ICT FOR FOSTERING SMALL AND MEDIUM SCALE ENTERPRISES IN TANZANIA: WHAT ARE THE BLOCKING FACTORS?

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ABSTRACT

This paper presents the results of a research carried out to identify the major barriers of adopting and use of Information and Communication Technologies on Small and Medium Scale Enterprises in Dar es salaam, Tanzania. Information and Communication Technologies is a pathway to economic development in both developed and neighbouring countries than it is in Tanzania.

Data on these aspects of ICT was collected from 98 SMEs through a questionnaire. The results of the study show that SMEs in Tanzania are aware of some of the critical barriers of ICT adoption. Majority of the firms participated on this study use the ICT business mainly for general business information, and hardly doing mobile transactions and e-commerce. Lack of reliable power, skilled IT experts, suitable legal and regulatory practical framework, limited availability of online banking service, poor telecommunication infrastructure, high cost of internet connectivity and language barrier were the major barriers in adopting ICT. It is concluded that TCRA and body of electrical power should work hand in hand to tackle the problem of infrastructure in the country. There is a need for more focus and concerted efforts on increasing awareness among SMEs on the limitations of ICT adoption

Keywords: Information and Communications Technology (ICT), Small and Medium sized Enterprises (SMEs), ICT adoption, ICT barriers, e-commerce.

1.0 INTRODUCTION

ICT adoption in the area of e-commerce among SMEs in Tanzania is among the key remedy in creation of business opportunities locally and internationally. ICT adoption is a cost effective way to reach global players, gaining market share, streamlining a wide spectrum of business processes and technology for competitive advantage utilizing telecommunication networks, improving relationships, advantageous to early adopters, ready and willing to change communication internally and externally, ensuring sufficient resources and skilled-staff (Motjolopane & Warden, 2007). Tanzania like any other developing countries is aggressively emphasizing the use of ICT in government and private sectors including on SMEs.

ICT therefore is a key innovation tool that can advance social and economic development, good governance, and poverty reduction in the developing countries of Africa (Datta, 2011). According to (Nnafie *et al.*, 2002) and as described in (Uzokaet *et al.,* 2007) 'ICT especially e-commerce activities would be a major source of foreign exchange and a key indicator of national development'. However, study findings focusing on developing countries have indicated that ICT/e-Commerce adoption is yet to reach its full potential (Boateng *et al*., 2011). That is, most firms have websites which are generally informative but lack interactive facilities for online transactions partly because ICT in most developing countries and African countries

in particular, is generally characterized as poor which results in low levels of internet usage activity (Siyao, 2012). The introduction of National Information and Communication Technology (NICT) in 2003 in Tanzania was the beginning of a new chapter of innovation that aims at enhancing national-wide economic growth and social progress by encouraging beneficial activities of ICT in all sectors through providing a conducive framework for investments in capacity building and in promoting multi-layered co-operation and knowledge sharing locally as well as globally (URT, 2003).

Although the SME sector is important to the socio-economic development of Tanzania, studies have revealed that it is under-performing due to a multitude of barriers facing it (Mutambala, 2011). On the other hand, some studies that have related e-commerce under ICT and SMEs in Tanzania tend to generate multiple barriers/limitations which sometimes differ from one researcher to another. The study conducted by Aydemir (2013) reveals that the SMEs were affected by the lack of telecommunication infrastructure, lack of qualified and skilled workers to develop and support ICT/e-Commerce sites, lack of skills among consumers necessary for using the internet, lack of timely and reliable systems for the delivery of physical goods, limited online bank accounts and credit card penetration, low income and low computer and internet penetration. Another study points out that there is lack of awareness for e-commerce and related technologies, social-cultural beliefs, high costs associated with investment in e-commerce infrastructure, poor laws to combat cyber-crime and protect consumer privacy, and poor government policy (Salah, 2013). Orek *et al*. (2011) also indicates that factors affecting SMEs are lack of sufficient security system, reliability, poor standards and communication protocols, and insufficient bandwidth. Others include rapid changes in technology, as well as lack of trust. However, such numerous ICT e-commerce adoption barriers identified might be difficult to tackle at once due to the limited resources facing the country (Siyao, 2012). As a result, such barriers continue to persist without solutions. This study therefore aims at assessing the main critical barriers facing ICT/e-commerce adoption among SMEs in Tanzania and finally proposes strategies, which will enable policy makers and other business practitioners to mitigate these barriers through prioritization of the available resources in the country.

1.1. Challenges Facing SMEs in Adopting ICT

Most of LDCs have unreliable and inefficient telecommunication infrastructure that can support the conduction of conventional ICT/e-Commerce; however, telecommunication infrastructure plays an important role when firms decide to adopt ICT/e-Commerce (Zhai, 2011). On the other hand, it is pinpointed out that most commercial and financial institutions in developing countries are not matured enough to handle and secure reliable electronic transactions. Therefore, it can be argued that ICT/e-Commerce can be affected by socio-cultural norms of a given country. Social factors are concerned with informal regulations and are implicated in the adoption of ICT/e-Commerce (Lin, *et al*., 2011). For instance, websites in Vietnam are perceived as being 'merely places for promotion; not for purchase' because 'Vietnamese consumers are used to the practice of seeing and touching before buying (Rowe *et* al., 2012). One of the social barriers of ICT is language of online contents. Some study state that the differences in language and work habits as one of the barriers to people using ICT (Gattiker *et al*.2000) The majority of the content of the World Wide Web is produced in English language, creating a barrier for many potential users in LDCs, especially those in African countries whose first and second languages are not English (Molla *et al.*, 2006). A survey conducted by Aydemirin (2013) indicates that low acceptability within the sector; poor customers' preferences, poor security, inadequate technical infrastructure, cost and lack of competence in e-commerce are barriers for e-commerce adoption in Turkey.

Moreover, survey in Kenya [Kenneth et al, 2012] identifies that SMEs failure to adopt ICT is due to limited resources whereby, financial, human and technological resources affect the adoption of ICT/e-Commerce largely with mean of 4.41 and 4.46 with significant standard deviations respectively. Budget constraints also had a mean of 4.5 with significant standard deviation (Kenneth *et al*., 2012).

Study conducted in Tanzania also notices the problem of infrastructure. The study by FITSO about Financial Inclusion Tracker Surveys Project on the Mobile Money in Tanzania indicated that about 72% M-money agents handled transactions services without considering customer privacy and 49% were unable to withdraw money because the provider's network was down (FITSP, 2013). Similar findings were reported by (Kimambo, 2012). Kimambo stated that about 56% suffered network failures during withdrawing and transferring money while 33% experienced high charges per transaction and also most customers suffered the issue of forgetting password when using mobile transaction.

2.0 MODEL AND THEORY FOR ADOPTION OF ICT IN SMES

There are number of theories and models developed in relation to ICT in SMEs. Below is a brief description of some theories and a model.

2.1 Technology Acceptance Model (TAM Theory)

Technology Acceptance Model (TAM) is one of the most frequently employed models for research into new information technology acceptance. The TAM theory suggests that when users are presented with a new technology, a number of factors determine their decision about how and when they will use it. The TAM theory was proposed by Davis (1989). It comprises two beliefs. One is the perceived utilities and the perceived ease of application, which determine attitudes to adopt new technologies. The attitude toward adoption will decide about the adopter's positive or negative behaviour in the future concerning the new technology. It is asserted that the systems designer has some degree of control on these two factors. In TAM, Perceived Usefulness (PU) is defined as the degree to which an individual believes that using a particular system would enhance his or her job performance, whereas Perceived Ease of Use (PEOU) is the degree to which an individual believes that using a particular system would be free of physical and mental effort (Davis, 1989).

2.2 Factors for adopting ICT by SMEs and its Interactions

There have been a number of research studies concerning SME ICT/e-Commerce adoption factor. A framework of classifying SME ICT and e-Commerce adoption factors, which have been used more successfully, is Tornatzky and Fleischer's (1990) 78 models, which has been applied previously in SME studies. The model comprises three contexts, which influence the adoption of innovations in organizations: (1) organizational; (2) environmental; and (3) technological contexts. The organizational context refers to the factors of the organization, such as the size of the firm and internal processes. The environmental context refers to the organization's business environment such as competitors, legal issues and customers. The technological context refers to the technologies relevant to the firm, that is, the technology in question, on which the adoption decision is based. This model is useful for classifying organizational ICT/e-Commerce adoption factors because it explicitly acknowledges environmental effects.

2.3 Other related theories and models

Roger's Innovation Diffusion Theory (IDT) states that potential adopters evaluate the following technical characteristics to assess the adoption of an innovation: first, the relative advantage of the innovation compared to the competition and its compatibility with the existing infrastructure are the most significant adoption determinants (Torntzky & Klein, 1982). Second, in terms of complexity and trainability, a firm also evaluates the external organizational context to suppliers, customers, or governmental authority's in terms of efficiency gains or possible constraints from the adopted innovation (Chan and Tam, 1997).

The Technology, Organization and Environment framework (TOE) proposed in (DePietro, 1990) is a widely accepted framework (Oliveira, 2011) which identifies three constructs that are vital to adopt an innovation:

(i) availability, best practices and equipment
(ii) firm size, communication processes and managerial structure
(iii) industry characteristics, market characteristics and technology support.

Following the arguments by Scott (2001), institutional environments such as business partners or competitors shape organizational structures and actions which leads to the Inter-Organizational model (IO) based on the constructs of:

(i) perceived benefits
(ii) organizational readiness and
(iii) external pressure.

Raymond (2001) underlines this approach and postulates that IDT and TOE frameworks need to be enriched when the innovation relates to complex technologies with an inter-organizational locus of impact for which adoption decisions are linked (e.g., when imposed by business partners) and when the innovation is adopted by organizations.

3.0 RESEARCH METHODOLOGY

Quantitative approach was used to determine the magnitude of each barrier in influencing adoption of ICT/e-Commerce by SMEs in Tanzania. Simple random sampling was used to obtain 98 respondents who are SMEs owners and employees where questionnaires were used to capture data to test the hypothesis. A pilot study was done prior to the main survey in order to test the suitability of research instrument before actual data collection. Multiple regression analysis was used to test for the relationship and strength of the relationship among the barriers in adoption of ICT.

Data were collected from SMEs in Dar-es-salaam and Arusha. Dar-es-salaam is the region in Tanzania with the highest urban population and the cultural and economic hub of the country. About a half of the country's manufacturing sector is located there. It is also the region with the highest presence of ICT use and therefore does serve as a useful location to interrogate uptake of ICT/e-Commerce in Tanzanian SMEs as supported by Oreku et al., (2013). Arusha is a major international diplomatic hub, the city is host of the East African Community, and it is a multicultural city with a majority Tanzanian population of mixed backgrounds: indigenous African, Arab-Tanzanian and Indian-Tanzanian population, plus minority European and American population. The primary industry of the city is tourism service sector. The city hosts numerous small and large businesses, banking, retail and commercial enterprises thus making it the financial and cultural capital of the region. Moreover, Arusha is a home to the largest

manufacturing sector in the region with breweries, agro-forest processing and a large pharmaceuticals maker.

3.1 Reliability Statistics

The Cronbach's alpha reliability coefficient was computed using SPSS. Table 1 presents the results for each major group, which ranges from good (0.861) to satisfactory (0.685). From the scores of the Cronbach's alpha, we can conclude that there is very good internal consistency from the questionnaire used in this research.

Table 1: Reliability statistics

Barriers	Cronbach's Alpha	Standardized Cronbach's Alpha	No of Items
Communication /Technological	0.861	0.862	8
Environmental	0.844	0.846	9
Organizational	0.685	0.687	8
Legal and Political	0.746	0.743	7

4.0 RESULTS AND DISCUSSIONS

4.1 Results

The study finding shows that several factors are associated with challenges of ICT adoption to SME. However, power infrastructure and network infrastructure are interrelated. The cost of internet exuberates the problem not only in Tanzania but also in some African countries. Nevertheless, the study also noted that internet cost and unavailability of power is time problem. The use of solar power and The Rural Energy Agency (REA) projects in rural area in Tanzania are encouraging in solving the problem.

4.1.1 SME Category and Turnover

The investment of SMEs in Tanzania is promising; however, its rate of growth is not enough. The investment values of SMEs in various categories varies from 2.174.29 USD to 347, 886.59 USD. However, when compared with the same categorization in Europe big gap realized.

Table 2: Small businesses categories in Tanzania and their Turnover

Category	Employee	Turnover in Tanzania (USD)	Turn Over in Europe (USD)
Micro Enterprises	Less than 10	2,174.29	1,801,801.80
Small Enterprises	less than 50	86,971.65	9,009,009.01
Medium Enterprises	less than 250	347,886.59	45,045,045.05
Large Enterprises	100+		

Source European Small Business Finance Outlook (Helmud et al., 2019)

4.1.2 Potential barriers which hinder adoption of ICT by SMEs in Tanzania

The prevalence of the potential barriers that hinder adoption of ICT by SMEs in Tanzania is presented in Figure 1. The factors immerge from communication, environment, organization as well as legal and political barriers.

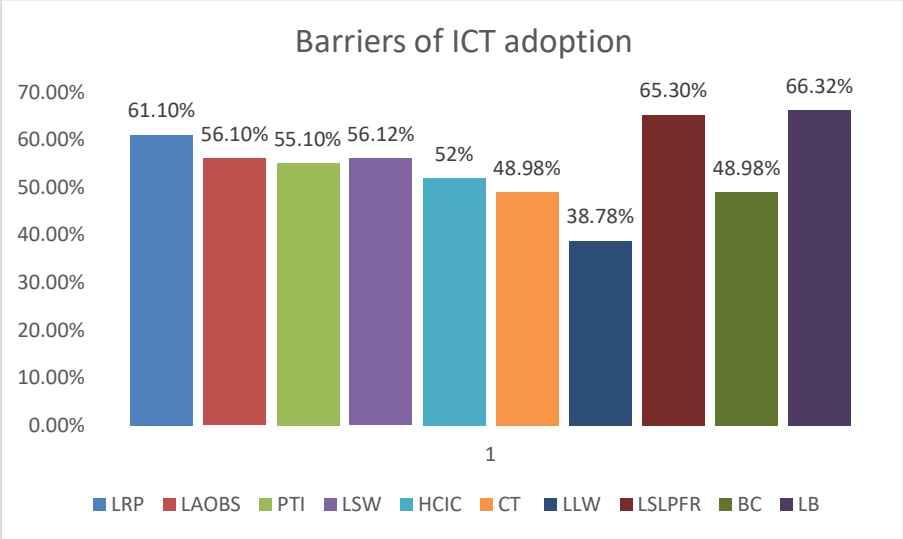


Figure 1: ICT barrier for SME

From Figure 1 the result shows that there are almost six factors that are leading in blocking the growth of ICT in promoting SME in Tanzania. These include language barriers (LB) which account for 66.2%, lack of suitable legal practical framework and regulatory (LSLPFR) which account for 65.3%, and lack of reliable power (LRP) account for 61.10%. Others include lack of skilled IT workers (LSW) accounting 56.12%, limited availability of online banking services (LAOBS) which account for 56.10%, poor telecommunication infrastructure (PTI) which is almost 55.10% and high cost of internet connectivity (HCIC) 52 %. Even though cannot be neglected but social-culture and belief (CT) as well as lack of skilled IT workers and low level of literacy or awareness of (LLW) which contributed 48.98 and 38.78% respectively.

4.1.3 Model of ICT Factors in relation to SME

The data were analysed to find the p-value of each independent variable in relation to SME. The results are presented in the following Table 3 which summarizes the test of dependency between the combination of various ICT systems (ICT devices used by SMEs) and the barriers in Tanzania. The table equally takes into consideration the four major grouping barriers: Communication barriers, environmental, organizational and legal & political barriers. Cross tabulation was performed in the SPSS program to determine whether there is any dependency as well as the strength thereof. The Hosmer and Lemeshow test shows how well the analysed data fit the model. At a value of 0.50, the statistics can be said to provide a reasonably good fit for the data.

Table 3: The statistical modelling of ICT in four groups of major barriers for SME

95% CI for EXP(B)								
Step 3	**B**	**S.E**	**Wald**	**df**	**Sig**	**Exp(B)**	**Lower**	**Upper**
Communication	18.096	8279.105	.000	1	.998	72261199.412	.000	
Environment	-.859	1.190	.526	1	.471	.424	.041	
Organization	17.097	10229.164	.000	1	.999	26602318.574	.000	
Legal Political	17.843	9486.704	.000	1	.998	56134066.144	.000	
Constant	-54.645	16222.729	.000	1	997	.000		4.368

Considering the research objective and the findings, a linear model that combines four major factors is proposed. The model is based on a concept presented by Davis et al.; in year 1989 and they claimed that it could influence the adoption of ICT and e-Commerce. The model is based on four pillars as described in Table 3.

$$\mathbf{Y = \alpha 0+\alpha 1x1+\alpha 2x2+\alpha 3x3+\alpha 4x4+\varepsilon} \quad (1)$$

Where;

X1 is Communication barrier (COMM)
X2 is Environment barrier (ENV)
X3 is Organization barriers (ORG)
X4 is Political & Legal barrier (POL&LEG)
ε - Provision for error,
Y is ICT (e.g. Computer, Tv, Mobile, Internet).

4.2 Discussion

Figure 1 above indicate that lack of reliable power, limited availability of online banking services, poor telecommunication infrastructure, lack of skilled IT workers, high cost of internet connectivity, lack of suitable legal practical framework and regulatory system and Language barrier are the critical barriers of ICT adoption by SMES in Tanzania. These factors are also featured in several studies by Sampson, (2012), SMEVenture, (2017) and GUI et al, (2017). It is noted in SMEVenture, (2017) that SMEs alter globally in light of many aspects including the ease of access to a source of financing, the aptitudes base in the locality and attributes of provincial markets. ICT empowers nearer interfaces between organizations, suppliers, customers and community-oriented accomplices.

On the other hand, low level of literacy and awareness of ICT benefits, social-culture and belief as well as complexity of technology is found to be contributing factors. Lack of reliable power is also a contributing factor; however, it is a temporary factor. The lack of power is a multiplying factor. That is, whenever there is unreliable electricity; a lot of associated barrier may arise. As the result, some SMEs frequently affected by power failure may withdraw themselves from using ICT and instead will opt for the traditional way.

Even though we noted a considerable changes since last five years in innovation on banking system, where there is internet banking, mobile banking but more innovation is required such as card swapping, internet shopping, ATM depositing and others alike. SMEs utilization of ICT ranges from fundamental Technology; for example, radio and fixed lines to more advanced Technology; for example, email e-commerce and information handling frameworks as part of SME facilities. This facility permits the SME to speak with its suppliers and customers without visiting them one by one. It is noted that even some of large SMEs still work in assumption of manual, for example, presenting the BIMA Cards in health centres instead of presenting identification numbers, intra-bank charges is still high, intra-mobile charges is found to be even higher.

Organization in which SME operate need to have good ICT infrastructure. Infrastructure facilitates all mobility as well as cost reduction. The improved infrastructure reduces internet cost, fast network communication, more and reliable purchase and time saving. Otherwise, SMEs might be discouraged using ICT in a poor infrastructure. In Tanzania, most of SMEs

use wireless internet (satellite) from telecommunication companies for their activities, which cost much, compared to European countries. According to Hesselmark (2003), cost of internet and mobile operation is more than ten times in Africa compared to Europe. According to the report by Yomi (2019), the general cost of 1 GB in Africa ranges from 12.5% to 8 % of the average individual income from year 2015 to 2018. Likewise, in Asia, it ranges from 3.5% to 1.5% of individual average income while in America it ranges from 4.5% to 2.5%. Notwithstanding, not all SMEs need to utilize ICT to a similar level of intricacy. The primary ICT instrument that most SMEs embrace is having fundamental interchanges with a fixed line or mobile, whichever is more cautious or most helpful for their business. Moreover, lack of skilled IT workers leave some SMEs in a dilemma of either to accept or reject such technology since they lack understanding of how to interact with IT technology and the benefits accrued from it. According to TAM, the users' decision to accept or reject particular technology depends on PU and PEOU. In fact, PU and PEOU will only be easily understood by workers through training, which is offered by IT experts.

The environment in which SMEs operate needs to be transparent in legal and political influence to business. Good infrastructure, skilled IT experts, reliable power and securing finance for SME is almost impossible in a bureaucratic environment. ICT in financial aspects plays two vital roles, which are strategic management and cost reduction. The organization utilizing ICT changes the investment policy, legal procedures as well as business procedures to suit the work environment and makes easier adaptability to ICT environments. As indicated, ICT utilization may enable a firm to access, to easily integrate and grow globally while developing its internal capacity.

Communication is a source of handshaking in business. A language barrier could present an obstacle if two parties involved cannot understand each other in the business. The study by Klomsri & Tedre, (2016) reported similar findings. On the other hand, internet communication requires both fluency and speed of communication. It is a point of disappointment when there is slow internet which results into higher cost. The more problem you have in language you are likely to spend more money on the internet. Comparing cost of surfing the internet in different African countries, it is observed that there are some inter-country variations.

Legal and political influences spill over to SME developing nationwide and finally globally. SMEs regularly do not have the human innovative resources required for ICT risk analysis. An absence of awareness on vulnerability of ICT and benefits associated with use of ICT, set-up expenses and evaluating issues and security concerns of ICT count for failure of getting involved in e-Commerce. Likewise lack of financial support and political vulnerability are hindrances to ICT adoption by SME innovators.

5.0 CONCLUSION AND RECOMMENDATIONS

The main objective of this paper was to examine the barriers of ICT adoption by SMEs in Tanzania's environment. This paper concludes that language barriers (66.32%), lack of suitable legal practical framework (63.5%) followed by lack of reliable power (61.1%) are the most critical barriers adopting ICT in Tanzania followed by other barriers as lack of skilled IT workers (56.12%), limited availability of online banking services (56.1%), poor telecommunication infrastructure (55.10%) and high cost of internet connectivity (52%). The implication of these findings is that serious measures should be taken by the Government in order to curb these barriers by prioritizing the strategies following the intensity of the barriers.

Study also recommends that to realise the benefit of ICT, electrical power line infrastructure and ICT backbone infrastructure should go hand in hand. This barrier should be addressed first before solving other barriers. Overall, it is recommended that TCRA which is the regulatory board on ICT should keep their eyes open on the price of internet as charged by operators. By doing so SME penetration may increase in few years.

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