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UNDERSTANDING THE DRIVERS OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTs) ADOPTION BY KENYAN SMALL AND MEDIUM ENTERPRISES (SMES).

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ABSTRACT

Small and Medium Enterprises (SMEs) play a major role in developing and developed economies in job creation and diversification of economic activities. Despite all these, SMEs are faced with many challenges such as non-adoption of information communication technologies (ICTs), poor infrastructure and inaccessibility to credit facilities. This notwithstanding, many studies have been done on ICTs adoption by SMEs but mainly on the importance of ICTs on enterprise competitiveness. Understanding the drivers, barriers and strategies to ICTs adoption by SMEs especially in the less developed countries, and in particular by Kenyan SMEs, have not been addressed. To fill this gap, this paper will address the drivers and ICTs tools used by Kenyan SMEs. To achieve this, a stratified random sample of 380 owner/managers of SMEs in three provinces in Kenya was selected for the study, namely Nairobi, Rift Valley and Nyanza provinces.

Key words: Adoption; economies; Kenya; managers.

INTRODUCTION

There is no universal definition of Small and Medium Enterprises (SMEs). Definitions vary from country to country. In Australia, SMEs are defined as enterprises employing between 5 and 199 employees (Kotey and Folker, 2007). In Indonesia, they are business enterprises with 5-99 employees (Mira, 2006) and in Kenya; SMEs are defined as enterprises which employs between 11-99 employees (Moyi, 2003, Migiro, 2005).

SMEs play a critical role in both the developed and developing countries. They create employment opportunities, adopt innovations and generate export opportunities (Thuvile and Wennekers, 2004). For instance, in Japan, 81 percent of the employment is in the SME sector (Lukacs, 2005-2). In addition, UK SMEs employ 14.23 million people, out of a working population of approximately 30 million. In Singapore, 51percent of the total workforce is employed in the SMEs (Lukacs, 2005). In Kenya, 2003, the sector employed 5.1 million people accounting for 74 percent of the total employment and it also contributed to 18percent of the GDP (Kenya, 2009). In Malaysia, SMEs account for 98.8 percent of all enterprises, contribute 25.9 percent of total manufacturing output, 25.9 percent to value added production and employ 31.1percent of the country's workforce **(**SMIDEC, 2005).

Besides, SMEs stimulate competition, aid large firms and serve as a seedbed for growth **(**Mohdeval, 2002). Hence, abilities of SMEs to adopt e-business technologies would render them global competitiveness and sustainability (Rovere, 1998; Kuan and Chau, 2001). However, the extent for e-business technology adoption in Kenya is not clear. Previous studies have focused on the benefits but have failed to address the drivers of Information and Communication Technologies (ICTs) and ICTs tools used by SMEs. In order to identify the current state of e-business technology adoption by Kenyan SMEs, there are three important components to be integrated in the measurement of e-business technology adoption. These components are drivers for ICTs adoption, ICTs tools used and benefits of adopting ICTs in SMEs. Therefore, the aim of this paper was to investigate the drivers for ICTs adoption and ICTs tools used by SMEs.

This paper is divided into four sections. Section 1 gives the overview of the literature review and conceptual framework. Section II explains the methodology used, section III elaborates the discussion and findings and section IV ends with conclusions and implications of the study.

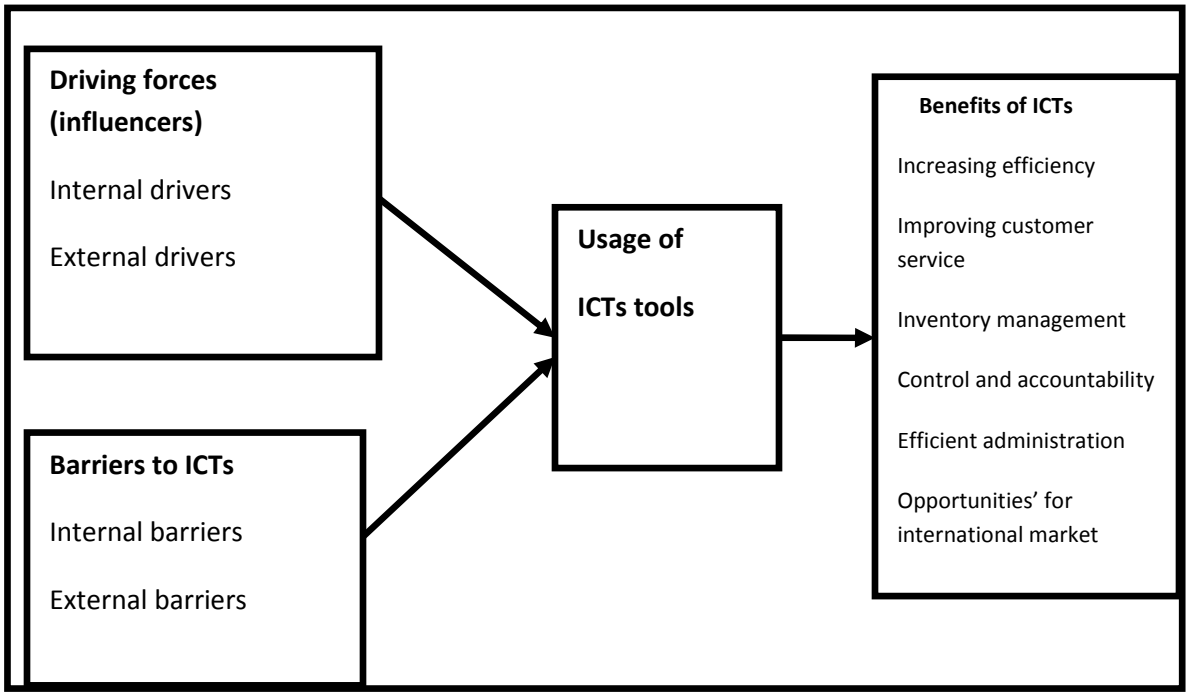
LITERATURE REVIEW AND CONCEPTUAL FRAMWORK

Small and Medium Enterprises in Kenya: In Kenya, according to a baseline survey conducted in 1999, indicated that SMEs employed 2.4 million people, which constituted 18percent of the total workforce (Lukacs, 2005). In 2003, the sector employed 5.1 million people, accounting for 74 percent of total employment in Kenya. Similarly, in 2009, SMEs sector contributed 18 percent of gross domestic product (GDP) of the economy (Kenya, 2009). In addition, this sector contributed 87 percent of all the new jobs created and it employed 77 percent of the total number of the workforce. Thus, SMEs in Kenya make a significant contribution to Kenya's Gross Domestic Product (GDP) and creation of employment. Despite all these contributions SMEs are faced with many challenges like inaccessibility to financial services, deficiencies in technical and management skills, depilated infrastructure, and increasingly volatile input and output market(Kenya, 2009; Bowen *et. al.,* 2009). In recognition of the importance of the sector, in 2003 the Kenyan government created a SMEs policy framework, which placed the development of SMEs in line with the national economic growth goals, employment creation, income generation, and poverty reduction.

Conceptual Framework

The conceptual framework for this study is presented in figure 1. The framework is based on four constructs which are critical in ICTs adoption by SMEs. These constructs are the drivers to ICTs adoption; barriers to ICTs adoption; ICTs tools and benefits of ICTs adoption in SMEs. The drivers include the change in technology, globalisation, competition, market advantages and personal consideration of SME owner/managers. However, despite these drivers, SMEs have failed to adopt ICTs in their business because of barriers to ICTs adoption. These barriers include unfamiliarity with software application, lack of infrastructure, human resource and information knowledge management. In addition, high cost of internet connectivity and lack of security and reliability in the use of ICTs are some of the barriers to ICTs adoption. Despite the barriers, ICTs adoption in SMEs, will improve their customer service, flow of information, inventory

management, control and accountability. In addition, ICTs adoption will create opportunities to international markets, managing resources effectively, and efficient administration of the business.



Drivers of ICTs adoption in SMEs.

ICTs adoption by SMEs is influenced by many factors which have compelled SMEs to adopt ICTs for survival growth, sustainability and competitiveness. However, there are many forces tends to influence the process of ICTs adoption in SMEs which constitute of the following: environment, human capital, firm structural characteristics, competitive strategy and internal organisation.

The impact of competition has compelled SMEs to adopt ICTs, so that they can be able to survive, grow and develop in this era of globalisation. The Macro and Micro environments are not constant thus geographical distances are of no importance for customer-supplier relationships (Sharma and Bhagwat, 2006). Scholarly evidence tends to shows that durable productivity gains have been achieved in enterprises which use ICTs in the business (Bresnahan *et al.,* 2002; Chiware & Dick, 2008). This is due to the faster growing rate of globalization expansion which has encouraged among other things the effective flow of data in organizations, which would only be facilitated by the use of ICTs. The study conducted by Sharma and Bhagwat, (2006:201)

demonstrated that the flow of information in an organisation is the backbone of any business operational unit irrespective of its size.

The development of technology has highly affected the way businesses operate; especially it has changed the organisation structures and altered the degree of competition. Similarly, it has also created a competitive edge for the businesses which have adopted ICTs in their business. Finally, it has affected the business operations which have compelled SMEs to adopt ICTs in their business to cope with these changes in the environment (Enderwick, 2002). ICTs adoption in SMEs are said to provide means to accessibility, processing and distributing greater amounts of data and information quickly in the organisation to aid the process of making thoughtful decisions (Jimmy and LI, 2003).

Also there is need for SMEs to embrace the state-of the art technologies in order to penetrate the international markets and remain competitive despite the challenges posed by globalization, liberalisation and technological changes (Sharma and Bhagwat, 2006; Dangayach and Deshmukh, 2000). This condition has forced SMEs to adopt ICTs in their business processes in order to counter the competition posed by large and multinational companies (Ramdani *et al*., 2009; Nguyen, 2009).

As the number of SMEs increases, competition also increases, which leads to a decrease in prices, customer base, or both, hence resulting to the erosion of existing profits of SMEs. SMEs tends to led to unnecessary competition, in which case SMEs are compelled to lower prices through increase promotion of their products, improving their products, adding new distribution channels and enhancing internal process by adopting ICTs in their business (UNDP, 2007). ICTs tools are said to play an important role in SMEs by creating business opportunities and cut down costs by improving internal processes and products through faster communication with customers in promoting and distributing products through online network systems.

The availability of human capital within and outside the organisation is a driving force in ICTs adoption in SMEs.The human capital availability acts as facilitating factor in ICTs adoption by SMEs. The availability of educated human capital with the required ICTs skills tends to act faster and they are more receptive to new ideas and techniques (Pavic *et al.,* 2007). This has encouraged SMEs to purchase and implement new systems which enable SMEs to cope with new idea and technologies. The workforce age has also contributed to ICTs adoption in SMEs. For instance, youth's flexibility in implementing new ideas, concepts and technologies has

accelerated ICTs adoption by SMEs. In addition, the younger workforce, managers are known to be enthusiastic towards ICTs adoption in their business. In addition, a better educated employee tends to create the flexibility needed to ICTs adoption and innovation (Roffe, 2007; Mohamad and Ismail, 2009).

SMEs have unique characteristics such as limited resources and firm dependency on few key personnel which creates a big challenge to the development and implementation of ICTs. SMEs which have adequate financial resources are more likely to adopt ICTs in their business because these SMEs are in a position to meet huge expenses involved in ICTs adoption (Moriones and Lopez, 2007; Mohamad and Ismail, 2009:4). SMEs owners/managers who have positive attitude towards innovative and knowledgeable about Information Technology (IT) are likely to adopt ICTs in their business and vice versa (Nguyen, 2009). Indeed, owners/ managers who are in position to recognise opportunities and threats in their environment especially in choosing the market target are in position to develop appropriate strategies to retain and increase their market share by adopting ICTs in their business to access to local and global market. However, large volume of information intensity will tend to compel SMEs owner/managers to adopt ICTs to assist in management and operational control.

Furthermore, in this era of globalisation SMEs are compelled to adopt ICTs in their business so that they would be in a position to serve their customers better, develop ways to integrate suppliers and change their operational process. In some SMEs where quality control is taken seriously at each stage of process, ICTs tools adoption is critical to ensure quality output of their final product. Similarly, issues of International Standards Organisation (ISO 9001) have also compelled SMEs to adopt ICTs in their business to ensure quality products. In addition, firms which have quality products offerings have a positive impact on ICTs adoption in their business (Hughes *et al.,* 2003). Decentralisation of SMEs activities compels SMEs to adopt ICTs in their business to facilitate the process of communication in organisation (Moriones and Lopez, 2007; Nguyen, 2009).

ICTs tools

There are a variety of ICTs tools used by business enterprises which includes Microsoft Office applications, computers, internet, e-mail, telephones, fax machines; photocopiers, printers, and websites (Raymond *et al.,* 2005:108; Mutula and Brakel, 2006:409;Chiware & Dick,2008).

METHODOLOGY

Research strategy and the survey instrument

To achieve the objectives of the current study cross-sectional survey research strategy was used and this design has been used in previously related studies (Chiware and Dick, 2008; Maguire, *et al.*, 2007; Sharma and Bhagwat, 2006; Vachara and Derek, 2006; Martin and Matlay, 2001).

The survey instrument was developed based on previous empirical work experiences in both developed and developing economies (Neuman, 2000). The questionnaire was divided into four sections with distinct constructs. Section 1 consisted of respondent's demographics, section 2 business profiles, section 3 drivers for ICTs adoption and section 4 ICT tools commonly used. The items in each construct were measured on a 5 point Likert- Scale (5-strongly agree to 1-strongly disagree).

Four hundred and fifty questionnaires were distributed to SMEs sample of the study. The strategy adopted to collect data was of 'drop and pick' questionnaire later. The questionnaire was first pilot tested with a group of ICT experts and SME owner / managers to clarify wording of question items and variables to help enrich the questionnaire for its validity and reliability before its final distribution. Their comments and suggestions were incorporated before final distribution of the questionnaire. In addition, Cronbach's Alpha coefficient was used to ensure internal consistency of the responses and factor analysis was used for reduction and summation of data.

Sampling design

To achieve the objectives of the study a stratified-random sampling was used. Stratified -random sampling was used to allow the researchers to obtain higher degree of representativeness of the SMEs in the two sub sectors of SMEs namely metal and fabrication and furniture and wood thus reducing the probable sampling error (Ghauri and Gronhaug, 2005; Welman et al., 2005; Saunders et al., 2007).

Data analysis

Data was analyzed by the use of SPSS 18.0 (statistical package for social sciences) software. Later on it was cross-tabulated for ease in interpretation.

FINDINGS AND DISCUSSION:

Demographics of the respondents

The results of the demographics of respondents are presented in Table 1 and show that in total there were 380 respondents, 74 percent (n=280) were males and 26 percent (n=100) females respectively. The majority of the respondents were in the age group of 26-35 years 45 percent

(n=172) and 26-45 years, 23 percent (n=86). Holders of Kenya Certificate of Secondary Education (KCSE) were 38 percent (n=143) and diploma 26 percent (n=98). This clearly demonstrated that the majority of respondents who operate the Small Medium Enterprises have Kenya Certificate of Secondary Education and they understand the need of using ICTs tools in their business. Furthermore, the respondents who have experience in business for a period of 1-5 years were 42 percent (n=157) and 6-10 years, 41 percent (n=154) respectively.

Table 1: Demographics of Respondents

Item	**Frequency**	**Percent**
Gender		
Male	280	74
Female	100	26
Total	**380**	**100**
Age		
18-25 years	90	24
26-35 years	172	45
over 36 years	118	31
Total	**380**	**100**
Experience in business		
1-5 years	157	41
6-10	154	41
11-15	49	12
16-20	14	4
Over 20 years	6	2
Total	**380**	**100**
Academic qualification		
KCPE	59	16
KCSE	143	38
Diploma	98	26
Degree and others	80	20
Total	380	100

Business profile

The profile business result is presented in Figure 2. The findings indicated that the majority of the business surveyed are owned by sole proprietor ownership 60 percent (n=233) followed by partnership ownership 29 percent (n=108). In addition, Small Medium Enterprises surveyed were classified into two strata's that is Metal and Fabrication, and Furniture and Wood. The results indicated that most of the respondents were from Furniture and Wood sub- sector were 63 percent n=241) and metal and fabrication were 36 percent n=136). Thus, majority of Small Medium Enterprises surveyed was Wood and furniture and this showed that most of the respondents were operating business of furniture and wood than metal and fabrication. Age of the business existence in business indicated that most of SMEs investigated have been in business for a period ranging from 1- 5 years 44 percent n=166) and 6-10 years, 34 percent (n=127). This demonstrated that the business investigated have either used one or more of ICTs tools.

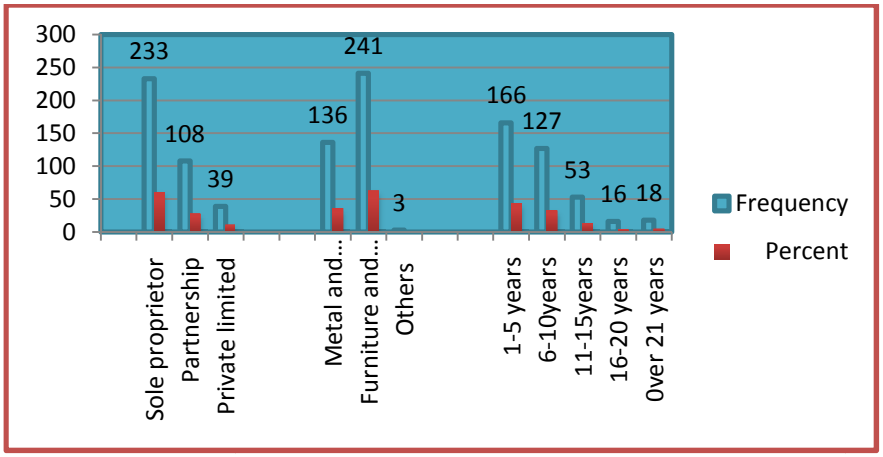


Figure 2: Business Profile

Drivers of ICTs adoption in SMEs

SMEs are influenced to adopt ICTs in their business because of external and internal drivers. The empirical findings are presented in Table 2. The factors which have influenced ICTs adoption in SMEs were analyzed and tested using exploratory principal component analysis with Varimax rotation. This was done in order to identify the meaningful factors which have influenced ICTs adoption in SMEs. The individual items were selected for elimination using a number of criteria: (1) A two constrained factor solution was extracted (ii) factor loading of .30 or more on a particular factor are retained (iii) only factors greater than .30 and more were

retained because they seemed critical drivers for ICTs adoption in SMEs. The two factors emerged the analysis namely internal and external explained the total variance of 61.4 percent.

Then, reliability test of the items representing the factors which have influenced the ICTs adoption in SMEs was tested using Cronbach's Alpha. The reliability test shows the following Cronbach's values: *External drivers (*α =93) and *Internal drivers* (α=.81). Hence, the Cronbach's Alpha ranging from .60 to 1 is considered reasonable.

The driver which has influenced ICTs adoption by SMEs is pressure from competitors (Mean 3.78). This clearly demonstrated that SMEs are compelled to adopt ICTs in their businesses to compete with other business in the environment in this era of globalisation. The finding is consistent with Mohamed and Ismail (2009) who argued that SMEs are greatly compelled to adopt ICTs because of pressure from competitors, management characteristics, perceived usefulness and top management commitment. Pressure from SMEs associations was rated as the second driver which has influenced ICTs adoption in SMEs (Mean 3.3). Other external factors which have influenced ICTs adoption in SMEs include pressure from the trade unions, customers, and government and trade associations.

The internal factors which have influenced ICTs adoption in SMEs as rated by most of the respondents were to improve customer services (Mean 4.6). Thus, businesses which are continuously improving their customer services are in the position to survive and grow in this era of globalisation. To increase sales and pressure from staff with means score of 4.5 and 4.6 respectively were rated as the drivers to ICTs adoption by SMEs. These findings are consistent with Bocquet and Brossard (2007) who argued that SMEs adopt ICTs in their business because of customer's demand, strategy to increase sales and to improve quality and costs.

Table 2: Results of an Exploratory Factor Analysis on Drivers of ICTs adoption by SMEs

	Component					
Items	Factor loading	Percent of variance **61.4**	Means(S.D)	Corrected Item-Total correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Factor1:External Drivers		**43.5**				**.93**
Pressure from Government	.92		2.8 (1.5)	.88	.90	
Pressure from the unions	.92		2.9 (1.4)	.87	.90	
Pressure from Trade associations	.91		3.0 (1.6)	.86	.90	
Demands from SMEs associations	.86		3.3(1.4)	.79	.91	
Customer demands	.81		3.2(1.3)	.77	.92	
Pressure from competitors	.60		3.7(1.2)	.55	94	
Factor 2: Internal Drivers		**17.9**				**.81**
Increase sales	.79		4.5(.84)	.64	.77	
Improve customer services	.78		4.6(.70)	.60	.78	
Pressure from staff	.76		4.5(.76)	.58	.78	
Improve relations with other business partners	.64		4.2(.92)	.59	.78	
Cost reduction	.63		4.4(.79)	.54	.79	
Develop new markets	.54		4.3(1.0)	.45	.81	
Growth of business	.51		4.3(.83)	.48	.80	

ICTs Tools Commonly Used

To address the objective of ICTs tools commonly used by SMEs the means and frequencies were used to analyse data. The results are presented in Table 3. Majority of the respondents (79percent) agreed that mobile phones were mostly used with a mean score of 4.53. This demonstrated that SMEs use mobile phones than others ICTs tools. The finding is consistent with (Tilvawala *et al.,* 2009) who argued that the fast growing and most popular ICTs use in SMEs in Kenya is mobile phones. Personal computers were ranked second ICTs tools used by SMEs as supported by (46percent) of respondents with an average score of 3.50. The findings is consistent with (Syed and Mohd, 2009; Chiware and Dick, 2008) who argued that SMEs used personal computers to improve their business competitiveness and operations.

Table 3: ICTs Tools Used by SMEs

	Percentages					
ICTs tool	**Most used**	**Used**	**Sometimes used**	**Least used**	**Not used at all**	**Mean (SD)**
Personal computers	46	16	5	9	24	3.50(1.68)
Laptops	28	19	7	14	32	2.97(1.65)
Fax	21	12	6	12	49	2.44(1.65)
Printer	37	12	6	13	32	3.10(1.73)
Photocopier	38	14	12	13	23	3.29(1.63)
Mobile phones	79	10	3	2	6	4.53(1.09)
Internet	40	9	5	17	29	3.13(1.73)
Website	31	9	4	12	44	2.73(1.77)
Landline telephones	29	13	9	14	35	2.86(1.67)
Telex	17	10	7	16	50	2.31(1.56)
Scanner	22	9	9	14	46	2.48(1.64)
Typewriter	26	9	7	16	42	2.59(1.67)

Note: 5= most used; 1 = not used at all

CONCLUSION AND IMPLICATION OF THE STUDY

There are several drivers which have influenced ICTs adoption by SMEs. These drivers are categorised into internal and external. With respect to external factors, pressure from the competitors is considered as a major driver for ICTs adoption by SMEs. Similarly, internal factors such as to increase sales, customer demands and improving customer services are perceived as drivers of ICTs adoption in SMEs. Generally, internal drivers seem to be more influential than external drivers. The ICTs tools commonly used by SMEs are mobile phones, personal computers and photocopier machines.

The study has laid a foundation for future researchers who would like to have a holistic view of the drivers of ICTs adoption by SMEs. In addition, academicians, researchers, consultants, policy makers, ICTs experts and graduate students may use the findings of this study as additional literature on ICT adoption by SMEs in the third world. This research will provide an opportunity to owner/ managers to do self assessment on the various aspects of drivers of ICTs adoption in SMEs and appreciate the role played by ICTs adoption in SMEs.

The research used cross-sectional survey and hence a longitudinal study may be necessary to help validate the findings. In addition, the study focused on limited geographical regions and therefore, it becomes difficult to generalize the results of the study to other Kenyan regions which were not part of the study. There is need for a comparative analysis of various sub- sectors under SMEs so that one can have a holistic view of ICTs adoption (regions, industries). Finally, the study also focused on two sub- sectors of SMEs that is furniture and wood and metal and fabrication which does not comprise all sectors in SMEs and therefore, need to investigate all SMEs sectors to have an overview on ICTs adoption in SMEs.

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