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# Examining the impact of information technology on internal auditing effectiveness in Tanzanian organizations

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This research assessed the impact of Information technology on internal auditing in Tanzanian organizations. The study was exploratory and descriptive in nature and it was restricted to the Dar es Salaam area, which is the commercial center of Tanzania. As such it represents IT growth of both government and a business organizations in the country. Primary data was collected through questionnaires. The central finding in this research work reveal that the internal audit profession in Tanzania lags behind in effective use of IT to support their duties. From the discussion of the findings it was clearly observed that several factors, which contributed to the hindrance of internal auditors' use of technology, are interwoven. As such, it was clear that the lack of top management support seemed to be a critical problem because it is from this factor that other factors were brought into existence. For instance, inadequate training programs, internal auditors' involvement in information systems development, and poor allocation of budget to the internal audit department were the result of lack of top management support.

**Key words:** Internal audit, Information technology.

## INTRODUCTION

Of all technologies developed over the past 150 years; Information Technology (IT) has eclipsed all its predecessors (Garitte, 2000). Development in IT has experienced such a rapid growth and continuous change that even statisticians cannot accurately define its benefit or its effect on the economy (Garitte, 2000). Others predict a future where every organization irrespective of its mission or role will critically depend on IT on every functional area. Analysts who have studied the advances in IT say that the power of computing is growing twice as

much every less than two years and traffic on the information thruway is increasing by doubling every 100 days. In addition to convenience, speed, and accessibility, the cost of doing business via the new technology is dropping while prices in the non-technical areas are on the rise, therefore making IT even more attractive as a business tool (Garitte, 2000).

This phenomenal growth, combined with affordability, has prompted more and more organizations to assess the benefits and risks of IT. Key players in organizational hierarchies from CEOs to accountants, auditors and members of the board ought to be sorting the wheat from the chaff on IT issues. This is important because they would want to reap the greatest rewards on technological

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capabilities while making sure that the organization (with its assets) is secured and protected (Garitte, 2000).

Corporate firms are heavily investing in information technology (IT). Spending on IT has kept shooting up in proportion of firms' budget higher than even spending on R&D or advertising (Mithas et al. 2012). Similarly the technology adopted by organizations has become increasingly sophisticated (Dewan et al. 2007).

It was not until 1954 when the technology revolution in accounting and auditing began with the first operational business computer. Through the use of IT the way accounting data was stored, retrieved, and handled completely changed. According to Salehi and Alipour, (2010) these new systems led to radically different audit trails.

The authors further point out that the revolution changed to be more dynamic because the computer industry sustained continuous, rapid and technical innovations. In addition to the introduction of computers to the business world, other IT-related events have also had a profound effect on the auditing profession and the way audits are conducted. Salehi et al (2010) mention these events to include the commercialization of computers; the introduction of AUDITAPE; the Equity Funding scandal; the emergence of Information Systems Audit and Control Association (ISACA); the systems, auditability, and control (SAC) studies by the Institute of Internal Auditors (IIA); and constant emerging technologies.

The authors say that the audit process itself has become different from traditional audits prior to 1954 (for example, audit tools and techniques). They report that during that period it was possible for an auditor to retire in the 1950s having used similar audit programs throughout his/her career something which will rarely happen again!

The impact of IT on auditing has resulted in a set of knowledge, skills, and standards necessary to conduct the contemporary audit that were nonexistent in 1954. The introduction of computer technology into accounting systems disrupted the routine auditors had been able to establish to properly audit accounting systems (Salehi et al., 2010).

Chen et al. (2014) examined the role of firm IT capability in contributing to internal control and external audit and found results which support the concern that accounting professionals have regarding the impact of the use of IT on business risks and controls relevant to the audit. According to the authors' findings, specifically, IT capability directly mitigates audit fee increases, but not audit delay increases, indicating high IT capability signals lower business risks associated with the use of IT and reduces the auditor's risk premium. Further, the authors report that IT capability has pervasive impacts on both the effectiveness of internal control and the components of effective internal control, which, in turn, further restrain audit fee and audit delay increases. Overall, the findings

of Chen et al. (2014) suggest that a firm's IT capability has the additional benefits of supporting the functioning of internal control and the efficiency of the audit process.

While in most parts of the developed world IT has been in place in both accounting and financial information systems, in Tanzania it is just gaining momentum. The late coming of computerized information systems in Tanzania has its background in 1974 when the United Republic of Tanzania (URT), according to Government prohibitions notice no. 142 banned importation of Computers and television sets. The ban led to most systems running manually or mechanically something which is inconsistent with the trend of the growing global technological culture.

It is held that, for any IT initiative to be effectively implemented within organizations it should first receive the highest degree of acceptance at the national level (Adkins, 1988). In Tanzania on the contrary the state took deliberate actions to discourage the growth of IT.

It was not until 1993 that the ban was lifted as directed by Government revocation notice no.245. The revocation order together with the persistent fall in prices of computer hardware and software and the world wide popularity of computerized systems meant that Tanzania could not afford to remain an island in this globalized IT world.

Business organizations are highly depending on IT at the moment and the accuracy and speed of processing the transaction is at an increasing side but it also increases the potential for fraud, privacy violations and other internal control problems. A study conducted by Juma (1997) revealed that, generally, business firms in Tanzania believe that they are benefiting very much from IT investments although most of them could not directly measure productivity gains, efficiency, effectiveness, transformation or increase in competitiveness.

For the internal auditor, IT can be seen as a two edged sword. On one hand, IT has become a tool to assist auditors in their day-to-day work. On the other hand, the rapid continuing development of new IT causes worry about new audit risks (Institute of Internal Auditors (IIA) 1998). Indisputably, the role of the internal auditor especially in the issues of control and security in an organization is of critical importance. In this age of rapid technology advance, organizations that tolerate the violations of control and security because of ignorance become vulnerable to "hackers", "crackers" and other external threats. If there has ever been a need for continuous training of internal auditors, then this is the times (Park et al., 1994).

IT training in Tanzania seems to be uncoordinated; with most training centers concentrating on application programs especially word processing and spreadsheet processing. It is doubtful if any of these institutes can provide the knowledge that is relevant to internal auditors. There is even a worry whether the CPAs

(certified Public Accountants) in Tanzania are technologically up to-date (Muragu, 1999).

This study is set out to explore the impact of IT on internal auditing effectiveness. For this reason, the study addresses the following questions.

1. To what extent has IT influenced internal audit functions in Tanzanian organizations
2. Are internal auditors in Tanzanian organizations familiar with common Electronic Data Processing Audit techniques?
3. Is there any relationship between IT use by internal auditors and the perceived ability of internal auditors to audit IT-based information systems?

The general objective of this study is to assess the impact of IT on internal auditing functions in Tanzania organizations. Specifically, the research aims to:

- Explore the methodologies that internal auditors in Tanzanian organizations use in performing their duties and find out whether the methodologies are IT- based.
- Assess the ability of internal auditors to audit information systems in Tanzanian organizations.
- Establish the relationship between IT-use by internal auditors and the perceived ability of internal auditors to audit computer-based information systems.

## LITERATURE REVIEW

In the current computerized business environment where IT has a spectacular influence on internal controls it is mandatory for auditors to be equipped with some degree of Electronic Data Processing (EDP) skills and knowledge. To communicate with system and EDP personnel requires auditors to have understanding of the data processing principles being employed; the terminology used by these people and a general awareness of the functions being performed, so that they can ask the essential questions and gain their confidence so as to determine the systems and procedures in operation. The auditor must have the ability of interviewing technical personnel, reviewing the systems and operating documentation and observing operations of the installation with a substantial knowledge (Gage, 1974).

An increasing number of studies gives evidence that IT improves corporate operational , decreases transaction cost within and outside the firm, improves managerial decision making, increases the operating efficiency and also corporate value (Hendricks et al., 2007; Kobelsky et al., 2008; Masli et al., 2011; Mithas et al., 2011, 2012; Tambe and Hitt, 2012). On the other hand, a number of researchers find that the effect of IT on firm performance may be either mixed or subject to contingencies (Dewan

et al., 2007; Xue et al., 2012). Other studies document that IT investments are risky and not cost effective (Hitt et al., 2002; Dewan and Ren, 2011).

Williams (1984) surveyed the audit experience of two hundred of the largest Australian companies and reported evidence of the lack of internal and external audit attention paid to computer operating systems. Few specific audit tests were carried out on the operating system. Checks of system modification and of modification documentation were rare. Even checking of physical control procedures in and about the computer center – which Williams considered to be a minimum function that auditors had to carry out – was done in only 22% of the companies during the eighteen months preceding the variables and the level of audit testing, e.g. the existence of recent operating system modification had no apparent effect on the likelihood of checks on physical controls.

In the light of these findings, Williams and Lillis (1985) carried out a survey of EDP managers of two hundred large Australian companies designed to determine the manner in which certain variables affected the perceptions of the managers as to the overall system faults, unauthorized system changes and overall system security. The three variables considered were whether the company had access to the operating system source code, whether the company staff had made changes to the operating systems, and the number of company staff capable of modifying the operating system. The results indicated that these variables had a significant effect on the EDP managers' perceptions of security risks. Access to the source code, changes to the operating system and the ability of the staff to change the operating system were all positively related to increases in risk. They suggested that these results could be useful to auditors in revising their prior probabilities of the risk inherent in operating systems when making control judgments preceding audit testing.

According to Salierno (2001) modern organizations continue to offer their workers including internal auditors working tools including the personal computers and internet modems so as to access the Information Systems. Furthermore, Salierno (2001) insists the need for internal auditors to respond to the new challenges facing expanding companies. He suggests the need of specialized resources in information technology and other business operational areas.

Furthermore, an imperative need exists for organizations to put in place a system for managing these impending problems. For organizations to survive in the coming years they need to develop a broad approach to information security, taking on both the human and technical dimensions by empowering those who are entrusted with enterprise-wide information security through frequent trainings (Salierno, 2001).

An internal auditors' survey by McCollum and Salierno,

(2003) revealed that 51 percent of them used the General Audit Software (GAS) in detecting and preventing fraud. The survey further acknowledged several fraud detection tests performed with GAS by the internal auditors namely completeness and integrity, cross-tabulation, duplicates, gaps, data profile etc.

Another US-based survey conducted by Salierno (2001), involving 538 computer-security professionals in private companies, governmental agencies and medical institutions, showed that that about 85% of internal auditors were able to detect a computer security breach in the previous six months. Additionally, 64% of them pointed out that they incurred financial losses following the breaches.

Another survey by Computer security Institute (2003) discovered that, almost 100% of American organizations use antivirus software and firewalls. It is also revealed that about 92% of the surveyed organizations have access controls while 72% use intrusion detection software. The same survey reported that about 69% use encryption and only 11% use biometrics. The survey further reported that, 15% of interviewed respondents were not aware whether their computer systems had unauthorized use in the last year, and 22% had no idea that their Web site had experienced unauthorized access or abuse.

## CONCEPTUAL FRAMEWORK

From the literature review it can be conceptualized that IT plays a crucial role in enhancing the internal audit function through its tools as seen in the framework below. It is the internal auditor who needs to be well equipped with the thorough understanding of these IT tools so as to apply them in the day-to-day activities. The auditor requires some training to adopt this technology. Furthermore, it is to the advantage of the firm to hire the IT-competent internal auditor who will be able to cope up with IT development. Not only that but also variety of communication tools such as e-mail, video conferencing, groupware etc. are playing a great role simplifying internal auditors communication toward the fast change in communication technology. The internal auditor who is well equipped with IT knowledge is believed to perform his duties in a more effective manner.

## RESEARCH HYPOTHESES

Three hypotheses have been tested in this study in order to assess the impact of IT on internal audit in Tanzanian organizations. These hypotheses are explained one after another in the foregoing paragraphs.

*H1: There is no significant relationship between the*

*number of Certified Public Accountants (CPAs) in an organization and the internal auditors' perceived ability to audit computerized information systems.*

Application of IT tools such as internet, computer network, audit software, automated teller machine, electronic fund transfer, electronic data interchange and others influences the internal audit function to a great extent. The internal auditor who is well equipped with IT knowledge is believed to perform his duties in a more effective manner.

It is essential for Certified Public Accountants in this globalized world to be competent in working in a computerized environment. In Tanzania the professional regulating board, National Board of Auditors and Accountants (NBAA) conducts various seminars and workshops to equip the accountants with current knowledge in accounting particularly auditing in a computerized environment. To ensure that accountants are aware of computer auditing, the NBAA examinations also contain such a topic in Module B (foundation stage) and Module F (final stage).

If that is the case then, it should be expected that the more CPAs be employed in an organization, the more improvement in computer-based Information System.

*H2: There is no association between the level of computerized IS in Tanzanian organizations and the frequency of internal auditor's training on auditing computer-based information systems in an organization.*

More organizations are computerizing their application systems e.g. accounting, finance, banking e.t.c. This changes inevitably the way in which auditors work. Internal auditors should therefore work proactively with management to identify risks and control objectives of an organization. This requires appropriate knowledge and skills that can be acquired through training relevant to IT. Based on literature, one would expect that an organization with highly computerized systems would offer more training to its internal auditors in relevant methodologies and technology. The relevance of this assumption will be tested.

*H.3: There is no relationship between IT use by internal auditors and the perceived ability of internal auditors to audit computer-based information systems.*

Internal auditors who use information technology in their organizations become very comfortable with this technology that is they are thought to be better in auditing computerized information systems. If this is true, then one way for organization to improve the ability of their internal auditors to work in computerized environment is by giving them access to a wide range of new technologies in their departments.

## METHODOLOGY

### Research approach, data and scope of the study

The study was exploratory and descriptive in nature. It was restricted to the Dar es Salaam area, which is the commercial center of Tanzania. As such it represents the growth of IT use in both government and a business organizations in the country.

Primary data was collected through questionnaires, administered to the selected sample. A sample was selected from a database of top 100 large organizations in Tanzania. A firm was included in the sample if it uses information technology in processing its accounting data and has an internal audit department. It was ultimately realized that only 55 companies use IT in processing its accounting information and have internal audit departments.

The sample comprised of corporations/organizations, belonging to various industries like manufacturing, financial institutions, education and others. Also, different ownership style was considered in sample selection like private ownership, public ownership, government and parastatal. Before dropping a questionnaire to a particular organization the researcher tried to take a little trouble to establish whether the organization has an internal audit department and whether the internal audit department uses IT.

The selected respondents were given questionnaires through drop and collect method. The researcher upon collection of questionnaires tried whenever possible to conduct discussion with every respondent and obtained useful experiences of internal audit managers. These discussions supplemented the opinions provided into the questionnaires and turned to be very useful in obtaining the perception of the internal audit managers about the impacts of IT in their day-to-day activities.

With regard to the objective of the study, it was reasonable to select corporations that have computerized IS and internal auditing departments. Heads of these departments were asked to respond to the questionnaire. In total, 55 questionnaires were distributed but only 40 of these were collected by the researcher. The questionnaires were distributed by the researcher himself to assure that every respondent got the questionnaires and wherever there was a need for clarification, the researcher cleared every doubt and after appointment the questionnaires were all successfully collected. The questionnaires comprised of 20 questions aimed at a mixture of facts and opinions about internal auditing activities and attitudes.

### Data analysis

A Likert scale questionnaire was used to gather data for

analysis. The respondents were asked to indicate the target department's overall view on how IT has influenced it. The data was then edited, summarized, classified, tabulated and analyzed using Social package for social sciences (SPSS). Cross tabulation was used to explain some relationships. Cross tabulation is used for comparing the two classification variables.

Qualitative factors in the hypotheses have been analyzed using the descriptive method. This method enables the researcher to use factors of information already available and analyses these to make critical evaluation.

The Chi-square statistical test ( $X^2$ ) was employed for testing associations between various research variables.

The research, which bases on primary data and discussions with the respondents, assures reasonable reliability. This research was based on primary data accompanied by discussions of some findings with few selected respondents hence the researcher is confident about its reliability. The data are believed to be significantly error free because throughout the research the researcher insisted to the respondents that the study was only for academic purposes. This was stressed in the introductory part of the questionnaires.

### LIMITATIONS OF THE STUDY

Every study is prone to some limitations. This study is not an exception. The following limitations were encountered in the course of the study;

- i. Few organizations had internal audit departments; and even those with such departments, are just in the preliminary stage hence did not have any useful information to offer about the use of technology.
- ii. Little cooperation from some very important respondents for my study was one of the limitations for this study. In some organizations the questionnaires were rejected at the point of distribution while others who accepted the questionnaires could not pay any serious attention to answer the questions asked properly. Some questionnaires were collected unfilled.
- iii. Time and financial constraints. Due to time and cost, the study only concentrated in the Dar-Es-Salaam region

Regardless of the above limitations the researcher believes that the collected data are sufficient to present the current situation of the use of information technology by internal auditors in Tanzanian organizations.

### RESEARCH FINDINGS (TESTS OF HYPOTHESES)

In this study, three hypotheses were tested and the results are presented as;

**Table 1.** Association between number of auditors with CPAs/ACCAs and extent of internal auditors ability to audit newly introduced IT-based information system.

Variable		Extent of internal auditors ability to audit newly introduced IT-based information system				Total
		Satisfied	Moderately satisfied	Neutral	Extremely dissatisfied	
No of auditors with CPAs/ACCAs	1 or less	0	2	7	1	10
	2-4 auditors	0	3	10	2	15
	5 or more auditors	3	1	5	6	15
Total		3	6	22	9	40

**Table 2.** Chi-Square Tests for the association between number of auditors with CPAs/ACCAs and extent of internal auditors' ability to audit newly introduced IT-based information system.

Variable	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.468(a)	6	0.075
Likelihood Ratio	12.545	6	0.051
N of Valid Cases	40		

a 9 cells (75.0%) have expected count less than 5. The minimum expected count is 0.75.

*H1: There is no significant relationship between the number of CPAs in an organization and the internal auditors' perceived ability to audit computerized information systems.*

When the internal auditors were asked to show their level of satisfaction on their ability to audit computerized information systems Table 1 shows that about 23% of the respondents were either satisfied or moderately satisfied while the same percentage of respondents said they are extremely dissatisfied. The table also shows that about 54% of the respondents were neutral as to whether they are satisfied or not on their ability to audit computerized information systems.

When further test was performed the results of the test, shown in Table 2, show that the value calculated for Chi-square is less than the table value. For this matter there is no statistical evidence to reject the Null hypothesis at 5% level of significance for a 6 degree of freedom. These results show that the number of internal auditors CPA holders in the organization is independent of their perceived ability to audit computerized information system.

The organization whose systems are computerized cannot improve the internal audit function by employing more internal auditors with CPA qualifications. Rather effort should be directed to intensive training of their internal auditors with IT. The NBAA in Tanzania currently produces the accountants and auditors with very little awareness with the audit in computerized environment

though their examinations cover such area.

*H2: There is no association between the level of computerized IS in Tanzanian organizations and the frequency of internal auditor's training on auditing computer-based information systems in an organization.*

Respondents were asked to estimate the level of computerized application systems such as manufacturing information system, banking information system, financial information system and accounting information system in their organizations in percentage form. Since the duties of internal auditors in Tanzanian organizations as learnt from discussions with selected respondents are mostly reviewing the accounting information systems, the hypothesis testing was based on accounting information systems. Table 3 reports that only about 7% of the respondents are extremely dissatisfied with their ability to use technology while about 43% of them are either satisfied or moderately satisfied with about 50% remaining neutral. Further test presented in Table 4 reveals that the calculated value of Chi-square is less than table value at 5% level of significance with 12 degree of freedom.

This result indicates that there is no enough statistical evidence to reject the Null hypothesis. In this case the conclusion can be drawn that the level of computerization in Tanzanian organizations has got no relationship with the frequency of IT-related trainings for internal auditors. The two variables have no associations at 5% level of

**Table 3.** Association between extents of internal auditors' ability to audit newly introduced IT-based information system and Level of satisfaction of internal auditors' use of technology.

Variable		Level of satisfaction of internal auditors use of technology					Total
		Extremely satisfied	Satisfied	Moderately satisfied	Neutral	Extremely dissatisfied	
Extent of internal auditors ability to audit newly introduced IT-based information system	Satisfied	0	0	1	2	0	3
	Moderately satisfied	0	1	0	5	0	6
	Neutral	2	3	7	9	1	22
	Extremely dissatisfied	0	1	2	4	2	9
Total		2	5	10	20	3	40

**Table 4.** Chi-Square Tests for Association between extents of internal auditors' ability to audit newly introduced IT-based information system and Level of satisfaction of internal auditors' use of technology.

Variable	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.603(a)	12	0.651
Likelihood Ratio	11.782	12	0.463
N of Valid Cases	40		

a 18 cells (90.0%) have expected count less than 5. The minimum expected count is 0.15.

**Table 5.** Chi-Square Tests for the association between IT use by internal auditors and the perceived ability of internal auditors to audit computer-based information systems.

Variable	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	23.130(a)	12	0.145
Likelihood Ratio	20.140	12	0.064
N of Valid Cases	40		

a 19 cells (95.0%) have expected count less than 5. The minimum expected count is 0.40.

significance with 12 degree of freedom.

The computerization process which is currently a burning issue in different parts of the world including Tanzania does not draw any attention to top managers in Tanzanians organizations to provide more training to their internal auditors the fact which was already pointed out.

*H.3: There is no relationship between IT use by internal auditors and the perceived ability of internal auditors to audit computer-based information systems.*

The results of this hypothesis show that the calculated value of Chi-square is greater than the table value at 5% level of significance with 6 degree of freedom (Table 5).

These results suggest that the Null hypothesis is to be rejected at 5% level of significance. This leads the alternative hypothesis that "There is an association between IT use by internal auditors and their perceived ability to audit computer-based application systems" to be

taken.

It is the fact that auditors who are familiar with various technologies can easily adapt to auditing in computerized environments. This fact has been crosschecked by the above hypothesis.

## DISCUSSION OF FINDINGS

This section aims at giving analytical overview of the findings. The discussion is focused on the responses obtained from the respondents and the hypotheses tested. The study was meant to assess the impact the IT has had on the development of the internal audit profession in Tanzania. The central finding from the study is that IT plays a very important role to support internal audit function in Tanzanian organizations. This was proved from views provided by the internal audit managers during discussion with the researcher and in

their responses to questions asked in the questionnaires.

The open-ended question on the duties of internal auditors was asked so as to determine whether internal auditors in Tanzanian organizations are performing the real internal auditors' functions, which cannot separate them from employing IT in this current world where technology is growing so fast. The results from this question revealed that the duties of internal auditors in Tanzanian organizations are closely tallying with the required duties of internal auditors and therefore performing these duties can-not exclude the application of IT.

### **Internal auditors' use of technology**

The dramatic influence of IT on internal controls and the whole subject matter of internal auditing in a computerized environment have meant that the auditor requires some degree of EDP skills and knowledge. The auditor will be required to communicate with system and EDP personnel and gain their confidence so as to determine the systems and procedures in operation. This requires an understanding of the data processing principles being employed; the terminology used by these people and a general awareness of the function being performed in order to ask the necessary questions intelligently. He/she must be able to interview these technical people, review the systems and operating documentation and observe operations of the installation with some degree of understanding.

Results from the field survey showed that the internal auditors in Tanzanian organizations need the IT-based audit tools and methodologies because large numbers of application systems in organizations are computerized. The internal auditors who are backward technologically cannot cope with this rapid change in technology.

Managers in the surveyed organizations indicated that they are not satisfied with the ability of their internal auditors to work under computerized environments. It is riskier for organizations whose internal auditors are not familiar with computerized systems. Internal auditors are responsible to secure and safeguard as much as possible the assets of the organizations, hence they should be well equipped with IT knowledge so as to perform well their duties to the organizations. The inability of internal auditors to audit computerized application systems should therefore be of concern and receive reasonable attention.

The most widely used standard software package was found to be payroll master system that was applied by 37.5% of the surveyed organizations. While accountants have been trained in the use of the accounting packages, no adequate training has been specified to internal auditors. The result of this contributes much to the inefficient internal audit function in Tanzanian

organizations. It was further found that most of internal auditors in the surveyed organizations are aware of technologies, which just relate to normal office automations. The use of e-mail ranked high when respondents were asked to indicate the types of technology they use in their department (about 80%). The use of e-mail has supported very much the internal auditors to perform some of the duties they are assigned by their directors like report preparation and sending reports.

The internal auditors in Tanzanian organizations are not aware of technologies which directly support their duties as internal auditors. This is very dangerous because while technology grows very fast Tanzanians' organizations keep on using manual systems which hinders them to cope with the speed of changing world. Training internal auditors on how to use technologies, which directly support their functions, is the only solution to this problem. It is high time for management of these organizations to wake up and give priority to this problem so as to secure the internal audit sections in their organizations.

Most audit managers contended that inadequate training and top management support have been the greatest obstacles to IT use by internal auditors.

This goes hand-to-hand with the findings for training for information technology provided to internal auditors whereby only 35% of the respondents were satisfied with the level of training they are provided within their organizations.

The top management in these organizations should put much more effort to train its internal auditor's new technologies as long as they are computerizing their application systems so that the internal auditors become comfortable when it comes to auditing such systems. This will enable the audit function to go smoothly in securing and safeguarding companies' assets.

### **Top management attitude towards internal auditors use of technology**

The role of internal auditor is very crucial to any organization. They authenticate the accuracy of the internal records of the organization and check for misconducts, waste, or fraud. Not only that but also internal auditors are responsible for reviewing the operations of the company by evaluating its efficiency, effectiveness, and compliance with the set policies and procedures.

Audit of information technology applications is a relatively new service provided by internal auditors in Tanzanian organizations. Auditors can find it difficult at times to explain the benefits of an IT audit to business executives who have never heard of auditing services before. This was a statement from the internal audit



manager of one of the big communication company during discussion with the researcher.” As an internal auditor, I have seen many proposals for IT audits disregarded by executives without any serious thought given to them. Through years of trial and error, my colleagues and I have realized that management attitude toward this issue is negative”.

This is evidenced from the results obtained from the survey. When the internal audit managers were asked to rank the obstacles for their use of technology, top management support and adequate training were ranked high.

The usage of IT in audit departments in Tanzanian organizations has not progressed to a satisfactory level. The fact that the top management in Tanzanian organizations doesn't put serious attention regarding the budget allocation in IT development in internal audit department goes hand to hand to support the claim by respondents that lack of top management support is the major obstacle to their use of technology. This is true because investment in IT needs reasonable amount of funds and the availability of these funds depends on the priority given to the subject matter.

Most surveyed audit managers agreed that their departments adopt new technology slower than other parts of their organizations. Top management in these organizations has been taking the audit department as not so important to warrant substantial IT investment. This clearly indicates the lack of understanding of the IT potential by internal audit managers in Tanzanian organizations.

One of the large private companies' internal auditing manager internal auditing claimed that the evolution of technology in his organization is very rapid but the internal audit department has not yet received any serious attention. As such, internal auditors get serious problems when auditing computerized systems.

It is mandatory in Tanzania for most of the organizations for internal auditors to be CPA holders. This is for the purpose of gaining reputation from the public so that their contributions in the organizations get acceptance from stakeholders.

The National board of auditors and accountants in Tanzania (NBAA) is responsible for training of internal auditors who are competent enough to cope with worldwide technological change. The expectation was that because the auditors pass through series of exams, particularly auditing examinations whose syllabus contain auditing in computerized environments, they were supposed to be keen with the computerized application systems.

The results of the test showed that the increase in number of CPAs holders in organizations did not improve the level of technology in the internal audit departments. The level of satisfaction of internal auditors to audit computerized application system remained low

regardless of the number of CPA holders the organization had. From these results therefore, it is suggested that attention should be put into training internal auditors in computerized systems rather than thinking of employing more CPAs holders in internal audit departments.

Furthermore, the hypothesis that, "There is no association between the level of computerized IS in Tanzanian organizations and the frequency of internal auditors training for auditing computer-based information systems in an organization" could not be rejected at 5% level of significance. The conclusion was drawn that the level of computerization in Tanzanian organizations has got no relationship with the frequency of IT related trainings provided to internal auditors.

Results from the survey revealed that the level of computerization of application systems in Tanzanian organizations is higher than the level of internal auditors' development in information technology. This implies that internal auditors will not be able to audit these computerized systems. It is not surprising to get this result from the test because previous discussions already pointed out the lack of commitment of top management to prioritize the internal audit training programs being the most significant obstacle for their use of technology. In this case the management will not care much about internal auditors' development in IT regardless of the level of computerization achieved in the organizations.

Finally the results from the hypothesis that, "There is no relationship between IT use by internal auditors and the perceived ability of internal auditors to audit computer-based information systems." is the common fact.

The result shows that there is the association between internal auditors' use of technology and their ability to audit computerized information systems. If the auditor is familiar with various computer technologies he is likely to understand easily any computerized system with just little guidance different from the internal auditor who is not familiar with computer at all.

## CONCLUSION

This research assessed the impact of Information technology on internal auditing in Tanzanian organizations. The central finding in this research work reveal that the internal audit profession in Tanzania lags behind in effectively using IT to support their duties.

From the discussion of the findings it was clearly observed that several factors, which contributed to the hindrance of internal auditors' use of technology, were seen to be interwoven. As such, it was clear that the lack of top management support seemed to be a critical problem because it is from this factor whereby other factors were brought into existence. For instance the inadequate training programs, internal auditors' involvement in information systems development and

poor allocation of budget to internal audit department were the result of lack of top management support.

From the above explanations it can be noted that for the betterment of internal audit departments in Tanzanian organizations most of the obstacles for the internal auditors' use of technology can be solved only by tackling the problem of lack of support from top management because it seems to be the source of several problems as identified in the aforementioned paragraph.

It is then suggested that, the top management has to be sensitized on the significance of training internal auditors with IT so that they perform their duties in an effective and efficient manner for the betterment of the organization as a whole.

In an attempt to improve the level of IT in internal audit departments in Tanzanian organizations, various recommendations have been pointed out. Below are few of the suggestions as to the ways to improve the level of IT in internal audit departments.

Internal auditors should educate executives about the existence of effective controls within the organization's IT infrastructure, which can improve overall efficiency, reliability, and performance of IT systems with little or no additional investment. Auditors also can provide examples of other organizations that faced similar problems to enlighten executives about the benefits of establishing corporate internal controls in IT operations.

Inexperienced internal auditors will be surprised how many easy-to-implement recommendations to replace manual controls with automated solutions are not accepted by business executives. In developing countries, including Tanzania many executives are not always willing to replace staff administering manual controls with an automated solution, even though the long-term benefits will be beneficial to the organization. This is not surprising: In areas where unemployment rates are high, employees are afraid of losing their jobs and work hard to keep them, (Chambers and Court, 1991).

Auditors need to be sensitive when providing recommendations for improvement that involve downsizing and should realize their feedback may not be welcomed at first. Whenever auditors advise executives to replace manually administered controls with automated solutions, they should focus their recommendations on the higher levels of efficiency and accuracy provided by automated controls, and how business information will be improved and captured better through an automated application.

A general belief among executive managers is that attacks to corporate networks and IT systems are performed by highly skilled hackers who gain access to network resources through technically advanced methods. Organizational efforts to prevent and monitor these threats are directed generally toward people outside the organization, without any consideration to

internal threats, such as unauthorized access to sensitive corporate data by employees. Unfortunately, internal auditors are expected to have a similar mind set.

Because insiders have direct access to corporate networks and IT resources, they pose as great a risk as outsiders. Auditors should educate managers about the risks posed by insider threats, such as unauthorized access by former employees, whose usernames and passwords were not deactivated, resulting in crimes or temporary employees who caused harm to an organization's intellectual assets. These real-life examples can be an eye-opener to executive managers to help them realize the significance of security practices — such as IT security policies, access control lists, and password-setting procedures — and encourage them to incorporate internal controls as part of the governance process.

Given the current situation with regard to the impact of IT on Tanzanian organizations, it is clear that if the trend continues this way, the internal auditors will not be able to cope up with the tremendous change in technology, hence serious attention should be posed to adequate training of internal auditors in technology directly related to the audit process.

Furthermore, internal auditors should be involved in systems development. They must have sufficient knowledge of the structure and techniques of computer controls to form a conclusion as to the effectiveness of the control system in particular situations. This will help the internal auditors to communicate with systems and EDP personnel and gain their confidence so as to fully understand the systems and procedures in operation.

Internal auditors should pay close attention to the current organizational atmosphere and the different audit considerations that must be taken into account in Tanzanian organizations. Different processes, such as accounting and transactions involving the use of personal data, also require specific services and audit considerations. In industries such as banking, executives may be more responsive to disaster recovery management and network security audit issues. In the manufacturing field, executives will be worried more about automated audit solutions that deal with more effective inventory controls. By keeping an open mind and understanding the organizational environment, internal auditors can recommend IT practices as part of the audit process that achieve expected results and help the organization in the long term.

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