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Computer Assisted Audit Techniques and Audit Quality in Developing Countries: Evidence from Nigeria

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Abstract

Most business organizations world-over have computerized their accounting systems. Extant literature finds that the use of Computer Assisted Audit Techniques (CAATs) is positively related to the quality of audit reports. CAATs are widely applied to audit financial statements in developed countries. However, there is a void in literature about the audit of computerized accounts in developing countries. We draw a sample from Nigeria to investigate the following questions, “Do auditors effectively audit computerized accounts and; Is there a positive relationship between the use of CAATs and audit quality?” Using descriptive statistics, correlation analysis and logistic multiple regression, we provide evidence that: (1) CAATs are effectively used, (2) there is a positive relationship between the use of CAATS and audit quality, and (3) in a sample

that excludes the big 4 International audit firms, local Nigerian firms are not effective in applying CAATs, and so, do not produce quality audit reports.

Keywords: **CAATS; Computerized accounting; Audit quality; Auditor; Nigeria**

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INTRODUCTION

Auditing is an attest function that authenticates the credibility of financial statements. Without audit certification, financial statements could be misleading by failing to present a true and fair view of the financial position of an organization. Auditing involves systematically and objectively obtaining and evaluating evidence regarding assertions about economic actions and events to ascertain the degree of correspondence between those assertions and established criteria and communicating the results to interested users (Messier, Glover and Prawitt). Financial Statement audit is performed by Certified Public Accountants (CPAs) who are independent of the company being audited. From Agency perspective, an auditor acting on behalf of the principal (shareholders) will check whether or not the agents (managers) have acted in the interest of the principal [1]. An auditor has to ascertain that the financial information submitted by agents reflect the true financial performance of the company in an effort to protect the principal from information risk. Minimizing information asymmetry between the agents and the principal is a crucial role for the auditor [2]. Information risk is reduced if accountants prepare financial statements in accordance with Generally Accepted Accounting Principles (GAAP). The auditors are expected to perform the audit in accordance with the Generally Accepted Auditing Standards (GAAS). To benefit consumers of audit reports, audit quality must be emphasized. Wang et al. [3] measure audit quality by audit failure rate. Most archival research including Choi et al. [4] measure audit quality by unsigned abnormal accruals. Francis and Moehs [5] define a low quality audit as the presence of one or more clients with overstated earnings that were subsequently corrected by a downward restatement.

Many companies in the world have automated their accounting systems. Companies now use computerized accounting programs or accounting softwares/packages to process their financial transactions instead of doing it manually. According to Kaplan [6], Computer Assisted Audit techniques (CAATs) are audit software used to interrogate a client's accounting system. Financial statements that have been computerized can only be interrogated by CAATs. Bierstaker, Janvrin, and Lowe observe that CAATs use is fairly low.

Ikoro found that most businesses in Nigeria have computerized their accounting

systems. However, no study, to the best of our knowledge has investigated whether auditors in Nigeria have the resources and skills to effectively audit computerized accounts. The research problem this study investigates is the void in accounting literature on the use of CAATs and its impact on audit quality in developing countries using evidence from Nigeria. This study is primarily motivated by the fact that Nigeria being the largest economy in the African continent has many large businesses that have computerized their accounting systems. It is interesting to investigate whether auditors effectively use CAATs to audit computerized accounting systems in that setting. This study pursues the research questions, "Do auditors effectively audit computerized accounts and is there a positive relationship between the use of CAATs and the quality of audit reports?" This question arises because there have been reported cases of audit failures in Nigeria. If computerized accounting is seen as a problem to auditors, it would mean that auditors will have a hard time detecting material misstatements due to error and fraud in the financial statements. As aforementioned, we chose Nigeria for this study because basing on the most recent data it is the largest economy in Africa.

To investigate the research question, we selected a sample of auditors from the pool of audit firms that operate in Nigeria. We also selected a sample from investors who rely on audit opinions for their decisions. We collected primary data by using self-administered questionnaires. The data was processed using SPSS and computed descriptive statistics. We also performed correlation analysis and multiple regression analysis. This is a behavioral research design that uses primary data for audit quality. We are aware that most studies on audit quality use archival data. Boone, Khurana and Raman [7] document that archival studies failed to differentiate Deloitte's audit quality from that of other audit firms. This finding supports our use of primary rather than archival data.

Results indicate that the big four international audit firms are effectively auditing computerized accounts but the local audit firms are not. Based on findings in this paper, investors and other users may not heavily rely on audit reports produced by local audit firms for important decisions.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The purpose of auditing financial statements is to determine whether financial statements were prepared in accordance with specified criteria such as generally accepted accounting principles by Messier, Arens and Loebbecke [8]. Auditing can be explained as a systematic process of objectively obtaining and evaluating evidence regarding assertions about economic actions and events to ascertain the degree of correspondence between those assertions and established criteria and communicating the results to interested users. The main function of auditing is to ensure that information asserted by a company actually measures up to what that company is professing of its business and if it does not, the auditor is to

make it known to the relevant audience. In other words auditors are to make sure that the financial statements and other forms of information provided by the companies being audited can be trusted by people who want to make use of these statements. Also once a company's financial statement has been audited, the financial statements can be seen as more credible and there will be less risk when investing in a company whose financial statements have been audited and proven credible. The demand for auditing emerges from the fact that companies need to be held accountable for their business transactions especially when business owners hire other people to work in their companies [1]. Auditing can be seen as an assurance service, hence auditors apart from reporting on how reliable and credible a piece of information. There are many risk associated with using technology to aid audit work. Abu-Musa [9] detailed some of the risk to includes loss of computer assets, erroneous record keeping, increased risk of fraud, competitive disadvantages if the wrong IT is selected, loss or theft of data, privacy violations and business disruption. Other risks associated with auditing which include inter alia;

- Audit failure risk, also called detection risk- This is the risk that an auditor will issue audit report with a positive opinion about a company's financial statement when in reality, the financial statements of that company have material misstatements caused by fraud or human errors.
- Control risk – The risk that internal controls will fail to prevent fraud and errors
- Materiality risk- A transaction can be referred to as material if its omission or inclusion affects the judgment of a reasonable person.
- Audit evidence – Any information or data related to accounting made available to the auditor either by the company being audited or gotten externally. In other for information to be considered as audit evidence, it must be relevant and reliable.

In order for auditors to audit the financial statement of a firm, there are Generally Accepted Auditing Standards (GAAS) that are to be followed. GAAS can be defined as general guidelines that help auditors in fulfilling their professional responsibilities in the audit of historical financial statements [8]. There are ten generally accepted auditing standards but they are all under three categories and they are; General standards, Standards of field work and Standards of reporting.

General standards

The general standard consists of technical training and proficiency, independence, and due professional care. Technical training and proficiency basically means that the auditor must be adequately trained in terms of education and experience and must be up to date with new changes in the auditing and accounting world. Independence means that the auditor should be free of any

influence in all situations that are related to the audit of any company. Finally, due professional care means that an auditor is expected to carry out auditing activities in a way that is expected of a professional in the accounting industry.

Standards of field work

Standards of field work consist of planning and supervision, understanding the entity and its environment and audit evidence. Planning and supervision basically means that the auditor should adequately plan his audit and supervise any assistants that he may have during the audit process. Understanding the entity and its environment means that the auditor must understand what the entity is about especially the internal controls of the company so as to be able to detect fraud that will result in material misstatements. Finally, audit evidence means that the auditor must gather audit evidence that serves as a sensible core for any opinion the auditor may develop when auditing financial statements.

Standards of reporting

There are four rules to standards of reporting which state that;

- The auditor's report should assert whether or not the financial statements are depicted according to GAAP.
- The auditor's report should state whether GAAP were constantly used in the financial statement and it should state cases in which it was not used.
- The report must state whether all disclosures have been made and if not, it should state that also.
- The auditor must either state an opinion or state that he or she cannot express an opinion concerning the financial statements. The audit report should also state the degree of responsibility taken up by the auditor and the audit work character. The use of computerized accounting arose due to the fact that it is more accurate, faster and more efficient than manual accounting [10]. Computerized accounting is reliable as opposed to manual accounting where individuals can make mistakes in handling accounts. When using computer programs, one does not have to worry about mistakes in the company's financial statements. Computerized accounting also makes for an improvement in the performance of a business in the sense that it helps the business get information faster, faster communication of information and quicker decision making process. Al-Hiyari et al. [11] found that there is a non significant relation between data quality and accounting information quality. This finding though surprising was corroborated by Rahaya et al. [12].

Computer accounting packages are responsible for the preparation of accounting

documents such as invoices, recording of transactions that occur from the preparation of said invoices, and preparing various financial statements that are a result of previously recorded transactions. All these are done by computer accounting packages in record time and without error as long as the information put into the system is accurate [13]. Sun [14] opined that internal control mechanism and means of traditional computerized accounting system may be hard to work effectively in internet environment. Sharairi [15] found a number of challenges for an internal auditor in a computerized accounting environment.

Computer assisted audit techniques are defined as vital instruments that auditors can use in auditing various businesses so as to make the job easier and faster for them to handle. They are computer programs used by auditors as a part of their audit procedure to sort out data that is instrumental in the performance of their audit. These computer assisted audit techniques play a huge role in ensuring the accuracy of an auditors audit report. CAATs are effective because they are used to gain and process audit evidence and information. They are also effective in checking transactions of companies being audited because they are used to pick samples of the transactions made by these companies and are also used to audit these transactions.

DeAngelo [16] referred to audit quality as the probability that auditors will discover errors and material misstatements in financial statements and report the errors and materials misstatements accordingly. In other words, audit quality is a function of technical capability of the auditor and ability to uphold standards. PCAOB [17] re-emphasizes a classic academic definition of audit quality as, “the market assessed joint probability that a given auditor will both (a) discover a breach in the client’s accounting system, and (b) report the breach”. According to Memi and Çetenak [18] the technical capability of auditors or the probability to uncover errors and going concern breaches is invariant across auditors. Prior researches have argued that the size of the firm or brand name of audit firms is proportional to audit quality [19,20]. Several other variables such as economic dependence, auditor’s term, industry expertise, audit fees, reputation and cost of capital have also been used as measures audit quality [20]. Arising from the afore-mentioned definition, an audit failure happens (lack of audit quality) when an auditor fails to uncover material errors and fraud that led a clients financial statements not to reflect a true and fair view. PCAB [17] further identified more indicators or determinants of audit quality. These include inter alia; competence and experience of audit personnel, whether or not the audit is conducted in accordance with Generally Accepted Auditing Standards (GAAS), audit resources, the strength of the clients internal control system, compliance with independence requirements, investment in infrastructure supporting audit quality, audit firm’s internal quality review and industry expertise.

Several research works have been carried out on the use of computerized accounting systems. Abu-Musa [9] investigated the impact of information

technology (IT) on internal auditors' (IA) activities in Saudi Arabia. The study recommends IA to enhance their knowledge and skills of computerized information systems (CIS) for the purpose of planning, directing, supervising and reviewing the work performed. Prior authors have argued that internal auditors (IA) are under pressure to maintain their unique characteristics and function as a result radical changes in organizations due to technological advancement. Tongren [20] said that advances in technology have continued to render control procedures obsolete, and also make the "value" of traditional audit questionable.

Studies have also shown that the use of CAATs has different effect on internal and external auditors [21-23]. Factors influencing the use of CAATs include accomplishment of ISA statements and the supervision from the National Audit statutory bodies, training, etc. [24]. In other for the use of CAATs to be effective and successful, the auditor has to carefully apply all the steps necessary for the CAATs to work effectively. There are few studies that have investigated the use of CAATs in auditing in Nigeria. Olasanmi [25] found that CAATs have played a major role in fraud detection, and hence can be used to curb fraud in organizations and that CAAT helped to improve the auditors' performance.

However, his study did not segregate between local audit firms and international audit firms (Big 4). It remains an empirical question whether CAATs have improved audit performance of both local and international audit firms. This study partitions the sample into local and international audit firms and then investigates whether CAATs have improved audit quality in both type of audit firms. Adeyemi, Mohammed, Ogundeji, and Tijani [26] find that internal auditors and audit departments in Nigerian companies are not making substantial use of available tools (CAATs) and that internal auditors have adopted audit software on an ad hoc basis with some repetitive use. Their study investigated the use of CAATs by internal auditors. Building on existing literature, this study investigates the use of CAATs by external auditors to enhance audit quality.

Watts and Zimmerman [27] predict that large audit firms supply a higher quality audit because of greater monitoring ability. This implies that the big 4 audit firms are likely to provide a better audit report than small local firms. CAATs increase the accuracy of audit tests. Test data involves the auditor submitting a "dummy" data into the client's system to ensure that the system correctly processes it and it prevents or detects and corrects misstatements [6]. Bierstaker et al. [28] document that expectation, the extent of organizational pressure and technical infrastructure support influence the likelihood that auditors will use CAATs. The availability of these factors in a developing country like Nigeria is an empirical issue.

Arising from the above-mentioned theoretical underpinnings and literature review on the use of CAATs and a positive relationship between the use of CAATs and audit quality in developed countries research contexts, the following hypotheses

were developed for empirical testing using data from Nigeria;

H1: Auditors in Nigeria are effective in utilizing computer assisted audit techniques to audit financial statements.

H2: There is a positive relationship between the use of CAAT and the quality of the auditor's report.

RESEARCH METHODOLOGY

We used purposive sampling to select a sample of 450 respondents. Major audit firms operating in Nigeria and audited financial statement users were purposively selected and included in the study sample. This study design was cross-sectional for the year 2012. Primary data were collected by using self-administered questionnaires. Questionnaires were designed using a five-point Likert scale.

Usable data was obtained from 320 respondents giving a response rate 71%. To mitigate bias in our findings, we made sure that half the sample included auditors and the other half, research report users. To be more explicit, 160 respondents were auditors and 160 were audit report users. The data were processed using SPSS. Descriptive statistics were computed and correlation analysis done. However, strong conclusions cannot be made from afore-said analyzes. In an effort to obtain stronger results for our hypotheses tests, we performed logistic regression based on the following model;

$$Q = B_0 + B_1CAATs + B_2Big4 + B_3IC + e.$$

Where;

Q = Quality of the audit report as perceived by users, a dichotomous or dummy variable that equals 1, if the report is reliable and 0, otherwise.

CAATs = Computer Assisted Audit Techniques.

Big4 = The four big international audit firms which include; Price Waterhouse Coopers; Ernest and Young; Delloite and Touche; and KPMG.

IC = The strength of the internal control system.

We operationalize the audit quality variable using the perception of the users of the audit report which includes inter alia; the timeliness of the audit report, reliability of the report in informing investment decisions. From auditors and investors' perspective, we operationalize audit quality construct by using the number of audit failures. If there was or a perception of audit failure, we score the dependent variable 1 and zero otherwise. We measure the independent variable

of interest, CAATs using 5 point Likert scale. 1 is for least effective application of CAATs and 5 for most effective application of CAATs. For measurement of control variables, Big4 is equal to 1 if the firm is one of the big four international audit firms and zero for local audit firms. The strength of the internal control system, IC is measured on a Likert 1-5 scale. 1 when the client’s internal control system is very weak and 5 when it is very strong. In the regression model, we predict the signs of all independent variables (both the test variable and control variables) to be positive. This is consistent with afore-mentioned literature finds that CAATs, the strength of the client’s internal control system, and being a big international audit firm is positively associated with audit quality [29].

In the parsimonious regression, the study variable of interest is CAATs. We study the relationship between the use of CAATs and the quality of the audit report as measured by dummy variable, Q. We control for the big 4 audit firms (big4) because they have been known to provide reliable audit reports [29]. We also control for internal control of the finding that when the internal control system is strong, the audit report will be more reliable [30].

Reliability of the research instrument

Reliability Statistics of the effectiveness of auditors in auditing computerized accounts (Table 1).

Table 1: Reliability Analysis of the Research Instrument

Variable	Cronbach’s Alpha Coefficient
Use of CAATs	0.737
Effectiveness use of CAATs	0.783
Quality of the audit report	0.754

The reliability statistics, cronbach’s alpha shown above is greater than the benchmark of 0.6. This is evidence that the study instrument was reliable.

Presentation and Discussion of Findings

It can be seen from Table 2 that the majority of the respondents have good academic and professional credentials. 18.75% hold master degrees while 56.25% are first degree holders. 31.25% are professional accountants (ACA, Nigeria and ACCA, UK) belonging to accounting associations/institutes that are

members of International Federation of Accountants (IFAC). The Table 2 also shows as expected the domination of men. Regarding working experience, the majority of the respondents have been working for 0-5yrs. This suggests that the respondents are relatively young individuals (Figure 1).

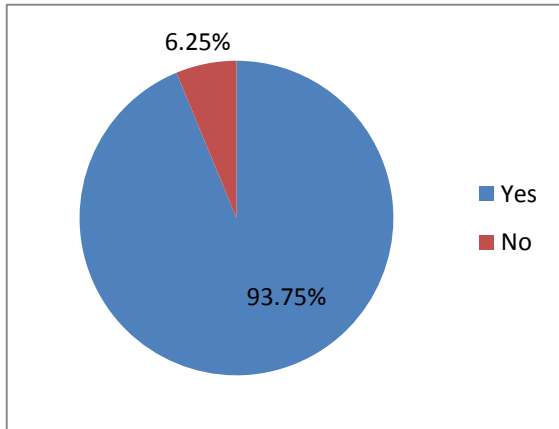


Figure 1: Use of CAATs by audit firms

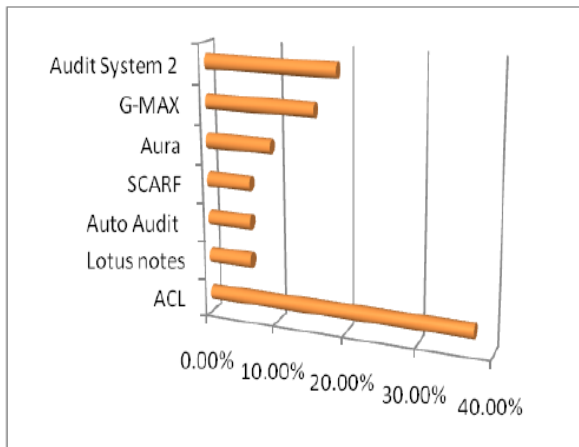


Figure 2: Graphical Representation of the Types of Computer Assisted Audit Technique packages used by firms

Table 2: Respondents' demographic profile

Variables	Category	Frequency	Percentage
Respondents' Status	Auditors	160	50%
	Users	160	50%
Gender	Male	224	70%
	Female	96	30%
Highest Level of Educational	Diploma	80	25%
	Bachelor's degree	180	56.25%
	Masters	60	18.75%
	PH.D	0	0
Professional Qualification	ACA, Nigeria	80	25%
	ACCA, UK	20	6.25%
	ANAN, Nigeria	50	15.625%
	None	170	53.125%
Working Experience	0-5yrs	200	62.50%
	6-10yrs	60	18.75%
	11-15yrs	40	12.50%
	16 and above	20	6.25%

The pie chart shows that a large number of audit firms use computer assisted audit techniques. 93.75% of the respondents answered “yes” to the question of whether or not their firms make use of computer assisted audit techniques to auditing company financial statements (Figure 2).

The graph above basically shows the various computer assisted audit packages used by audit firms. From the graph it can be seen that 37.5% of the firms make use of ACL which is short for Audit Command Language, 6.25% of the respondents make use of Lotus Notes, Auto Audit and SCARF. 9.38% make use of Aura, 15.63% make use of G-MAX and 18.75% make use of Audit System 2. It is clear from the study most audit firms use Audit Command Language.

Table 3: Descriptive Statistics on the effective use of CAATs to audit financial Statements

Variable	Valid	Missing	Mean	Standard Deviation	Skewness	Kurtosis
B1	160	0	1.862	.24593	3.795	13.227
B2	160	0	3.718	.72887	.498	-.915
B3	320	0	4.593	.71208	.791	-.564

B1=> Use of CAATs

B2=> Effectiveness use of CAATs

B3=> Quality of the audit report

From the Table 3 above, the mean of variable B1 is 1.862 on a scale of 2.0 shows that there is a high use of computer assisted audit techniques by audit firms. This finding is inconsistent with that by Adeyemi et al. [26] who find that there is low usage of CAATs in Nigeria. Variable B2 has a mean of 3.718 on a likert scale of 5.0 shows evidence that audit firms are effectively using CAATs to audit financial statements. This finding support Hypothesis 1. Variable B3 has a mean of 4.593 on a scale of 5.0 provides evidence that the utilization of CAATs has a positive effect on the quality of the audit report. This finding supports hypothesis 2 (Table 4).

Table 4: Inter-Item Correlation Matrix (P-value)

	B1	B2	B3
B1	1	0.971	0.68**
		-0.0002	-0.04
B2	0.971	1	0.709***
	-0.0002	0.709***	-0.001
B3	0.68**	-0.001	1
	-0.04		

** Significant at 0.05 level

*** Significant at 0.01 level

B1=>Use of CAATs

B2=>Effective use of CAATs

B3=> Quality of the audit report

The correlation between B2, the effective use of CAATs and variable B3, the quality of the audit report of 0.709 is positive and significant at $P < 0.01$. This finding corroborates the finding under descriptive analysis that effective use of CAATs is associated with improved quality of the audit report. Likewise, the correlation coefficient between the use of CAATs and the quality of the audit report is 0.68. The correlation is positive and significant at $P < 0.05$. This finding is consistent with prior literature that finds a positive association between the use of CAATs and audit quality [17,25] (Table 5).

Table 5: Regression results

Based on the model: $Q = B_0 + B_1CAATs + B_2Big4 + B_3IC + e$.

Variable	Expected Sign	P-value (T-statistic)
Intercept	?	0.27 (0.2)
CAATs	+	0.03 (2.41 ^{**})
Big4	+	0.001 (4.51 ^{***})
ICS	+	0.04 (1.26 ^{**})
Sample size	N	320
Explained variation	Adj. R ²	0.72

** Significant at 0.05 level; *** Significant at 0.01 level

Where:

Q = Quality of the audit report as perceived by users, a dichotomous or dummy variable that equals 1, if the report is reliable and 0, otherwise.

CAATs = Computer Assisted Audit Techniques.

Big4 = The four big international audit firms.

IC = The strength of the internal control system.

Regression results indicate that after controlling for the effect of the big four audit firms and internal control system, the test variable (CAATs) has a significant negative sign with a p-value of 0.03 and a t-statistic of -2.41, all significant at $P < 0.05$. The interpretation of this finding is that audit firms do not effectively apply CAATs and improve the quality of the audit report. This finding supports hypothesis 2. The results of the control variables are as expected. An international audit firm (Big4) is positively associated with audit quality. This

finding is consistent with Morsefield and Tan [29] and Watts and Zimmerman [27]. Likewise, the strength of the client's internal control system is positively associated with audit quality. This finding is consistent with that by Doyle et al. [30] and Francis and Moyses [5] (Table 6).

Where:

Q = Quality of the audit report as perceived by users, a dichotomous or dummy variable that equals 1, if the report is reliable and 0, otherwise.

CAATs = Computer Assisted Audit Techniques.

Big4 = The four big international audit firms.

IC = The strength of the internal control system

We exclude the big four international firms that have been found to produce quality audit reports. We re-run regressions based on the afore-mentioned model for only local Nigerian audit firms. Results are presented in Table 5 above. We find the relationship between CAATs and audit quality measure (Q) is positive but not statistically significant at any conventional level. We conclude that local audit firms do not produce quality audit reports. The relation between audit quality and internal control is as expected, positive and significant at $P < 0.05$. This finding is consistent with findings of Files, Sharp, and Thompson [31] who find that repeat restatements (low quality reports) are more likely with clients of non-Big 4 auditors and Morsefield and Tan and Watts and Zimmerman [27] who find that the big four international audit firms are providers of high audit quality. The signs and consistency with prior literature for control variables are as discussed in Table 5 above.

CONCLUSION

This study addressed the questions, Do auditors effectively audit computerized accounts? and is there a positive relationship between effective application of Computer Assisted Audit Techniques (CAATs) and the quality of the audit report. These questions are important because computerized accounting has changed the landscape of auditing. The preparedness of auditors in developing countries to audit computerized accounts and issue audit reports of good quality is an empirical issue that deserved academic inquiry. To investigate these questions, we took a sample of audit firms that operate in Nigeria and audit report users, majorly investors in the stock market. Results indicate what prior studies found that the use of computer assisted audit techniques (CAATs) is positively associated with the quality of the audit report even after controlling for the big four international audit firms and internal control system. However, in the sample of only local Nigerian audit firms, we found that the relationship between CAATs and audit quality is not significant. We conclude that local audit firms do not

produce quality audit reports. This findings suggests that non-“big 4” audit firms are not effective in applying CAATs to audit computerized accounts.

This study contributes to the existing body of knowledge regarding auditing of computerized accounts in developing countries. Accounting and auditing regulators that have oversight role should find the results of this study interesting. In order to protect public interest especially investors and creditors who are the main consumers of audit reports, there should be increased scrutiny of reports issued by non-Big 4 auditing firms. Findings of this study show that the Big4 audit firms are positively associated with audit quality while the local audit firms are not. The oversight bodies such as Nigerian Security and Exchange Commission (NSEC) should increase scrutiny of audit reports issued by local Nigerian audit firms. The study findings also imply that local external audit firms in Nigeria should train their staff on the effective application of CAATs in an effort to improve audit quality.

The study has some limitations. First we narrowed our sample to only Nigeria. We may not be able to generalize our findings to other research contexts. Secondly, we measured audit quality in terms of investor perceptions. These perceptions may be misleading in some cases. Furthermore, ours was a parsimonious regression model. To improve work, future studies should include more independent variables that affect audit quality after testing for multi-collinearity. Future research studies should also investigate this problem using a wider sample drawn from developing countries from other continents. Future studies can improve the measure of audit quality using a composite measure that includes perceptions and other variables.

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