

ROLE OF INFORMATION SYSTEM SECURITY IN THE GROWTH OF SMALL AND MEDIUM ENTERPRISES IN KENYA: A SURVEY OF INFORMATION COMMUNICATION TECHNOLOGY FIRMS IN NAIROBI

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ABSTRACT: *Small and Medium Enterprises (SMEs) in Kenya have reluctantly laid focus on information system security which has hampered growth in most firms resulting in stagnancy. Like the rest of Africa, SMEs in Kenya are faced with exertions of malicious system corruption, espionage, electronic fraud and malicious hackers. Consequently, Information Communication Technology (ICT) SME firms fail to reap the benefits of information system security such as firm growth and economic opportunities. This study sought to establish the role of information system security in growth of SMEs in Kenya. It sought to establish the role of technology, infrastructure, finance and quality control on the growth of ICT SMEs. The study adopted a descriptive research design. The population included the operational managers of various ICT firms in Nairobi. Qualitative and quantitative techniques were used for data analysis. The study found that quality control, followed by finance, and technology contributed most to the growth of ICT SMEs in Kenya. Infrastructure was found to be the least contributor. This study recommends that extra attention should be given to information systems security in the ICT industry. It further recommends that ICT SMEs should devote more attention to quality control, finance and technology, to ensure that information systems are secure, efficient and effective.*

KEYWORDS: Information System Security, Information Communication Technology, Information Systems

INTRODUCTION

In Kenya micro-enterprises are those with 10 or fewer workers, small enterprises have from 10 to 50 workers, and medium enterprises have 51 to 100 workers (Gray, 2000). The Government of Kenya (2005) defines SMEs as those enterprises that have between 1 and 50 employees, whether formal or informal. SME growth can be significantly enhanced through adoption of information communication technology (ICT). Earl (2002), indicates that the evolution of SMEs with respect to information systems security is dependent upon the usage of ICT. Information security is the protection of information within a business, and the systems and hardware used to store, process

or transmit this information (Whiteman and Mattrod, 2003). Over the last several decades, managers have become aware that information and information systems are critical organizational resources. It might be assumed, therefore, that the security of information and information systems would be seen in a favorable light. However, security of ICT SMEs has so far received little managerial attention; in fact, by 1986, security administration had evolved into a separate functional unit in only about 60% of all organizations (Hoffer and Straub, 1989 as cited in Black, 2010).

Information security has evolved and in the last few years there has been renewed interest in the subject worldwide; this is evident from the many standards and certifications now available to guide security strategy (Venter, Coetzee and Lebuschagne, 2009). Much like any other business asset, information is an asset that needs to be strategically managed and protected. It is therefore imperative that leaders of organizations and particularly SMEs understand the value of information contained within their business systems and have a framework for assessing and implementing information security (Kimwele, Mwangi and Kimani, 2010). Clear (2007), states that data security is critical to the operations of firms. Without the ability to store, process or transmit data securely, operations may be compromised, with the potential for serious consequences to trading.

Many studies have addressed computer security, information security, cloud security, internet and network security but there are hardly any studies conducted that have addressed the issue of information system security in ICT SMEs in Kenya. This study makes an initial attempt to explore the issue of SME system security with regard to their information.

LITERATURE REVIEW

Von Solms (2000) emphasized that information security has evolved through three waves. Firstly, the technical wave demonstrated by a technical approach to information security. Secondly, the management wave which includes a growing interest and involvement from management to protect information, and thirdly, the institutional wave where best practices and codes of conduct are adopted. Management is focused on proving the information security strength of the organization by implementing information security into the organizational culture, certification, and continuous measurement and monitoring. While viewing information security from a waves perspective is beneficial, a more valuable approach to viewing information security is from a stages of growth perspective because a stages of growth perspective attempts to identify the antecedents of change over time and provide researchers and practitioners with tools to better study and manage organizational change (Young, 2008).

ESA (2009) indicated that technology is practical application of knowledge that brings out something entirely new in a completely new way. Technology can be seen as doing new things within an organization. Technology and software development are directly related. This is why software development is important in any technological information system advancement (Terlizzese, 2012). Technology always plays a role whenever an information system is involved in an organisation.

Infrastructure is best when it is offered as a service. Techtarget (2011) indicated that infrastructure as a service is a provision model where organizations outsource their equipment to be used for support operations including storage, hardware, servers and networking components, while the service is responsible for housing, running and maintaining it. Patel (2006) argued that infrastructural architecture is important especially when adapting to different architectural designs that other companies have embraced within the environment.

Financial investment is important in any business environment. Inadequate credit normally leads to ineffective management of business assets and a weak enterprise information system which creates poor integrity of financial information which reduces the value of the enterprise financial information (Harris, 2010). Most financial institutions will not give funding to businesses that cannot provide collateral, so technopreneurs are required to be creative in the startup stages to generate enough revenue, so as to acquire and use that collateral to fund for the long term obligations that will assist their businesses to grow instead of stagnate (Akrani, 2011).

Shewhart (2001) emphasized that adding value is an aspect of quality control that many organisations avoid, yet it contributes to growth in manufacturing industries today. When enterprises adopt value added features like reduction of the risk of occurrence of a safety incident or accident, reduction of the risk of occurrence of an environmental incident or accident, improved assurance of specified product or service quality, improved actual product or service quality, reduction of product or service delivery cost, reduction of the delivery time for product or service and improved management of resources (human, facilities and financial) then businesses will undeniably grow (Federation of Small Businesses, 2007).

All these four variables, i.e. technology, infrastructure, finance and quality control have a critical bearing on information systems security in an ICT SME. Their conceptualised relationship is shown in Figure 1.

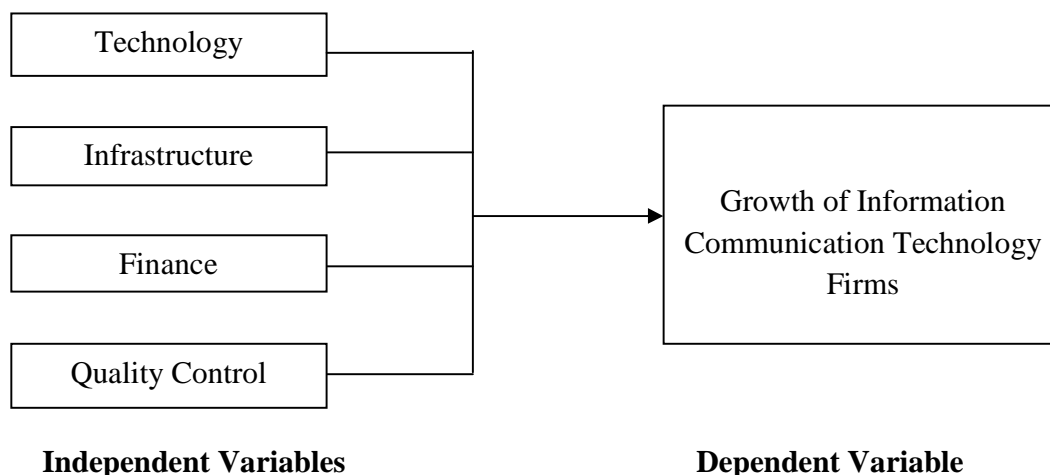


Fig 1 Conceptual Framework

METHODOLOGY

This study used a descriptive survey design. The study population was identified from a sample drawn from Computer Society of Kenya (CSK) online database of registered ICT firms operating in Kenya. The sampling frame, which is a set of source materials from which to select a sample (Turner, 2003), was CSK online database for registered ICT firms operating in Nairobi. The choice of Nairobi was informed by the fact that 81% of all ICT firms are based in Nairobi (Nailab, 2008). This study used a pure random sampling technique to obtain 118 managers and supervisors as the study respondents. The study used descriptive statistics and inferential statistics to analyze the data obtained.

RESULTS

Out of the 118 questionnaires administered, 112 were filled and returned. This represented a 95.98% response rate, which is quite suitable to make a finale for the study. According to Dixon (2012), a response rate of 50% is adequate while a response rate greater than 70% is very good. This agreed with Mugenda and Mugenda (2003), that a 50% response rate is adequate, 60% good and above 70% very good. This therefore implied the response rate of 95.98% is very good. Cronbach's alpha (α) was used to establish the reliability of the data collection instrument. Reliability is the ability of an instrument to draw out consistent results or measurements repeatedly (Black, 2008). For each of the independent variables, α was greater than 0.7; this conforms to (Chang, 2005), that a minimum of 0.7 value for α is acceptable for a research instrument. Validity was determined by use of content validity index (CVI). CVI was obtained by adding up the items rated 3 and 4 in the questionnaire. A CVI of 0.876 was obtained. Oso and Onen (2009) found that a CVI value of 0.70 is acceptable as valid for a research, hence the acceptance of the research instrument as valid for this study.

From the study findings majority 38(30.2%) agreed that technology with basic information system security skills is very important in the enterprise for growth followed by 31(24.6%) who indicated uncertain over the same statement. Further the study findings indicated that majority 37(29.4%) found it least important that there is need for technology advanced information system security skills of employees. Majority 32(25.38%) indicated that usual technology information system security training for employees is important for growth of ICT firms. The study also indicated majority 42(33.3%) that relationship between role of information system security and skills needed to make your company grow is important. This is further supported by a high number 31(24.6%) that it's very important.

From the findings majority 42(33.3%) of the respondents agreed that better technological support and proper infrastructure is key for information system uptake for SMEs. A further 41(32.5%) of the respondents agreed that in common information system infrastructures are vital to technology enterprise success. This is supported by 32(25.4%), who agreed that efficient information system infrastructure is a requisite for growth of ICT firms. 43(34.1%) of the respondents agreed that infrastructural support for information system security is crucial for ICT firms, while 51(40.5%) agreed that establishing competitive information system security infrastructures and standards

are very important for growth among ICT firms. A further majority 43(34.1%) also agreed that availability of fibre optic networks may affect the way SMEs adapt information system security.

A majority 38(30.2%) of the respondents agreed that finance is important for ICT enterprises in obtaining resources. Further from the findings majority 44(34.9%) also indicated researching on core and financial accounting software to leverage technology efficiencies enables ICT enterprises to discover growth opportunities. 32(25.4%) agreed that high cost of information system security applications leads to use of pirated applications, with 41(32.5%) agreeing that quick changes in technology have raised information system overheads, thus lowering information system adoption among ICT SMEs. A further 45(35.7%) of the respondents also indicated that investment in information security applications does not represent the value for capital in firms with 44(34.9%) agreeing that the zero-rated VAT on information system products have positively impacted on the success of ICT enterprises. A majority 50(39.7%) of the respondents also agreed that high cost of information system security infrastructure maintenance cost reduces its application.

The findings indicate that majority 40(31.8%) of the respondents agreed that information system quality plays a very important role in the type of security feature to be used. 38(30.2%) reported that quality control ensures that the information system in use by SMEs is secure and the end result is performed effectively and efficiently. A majority 37(29.4%) of the respondents indicated that without information system quality management systems, it is difficult to determine the value of growth in the firm. 28(22.2%) also strongly agreed. Majority 32(25.4%) of the respondents further agreed there is a direct relationship between role information security and quality control to make a company grow, while 29(23.0%) also strongly agreed.

A regression model was run to show the relationship between the dependent variable and the independent variables.

$$Y = 0.86 + 0.72(\text{TEC}) + 0.64(\text{INF}) + 0.86(\text{FIN}) + 0.97(\text{QCT})$$

Where Y= Growth of ICT firm QCT= Quality Control

TEC= Technology

INF= Infrastructure

FIN= Finance

The model shows that quality control had the most influence on growth of ICT firms, followed by finance, technology, and finally infrastructure.

DISCUSSION

The purpose of the study was to find out role of information system security in the growth of ICT SMEs in Kenya. The variables examined were technology, infrastructure, finance, and quality control. A review of related literature and empirical studies informed the construction of the data collection instrument. The results indicate that there is a strong positive relationship between technology, infrastructure, finance and quality control on the growth ICT firms in Nairobi.

Lane (2006) argued that ICT enterprises are defined by the technology they use. She further stated that using the wrong technology in business contributes to poor growth of ICT SMEs in the environment. When entrepreneurs do not implement the right technology in their firms, they suffer business stagnation (Cooper, 2001). This concurs with Gonzalez, Gasco and Llopis (2009) who emphasized that correct choice of technology is essential for any enterprise to grow in the current ICT environment. Chang (2005), observed that having the right technology with basic information system skills enables workers within the enterprise to understand how, when and where to use that technology when needed. Hoffer and Straub (1989) argued that standard training of workers in computer information systems training enhances growth. There is always a positive relationship between information systems and company growth, especially in SMEs that use information systems frequently (Kontio, 2005).

Information technology infrastructure is essential to ensure that information is effectively relayed within the different firm organs (Techtarget, 2011). This implies that infrastructure is vital in ICT SMEs since it helps in both information and resource sharing, which lead to an effective and efficient information system. Patel (2006) argued that technology infrastructure should cover all enterprises that change or are changed by information systems. Enterprise owners ought to ensure that they have the relevant technology infrastructure in place. Greener (2008) observed that technology and infrastructure are interlinked in ICT SMEs. Kiebel and Holmes (2001) identified in their two case studies the adjustments of information system infrastructures plays a fundamental part in information system security design models. The findings indicate that ICT SMEs embrace infrastructure as paramount to their growth.

The findings on the role of finance on information system security agree with those by Akrani (2011) that without financial investment in information systems, there is little room for the firm to experience growth. His study stipulates that when SME owners and investors come together, resources are acquired faster, raising growth prospects, and increasing revenue creation. The role of finance in information systems may not only explain how ICT enterprises get resources, but also how they spot opportunities for growth. Investopedia (2012) suggested that with the proper finances, businesses are able to achieve their goals. Therefore ICT SMEs are capable of operating successfully with adequate funds to ensure that their objectives are accomplished.

Information systems are known to add value, which is an aspect of quality control. Shewhart (2001) explained that adding value is an aspect of quality control that many organizations avoid, in spite of its contribution to growth. This is vital for ICT SMEs, owing to the fact that many enterprises are keen to add value to all aspects of their products and services. Quality control is an important issue in the development and implementation of information systems, aimed at application, structuring and increasing the market divide (Alcalá, 2010). To have lasting associations with clients, ICT SMEs must ensure that their quality control yields products and services that exceed customer expectations. For applications to be acceptable, ICT SME managers need to use feasible aspects that are related to quality.

IMPLICATION TO RESEARCH AND PRACTICE

Not all Kenyan ICT SMEs have embraced information system security. These findings will help ICT SME managers to better appreciate the role of information security in the growth of their firms. This will further sensitize SME firms to put control checks ensuring information security is effective and efficient in the ICT industry. This will enhance public-private partnerships to promote policies that regulate monitoring and evaluation of ICT firms in relation to information system security.

This study will help avoid phishing, leakages of blueprints to competition, and safeguarding integrity of information while making it available for quick retrieval. Further, providing new information that policy makers can use to improve information system security in ICT SMEs and in the process address the needs of all stakeholders. In addition, this will be significant to Kenyan SMEs, technopreneurs, academicians and investors interested in investing in the ICT sector.

CONCLUSION

Financial investment is important especially in regards to researching on core and financial accounting software to leverage technology efficiencies enabling ICT enterprises to realize growth opportunities. Without financial investment in information systems it is difficult for ICT SMEs to experience growth or success.

Quality control measures influences the growth of ICT SMEs greatly, and must be established to ensure that information system quality matches the type of security feature to be used. It is also important especially in development and implementation of information systems aimed at application structuring and increasing the market divide. To ensure lasting associations with clients, ICT firms must ensure that quality control of their applications adds value to their products and services. Using the ISO certification for quality in information system security can ensure SMEs are secure and the end result is performed efficiently and effectively.

FUTURE RESEARCH

There is a need to audit ICT firms in Kenya to assess their efforts to adopt ICT security measures, and how they leverage this to create a competitive edge in the ICT SMEs habitat.

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