



## TECHNOLOGY USAGE AND ITS IMPACT ON FINANCIAL AUDIT PROCESS: A QUALITATIVE ENQUIRY

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### **Abstract**

*The integration of technology in financial auditing has revolutionized the audit process, enhancing efficiency, accuracy, and reliability. This qualitative enquiry explores the usage of technology and their impact on the financial audit process. Through in-depth interviews with thirteen experienced auditors from large and medium audit firms in Tanzania. Data was analysed in themes and triangulated with relevant documentation from various sources. The study explored into the ways in which technology has transformed audit practices particularly in a developing country's context. The findings indicate that technologies facilitate real-time data analysis, improve risk assessment, and enhance audit trail accuracy. Additionally, the study identifies challenges such as the need for continuous training and the risk of over-reliance on automated systems. The findings highlight the importance of a balanced approach, combining technological tools with professional judgment to ensure comprehensive and effective audits. This research provides valuable insights for auditors and accounting professionals, emphasizing the need for on-going adaptation and skill development in the evolving landscape of financial auditing.*

*Keywords: Financial auditing, audit process, technological integration, IS tools, automated systems, risk assessment*

## INTRODUCTION

The audit life cycle is composed of five main stages namely, engagement, planning, execution, gathering audit evidence and reporting the audit findings. The International Federation for Accountants (IFAC) standards clarifies that the audit procedures remain the same whether the entity operates in manual or IT based platforms. However, in auditing a computerised environment, auditors are expected to use technologies for efficiency and transparency (Kotb and Roberts, 2011). Audit technologies and their usage vary between countries and between audit firms within the country. The variation of information systems (IS) usage is dependable on various factors including the type of clients' automation and the level of IT diffusion of a particular country.

There are various technological tools which auditors can use in the audit engagements depending on the level of their client automation. These tools are known as Computer Assisted Audit Techniques (CAATs). CAATs were established to have various ability including simplifying audit procedures (Thottoli et al., 2022; Banker et al., 2002; Greenstein-Prosch et al., 2008; Widuri et al., 2019), fraud detection and identifying unusual transactions (Janvrin et al., 2009; Ahmi and Kent 2013, Curtis and Payne, 2014). However, there is little understanding on how audit firms in developing countries use technology in the audit process and the auditors' perceptions of IT importance across various audit procedures. This study aimed to address this gap by focusing on the data from a developing country-Tanzania, which is also scarce in the literature.

Prior studies in audit technology have examined the extent of technology adoption and factors influencing its usage (Pedrosa et al., 2020; Abreu et al., 2018; Ahmi et al., 2017; Al Hiyari et al., 2019; Widuri et al., 2019; Widuri et al., 2016; Betti and Sarens, 2021); or the impact of technology on audit professional (Thottoli et al, 2022 and Thottoli et al. 2019; Thottoli, 2021); and how technology posed challenges on the audit profession (Katamba and Yee, 2019; Kotb et al., 2014). None of these studies explored the post-adoption impact of technology usage on the audit process. Grounded on previous studies which reported positive results of technology usage in other management field such as e-commerce (Gibbs and Kraemer, 2010; Gunasekaran and Ngai 2005; Maswera et al., 2008), manufacturing (Barua et al., 1995), banking (Aliyu and Tasmin, 2012), insurance (Lee et al., 2007), healthcare (Bardhan and Thouin, 2013) and hotels and hospitality (Gonzalez and Gidumal, 2016); IS could be viewed as useful in fulfilling audit objectives and improving the audit process. However, there is scanty of empirical evidence in investigations in this area of study particularly in Sub-Sahara African countries. The findings of this study will foster IS usage in auditing so as to increase the level of audit assurance among clients.

## LITERATURE REVIEW

### Technology in Auditing

This study defines audit technology as a tool which can aid auditors in accomplishing audit tasks. They combine measures, controls and auditing techniques with the technology of the IT industry, user interface, computer applications and sophisticated software (Ghasemi et al., 2011). The software can be used to pathway transactions and to provide internal reporting data, external reporting data and financial statements. Specifically, it includes Word processing, Excel, Emails, Internet, Image processing and e-presentation, generalized audit software (GAS) and computer assisted audit tools and techniques (CAATTs) (Greenstein-Prosch et al., 2008; Ahmi and Kent, 2013).

The literature suggests that utilisation of technological tools enabled audit firms to improve the audit processes through improving the audit quality (Omoteso et al., 2008). Specifically, technology simplified coordination of audit activities due to the availability and use of new and relatively inexpensive information delivery mechanisms by maintaining links with clients for value-added services and support (Banker et al., 2002). IS supports four key areas of audit processes; namely, planning, documentation, testing and communication of audit reports (Bierstaker et al., 2001; Banker et al., 2002; Omoteso et al., 2010). The use of technological tools in auditing enables audit firms to experience a steady growth of revenue due to enhancement in risk assessment capability to their e-business clients (Vendrzyk and Baganoff, 2003). The use of IS software and capability enable audit firms to expand their products and services from auditing financial statements alone into WebTrust and SysTrust assurance services (Kotb et al., 2012). It can be concluded that the utilisation of IS tools by audit firms has not only increased its revenue margin but also improved coordination of activities within the audit departments and other segments (Banker et al., 2002; Kotb et al., 2012). For audit firms with international affiliations, the use of knowledge sharing applications enhanced audit tasks by fostering transparency in the audit process.

Studies have documented various measurement criteria of information (IS) usage and their impact on firm's performance as inconclusive. Some studies measured the impact of IS by employing either financial measures like profitability, cost reduction or revenue recognition (Banker et al., 2002). Others applied non-financial measures to include improved operations, customer satisfaction, competitive advantage and other market measures (Ahed and Louis, 2008) or a combination of financial and non-financial measures (see Banker et al., 2002). Non-financial measures of IS utilisation for audit value includes efficiency of operations, improving audit quality and individual auditor's performance level (Banker et al., 2002; Omoteso et al., 2010). Other scholars have defined efficiency improvement in IS utilisation to include improved

coordination and supervisory activities (Omoteso et al., 2008). The impact of IS on efficiency comes from internal and external efficiency adjustments. Internal efficiency adjustments include time and cost savings by abandoning complex manual tasks which are time consuming and increase administrative expenses (Janvrin et al., 2009). In contrast, external efficiency stems from stakeholders' satisfaction of the audit quality and on time delivery of audit services (Ohman et al., 2012; Mohamed and Habib, 2013).

The usage of IS in auditing narrowed the expectation gap among audit stakeholders (Omoteso et al., 2008). It is argued that through the use of IS, auditors can perform several tasks by applying modern techniques in gathering audit evidence and identifying fraud easily than using manual processes. Other measurements reported include increased audit independence (Omoteso et al., 2008) and firms' competitive advantage (Kotb et al., 2012). However, studies have reported various benefits depending on the expected outcomes. In other management research, Quaddus and Achjari (2005) measured the impact of technology usage (i.e. e-commerce) in terms of the degree of contribution of IS in meeting organisational goals and increase in customer base. It was found that the adoption of e-commerce increased the number of customers by tapping them across borders and also reduced the costs of operation.

The unique features of audit software (such as GAS) enable audit value creation by improving efficiency in analytical procedures, documentations, clients' feedback and information sharing (Banker et al., 2002; Greenstein-Prosch et al., 2008; Janvrin et al., 2009; Ahmi et al., 2017; Ahmi and Kent, 2013; Widuri et al, 2016; Thottoli et al., 2022). The value creation of IS utilisation has been found to depend on IT systems used, firms' sizes and human resources capabilities (Greenstein-Prosch et al., 2008; Elly and Boter, 2011). The macro level of IS utilisation success model that was developed by Melville et al. (2004), highlights the core internal and external determinants, and internal and external obstacles as important factors affecting the achievement of IS usage in an organisation. Internal and external determinants were defined as the success factors' accruing to a firm as a result of using IS. Meanwhile, internal and external obstacles were the impediment that hinders firms from utilising IS in its business processes.

In an emerging market context (Egypt), it was found that the use of audit technology in technical audit procedures varied with the size of the audit firm and auditor's expertise in IT usage (El-Sood et al., 2015). For instance, if the audit firm is a Big Four, with sufficient IT auditor proficiency, the perceived importance of technology usage for audit process increased. This study has therefore, benchmarked the degree of impact of IS usage on financial audit based on the improved audit processes derived from the audit life cycle. This part of research has limited empirical data and even less from emerging markets.

## RESEARCH METHOD

Since this area of research has been less explored in developing countries, interview technique becomes the ideal research approach (Yin, 2009). Hence, a purposive sampling technique was used to select respondents from the audit firms that audited computerised clients, particularly financial institutions in Tanzania. This is because banks in Tanzania are considered to be more automated and risky clients hence, the use of technology for auditing becomes important (Katamba et al., 2017).

A total of 13 interviews cases were identified and in one case, two (2) respondents were interviewed at the same time making a total of 13 cases. This sample size suffices a qualitative sample which is suggested to be  $\leq 10$  (Creswell, 2007) or  $\geq 6$  in number (Morse, 1995). The respondents were composed of 13 auditors at management level with varied IT skills and audit experience. Their average working experience was 21 years while their average IT skills mentioned as either 'good' or 'excellent'. Interviews were considered the suitable approach as it allows a researcher to put forward a broad theory testing by providing rich, comprehensive information that provides specific and fresh understanding of the phenomenon (Silverman, 2013). Hence, in-depth face to face interviews were conducted in April 2016 to December 2016. All interviews were audio taped, transcribed and analysed in thematic coding.

Thematic coding includes labelling the manners in which patterns are established, connected, defined and applied to describe the communality of words mentioned by respondents (Thorpe and Holt, 2008). Accordingly, themes were grouped based on the identified stages in audit life cycle. Ethical issues were considered whereby researchers adhered to privacy of respondents' data and anonymity of information. The study abbreviated the word 'respondent' as R1, R2, R3 and so on to denote respondents who were interviewed and arranged them in a chronological order according to how they were approached during the interview sessions. This ensured anonymity of respondents as part of ethical consideration in qualitative enquiries (Silverman, 2013). This arrangement helped to track records of narratives to be included in the findings.

Transferability and generalisability sound similar to the art of knowledge sharing or testing the results to another setting (Merriam, 2009). To ensure this, we employed thick narratives to detail the framework and research findings (Maxwell, 2005). Furthermore, the respondents and research locations were cautiously selected so as to enable reviewers to apply the results to another environment. Meanwhile, reliability was considered through the use of data triangulation strategy by sharing transcripts, documents, field notes, memos and diary entries with the respondents (Merriam, 2009). Likewise, researchers constantly visited the websites to confirm other information such as the names of the software that was mentioned

during the interview in order to avoid mistakes in naming the mentioned technologies. The next subsection discusses the important findings.

## **FINDINGS**

### **Types of IS used by external auditors**

The interview findings revealed that the most widely used technology was the Audit Command Language (ACL) which was used by 50% of the respondents. The second most used tool was Interactive Data Extraction and Analysis (IDEA). Respondents who used ACL reported that it facilitated the process of data analysis by mining huge amount of data, summarising, detecting missing sequences, errors and spotting unusual patterns in transactions (R2 and R9). Furthermore, ACL facilitates interrogations of the data, predicting risk occurrences by checking outliers in a given set of electronic accounting records (R9 and R12b). The tool can display signals to auditors by showing where problems might have occurred, enabling them to concentrate on such areas rather than assuming risk to have occurred in all transactions (R9). Other software and tools include SAS, Pro-audit, PCAS and GAMX. Similarly, Microsoft Office applications were also used, although were not considered as audit technologies but a must used tool for conducting multiple tasks. The tools are used to achieve audit objectives and to enhance the audit process.

### **The impact of IS usage on financial audit process**

The interview findings revealed that IS usage had impacted the audit process differently. The following sub-section discusses these aspects as was described by the interviewed respondents:

#### ***Planning and Audit Team Composition***

Audit planning involves allocating appropriate resources including manpower based on the nature of the audit assignment. The interview revealed that unlike in a manual environment where a partner would select the audit teams from among financial auditors, in a computerised environment, audit teams are composed of both financial auditors and IS experts to effectively audit the systems as well as transactions (R2, R8, R9 and R11). The IS experts check the IT environment first and ascertain its extent of complexity and security that would permit the financial auditor to rely on the systems that process information. In a situation where the level of audit risk is assumed to be high, the audit team would require more IT experts and other specialists such as IT fraud examiners (R9 and R11). A partner in a large international firm clarified that *“it has become imperative for audit firms to develop additional skills outside the*

*traditional audit*" (R11). In contrast, if the system is just used to post transactions with few electronic transfers of cash, few individuals (two or three), who have access to the system; it becomes economical for the financial auditor to just audit the transactions directly without the assistance of an IT expert (R5, R11 and R12a).

### **Documentation of Audit Work**

As businesses are gradually relying on paper-less processes and documentation, audit firms are expected to also move to automated systems (Biestaker et al., 2001). The interview data revealed that more than fifty percent (50%) of the respondents mentioned that they were in the process of transforming to automated working paper mechanisms and storage of information. The main benefit of automated working papers is that data can be shared easily via emails or mobile related applications (R8 and R11). Past years' audit working papers can be retrieved and compared with recent years' working papers. For safety reasons, several backups are maintained electronically at various storage locations and even in clouds. This practice has significantly reduced the cost of storage of working papers which could not be achieved in manual documentation systems (R2, R9 and R11). A partner in Big Four delineated "*the NBAA does not want to find box files kept by audit firms anymore*". This asserts the importance of the audit oversight body to be strict on compliance issues through their emphasis on audit firms to use IS tools.

The interview findings further revealed that six audit firms did not have to develop audit programs. It was clarified that the audit software has embedded both audit procedures and authoritative guidelines from International Federation for Accountants (IFAC) standards, the National Board for Accountants and Auditors (NBAA) standards and other regulators (R11). For the internationally affiliated audit firms, the audit programs were developed by their mother organisations and embedded within the audit software. The practice has significantly simplified the audit procedures. For instance, a partner commented "*in a practical audit, after completion of CPA training, a junior auditor who is not yet exposed to IFRS would realise the applications of the accounting standards automatically as he starts doing the audits because it is something that they work with daily within the audit system*". (R11).

### **Audit Testing**

The interview findings reported that between 60% and 80% of audit clients were using some kind of enterprise computing platform (R1 and R12a). This, therefore, means that paper-based trails and mechanism check points that were formerly normal for an average audit firm, are accessible in an automated form. Thus, it becomes critical for auditors to have an in-depth

understanding of the clients' systems so as to audit through the system. For instance, during reconciliation of client's financial data, auditors used software to pull the client's records for verification (R2 and R5). Audit standards also require that, if clients use IS to process and store data, the IS platform must also be audited (R11). Hence, testing of sophisticated controls like firewalls, encryption of sensitive information, passwords, and authentication of automated data and signatures becomes important (Bierstaker et al., 2001; Kotb and Roberts, 2011; No and Vasarhelyi, 2017). Consequently, respondents mentioned that they have implemented a risk-based audit methodology that focused on analytical review, testing of IT controls and reduced substantive testing (R9, R11 and R12b). Similarly, the use of software such as ACL, IDEA, GAMX and so on, has helped auditors to improve the audit tasks by auditing through the system especially in high computerised clients (R2, R5, R8 and R11). Testing of larger samples of data can be performed on some businesses with high compliances like banks, insurance companies and telecoms where audit software can probe for repeated invoices and false claims (R11 and R12a).

### ***Execution of the Audit***

The computerised environment of the clients has changed the way the audit is conducted. The interview findings revealed that the IS auditor first checks the IT general controls around the system after which the financial auditors perform transaction audits by relying on the tested controls by the IS auditor (R2, R5, R9 and R11). In a situation where the controls in the systems are confirmed to be ineffective, further verification of the system is performed, after which auditors will contact the management for clarifications and confirmations to see whether the management is aware of the situation (R5). In rare, extreme cases the audit firm would resign and recommend the client to change the auditor if the system is believed to be unreliable (R5 and R11).

The nature of financial audit has now enshrined into understanding of a client's business (R2, R8; R11). It was clarified that the auditors' methodologies are converging with the changes of the clients' environment (R9 and R11). It therefore means that for computerised clients, manual audits cannot be applied (R11). Additionally, IFAC standards require auditor to use technology to achieve efficiency and to be effective in performing audit assignments. It was stated that since audit software can select, scrutinise, and analyse large data sets, it has improved efficiency in the audit process (R9 and R11). For instance, audit processes such as reconfirmation of accounts balances, aging of accounts receivables, and recognising of outliers in transactions might be conducted on the whole population instead of a sample (R2 and R5). However, such a procedure is desirable but not practiced because the notion of audit relies on

efficiency on the side of the audit firm (R11). The audit of the entire population may produce high level of audit effectiveness but may not be cost effective. Besides that the need justifies the means (R9); and the nature of audit clients in Tanzania does not require a verification of the entire population due to other cost-benefit related issues (R5, R9 and R11).

### ***Communication and Information Sharing***

The interview findings revealed that the use of IS has enhanced the sharing of information among auditors when they are working in different audit locations. It was mentioned that the use of software such as EMS has shareware applications where the work performed by each auditor can be viewed by others. The updated and deleted work can be viewed simultaneously hence, enabling transparency and knowledge-sharing among the team members. For instance, if one auditor is working with payables' database and another one with receivables, the work can be viewed and shared by all (R11). Furthermore, a manager can leave a coach note on how the juniors need to improve and also the audit findings can be discussed by the team members through shareware applications which were not possible in the past five years (R9). In the new ISAs, transparency in the audit process was emphasised and one of the ways to foster transparency is to discuss the audit reports internally before being signed by the partner. Subsequently, a few respondents (R2, R5, R8 and R9) reported using audit software (EMS) for communication purposes to produce a group consensus or opinion. Meanwhile, another respondent mentioned using work-related messengers to discuss the audit report at various stages (R11).

### ***Report Writing***

The interview findings revealed that the use of IS tools has facilitated the report writing process and allowed audit firms to issue reports on time. Basic IS applications such as MS Word and Excel enabled the preparation of the audit reports and sending them to the clients. Furthermore, audit firms are able to rectify errors, make adjustments and issue the corrected version of the report in a very short period of time (R1, R3; R4 and R7).

### ***IT Consulting Services***

Several respondents (R1, R9, R10 and R11) reported that training in IT related issues was among the important priorities for audit firms. Auditors were given internal training or sent abroad to acquire additional skills necessary for their working environment. The purpose of training in IT was to enhance human resources development so as to ensure that audit effectiveness is achieved (R7, R9 and R11). As auditors become more technologically

proficient, additional consulting services will emerge (Bierstaker et al., 2001). Subsequently, auditors were providing extra services to their clients such as risk management and cybersecurity services. The provision of such services enables the clients to be updated on the various risks categories that might threaten their information and learn mitigation strategies (R9; R11 and R12b). Furthermore, auditors assist their clients in designing assessable objectives and performance indicators that can be electronically monitored through enterprise computing (Bierstaker et al., 2021). The secondary data found that the selected audit firms had advertised their services extensively which include IT consultancy services. Similarly, the use of IS tools and techniques enabled auditors to utilise their extra time in assisting clients to assess business risks as part of financial statement audit.

### **Summary and Discussion**

The objective of this study was to assess the implication of IS usage on financial audit process which is the core business of the audit firm. The interview findings revealed that IS usage has implications on the audit process from planning, execution, audit testing, documentation and report writing. The use of IS tools has enhanced these audit procedures differently. Some of the respondents stated that their audit firms had computerised their audit procedures while others were in the process of converging. The use of IS tools and techniques has necessitated for auditors to acquire additional skills in IT which is becoming useful in providing extra services to their clients. In turn, auditors are saving time and efforts, ensuring safety of clients' data, while increasing revenue to the audit firms by providing additional IT related services.

The interview findings revealed that external auditors planned the audit differently when auditing a manual client, computerised client or complex clients such as banks and telecoms. It was found that when auditing manual clients, the audit team composed of financial auditors who would test documents and report the findings. However, when auditing computerised clients, one or two IS auditors or IT experts were included as part of the audit team. On the contrary, when auditing complex clients, the audit team was composed of more IT experts and the use of IS tools and techniques during the audit process was dependable on the level of computerisation of the audit client. These findings are similar to prior studies (Asuquo et al., 2020; Grzeszczak, 2020; and Pedrosa et al., 2020) who reported the need of IS knowledge integration in executing accounting work in the digital era. The use of IS tools during the audit process was perceived more important when auditing banks and telecoms due to the volume of transactions and complexity of their products as compared to other clients. It was further reported that the complexity in banks becomes intense when their products are embedded with

telecom services in offering mobile banking transactions which commanded auditors to increase the use of IS tools.

## CONCLUSION

The findings revealed that external auditors in Tanzania used tools in the audit process but the usage differed between audit firms. The common audit tool was ACL, while office related applications were used by all auditors to perform various office related tasks which enhanced the audit process. The audit process composes of five main procedures which are planning, execution, gathering evidence, testing and reporting the audit findings to stakeholders. The interview findings revealed that external auditors planned the audit differently when auditing a manual client, computerised client or complex clients such as banks and telecoms. It was found that when auditing manual clients, the audit team composed of only financial auditors who would test manual documents and report the findings. However, when auditing computerised clients, one or two IS auditors or IT experts were included as part of the audit team.

On the contrary, when auditing complex clients, the audit team was composed of more IT experts and the use of IS tools and techniques during the audit process was dependable on the level of computerisation of the audit client. The use of IS tools during the audit process was perceived more important when auditing banks and telecoms due to the volume of transactions and complexity of their products as compared to other clients. It was reported that the complexity in banks becomes intense when their products are embedded with telecom services in offering mobile banking transactions which commanded auditors to increase the use of IS tools.

Furthermore, the interview findings revealed that auditors were steadily converging from using manual techniques in auditing to IS-based audit processes. Large audit firms were using software which had in-built audit procedures and guidelines in auditing each class of accounts. Electronic-based documentation systems and preparation of working papers were computerised which enhanced adherence to standards and codes while fostering transparency.

The overall findings revealed that the usage of IS tools by external auditors can be aimed to improve the audit process. As a result, it has enabled the study to propose a theoretical framework that can be improved using larger samples. Future studies expand the proposed conceptual framework to test post-adoption outcomes of using CAATs in different settings, where improved audit process can be established as outcomes.

## Hypothesis development

This study builds the body of literature by proposing further research on quantitative approach which could be validated by future scholar through a large sample size of auditors. We propose the following hypothesis:

*H1: The use of IS tool for audit planning improves the audit process*

*H2: The use of IS tool for documentation of audit evidence improves the audit process*

*H3: The use of IS tool for audit testing improves the audit process*

*H4: The use of IS tool for execution of audit assignments improves the audit process*

*H5: The use of IS tool for communication of the audit findings improves the audit process*

*H6: The use of IS tool in report writing improves the audit process*

*H7: The provision of IT consulting services to audit clients improves the audit process*

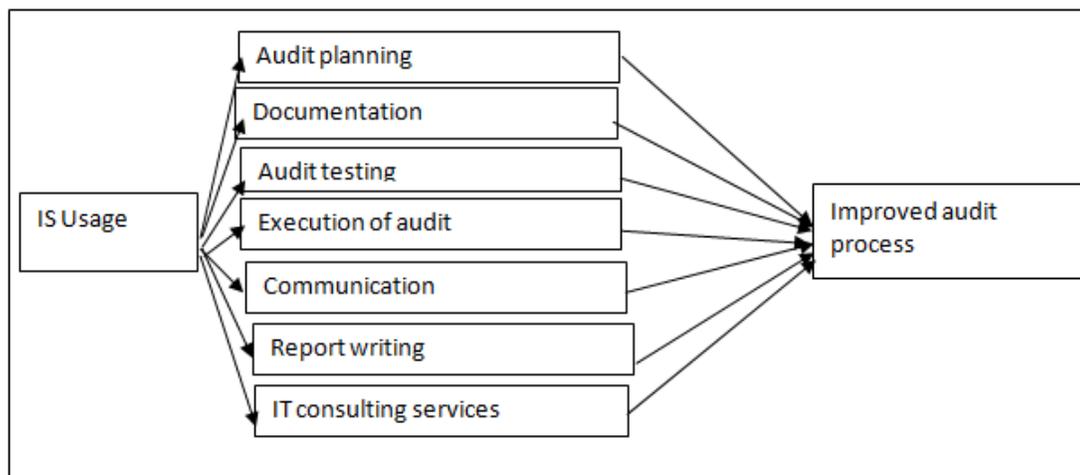


Figure 1. A proposed model on the impact of technology usage on the audit process

## Limitations and Research Implications

The author acknowledges two limitations for this study. First, the study used purposive sampling techniques to select respondents for interviews. The lack of random selection of respondents may have limited the chances of other auditors to participate, which can be claimed to create bias in the findings. Second, the study interviewed thirteen auditors from only one city (Dar es Salaam). This could have limited the study from generalising the findings to other regions of Tanzania. Additionally, the size of thirteen respondents could be perceived by many positivist scholars as small. Nonetheless, the study stands as a basis for future studies to explore the extent of usage of IS tools and techniques and how it improved the audit process.

Besides identifying the types of IS tools used by external auditors, the key outcome of this study was on how external auditors in Tanzania perceived IS usage for improved audit process. The findings of this study provide a motivation to auditors and decision makers in audit firms to speed IS adoption process. In the light of increased integration of technological processes among audit clients, auditors must be in the process of adopting technology to effectively manage the changing business environment (No and Versahelyi, 2017; Thottoli et al., 2022; Widur et al., 2019). Hence, the findings of this study can help owners of audit firms in Tanzania and in other developing countries to understand the potential of IS usage in improving audit performance levels.

The interview findings suggest that the adoption and usage of IS tools in auditing has a positive impact on the audit process. Auditors can improve the audit procedures while improving risk assessment to their clients while increasing IT consultancy services. The main contribution of this paper is the recognition of how IS usage can improve the audit life cycle by matching technology with audit objectives. Thus, the study has proposed a model of IS usage in auditing that can be validated quantitatively and promoting auditors to use technology so as to tap its various potentials.

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