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Built-In Functions and Features of Data Analysis Software: Predictors of Optimal Deployment for Continuous Audit Assurance

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Abstract: The purpose of this paper is to predict the influence of built-in-functions and features of data analysis software as external factors on Technology-Organization-Environment model. Survey approach were used to collect data from a random sample of internal auditors in Nigeria. Using multiple regression, 159 responses were analyzed. The results revealed that as audit specific software built-in functions and features becomes more complex, internal auditors are less likely to use those features due to decrease in the ease of use. Other than actual built-in functions available, the most important consideration when selecting audits software is the ease of use. This is often cited as the greatest barrier to entry for audit firms and internal audit departments. Although this study focused on the influence of built-in functions on audit software deployment, it fails to differentiate between various levels of users. The model can be used to assist audit software vendors not only to develop lee complex applications, but also to improve on more user-friendly analytical tools. The paper contributes to the continuing research in IS innovations adoption and diffusion in the context of the auditing profession.

Keywords: Data analysis software, Internal auditors, applications, Nigeria

INTRODUCTION

The International Education Standard (IES) 8 Competence Requirements for Audit Professionals issued by the International Federation of Accountants (IFAC) [IES8, 2010: par. 32] demands that the knowledge content of education and development programs should include information technology. This competence prerequisite is obligatory in both pre and post qualification stages for audit professionals. As with other practicing accountants, the use of computerized assisted auditing has contributed towards enhanced efficiency and effectiveness of the systems review function [1]. As auditors continue to advance in the use of automated tools and techniques, their relevance becomes continually significant with changes in the electronic business phenomenon and the challenging contemporary audit profession. From the basic spreadsheet working paper to other statistical analysis software and more advanced specialized database applications, CAAT's has also evolve as business intelligence applications for data retrieval and analysis [2]. Others include specialized audit programming languages, audit specific commands/tools, tests logging and colorized triggers. The role of the information systems auditor also becomes exceedingly vital with increased reliance of transactions processing on information technology. This is evident in advanced accounting information systems such as the enterprise resource planning (ERP), electronic data interchange (EDI) and the advent of IT governance [3]. In recent times, CAAT's support almost all data extraction and analysis in the audit process. They represent an innovative approach to manipulation of large databases without attendant added costs [4].

Our interest is in the deployment of groups of audit specific software with emphasis on their built-in functions and features, in particular data analysis software for internal audit (IA) professionals. These tools allow the audit professional to undertake digital analysis, duplicates identification, filtering/extraction, regression, stratification, test grouping, and outlier extraction. The use of data analysis software by auditors is rapidly increasing [5] as such performing audit tasks by assurance executives continually require background in data analytic technologies [5]. Furthermore, nearly two-thirds of internal auditors predicted that the use of technologies would increase in their organizations [6].

Empirical studies on the adoption of audit specific software have reached a remarkable development in recent years. Previous research on technologies acceptance model (TAM) with specific application to audit tools features have demonstrated that perceived usefulness was more important when basic features were used [7]. More studies on general technology acceptance have established that general features have significant effects on user behaviour towards technologies adoption [8-14]. However, there has been no empirical technology feature research with I-TOE, with special emphasis on audit specific software features. Most studies on TAM, TAM 2, UTAUT, and

I-TOE models have their focus on general audit technology acceptance. These include auditors proficiency in information systems [15]; critical factors for successful CAAT's adoption excluding audit specific software features [16]**;** general IT and internal audit [17]**;** continuous auditing [18] and predictors of CAAT's deployment [19]. [3] Combined I-TOE framework with diffusion of innovation and institutional theory to study adoption of audit technology but excluded emphasis on audit specific software features. The improvement of audit software for risk management, continuous monitoring, and data analysis was the focus of [20] while [21] analyzed and reported on the advantages provided by CAAT's on financial audit. The built-in functions and features of audit specific software have received inadequate attention in I-TOE research. Furthermore, most relevant empirical studies had developed the I-TOE model without providing support for audit specific software features [22]**.** Few studies identified in emerging markets have also failed to include audit specific software features in any of TAM, TAM 2, I-TOE and other similar models, even though a number of them produced empirical evidences [1]; [23-26].

The aim of this study is to fill this gap. We have included the most common data analysis functions by software vendor, using standard built-in features of the tools. Subsequently an empirical evaluation of the model was tested using a sample of 156 internal auditors who are members of the local professional accountancy body. We defined the data analysis functions of audit specific software for the internal audit function: aging, digital analysis, extraction/filter, regression, test grouping, and outlier extraction. These features are essentially advanced technologies features for systems control testing. [7] Categorized audit technology features into basic and complex. We verified technological, organizational, and environmental contexts with various audit specific software built-in functions and features.

This study is a substantial contribution towards literature on TOE research by adding audit specific software features and standards and empirically evaluating the model produced therein. The TOE theory is a framework describing how technology innovation adoption occurs at firm level and suggested three components having impact on the firm adoption process of technological innovation. These include technological, organizational, and environmental contexts. This framework is a general theory of technology diffusion and therefore, appropriate for as theoretical groundwork in studying the adoption of IS innovation [27-28]. Expanding the TOE with built-in functions and specific standards would assist IT researchers to understand systems auditors' acceptance of innovative techniques and tools. The study provides empirical evidence to reinforce past studies on technology acceptance. Furthermore, the study contributes towards technology utilization by professional accountants with the classification of specific audit software built-in functions and features. It is a strong support for auditors in placing high priority on leveraging technology to boost performance.

In addition to extending audit specific software built-in functions, we adapted and evaluated the TOE acceptance framework for compliance executives, in this case internal auditors. We also examined prior studies on external variables and subsequently recognized 14 external variables identified as having substantial implication for the internal auditor's behaviour of specific audit software acceptance. We grouped these variables into technological contexts, organizational contexts, and environmental contexts based on classifications espoused in previous studies. The uniqueness of this study is its identification with the group of end-users altered from a general population, the usage of audit specific software application by internal auditors as influenced by organizational, technological, and environmental contexts.

We delineate the remainder of this paper into four sections. The next session on Theory and hypotheses development is a review of theoretical background of TOE, specific audit software built-in functions and features research and presents the research model and hypotheses. The sample and survey instrument as well as data analysis procedure are the focus of the section on research methodology. In the final exploration, the results section presents data analysis and the discussion section establishes limitations of our research as well as provides directions for future study.

THEORETICAL FRAMEWORK AND HYPOTHESES

The adoption, acceptance and usage of innovative technologies have proven to be one major area of interest to date. For a number of years, researchers in academia have tried developing the most appropriate and precise models that examine the acceptance of new technologies and tools in organizations. Like a number of literature, we provide theoretical background of I-TOE and audit specific software built-in functions and features, and propose based on the theoretical background relevant hypotheses.in the first subsection, we review TOE and external variables research with which the hypotheses involving TOE is presented in the perspective of internal audit professionals. The second subsection identify with a number of prior studies on technology acceptance and features. Subsequently, hypotheses involving audit specific software built-in functions and features were focus of discussion.

Technology-Organization-Environment (TOE) Framework

The desire to achieve a generally accepted model and synthesizing erstwhile frameworks on technology acceptance model, [29] offered TAM. TAM model is one of the most prominent in the literature today [30]. As suggested by [30], TAM explains elements of technologies acceptance in a broad spectrum and thereafter traces the bearing of exterior factors on internal beliefs, attitudes, and intentions. Maintaining initial TAM constructs and examining social influence on TAM, [31] afterwards proposed TAM 2 with new additions regarding constructs linked to the acceptance of information systems. TAM 2 also filled the slit noticeable in the earlier model. In the same vein, widespread research intended at validating technologies models witnessed the development of the Technology-Organization-Environment (TOE) framework by [31]. The model comprehended earlier ones by describing the process of technological innovation adoption at firm level. The TOE framework suggested three elements capable of influencing the process of technology innovation adoption by a firm. These components include technological context, organizational context, and environmental context. The model is n suitable theoretical basis for studying information systems innovation adoption [27-28].

Technological context, which is the first element of the TOE framework, depicts how the environment features affect firms' adoption of technology tools. [31] Stressed that any technology is "a knowledge-embedded tool", and "is a combination of both social/behavioural elements as well as physical elements." Technology itself is merely a physical tool. However, the knowledge of human and interaction with technology defines its importance and the purpose of its use. This context inherently combines technology availability and characteristics [3]. Within the technological context, [32] included a sub component, the task-technology fit. Goodhue and Thompson highlighted that a technology is more likely to be put into use wherein it matches with the tasks it is expected to perform. As coined from the original TOE framework, technology context represented by the technology features and availability affect firm's decision to adopt. Accordingly, auditors must be able to determine whether particular technologies and tools suit desired audit tasks to be performed, even though technology might be perceived to be useful and advanced, if there is no relationship as to fitness for purpose in audit tasks, organizations might not consider its use. [33] Also supported this view when they emphasized that "researchers must also consider the nature, extent, quality, and appropriateness of the systems use" (p. 16). Thus, the success of audit specific software adoption depends on its fitness. Audit specific software must fit with audit professionals' tasks in performing audit. Furthermore, auditors in performing their test of controls must consider technology cost-benefit analysis in selecting audit software tools. Where the cost of acquiring audit specific software outweighs the present value of future benefit, the analytical procedure becomes irrelevant. Cost remains the major challenge in deploying specialized audit tools, with the next highest barrier being staff training [34]. Consequently, we hypothesized a positive relationship between audit specific software task technology fit and audit professionals' decision to adopt them, and technology cost-benefit and audit software acceptance in the audit profession.

H_1: Task-technology fit (TF) has positive effect on decision to use (DU) audit specific software

H_2: Technology cost benefit (TB) has positive effect on the use (DU) of audit specific software

We also hypothesized a relationship between task-technology fit and technology cost benefit. Task cost-benefit not only has a direct effect on the decision to adopt audit specific software but also indirect effect on use of audit specific software through task-technology fit [32].

H_3: Task-technology fit (TF) has a positive effect on technology cost-benefit (TB)

A number of studies have extended the original TOE framework. While the constructs of audit technology usage, task-technology fit, and cost-benefit of audit specific software use are obvious, the constructs of other external variables remain obscure. Hence, a careful review of prior literature on TOE identified such external variables. Fourteen 14 external variables are derivable from a number of extended TOE research [31- 37]. However, we only identify with variables placed into three categories referring to past literature: technological contexts, organizational contexts, and environmental contexts [31, 34-37]. [34] considered organizational context as external variables. The study examined technological, organizational, and environmental factors. The organizational factors include organization size, top management support, experience, information sharing culture, and technology policy. On the other hand, competition and trading partners influence tested relevant as environmental factors. Organizational support, trading partner readiness and competition emerged as the significant factors in the adoption of electronic archiving applications. In small organizations, technology policy largely stems from senior management and adopting a proactive strategy requires taking an interest in technological developments. External pressures from business partners, nevertheless considered low even within their decision to defer adoption to the technology itself but more to the lack of client demand and unclear benefits. Increasing number of business partners may request, or even require, adoption in the future leading to a competitive advantage for those organizations with existing applications.

In their meta-analysis, [36] found innovation and organizational characteristics as good predictors of IT innovation at an aggregate level though the analysis revealed more mixed results for environmental characteristics. [38] **A**lso noted that many studies in the small business context, have primarily focused on organizational variables. Nonetheless, several other studies highlight the salience of organizational characteristics in the adoption of technological innovations [39]. According to [35], the size of organization have often been deployed as a proxy for various dimensions that could affect innovations including total resources, employees' technical expertise and organizational structure. For instance, in the business context, larger firms would possibly possess more slack resources for adoption, and would be more likely to achieve economies of scale; in addition, they are also more capable of bearing the risk associated with IT investments [28]. Moreover, the variations in technology trainings for audit professionals by organizations, is a significant factor in the state of technology use by auditors. while on-the-job training are mostly used by organizations for new internal IS audit hires, others such as formal training by existing members of the department, formal instructor – led training by third party remains on the low. This situation is also true for current audit staff. The significance of training is sufficiently highlighted as greater proportion of specialized audit software users are non-programmers by training [19].

H_{4a}: Organization contexts (OC) have positive influence on use (DU) of audit specific software

H_{4b}: Technology policy of organization (TP) has positive influence on choice (CC) of audit tools

Environmental contexts have also been considered as external variables in previous studies [40]. External pressure in general was identified one of the best predictors of organizational IT adoption by [36]. [34] proposed as two closely related frameworks on external pressure but sufficiently distinct factors of competition and trading partners' readiness. Intense competition exerts pressure, and is generally believed to positively influence innovation adoption [41]. Innovations are adopted under increasing pressure to uphold competitive advantage and to reduce the risk of falling behind competitors [28]. [42] highlight the salience of tracking technological advances and strategic innovations in highly competitive service industries. [32] suggested that if regulatory agencies require the adoption of specialized standards, that firms might experience higher transaction costs in order to meet the necessary objective. In addition, [32] noted that organizational non-compliance with regulations might produce additional transaction costs and potential legal outcomes resulting from these activities. While [32] was directing her focus to the adoption of the ISO 14001 standard, the associated logic also holds in the context of web-services. [44] Asserted that governments can encourage adoption specifically e-business adoption, by developing business and tax laws that are beneficial to the organization. Furthermore, accountancy bodies have essential roles in the development and application of consistent global professional standards. These self-regulating bodies constitute significant element in the process of accountants leveraging on technology innovations. The International Education Standard (IES) 8 Competence Requirements for Audit Professionals issued by the International Federation of Accountants (IFAC) [IES8, 2010: par. 32] [32] demands that the knowledge content of education and development programs should include information technology. This competence prerequisite is obligatory in both pre and post qualification stages for audit professionals. As with other practicing accountants, the use of computerized assisted auditing has contributed towards enhanced efficiency and effectiveness of the systems review function [1]**.** Therefore, in the context of specific audit software, the following is proposed.

H_{5a}: Environmental contexts (EC) have a positive effect on use (DU) of audit specific software

H_{5b}: Professional regulations (PR) have a positive effect on use (DU) of data analysis software

Audit Specific Software Built-in Functions and Features

The scope of technology features is one broad area [7] nonetheless; this research is specific to exploring audit specific software tools particularly data analysis tools. The desire for Computer Aided Audit Tools and Techniques (CAATTs) is synonymous with continuous assurance of transactions systems for audit professionals. The audit process knowledge for specialized audit tools is a consistently sought area. The need to improve essential audit software skills and competence in areas of statistical analysis, data manipulation, CAATS, and the use of sampling tools with continuous assurance has experienced significant change in recent years [6]. With the commitment of senior management placement of high priority on leveraging technology to boost performance and providing assurance on effective training professional auditors can develop sufficient knowledge of technology-based audit techniques to perform their assigned task. Although user-friendliness is one important factor when considering any choice of technology tools, other factors may also be relevant.

A report of survey conducted by [6] revealed that of major market players in audit software, the Audit Commander Language (ACL) is most in use while Microsoft Access ranked next. Others include Caseware Interactive Data Extraction and Analysis (IDEA), ActiveData, Monarch Professional, Monarch Standard, ActiveAudit, TopCAATs and a host of other market players in the ascending hierarchy. The ACL is deployed by over two-thirds of the global 500, 89 percent of the Fortune 500, 98 percent of Fortune 100, all Big 4 accounting firms, hundreds of national, state and local governments including over 14, 700 organizations in more than 150 countries. Caseware is deployed in over 130 countries. While IDEA is a product of the Canadian Institute of Chartered Accountants (CICA), both ACL and IDEA are major market players and are designed by professional auditors with built-in commands/functions and log file for capturing work, and 100 percent data sources. Both application have specialized built-in functions such as reading computer files, selecting, manipulating, sorting and summarizing data, performing calculations, selecting samples, and generating customized reports. Besides user-friendly attributes, arguing over what audit software tool is best is like comparing technologies like Apple and PC, Ford over Chevy, as both ACL and IDEA have experts on both sides although the truth might meet somewhere in between.

There are intangibles for both applications. Houston is an IDEA hotspot and has VBA as its base language with several significant upgrades over the past years. More auditors have ACL experience and more employers are willing to deploy such resources.in addition, more books have been written using ACL than IDEA of other General Audit Tools. These specialized tools also have inherent disadvantages. For instance, ACL has only focus on ancillary products such as Workpapers, Acerno, Audit Exchange and Importer. There have also been no major enhancements from 2003 to 2012 as most improvements have either failed or alienated the user core. As at 2013, Microsoft Excel remained the largest competitor for ACL and IDEA with newer functions, autocomplete of pattern recognition, recommended tables/charts, and over 2 billion record limit. It also comes with limitations such as the Fat finger errors, affecting original data, absence of log, and other efficiency issues. The audit software market is a highly volatile area because of its technology-based platform. As such, few market niche players such as Arbutus featured full compatibility as of version 7.3 of ACL and developing the core product until 2013. To improve competitiveness, ACL in 2013 released its version 11 with enhanced abilities to read/load/export files, enhanced debugging and procedure capabilities, and version 15 with intelligent file deletion, temporary file prefix, variable field arrays, and several other functions [6]. As specialized audit software built-in functions and features become less complex, so would its acceptance increase. Consequently, we hypothesized the relationship between audit specific software acceptance and audit specific built in function and feature complexity.

H_6: Increasing complexity (IC) is likely to decrease deployment (DU) of audit specific software

Fig. 1 depicts the hypotheses incorporating audit specific software usage viz. technological contexts, organizational contexts, and environmental contexts. Top management can stimulate change by communicating and reinforcing values through an articulated vision for the organization [45]. Many studies found top management support to be critical for creating supportive climate for new technologies adoption [46]. For effective deployment of audit resources, the support of those responsible for corporate governance is vital [41]. Technical contexts refers to the influence of variables such as relative competitive advantage, compatibility with existing systems, task-technology fit, as well as cost-benefit relativity. Environmental context may be used to mean the probably effects of competition, regulatory compliance, and professional associations on the deployment of specific audit software tools.

MATERIALS AND METHODS

Research design

The main purpose of the study using the TOE framework, as the foundation model is to assess built-in functions and features of data analysis software as predictors of optimal deployment for continuous audit assurance amongst internal audit professionals. The proposed model consists of three key constructs, which are technological contexts, organizational contexts, and environmental contexts. The research target was internal auditors in listed companies with experience in the use of audit specific software technologies. The data were collected using an online survey platform, Qualtrics. The online questionnaire survey consisted of two parts. The first part documented participants' demographic information while the second obtained information on participants' observation of each identified variables in the model. Subsequently, we assessed demographic variables such as age, level of education, work experience, frequency of using audit specialized tools and the degree of familiarity with continuous auditing. The second part of the instrument is an indication of degree of participants' agreement with each construct. Specialized audit software usage was adopted from system usage in [30] and the relative variables are frequency and time. [[48] measured frequency of technologies usage on a 7-point rating scale ranging between "not at all" to several times each day." The actual amount of time spent on technology in a 24-hour period [41] is measured using a 7-point scale from "almost never" to "more than 4 hours daily." To provide for the absence of built-in functions, we separated the reply of "not available" in each case. Technological contexts were extracted from the model of [34] and measured using four indicator variables. One variables each from relative advantage, compatibility, technology cost-benefit, and task-technology fit questions. Organizational contexts adapted from [3] made of four indicator variables, one each from top management support, technology policy, experience, and size questions. Environmental contexts were drawn from [34] consisting of two indicator variables, one each drawn from competition, regulation, and professional association questions. All variables were measured with the 7-point Likert scale ranging between "strongly agree" to strongly disagrees."

An invitation e-mail was sent to about 1,600 financial members of the Institute of Chartered Accountants of Nigeria (ICAN) practicing as internal auditors via an online professional fora at the end of May 2013 and in September a reminder was sent. From the returned questionnaires, 159 responses were found to be complete and usable, rendering a response rate of **10** percent. Majority of respondents were male representing 74.3 percent, while the females presented 25.7 percent. Average age also ranged between 41 to 50 years. Data obtained on educational level revealed that 52 percent graduated at bachelor degree while 40 percent others are Master degree holders. Another 8 percent graduated at PhD level while average on-the-job exposure is at 7-10 years of professional experience. With regards to frequency of audit specialized software usage, 45 percent of respondents replied that they use audit tools more than 4 hours daily while 28 percent replied that their use span between 3-4 hours per day and 11 percent 2-3 hours per day. Finally, 8 percent are 1-2 hours daily users and another 8 percent spend less than one hour working with audit specialized tools. We therefore concluded that our sample presents a reasonable representation of the entire population with the high level of audit specialized software knowledge and experience.

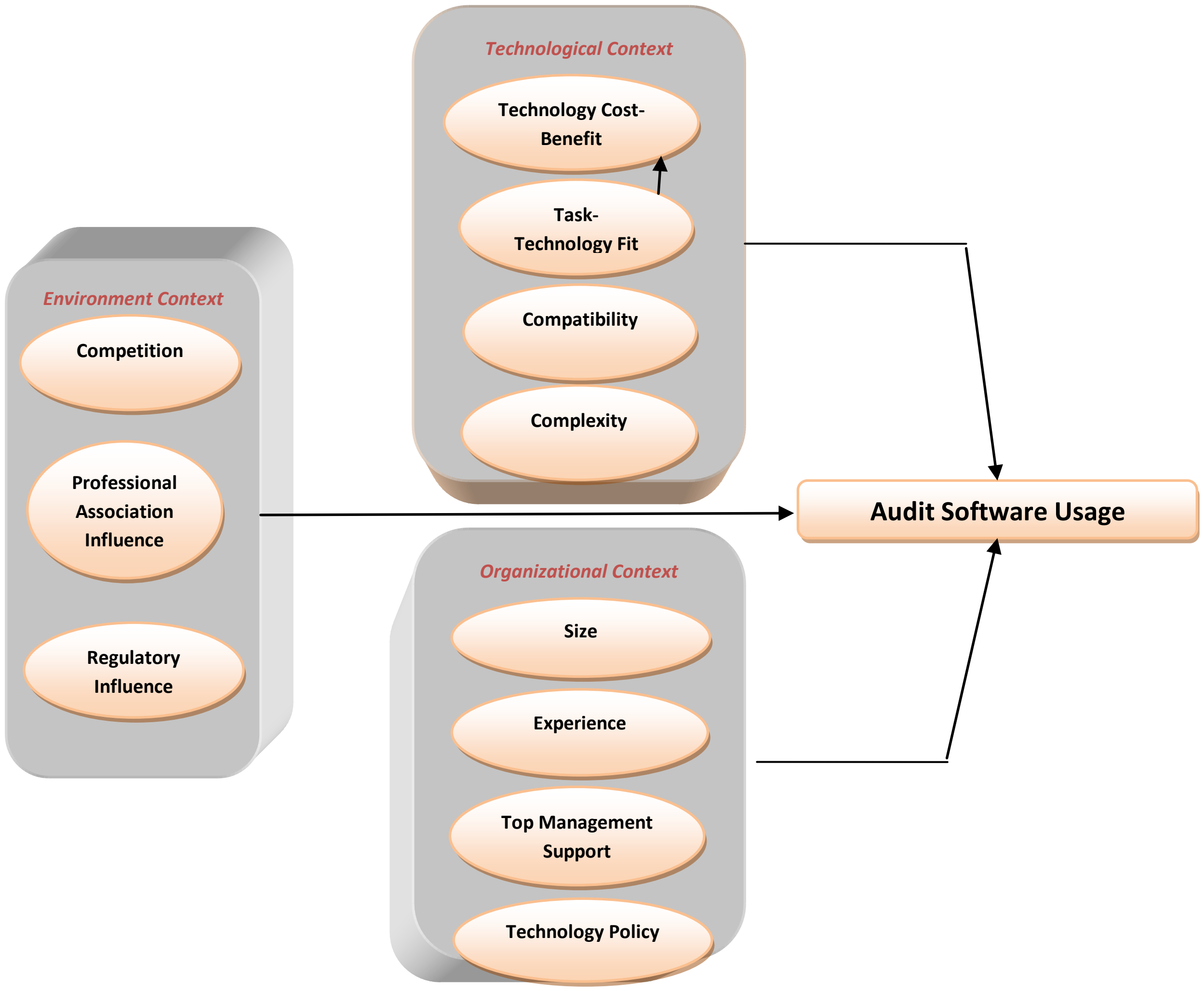

Fig 1. TOE Model for Audit Specific Software

RESULTS

Instrument Reliability and Validity

The empirical examination theorized in the methodology is provided in the reliability analysis and factor analysis of the constructs. The results are as presented in **Table 1 and Table 2**. The reliability of each item examined using Cronbach's alpha as it stated to be the most accepted measure for reliability assessment [50]. Reliability analysis of the data is determined from the viewpoint of both the entire construct model and each individual model variable. The overall Cronbach's alpha for TOE was 0.927 signifying that the scales are internally consistent with a high degree of reliability. Results of Cronbach's alpha coefficient for item analysis by construct range between 0.768 and 0.851. This is an indication of each subscale of possessing very good internal consistency. Cronbach's alpha value for task-technology fit was the highest (0.851), while environmental context was the lowest (0.768). Using Kaise-Meyer-Olkin (KMO), a measure factor analysis of sampling adequacy confirmatory, we also addressed factors analysis. The result of the KMO revealed 0.893, exceeding the recommended value of 0.6 [51]. This outcome is an indication that factors analysis is significant and that the construct model will be able to provide distinctive and trustworthy factors. Furthermore, Bartlett's Test of Sphericity was 0.0000 confirming strong inter-variable correlation, hence suitable for further analysis.

Test of Measurement

In this subsection, we provide the results of hypotheses developed in earlier section. Using linear regression analysis, particularly two separate regression analyses, we conducted a full test of the model. The use of two regression analyses was necessitated by the presence of more than one independent variable in the research model [43]. Table 3 presents result of regression analyses. Table 3 revealed the summary of regression analyses. Hypotheses 1, 2, 4a, 5a, 5b, and 6 predict that the decision to use audit specific software would occur if there were task-technology fit, technology cost-benefit, organizational contexts, environmental contexts, professional regulations, and increased complexity. The conclusion of the first linear regression specified that the model have a significant fit, since the R squared was 0.672, which explains 67.2 percent of the variation of the dependent variable (DU). Furthermore, the Durbin-Watson score was 2.214 showing the absence of autocorrelation amongst variables. The F-statistic in the model was 59.817. In addition, sig. value was 0.000, at the 0.01 (1%) level of confidence confirming the significant fit of the model. The standardized beta coefficient for the "task-technology fit" measure was positive and significant (beta = 0.667, p-value<0.01). Hence, hypothesis 1 is sustained. This shows that IS auditors will use audit specific software if there is cohesion between IS auditors task and the technology tools. This result confirms that audit specialized tools are easy applications to learn and use and therefore, they are motivated to use them more often. Therefor audit specific software are useful tools for IS auditors tasks as it contributes significantly towards reviewing and testing the operations of internal control procedures within accounting systems. This would lead into gathering sufficient appropriate evidence to demonstrate that the controls are functioning well enough to give the auditor confidence that material errors that might affect financial statements are discovered. The use of data analytics tools also assists auditors in streamlining existing internal controls. For "technology cost-benefit" the standard beta coefficient was positive and significant (beta = 0.249, p - 0.006). With this, hypothesis 2 is supported. The results revealed that technology cost benefit has a significant effect on the use of audit specific software by internal auditors. This is a confirmation of increased efficiency in the audit task because of the acceptance of technologies. There is significant reduction in turnaround time of audit procedures, since auditors spend less time carrying out similar procedures as conventional auditing.

Table 1. Reliability Analysis

Factors	All factors	TB	OC	EC	PR	IC	TP	TF	DU
Cronbach's alpha	0.972	0.822	0.833	8.768	0.792	0.824	0.838	0.851	0.769

Table 2. Factor analysis (validity analysis)

KMO and Bartlett's test		
Kaiser-meyer-olkin measure of sampling adequacy		000,893
Bartlett's test of sphericity Chi-square	approx.	883,310

df	130,000
sig.	000,000

Table 3. Regression analysis-TOE and audit specific software built-in function based regression

Independent variables	Beta coefficient	p-value	R^2	Durbin Watson	F	Sig.
Hypotheses	**1, 2, 4a, 5a, 5b, 6**					
TF	0.667	0.000	0.672	2.214	59.817	0.000
TB	0.249	0.006				
OC	0.193	0.022				
EC	0.062	0.326				
PR	0.074	0.233				
IC	0.629	0.016				
Dependent variable: DU						
Hypotheses	**3**					
TF	0.081	0.648	0.651	2.272	62.334	1.614
Dependent variable: TB						
Hypothesis	**4b**					
TP	0.647	0.000	0.652	2.286	64.887	0.000
Dependent variable: CC						

Results for “organizational factors” is statistically significant (beta = 0.193, p-value 0.022). Thus, hypothesis 4a is supported. This revealed that organizational factors such as size, firm scope, organizational readiness and management support positively influence the use of specialized audit tools. This result indicates that where senior management is committed to IT governance, there will be adequate support for the use of audit technology tools by internal auditors. The average cost of audit specific software is highly prohibitive for small companies, subsequently only mid-sized and large firms are able to utilize these technologies effectively. While cost is insufficient as a determinant when deciding on the choice of audit specific software, the cost of ActiveData or TopCAATs is less than a quarter of the price of IDEA or ACL (based on single user license and already having Excel installed).

Results for “environmental contexts” were not statistically significant (beta = 0.062, p-value = 0.326). Thus, Hypothesis 4b is not supported and we are able to conclude IS auditors’ use of audit specific software is not related to environmental contexts. This also implies that the use of technology tools by internal auditors is not influenced by any of competitive pressure, consumers, perceived industry pressure, or government pressure. However, rapid, pervasive change is quickly transforming the practice of internal audit, raising significant issues for audit leaders and their stakeholders. In recent times, audit committees are setting higher goals for internal audit. This trend is being driven by two major factors; increased turnover among audit committee chairs and the growing tendency of committee members to share best-practice ideas drawn from their current or past experience with other internal audit groups. Likewise, internal auditors are under pressure by audit committees and senior management for more timely information about major risks, and for faster and more actionable action results, especially with the advent of integrated. The result of “professional regulations” is also not significant (beta = 0.074, p-value = 0.233), an indication that the impact of professional regulations on the deployment of audit specific software with specialized built-in functions is not substantial. Although it might be encouraging for self-regulating professional bodies to recommend the use of specialized tools for auditors in other to improve efficiency, their influence however failed to influence significant use of these tools. The results of “increasing complexity” was positive and significant (beta = 0.629, p-value = 0.016). with this outcome, we are able to determine that as audit specific software built-in functions and features becomes more complex, internal auditors are less likely to use those features due to decrease in the ease of use. Other than actual built-in functions available, the most important consideration when selecting audits software is the ease of use. This is often cited as the greatest barrier to entry for audit firms and internal audit departments. Even worse, internal audit departments of large corporations end up not using the applications after acquiring them with thousands of dollars. The reasons are largely due to such complexities [6]. While ACL and IDEA have both got easier to use over the last few years, there is still quite a steep learning curve with them. Both manufacturers recommend multi-day training courses, and less IT literate staff often struggle to take it all in. on the other hand, ActiveData and TopCAATs are far simpler to use as both completely run on Excel – an environment just about which every auditor is familiar with.

Hypotheses 3 predicts that task-technology fit has positive effect on technology cost benefit and 4b predicts that organizational contexts has a positive effect on the choice of audit specific software used by IS auditors. The second linear regression indicated that there was 0.651 (65.1%) of the variation of the dependent factor task-cost benefit (TB). The Durbin-Watson value for this case was 2.272, which suggest that there is no autocorrelation between variables. The F statistic was 62.334 and sig 1.614 suggesting a good fit model. The regression result provides some evidence supporting Hypothesis 3 with standardized beta coefficient. Although the standardized beta coefficient was positive, it was found to be insignificant. “Technology task-fit” was making an insignificant contribution to the prediction of “technology cost-benefit”. This implies that though technology-task fit might influence the choice of audit software, it is not an indication to achieve a cost-benefit advantage. At a time when auditors perceive the use of audit tools to be highly relevant in their function of evaluating controls inherent in systems and processes, it is highly unlikely that small firms would deploy applications considered avoidably expensive even when associated benefits are apparent. The final linear regression indicated 0.652 (65.2%) of variation of the dependent factor “choice of audit software (CC)”. the Durbin-Watson value was 2.286. moreover, the analysis of variance displays that the F statistic was 64.887 and sig 0.000 suggesting a good model fit. The regression results produced a standardized beta coefficient for Hypothesis 4b (beta = 0.647, p-value = <0.01). “Choice of audit software was making a significant contribution to the prediction of “technology policy”. The choice of audit tools is more likely to be based on technology policy of organizations. This implies that the technology policy is a considerable factor in selecting audit technologies. If it is the policy of the organization to invest in innovative and sophisticated tools and equipment at all times, it is likely that such entities would be willing to deploy expensive urbane applications in other to complement existing IT policies. The result confirms that technology policy determines the quality of investment in technologies and subsequently the choice of audit specific software.

DISCUSSION

It is generally accepted amongst professional accountants that advances in technology have affected the audit process. With the ever-increasing complexity, specifically computer-based accounting information systems and the vast amount of transactions, it has become impracticable to conduct the overall audit manually. It is even more impossible in an e-commerce environment since all accounting data auditors need to access is computerized. Experience in the past has shown that auditors frequently outsource technical assistance in some auditing areas from information systems auditor, also called electronic data processing (EDP auditor. However, the as computer-based accounting information system become commonplace, such technical skill is even more important. Overtime, the boundary between the financial auditors and the information systems auditor becomes blurred. The current study provided some empirical evidence supporting five of eight hypotheses, which were based on previously validated measurement instruments for technology acceptance. The results suggested that a sizeable proportion of internal auditors are satisfied with the output and perspectives of audit specific software usage.

The findings contribute to existing literature in a number of ways. First, the study is a contribution towards audit specific software literature by providing insights into the factors that seem to affect their adoption. The result revealed that task-technology fit is a critical factor influencing the use of audit specific software by internal auditors. This is similar to Lorenzo (2009) results, which found that technological factors influence SME’s adoption of enterprise systems and that firms with greater ability to experiment with the systems before adoption were predicted to become adopters. Secondly, results of this study indicated that technology cost-benefit influence the decision to use audit specific software by auditors. This is consistent with52] when they concluded that value for money is a major factor influencing the intention to use CAATTs. These conclusions are also consistent with other TOE studies [53]; [54]; 34]; [34]55; [56].

Additionally, Kim et al. argued that the basic features of audit specific software such as database queries, ratio analysis, and audit sampling were more accepted by internal auditors, while the advanced built-in functions such as digital analysis, regression/ANOVA, and classification are less accepted. This is consistent with our finding that increasing complexity is likely to decrease deployment of audit specific software amongst internal auditors. the outcome of the study also coincide with [57]; when they found that users of Sam editor, a Unix-based text editor, adopted more commands when their experience increases, and the features being adopted late were more complex and powerful. When technologies are less complex, they are more accepted internal auditors because the complexity of technology features negatively affects their use [58].

The findings of the study show that TOE is appropriate to investigate the adoption of audit specific software among internal auditors in Nigerian companies. While the results can be considered statistically significant in most parts, there are a number of limitations that have to be stated. First, the sample size was relatively small compared to the number of professional auditors in Nigerian companies. Participants may not have been motivated to complete the survey mainly because they are not familiar with specialized audit applications because the spread of these tools amongst internal auditors in Nigeria is relatively low. Besides, most internal auditors are considered intermediate users of audit specific software rather than experts. The other limitations of the study are the built-in functions of audit tools we selected. These may not represent the features of all audit technologies, so simply averaging selected features and built-in functions would not be the same to evaluation of overall audit specific software. On these basis, the research model might not have included other extraneous determinants of choice of audit specific software as predictors for optimal deployment for continuous. However, regardless of these limitations this research offers considerable amount of knowledge in areas of accounting, reporting and technology systems acceptance.

CONCLUSION

The main aim of this study is to examine the acceptance and usage of audit technology tools in Nigeria in the light of the Technology-Organization-Environment (TOE) added with new variables, built-in functions and features of data analysis Software as predictors of optimal deployment for continuous audit assurance. The author is interested in a number of extensions to the research. Future studies could identify other external variables that are capable of affecting the choice of audit specific software by internal auditors. Models for successful CAATTs adoption by internal auditors could also be proposed and tested empirically. As there is limited research related to audit specific software acceptance and usage in developing economies, this study should encourage other researchers to further enrich the current scope by including possible determinants in the TOE, derivable from expanding literature. Such model could explore dimensions covering the issues of factors influencing motivation, best practices of implementation of audit specific software, performance measurement criteria and challenges that can become barriers to successful implementation of these tools. Furthermore, this study should be replicated in other professions such as computer science programming to verify the impact of technologies features acceptance in general.

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