Challenges Facing Audit Firms amid their Clients' move onto Computerised Platforms

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A B S T R A C T

The purpose of this research is to explore challenges facing audit firms when their clients are migrating from paper based to computerised platforms. Since most of the information will be available in paperless, it requires the audit to correspond to technology-based processes which has resulted into various challenges that have not been addressed in the prior studies. An exploratory study was conducted through semi-structured interviews on thirteen (13) external auditors in a developing country (Tanzania) where e-business is gaining momentum. Data was analysed in themes with the help of Nvivo software which fostered transparency and categorisation of themes. Themes were summarised in a tree map and interpreted there in. The findings revealed that in the past five years audit firms in Tanzania were in a transition from manual to technology-based audit processes. However, during this transition, the firms were experiencing financial and technical challenges; individual, organisational and stakeholders'-related challenges. The study concludes with suggestions from the respondents on the involvement of various accounting/auditing stakeholders in minimising the challenges. This study shades light for audit firms to understand the challenges related to technology usage by their clients which calls for a change in the audit methodology. It is contended that if traditional audit methodologies continue to be used to audit computerised clients, significant risks may go undetected.

1. Introduction

Businesses have adopted different models of technological innovations from simple to advanced models known as pure dot com (Kotb et al., 2012). In a simple model, a business will use the Internet as a mere platform to facilitate its adverts by displaying its products and services online, whereas complex business models integrate online processes, such as electronic fund transfers, e-supply chain management, electronic data transfers and online storage

of information (Jans et al., 2010; Kotb & Roberts, 2011). More so, these models are opted to take place in cloud, where an entity's data are processed and stored in a shared pool owned by a third party in the form of infrastructure, platform or software as a service (Lan & Bharadwaj, 2016).

The evolving e-business models have improved business availability, accessibility, cost and time but have also posed complexities in their processes which in turn have brought on challenges for financial auditors and specifically for audit firms. For example, the e-business processes have changed the risk profile of an entity from a traditional offline risk of paper-based manipulation into security risk, IT infrastructure risk, application and business process risks that may affect the reliability and integrity of financial information (Kotb & Roberts, 2011). As a result, the technical expertise of a financial auditor is challenged, requiring him to possess multiple skills in IT and e-business systems (Seeburn, 2013). Consequently, audit firms must train their employees to be equipped with the new skills to deal with evolving e-business models. In other words, the new IT-centric platforms have posed for audit change, technology usage and new skills which have high cost implications. Unfortunately, there is relatively scarce of literature highlighting challenges of audit firms when their clients are migrating from manual systems into computing platforms. In this study, the words "computing platforms", "e-business", "clients' automation" "pure dot com" and "accounting systems" have been used interchangeably to imply the move from using paper-based processes into using technology-based systems in processing and storing accounting information.

Most prior studies in audit technology have either examined factors influencing the adoption of computer-assisted audit tools and techniques (CAATTs), generalised audit software by external auditors or continuous auditing (Thottoli et al., 2019; Tilahun, 2019; Widuri et al., 2016; Curtis and Payne, 2014; Ahmi and Kent, 2013; Omoteso et al., 2008) or the impact of Extensible Business Reporting Language on users (Uyob et al., 2019) and the impact of e-business on the audit process and on accounting education (Kotb & Roberts, 2011; Kotb et al., 2013). However, studies did not examine the challenges faced by audit firms when their clients are migrating from manual processes into computing platforms. Furthermore, most studies have focussed on the developed world. Yet, technology is widespread across the African countries, which has resulted in various audit-related challenges. Hence, the study employed a qualitative approach by interviewing auditors at management level from large and medium audit firms in Tanzania. The findings revealed that for the past five years, audit firms were in transition in their audit methodologies to align with their clients' nature of automation. In this transition, there were challenges related to manpower, technology

and cost. The challenges are individual, organisational and stakeholders-related. The remaining sub-sections include the literature review, research method, findings, discussion and conclusion.

2.   Literature Review

2.1 *Adoption of technology in Tanzania*

Tanzania implemented her first National Information and communication technology (ICT) policy in the year 2003 with the aim of: "being the hub for technological innovations" with a vision of speeding up the provision of better, faster and reliable facilities to the community through the usage and implementation of technology" (Tanzania National ICT Policy, 2003). Since the implementation of the ICT policy, individuals, companies and the government increased adoption of technology in their departments and ministries. Due to Internet barriers, the easiest way to use technology among individuals in Tanzania is through mobile devices. It is estimated that 89% of Tanzanian population owns mobile phones (TCRA, 2015). The advanced use of ICT in the telecom industry grows steadily to provide financial inclusiveness to the marginalised rural population (Rumanyika, 2015). For instance, in the year 2000, the number of Internet users was 50,000 but in 2015 the number increased to approximately 7,600,000 people (TCRA, 2015). These statistics show a motivation for individuals and companies to adopt technology for personal use and business dealings. However, there are barriers hindering the growth of ICT to its full potential to include slow Internet, network interruptions, power outages and deficiency of knowledge among technology users Rumanyika, 2015). However, these challenges are some of the issues addressed in the ICT agenda in transforming the country into a global competitive nation by 2025 (Tanzania National ICT Policy, 2003).

Recent studies revealed that audit clients in Tanzania were increasingly shifting from manual to technology based by using various accounting software to process and save information. Small business clients were reported as using simple accounting systems such as Tally, MYOB, Pastel and Excel while some medium clients, large and multinational companies were using SAP and Limo software (Katamba et al., 2017). In percentage terms, it was estimated that the level of clients' automation in Tanzania is 60% while 40% are still using manual systems.

2.1.1. *E-government*

The government of Tanzania is utilising e-government in several of its ministries, departments and local governments (Dewa & Zlotnikova, 2014).

In recent times, the Tanzanian government introduced e-payments systems by adopting business integrated financial management system (BIFMS). The adoption of BIFMS implies that the government accounts are fully computerised and have become more or less on par with the private sector. Furthermore, from the year 2013, the Tanzanian government changed from cash to accrual accounting with a subsequent installation of a software called EPICOR that is used to process and store most of the government's financial data (Tanzania e-government strategy, 2013). The resulting benefits of e-government include reduced corruption, enhanced transparency, convenience, revenue growth, and decrease in government spending.

2.1.2. E-Business

Most businesses in Tanzania have adopted e-businesses (Oreku et al., 2009). Financial institutions are the leading adopters on this area of e-business (Nicholaus & Venkatakrishnan, 2013). Banks are using various software to process and store their information. There has been an integration of banking services between banks and telecoms, where a customer's bank account is directly connected to his mobile phone, hence, enabling him to pay for goods and services through his mobile phone. Customers can also transfer cash from the bank to another mobile phone, pay government taxes, charges and other levies, pay bills etc. directly through mobile money, something which was not possible a few years ago (Mwaikali, 2014). These impending advancements mean that the clients' information will be available in electronic forms which call for auditors to change their audit methodologies to align with their clients' business environment.

2.2. The Accounting Regulation and External Audit Environment in Tanzania

The accounting and auditing profession in Tanzania, is under the authority of the National Board of Accountants and Auditors (NBAA). The NBAA, which is also a member of IFAC, was established in 1973 to regulate financial reporting in the country (NBAA, 2015). There are 189 registered audit firms in Tanzania, which are authorised to provide audit services (NBAA, 2015). The audit firms are categorised as small, medium and large firms depending on its affiliation (international or local), number of partners and resources capabilities to conduct the audit (NBAA, 2015). The Big Four accounting firms have branches in Tanzania. They conduct rotational audit of all the listed companies in the Dar es Salaam Stock Exchange (DSE) including large unlisted private companies and several government departments. According to the Report on Observance of Standards and Codes (ROSC)

(2005), the BOT and the DSE have placed large trust and reliance on external audit assurance for compliance, statutory and effective audit.

2.3. Challenges facing audit firms and the audit profession

As technology continues to be widespread in business processing, the audit profession might face uncertainties in technology, trust, future products to offer, and pressure for audit change (Kotb & Roberts 2011; Hywel, 2017). Technologically, the evolving e-business models, data analytics and robotics process automation will continue to have an impact on the audit profession. In the new innovation era, many common controls and paper documents that were used to implement controls will slowly cease to exist. The use of machine-learning techniques such as data mining or other advanced tools will increasingly be useful to ensure reliability of information in the audit processes in computerised businesses (Jans et al., 2010; Boyle et al., 2015; Appelbaum, 2016). However, adopting these technologies by many audit firms might be challenging as they require financial resources and technical manpower for a smooth adoption process.

Recently, the innovation of blockchain, bitcoins or cryptocurrencies have created new trading ventures where currencies are decentralised in an open distributed ledger without an intervention of a central authority (Hywel, 2017). It is argued that the effective audit of these products might need the use of algorithm and machine-learning systems, codes and smart contracts to underpin these technologies to track each item of transactions from the start to the end (Hywel, 2017). Again, the adoption of these technological tools for effective audit might be costly in terms of manpower, equipment and financial resources. It is predicted that these technological innovations are some of the signals to the disappearance of many audit firms hence, creating dominance of the Big Four accounting firms (Marcelle, 2009). Subsequent to the law of evolution where the fittest survives, it is argued that new technology might nourish a few audit firms that are able to compete favourably using their resources to quickly adjust to new technological changes(Knechel et al., 2007). Therefore, the disappearance of small audit firms might create a shortage of independent auditors to audit businesses.

Similarly, the evolving use of cloud computing has widened challenges on how auditors conduct the audit in the digital platforms. Cloud-based products create a centralised shared pool of cloud users that are practically managed by a third party. Cloud-based products are available in three main forms which are software as-a- services (SaaS), platform as-a-service (PaaS) and infrastructure as-a-service (IaaS) (Lal & Bharadwaj, 2016). However, the policy and procedures on how auditors can access these data without

interfering with other cloud users are still unclear. This is due to the fact that cloud-based services provide an entity with no or little influence on its management information controls such as data transmission or possession (Kotb & Roberts, 2011).

The clients' computing platform is also perceived to have a huge impact on every aspect of the audit starting from how auditors execute their role, the tools they use, the skills set and potentially what should be audited (Chou & Chang, 2010). For instance, in the past few years, auditors were focussing on auditing financial records in manual box files by ticking the items confirming their material contribution to the financial statements. However, technology has required auditors to validate the accuracy of the financial records and the reliability of the systems that process and store those records (Vasarhelyi & Romeo, 2014). This includes checking network security measures, encryption, firewalls, digital signatures, password validation and intruder's detection systems (Kotb&Roberts, 2011; No &Vasarhelyi, 2017). Even though there could be many companies that do not receive this level of scrutiny from their auditors, it should be taken as a reflection of what is expect to be the audit of the future (Appelbaum et al., 2017). Likewise, unlike the audit of the manual processes which requires finance and accounting specialists, the audit of the digital products needs multiple skills. The skills required are IT, auditing, statistical modelling and e-business skill (Kotb et al., 2013; Seeburn, 2013; No & Vasarhelyi, 2017). Not only is acquiring these skills is difficult, it is also expensive and may take a long learning curve which would require audit firms to invest heavily in training manpower.

It is anticipating that the specialised IT knowledge and competence are not conventionally part of the financial auditor's core curriculum and training, many large audit firms opt to recruit IT experts as their primary preferences (Agnew, 2016). If the trend continues, more non-financial auditors will likely take over much of the financial auditor's role in performing and leading the audit in computerised business platforms (Kotb & Roberts, 2011). This trend is argued to create a potential jurisdictional clash amongst financial auditors and IT experts working in the same audit firm (Hunton et al., 2004). The work of financial auditors in computerised platform is becoming less pronounced while that of information systems auditor is changing from being a fly on the back of an elephant into being the elephant. If more elephants are recruited in the audit firms, it would result in questioning the ownership of the profession or diminishing its identity (Kotb et al., 2012; 2013).

Similarly, technology has expanded the avenues of electronic-based transaction fraud (e-fraud). Unlike offline fraud occurrences, e-fraud is

borderless, can be committed by either internal or external parties to the entity and may stay for a long time undetected, hence increasing the possibility of audit risk (Jans et al., 2010). As a result, auditors might issue a clean opinion when in fact at least one item of material misstatement was undetected during the audit process (Kotb & Roberts, 2011). Accordingly, the role of auditors has widened to become a 'close watchdog' by adopting a risk-based audit methodology (Masli et al., 2010). In other words, the auditor must identify areas of weaknesses to spot any possibilities of fraud to have occurred by testing automated controls in the entity's systems. These audit methodologies have resulted in increased audit tasks and accountability which makes auditors to demand for increased remuneration which must be paid by audit firms.

Furthermore, many companies today are generating a huge amount of data per minute, also known as 'big data' which calls for real time assurance (Appelbaum et al., 2017; No and Vasarhelyi, 2017). Real time assurance means that auditors need to use technological tools and techniques such as continuous auditing methodologies to audit through the systems instantaneously after the occurrence of the transaction (Vasarhelyi & Romeo, 2014). If machine-learning techniques become widely used, it might challenge auditor-relevance in intervening machine-auditing processes (Appelbaum et al., 2017). Since computers are the ones that generate data, do computation, summarise data, and can present them in many formats, these mechanisms might slowly substitute for accounting and auditing effort by replacing layers of repetitive work (Sun & Vasarhelyi, 2016), which will have adverse effect on the audit profession.

The issue of trust from the audit clients is another challenge especially where the profession has to prove to the public on the integrity, reliability and value of its services (Marcelle, 2009). In fact, from what happened close to the millennium with the professional scandals, the demise of Enron, Pamallant, WorldCom and Arthur Anderson, have all left a mark on the accounting profession, consequently raising questions of *'what's wrong with the audit profession'* (Knechel, 2007). Irrespective of many by-laws and stringent measures such as the Sarbanes-Oxley Act of 2002 and amended audit standards, there is a need for the profession to strive on ethics and good conducts to prove to the public that history may not repeat itself.

Besides that, the new audit standards that regulate the audit profession are another challenge facing audit firms. According to the Certified Institute of Public Finance and Accounting (CIPFA, 2013), some auditors find difficulty to apply standards in every aspect of the audit, which in turn increases audit hours for a specific assignment. Meanwhile, clients may

not be ready to compensate for extra time spent on an engagement, causing a potential increase in operational costs. Similarly, the amended new standards that introduced a risky-based audit methodology with stringent documentation systems and reporting requirements have resulted in increased audit fee (Kim et al., 2012). As a result, some clients may opt to be audited by a low level audit firm which might compromise audit quality.

Likewise, the increased regulatory restrictions such as providing non-audit services (NAS) to the same client has affected audit firms' revenue and profitability. Recently, the Public Accounting Oversight Board has issued directives restricting audit firms from providing NAS to the same client in fear of jeopardising audit independence and complete fidelity to the public (Auditing Practices Board, 2009). Many services were listed as endangering audit independence including bookkeeping and related services, valuation, management functions, broker-dealer, investment adviser, investment banking and legal services. Certainly, these are procedures worth implementing to ensure quality audit. However, they have adversely affected audit firms' revenue. A recent study found that until the 2000s, large accounting firms' revenue on NAS derived from their FTSE 350 clients was 70%. However, from 2006 to 2013, the revenue of NAS has significantly declined from 19% to 12% (Gwilliam & Teng, 2014). Today, audit firms are providing IT consultancy services to their clients such as WebTrust and SysTrust assurance services (Kotb et al., 2012). It is uncertain whether these additional services will also be scraped or not as computers are becoming totally dependable in processing and storing audit evidence.

As a final point, while automation in business continues to evolve, geopolitical landscape happening in many countries in the world creates a stumbling block to the existence of businesses. For instance, the election in the United States, the seclusion of the United Kingdom from the EU (Brexit) (Hywel, 2017), political uncertainties in many African countries such as Kenya, Zimbabwe, Egypt, Libya and the growing insecurity in the Middle East and elsewhere. These geopolitical destructions will continue to have an impact on business survivals and new ventures as they weaken investors' confidence. Since audit firms' performance depends on business prosperity, the shaky political atmosphere is affecting expansion of many audit firms.

In light of these challenges facing the audit profession and the growing adoption of technology to many businesses, this study aimed to explore specific challenges facing audit firms in Tanzania as technology integrating to businesses is increasing amongst their audit clients. Therefore, the study advanced the following research questions:

(1) What are the challenges facing audit firms in Tanzania as their clients are adopting technology into their business processes?

(2) What are the possible solutions to minimise these challenges?

3. Research Method

The study adopted a qualitative approach to explore the challenges facing audit firms in Tanzania. A qualitative research approach becomes the ideal research technique when exploring under-researched issues and on-going phenomena (Yin, 2009). The study utilised a purposive sampling technique by targeting auditors who audited banks and financial institutions. Therefore, semi-structured interviews were administered with 13 auditors at management level. Nine (9) respondents were from large audit firms (including Big Four) and four (4) were from medium audit firms. Six (6) of the respondents were information systems auditors and seven (7) financial auditors. The average working experience of the respondents was 11.7 years. Most respondents had Bachelor Degrees in Business or Computer Science with professional certification in either CPA or Certified Information Systems Auditor (CISA) qualifications. The respondents were assigned mock names such as R1 (respondent number one), R2, R3 up to R13. The interview took place between April and December 2016. On average, each interview lasted one hour and 5 minutes (1:05 hours), except with three respondents R1, R5 and R11 who showed extra interest in the topic and consequently gave more detailed information. R11 was an old experienced partner in the Big Four who had interest in technology evolution in auditing; and the conversation between the researcher and R11 lasted approximately two and a half hours (2:35 hrs).

3.1. Data Analysis

All interviews were audio-taped, transcribed and analysed using thematic coding. Thematic coding is an interpretivist research technique that requires the investigator to infer the data using sense-making process (Creswell, 2009). Thematic analysis therefore, involves labelling and aggregating information into large clusters of ideas and providing statements that support the themes (Creswell, 2009). To categorise the themes easily, NVivo software version 10 was used to create, code and store groups of data within the main topics of investigation. The Nvivo software fosters quick, efficient and transparent procedures in categorising themes which can be shared by a group of other researchers (Bazeley & Jackson, 2013). Subsequently, two main themes were identified, namely (1) 'challenges facing audit firms' and (2) 'solutions to minimise the challenges'. The remaining spoken narratives which were beyond the scope of this study were kept under

'emerging themes' (Silverman, 2013). Finally, the researcher dragged and dropped words, sentences and paragraphs from the transcripts into the child nodes on the Nvivo software to act as a back-up of what has been said on the particular theme. The summarised themes are shown in a tree-map as were generated by the software from the coding process (Figure 1). The next subsection discusses the important findings of the study.

4. Findings and Discussions

The respondents were asked on the challenges facing the audit firms and or personal challenges when their clients are converging from manual to computerised systems. Another question asked respondents on the possible remedies that they sought to reduce the identified challenges. The analyses of their answers were tabled, analysed, merged and summarised. Three categories of challenges emerged from the data, namely individual-related challenges, organisational, and stakeholders'-related challenges. Meanwhile, the solutions to the identified problems differed between respondents and were analysed as a separate theme. The results are summarised in a tree map as shown in figure 1.
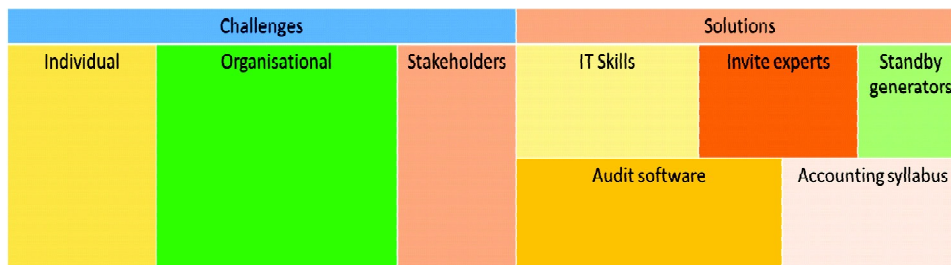

Figure 1 : Thematic coding on challenges facing audit firms and suggested solutions

Figure 1 shows a summary of the coding process in Nvivo software. The main coded themes were two (1) challenges facing audit firms and (2) possible solutions to minimise the challenges. The small boxes under each of the main themes are the references to the nodes that emerged from the interview transcripts. The larger the size of the box, the more the number of references cited from the transcripts. The next subsections discuss in details the findings of each theme.

4.1. Individual challenges

Historically, auditing has been mostly related to examining accounting transactions. Hence, in the past, many accounting graduates were recruited

to work in the audit firms. It was mentioned that due to clients' migration into computerised platforms, most audit firms do not consider accounting specialisation as the main criteria for recruiting auditors. Reasonably, they prefer to recruit graduates with IT background as it becomes easier for them to learn the IT environment of the audit client and also technological tools installed by the audit firms. Four audit partners explained the criteria for training auditors, mentioning that they only consider excellent performance at undergraduate degree in any field, but preferably, computer science. Although audit firms conduct extensive training to auditors prior to confirmation, still two respondents who were both IT experts found it hard to integrate their skills with what financial statements audit entailed them to do. An audit manager who was also an IT expert from a large local audit firm stated, *"You know auditing is more related to accounts transactions if you are not conversant with much of the accounts, at the end it will affect the financial reporting"*.

Another manager in the Big Four who hold a Certified Information Systems Auditor (CISA) qualification commented on the difficulties that IS auditors experienced which necessitated him to acquire additional accounting skills (CPA) because he could not understand items in the financial statements. He revealed: *"I felt that I did not understand much about financial statements, and this is a challenge that we, systems auditors have faced. That is why I opted to sit for NBAA examinations, so that I can become more competent"*. Irrespective of some auditors recruiting into CPA or ACCA, there are still a number of external auditors who do not possess these additional qualifications.

4.2. Organisational challenges

The respondents reported that audit firms are faced with high staff turnover which had dramatically increased the cost of investment. A partner in one of the Big Four explained that it needs three years to fully train an auditor, which includes acquiring audit skills such as CPA or CISA, and also internal and external training. Another partner added that some audit trainees were sent abroad to acquire additional skills necessary for their working environment. However, upon completion of training, the expectations of audit firms are not met because most of the trainees would change jobs and get employed elsewhere. As a result, it has created a gap in manpower which has high cost implications. Besides that frequent changing man power due to high staff turnover might lower audit quality. At the same time, there were a few external auditors who gained enough audit experience from large audit firms but opted to become self-employed. Some had opened up their own audit firms or registered business and tax consultancy services.

One respondent commented: *"I worked for [one of the Big Four] for 15 years and realised that I had all the knowledge in auditing, so I decided to quit my job and started my own audit firm"*. Equally, another manager reported to have opened up his own business consultancy services, expecting to quit his current job at any time.

Another reported challenge was a small number of certified accountants who did not meet the demand of qualified accountants in the country. The current records show that there are only 2,038 certified public accountants in Tanzania (NBAA, 2017). These statistics are consistent with ROSC which revealed that Tanzania had a below average number of professional accountants relative to its Gross Domestic Product (World Bank, 2005). The shortage of qualified accountants in the country poses a stiff competition between audit firms and their clients. It was mentioned that most of the competitive accountants are absorbed in the financial sector and other multinational companies.

The interview findings also revealed that since the clients' environments are now computerised, it makes auditors' learning curve on IT to be more intense. They must understand both the clients' IT systems and also the audit firm's software which becomes both a challenge and time consuming. Consequently, some auditors decide to change jobs from being external auditors to being internal auditors to avoid the long learning curves of information systems. An audit manager gave an example of some of his colleagues who changed jobs from one of the Big Four to being employed as internal auditors in banks. He stated: *"they find the work much easier for them as they have to learn and get conversant with information systems of only one single business"*. This could partly justify the high turnover rate among external auditors who want to avoid the long learning curves and pressure in conducting the audits in computing business platforms.

The interview findings further revealed that audit firms were using IS tools for working papers and electronic documentation systems. Yet, several others were using audit software for auditing purposes, which means they need stable power systems to run the computers. However, a few respondents reported to experience power shortages where electricity could go off for a few hours in a day or a week. This problem has caused a hindrance to audit firms as it becomes difficult to deliver the reports on time when most of their information is now computerised. It was mentioned that power outages is a national problem which cuts across many sectors due to increased demand for electricity beyond the capacity of the plants.

4.3. Stakeholders' challenges

Audit stakeholders are classified into internal and external. External stakeholders include clients and the general public. A few respondents cautioned that as the country is migrating to electronic business processes, the general public must be made conscious of the pros and cons of using electronic means in trading. For example in mobile banking, which is an electronic cash transfer, it was reported that most users of the services do not know the importance of passwords and they are ready to share or disclose their PIN to their friends or relatives. Not only the general public, but also employees were reportedly sharing passwords where in some cases major electronic fraud issues occurred without being able to identify the culprits. One respondent clarified an incident which occurred in one of the big hotels whereby cash went missing without the parties concerned being able to identify the culprits. He stated: *"In one of the hotels we audited [hotel X], an employee had stolen money using a password of a shared person. The investigation was conducted but it couldn't catch the thief, because everybody knew the password of everyone else"*. This highlights a low understanding of the sensitivity of passwords given to a few individuals in the organisation as a means of strengthening internal control systems.

Similarly, respondents put their concern on universities especially accounting departments for failure to produce graduates who are IT savvy. It was reported that when students completed their first degree, they knew little or nothing about technology which necessitates audit firms to spend a lot of time and resources to train accounting graduates on even basic IT issues. An audit partner from one of the Big Four commented *"we have to teach them even the simplest computer applications which should have come from university education"*. It was expected for accounting graduates to be equipped with at least IT as a soft skill to reduce the cost and time in training and also in understanding audit firm's software.

The interview findings further reported that some audit clients do not put priority on IT audit. IT audit aims at checking the security measures of the systems that are used to process and store information. It was reported that some of the clients fear the cost of conducting IT audit. Yet, a few other clients feared to disclose their information to a third party while others did not know the importance of IT audit. If clients do not conduct regular IT check, possible fraudulent activities can emerge due to weaknesses in controls within their systems. A senior manager clarified: *"if you tell them that you are going to check their system, they are not very much concerned, and some even fear that you could learn a lot from their data"*. Meanwhile, other clients were reported to put more concern on financial statements audits

because it is a statutory requirement. It was further stated that since IT audit is not a statutory requirement, some clients considered it as less important. This lack of understanding might result in poor management support on IT measures which in turn might lead to poorly designed security systems and policies (No & Vasarhelyi, 2017). Thus, a small problem could emerge into a bigger challenge, threatening the survival of the business.

Another challenge was related to the nature of conducting mobile banking transactions which was reported as more complex to audit than other products. In mobile banking, a mobile phone is used to withdraw, deposit, transfer cash or pay utility bills and government taxes/levies/ fines/charges and so on. An associate director in one of the Big Four reported that mobile banking is a challenging and risky business; banks, customers and agents have experienced cases of fraud where the culprits use different techniques to commit fraud. Besides that, she stated that there is no audit programme to audit mobile money which becomes a challenge for external auditors. She commented *"the complexity of some of these things has increased for sure. Mobile money is an example of it and I normally tell people mobile money is an East African product because you cannot find a checklist or an audit programme anywhere for mobile money. It is a highly risky business and there is a lot of fraud which people have experienced"*. This statement is consistent with those of prior scholars who contended that the mobile banking sector in developing countries is becoming a conduit for fraudsters (Paula et al., 2016). They argued that fraudsters are motivated to target the information systems infrastructures by taking advantage of the low prevention and detection mechanisms as well as the ignorance of technology players within the mobile banking sectors.

4.4. Recommendations to the identified challenges

The respondents perceived it important for audit firms to work with other audit stakeholders to reduce some of these challenges. For instance, the respondents expressed their concern for universities to incorporate IT into undergraduate curriculum. An audit partner clarified that if students are taught to learn and be conversant with any accounting software such as Tally or MYOB, it would save efforts and time in training auditors. He further clarified that the software has related functionalities and a background in one of them would make auditors understand any audit software easily.

Additionally, three audit partners suggested that universities invite experts from audit firms in designing accounting/auditing syllabus. The experts can help suggest what the market needs rather than what university

academics perceive as relevant to the beneficiary of the accounting education. Since a majority of university students expect to be employed after graduation, it becomes important to know what the job market expects. It was reported that experts from audit firms are ready to work with accounting departments in designing curriculum that can suit the current need of the digital market.

In minimising the knowledge gap, a partner clarified that many financial auditors in Tanzania are acquiring additional skills in IT. He mentioned an increase in the trend for enrolment of IT audit professional courses offered by the Information Systems Audit and Control Association (ISACA). The partner referred the researcher to the ISACA-Tanzania local chapter. The chapter showed that the number of membership had increased from 33 to more than 300 in a period of 13 years. It was also mentioned that while many CPA accountants find the need to acquire IT skills, many IT professionals have started enrolling for CPA examinations offered by the NBAA. This trend will reduce the skills gap between IT experts and accounting professionals after a period of time. Furthermore, it was mentioned that the current NBAA syllabus has included advanced IT which aims to enhance a CPA auditor to become an IT expert so as to bridge the knowledge gap in IT.

It was also reported that some audit firms are using stand-by generators in dealing with the problem of power outages. The use of stand-by generators increases the costs of operation. Nevertheless, it is the single option that audit firms' managements can take in order to ensure clients work is delivered on time. It was not clarified whether the extra costs would be compensated by clients' fees or not. Similarly, it was reported that the government of Tanzania has invented gas in the southern part of the country, expecting to provide a permanent solution to electricity shortage. It was clarified that the Tanzania national electricity company (TANESCO) announced cutting down costs of operations for both domestic and commercial users after the completion of the new electricity plant.

Furthermore, the interview findings revealed that audit firms were adopting technology of various levels to suit the needs of their clients. All respondents mentioned that they were using audit automation technologies, office automation and networking, and data transfer technologies. Specifically, they were using ACL, IDEA, SAS, GAM-X, Excel, Teammate, Ethical hacking, E-mails, work-related messengers and other software depending on the nature of their clients and the needs of the audit. The tools simplified data analysis, risk assessment, communication and reporting as well as security control measures. It was reported that the use

of IS tools and techniques enabled auditors to identify e-frauds which were not possible to spot in the past. For instance, in curbing electronic-based fraud, it was reported that audit firms had trained auditors to become system hackers who would try to penetrate the entity's systems to test the strength of the control measures in place in what was referred to as vulnera-penetration testing or ethical hacking. It was reported that the use of ethical hacking tools had deterred new frauds from occurring as culprits became aware that auditors would discover the frauds. Additionally, the use of penetration testing had reduced financial statements frauds. One respondent commented, *"Increasingly, it is becoming impossible to audit certain clients without technology particularity in banks and telecoms as it is difficult to prove that everything is okay"*. This suggests that auditors are ready to use technology to remain compliant and to minimise audit risk in the e-business platforms.

5. Conclusion

Audit firms experience varied challenges as their clients are migrating from manual based into computing platforms. Some of these challenges are internal, which include costs of investments in technology infrastructure and manpower. For instance, a high rate of staff turnover can negatively affect audit firms' investments decisions. It is essential for audit firms to keep the old staff because competence of its employees is one of their main investment strategies in ensuring audit quality. Similarly, competition for a few qualified accountants between the audit firms and their clients remains the main challenge irrespective of the efforts that the firms are making in training their own employees. An alternative strategy for audit firms might be to design strategies that will shorten audit training period so as to maximise the trainees' term in service. It is also important for other stakeholders to sensitise the public on the importance of passwords and the inherent risks of sharing passwords. These risks might not affect the clients alone, but can be extended to auditors' opinion and increased audit risk.

During the interview discussion, the respondents expressed their concern on the issue of technology integration by their clients in relation to a change in audit methodology. Although they perceived the current technology usage of their clients as manageable, they acknowledged the need for audit firms to move ahead of their clients in technology adoption. Additionally, the respondents addressed the need to involve accounting academics in higher institutions of learning on the need to integrate IT and business risks into their undergraduate curriculum. Generally, the study

objectives were considered both important and timely given the reported increased risks of electronic-based fraud which auditors must identify and report to the management.

In conclusion, the increased integration of technology and the ever-evolving technological business models will necessitate audit firms to speed up the adoption of technology to align with the clients' usage of innovation. Hence, it is essential for the profession to be early adopters of technology so as to reduce some of the technical challenges and risks in technology users. Besides these challenges, audit firms need cooperation from all stakeholders of audit reports, especially the academics in designing a curriculum that incorporate IT and e-business risk or cybersecurity which were reportedly as lacking the traditional accounting training (Kotb & Roberts, 2012). Similarly, the audit authority can supervise IT adoption processes while clients are urged to keep their accounting systems up to date so as to minimise systems-related risks. This is consistent with prior scholars' findings (No & Varsahelyi, 2017) who contended for audit clients to take a long-term approach regarding their cybersecurity enterprises so as to protect the critical systems and assets that are vital to them.

Theoretically, the study shades light for audit firms to understand the challenges related to technology usage by their clients which calls for a change in the audit methodology. It is contended that if traditional audit methodologies continue to be used to audit computerised clients, significant risks may go undetected (No and Vasarhelyi, 2017). Likewise, the accounting academics in Tanzania can use this study as a call to redesign curriculum at undergraduate level that fosters IT usage. It is important to recall that some respondents were dissatisfied by the quality of accounting graduates in Tanzanian universities as they are perceived as lacking important components of IT knowledge. Yet, businesses were advancing into computerised processes and storage of accounting information.

Practically, the study postulates information to auditors and the accounting oversight bodies. The study informs them that auditors can be effective by adopting new technology to provide better audit services, to remain compliant and to minimize various audit-related challenges brought by technology. Specifically, the audit oversight body such as the NBAA can use this study to gauge the extent of technology integration by audit firms in Tanzania and to establish a re-evaluation of adherence to standards and best practices. Similarly, the accounting regulators can put up rules which will speed the use of IT in auditing.

The main limitation of this study is its application of qualitative approach of purposive sampling by selecting 13 respondents from only

one city (Dar es Salaam). This could have limited the study from generalising the findings to other parts of the country. A stratified sample selection of respondents would produce results that are unbiased of this limitation. Lastly but not least, the respondents expressed the need for universities to include IT into undergraduate curriculum in order to reduce the costs of training auditors as well as to simplify the understanding of audit software and the clients' computing platforms. Therefore, this study recommends future researchers to explore the perception of accounting academics in Tanzania and elsewhere on their readiness to include IT and e-business risks into the accounting curriculum. Similarly, studies can also assess the extent of IT inclusion in the national accounting professional curriculum in Tanzania and in other countries.

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Interview questions

1. *Please tell me about yourself, your position, qualification, work experience and nature of audit tasks that you do? How long have you been working with this organization?*
2. How long have you been using technology for auditing purposes?
3. What are the main computer software do you use for audit purposes?
4. 3. What are the benefits and limitation derived from the use of information systems in auditing?
5. *How do you view the current level of technology usage by your clients' (such as e-business integration) in relation to a change in external audit procedures in your organization?*
6. *What challenges do you experience during the transition period from manual to technology based accounting systems practiced by your clients?*
7. *What do you recommend that should be done to minimize these challenges*
8. *What does your organization do to minimize these challenges?*