mean dependent var		0.444785
Adjusted R-squared	0.536038	S.D. dependent var		0.299313
S.E. of regression	0.278210	Akaike info criterion		0.312157
Sum squared resid	8.901117	Schwarz criterion		0.405573
Log likelihood	-14.57336	Hannan-Quinn criter.		0.350091
F-statistic	7.193355	Durbin-Watson stat		0.463254
Prob(F-statistic)	0.000181			

Source: E-View 10 Output (2023)

Table 7 display and analyses the panel fixed regression results of the explained variable proxied by DAC as well as the explanatory variables ICTH, ICTS and FSZ. Between the R2 and the adjusted R2,

there is a range of values 55% and 53% respectively. The variation in the dependent variable (DAC) as a result of change in the independent variables is explained by the R2 of 53%. Therefore, it

can be concluded that the independent variables have a combined predictive power of influencing on the audit quality of listed consumer goods firms in Nigeria, with the remaining 45% been explained by other factors not included in the model. Furthermore, the regression results as presented above reveals an intercept of (1.07) which is positive. This simply implies that when other variable are held constants, the audit quality of consumer goods firms increases by 1.07. The result of the constant is statistically significant, as indicated by a P-value of 0.0000.

On the basis of the individual variable, the analysis shows that all the variable are statistically significant the control variable inclusive.

Discussion of Findings

This study is aimed at investigating the extent to which the hardware application as well as the software application of ICT had influenced the audit quality recorded in the consumer goods industry in Nigeria. The study consequently formed two hypotheses and tested using fixed effect regression techniques. The study found that ICT software had positive and significant effect on audit quality of consumer goods firms in Nigeria during the study period. The study also found that ICT hardware and ICT software had positive and significant effect on audit quality of consumer goods firms in Nigeria during the study period. This means that ICT software had significant positive effect on audit quality while ICT hardware was not significant in determining audit quality. By implication, the statement conveys that the incorporation of ICT hardware and software has positively impacted the audit quality of consumer goods firms in Nigeria. This could mean improved efficiency, accuracy, and reliability in financial reporting and auditing

processes, potentially leading to increased confidence among stakeholders in the financial information provided by these firms.

The findings of this study are in tandem with the findings of Agbola (2022), Thottoli and Thomas (2022), Wada (2021) and Kacanski (2016) who found that ICT had positive and significant effect on audit quality. The findings of this study are in conflict with the findings of Semiu et al., (2014) who found that audit quality was not affected by ICT.

CONCLUSION AND RECOMMENDATIONS

This study was carried out to investigate the effect of ICT on the audit quality of listed consumer goods firms in Nigeria. The study affirmed that both ICT hardware and ICT software were significant in determining the degree of audit quality during the study period. The study concludes that ICT hardware and ICT software are significant factor influencing audit quality in the Nigerian consumer goods sector. Therefore, based on the findings of this study, the following recommendations are made for efficient audit quality of consumer goods firms in Nigeria Exchange Group;

- i. Consumer goods firms should continue to invest in state-of-the-art ICT hardware, ensuring that their technological infrastructure is up-to-date and capable of supporting advanced audit processes. This includes regular upgrades to servers, computers, networking equipment, and other relevant hardware components.
- ii. Consumer goods firms should explore and adopt robust audit software solutions that are specifically designed to enhance audit quality. These may include advanced data analytics tools,

artificial intelligence (AI)-enabled auditing software, and other technological solutions that can automate routine audit tasks and provide deeper insights into financial data.

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