

FACTORS AFFECTING ICT ADOPTION IN SMALL AND MEDIUM ENTERPRISES IN THIKA TOWN, KENYA

Lazarus N. Nduati

Master of Science in Entrepreneurship
Jomo Kenyatta University of Agriculture and Technology

Dr. Kepha Ombui

Project Supervisor
Jomo Kenyatta University of Agriculture and Technology

Dr. Assumptah Kagiri

Project Supervisor
Jomo Kenyatta University of Agriculture and Technology

CITATION: Nduati, N. L., Ombui, K., & Kagiri, A. (2015). Factors Affecting ICT Adoption in Small and Medium Enterprises in Thika Town, Kenya. *European Journal of Business Management* 2 (3), 395-414

ABSTRACT

Entrepreneurship is increasingly recognized as an important driver of economic growth, productivity, innovation and employment, and it is widely accepted as a key aspect of economic dynamism. Transforming ideas into economic opportunities is the decisive issue of entrepreneurship. History shows that economic progress has been significantly advanced by pragmatic people who are entrepreneurial and innovative, able to exploit opportunities and willing to take risks (Hisrich, 2008). It makes sense therefore to conclude that, throughout the world entrepreneurship is the tap root from which Small and medium enterprises (SMEs) emerge, converting later to big enterprises in the world today. The rapid development of information and communication technologies (ICT) which changes the existing business structures and ways of communication extremely influence metamorphosis and the growth- spread of SMEs. It is known that the adoption and use of ICT represents fundamentals of competitiveness and economic growth for companies, organizations and even countries that are able to exploit them. (Steinfeld, LaRose& Chew, 2012). Inevitably, the turbulent digital business environments in which small and medium-sized enterprises (SMEs) operate from necessitate SMES to adopt ICT in an effort to develop series of competitive activities required to generate a superior firm performance. ICT can play a very important role because it can help SMEs both create business opportunities and combat pressures from competition. Therefore Adoption of ICT can help SMEs cut costs by improving their internal processes, improving their product through faster communication with their customers. In retrospect, even with such information as indicated above, and the importance of ICT as an enabler to other sectors and to economic development having long been recognized, SMEs seem slow in

its adoption and use as compared to other sectors. While there has been growth in ICT use by large enterprises to gain a competitive edge, there is little evidence of its adoption and use by SMEs which continue to be faced by limited access to information and markets. As a result of this phenomenon, the study into deterrents of ICT adoption by SMEs is warranted.

The study sought to investigate factors affecting the ICT adoption in small and medium enterprises in Thika Town, Kenya. The study adopted a descriptive research design where the population of interest in the SMEs was visited. This study employed stratified random sampling technique, the target population for the study being SMEs entrepreneurs within Thika town area. The specific objectives of the study was, to investigate the influence of cost on ICT adoption in small and medium enterprises in Thika town; to find out the influence of skills development on ICT adoption in small and medium enterprises in Thika town; to determine the influence of Infrastructure on ICT adoption in small and medium enterprises in Thika town and to establish the influence of administrative support on ICT adoption in small and medium enterprises in Thika Town. The researcher used a questionnaire as the primary data collection instrument. The questionnaire was designed to give a brief introduction and was divided into sections representing the various variables adopted for study. The questionnaire designed by the researcher based on the research questions, adopted pilot testing to refine the questions before the questionnaire could be administered to the selected sample. The findings were presented using tables with Likert scales being used to analyze the mean score and standard deviation. Percentages, tabulations, means and other measures of central tendencies were used to present the data. The study affirmed that, development of ICT was very important in the running of small and medium enterprises and that most traders in the area studied had basic level skills in ICT which according to the study acts as a lid in hindering adoption of ICT in business running processes. Cost of computer software and other ICT equipment, administrative support, managerial, high cost of network and Internet are factors that were found to have heavily negated adoption of ICT into SMEs.

Key words: *ICT adoption, Small and Medium Enterprises, Thika Town, Kenya*

INTRODUCTION

Adoption of ICT is considered to be a means to enable businesses to compete on a global scale, with improved efficiency, and closer customer and supplier relationships. (Steinfeld, LaRose & Chew, 2012). It is therefore agreeable that SMEs should consider information and communication technology (ICT) as an important approach in business to take competitive advantage from the global markets. Moreover, ICT is a resource of SME which may help them to access information in order to enhance its competitiveness. (Swash, 2008) Today's business world has been deeply influenced by (ICT) and the adoption of ICT among business is widespread. Adoption of ICT in business management is rapidly changing global production, work, business methods and trade and consumption patterns in and between enterprises and consumers.

Information and Communication Technology (ICT) can play a very important role because it can help SMEs both create business opportunities and combat pressures from competition (Swash, 2008). Adoption of ICT can help SMEs cut costs by improving their internal processes, improving

their product through faster communication with their customers, and better promoting and distributing their products through online presence. In fact, ICT has the potential to improve the core business of SMEs in every step of the business process. Many organizations of all types are currently adopting Information and Communication Technology (ICT) around the globe, not only for cutting costs and improving efficiency, but also for providing better customer services. The effective adoption of ICT remains at central stage in facilitating the change and growth of enterprises. Many small and medium enterprises (SMEs) consider the creative use of ICT as a key enabler to their development. However, as the global economy became increasingly reliant on ICT to receive, process, and send out information, the small businesses within the developing countries which form a significant portion of their developing economies have yet to reap these benefits evenly. This is because obtaining such opportunities rests largely upon the ability of SMEs to engage in the regional and global economic business networks which, in turn demand provision of a prerequisite level of access to and use of ICT (Dixon *et al*, 2012). Unless these prerequisites are in place, these SMEs are set to lose out on opportunities to integrate into the global supply chain bid, for outsourcing businesses, and increase their internal productivity and efficiency. ICT can improve business competitiveness with internet providing numerous opportunities for SMEs to compete equally with large corporations. As the world economy continues to move toward increased integration as a result of advances in ICT, and the increasing reduction in trade barriers, some of the greatest opportunities for SMEs will derive from ICT is their ability to participate in the regional and international markets. It is therefore surprising that evidence relating to ICT adoption by SMEs suggests a slow response and limited progression (Small bone et al, 2011; Dawn et al, 2012). The expectation that SMEs might progress like large organizations in ICT adoption has not been the case (Mpofu, C., 2007).

Small and Medium Enterprises and ICT Adoption

ICT refers to the range of technologies for gathering, storing, retrieving, processing, analyzing and transmitting information (Ritchie & Brindley, 2009). ICT is viewed as a key driver of productivity, growth and economic progress and is an essential component in the pursuit of a high value, knowledge based economy. It can improve efficiency and increase productivity through; improving resource allocation, reducing transaction costs and enabling technical improvement, leading to the outward shift of the production function (GOK, 2006). Small and Medium Enterprises (SMEs) are firms whose personnel numbers fall below certain limits. The abbreviation "SME" is used in the European Union and by international organizations such as the World Bank, the United Nations and the World Trade Organization (WTO, 2013). European Union (2011) classified a business with a headcount of fewer than 250 employees as a medium-sized; a business with a headcount of fewer than 50 employees is classified as small, and a business with a headcount of fewer than 10 employees is considered micro business.

The significance of ICT to SMEs being a critical pillar, the adoption of ICT is expected to be an important factor for competitive growth of SMEs in global and regional markets. Growth of competitive pressure force SME to fight for new markets, new products and new distribution channels (Minton, 2013) and ICT adoption acts as the bridge through which to these achievements can be accessed. UNDP (2013) affirms this position by observing that these environmental movements can be alleviated from those businesses that have quality information systems support. Quality information systems support begets competitive advantages for SMEs and helps them in

their process of innovation and ability to derive value from information as resource (UNDP, 2013). Furthermore, it is claimed that through the use of ICT, SMEs can gain from developing capabilities for managing, information intensive resources, enjoy reduced transaction costs, develop capacity for information gathering and dissemination of international scale and gain access to rapid flow of information (Minton, 2013). New business models and market configurations enabled by information technology, including business process outsourcing, provide SMEs with access to new market and new sources of competitive advantages.

Literature Review

The literature reviewed was intended to help in identifying gaps in knowledge in order to create a framework and direction for new research. The review incorporated a theoretical review, conceptual framework, and empirical review that was used in the study. The review identified research gaps and areas that have been recommended for further research.

Theoretical Review

Kirzner's 'alert' Theory of Entrepreneurship

Kirzner (1967) focused on answering the question on whether a market economy works and if it does, what would be the process that leads the economy towards equilibrium. Kirzner (1967) further observed that initially the economy is in disequilibrium and the competition among 'alert' entrepreneurs leads to equilibrium and that markets are not always clear. There is no perfectly informed representative agent and for change to occur the entrepreneurs need incentives and this incentives comes from the difference among agents in terms of information and knowledge.

According to Kirzner (1973), an improvement in the technique of production or shift in preferences leads to change (disequilibrium) in the market where initially there was equilibrium. If there is equilibrium in the market there is nothing for the entrepreneurs to do and no exchange and profit opportunities for them since everybody will be able to carry out his initially determined exchange plans. But whenever the change has occurred, some planned activities will not be realized. Kirzner (1982) states there is no room for entrepreneurial discovery and creativity: the course of market events is foreordained by the data of market situation and for the system to create profit opportunities for entrepreneur there is need for an exogenous shocks constantly hitting the economy.

For Kirzner (1993), understanding the role of the entrepreneurs is essential to understanding how errors get corrected in the market and understanding the role of alertness is essential to understanding how it is that entrepreneurs come to identify these errors. As he explains, in the world where knowledge is necessarily dispersed and individuals are necessarily ignorant of all changes that occur in markets, alert entrepreneurs discover profit opportunities (i.e. opportunities to buy at low price and sell at a high price) and thus drive the market process toward equilibrium. The above instigates the second research question (Kirzner, 1993).

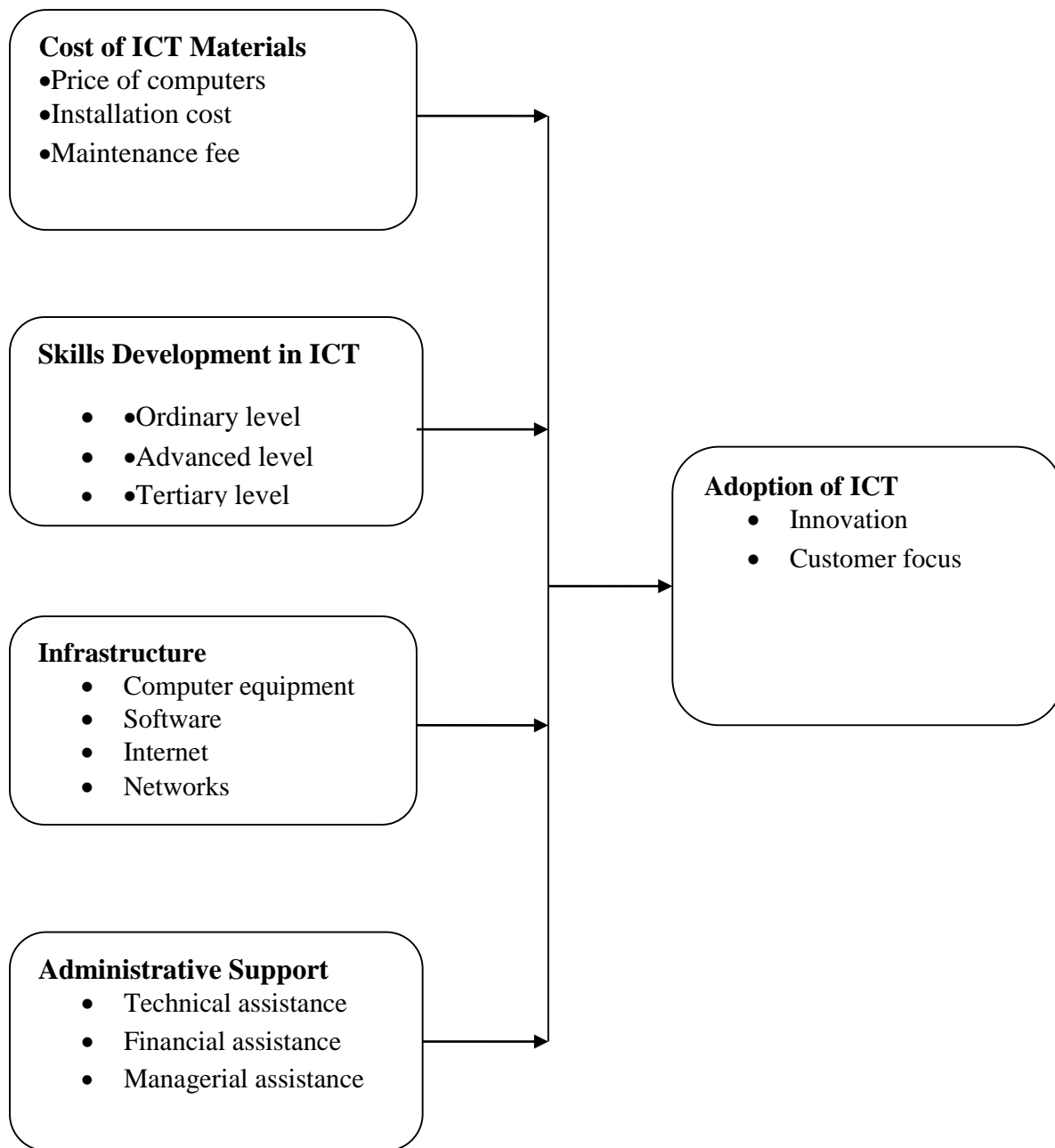
Schumpeterian Theory of Innovation

Schumpeter distinguished innovation as the function of the entrepreneur, since there has been the “unfortunate” discontinuity between the orthodox microeconomics and the Schumpeterian entrepreneurship. Today, entrepreneurs are powerful players in the global markets, their innovation is the seed bed of SMEs and by extension, large enterprises employing millions of people today. Because enterprises dominate the global markets of commodities, they can collectively determine the rules of the game in the core market segments and therefore the global economy is in expansion. We need new radical innovation and, thereby, constructive economic growth.

Schumpeter (1949) termed these entrepreneurial innovations “New Combinations” (Ibid.). Since tradition and routine stifled change, Schumpeter held that innovations tend to be undertaken by new firms. Thus in Schumpeter’s theory of innovation, entrepreneurial changes in business activity created an environment conducive to further change. Innovations were copied, applied in similar and related lines, and even transferred to other non-related fields. Through this widespread entrepreneurial copying, significant innovations transformed entire sectors of the economy. One consequence of extensive imitation was “that innovations do not remain isolated events, and are not evenly distributed in time, but that on the contrary they tend to cluster, to come about in bunches, simply because some, and then most, firms follow in the wake of successful innovation”(Ibid). The result, the Austrian economist concluded, was that innovation pushed capitalist economic development forward not evenly, but rather “by jerks and rushes.” It was “a distinct and painful process” (Ibid).

Conceptual Framework

The relation between variables in the study, also known as conceptual framework (Bogdan, R. C., and Biklen, S. K. 2006) was used to show the relationship graphically or diagrammatically. It is made of the dependent and independent variables. The dependent variable in this study is the ICT Adoption in SMEs. The independent variables of this study include Cost of ICT materials, skills, Infrastructure and administrative support. The relationships are presented in a hypothetical framework shown in Figure 2.1



Independent Variables

Dependent Variable

Figure 1.1: Conceptual Framework

The cost factor was studied by various Information System (IS) researchers like (Seyal and Rahim, 2006) who found direct and significant relationship between cost and adoption of technology. The lower the cost of adoption the higher the new innovation such as ICT will be adopted by a firm and vice versa. According to MacGregor et al (2006), small business tends to avoid ICT into their

business, if it is seen as complex to use. This is not surprising because SMEs always lack skills amongst workforce to use ICT (Spectrum, 2007). Elsewhere, Paul and Pascale (2007) study reveals that ICT adoption in SME depends on the CEO/Owner being the ICT decision-maker and therefore, lack of knowledge-based entrepreneurs hinders or prevents technology adoption if the owner believes that this technology can only be employed using specialist staff. James, (2012) observes that availability of ICT infrastructure contributes significantly to the adoption of ICT in SME, because if there is proper policy for telecommunication equipment and services in the country there will be increase in the usage of ICT in SMEs. Also high cost of computer equipment, which constitute the core ICT infrastructure for example internet facilities and other ICT equipment affect the adoption of ICT by SMEs. (Harindranath et al 2008). The importance of subscribing to high-speed broadband internet connection is amplified by Harindranath et al (2008) who observe that other studies like for example, in a recent survey of SMEs in the UK, 78% of SMEs use internet in their business. Use of internet as a business tool avails a sound platform of using ERPs for business' process automation. Administrative support in the context of ICT refers to the presence of encouraging staff to adopt ICT. In this study, administrative support refers to the help and guidelines given out by administrators in institutions to aid in integration of ICT into the program. Sife et al (2007) agrees that administrative support is critical to the successful integration of ICTs into learning processes. It can therefore be argued that administrators can provide the conditions that are needed, such as putting in place an ICT policy, incentives and resources. Sife et al (2007) adds that, for the adoption of ICTs to be effective and sustainable, administrators must be competent in the use of the technology, and they must have a broad understanding of the technical, pedagogical, administrative, financial, and social dimensions of ICTs in institutions.

Critique of the Existing Literature Relevant to the Study

Several studies have attempted to relate adoption of ICT in SMEs as a catalyst for increased performance and profitability. However Lal (2007) observes that increased use of ICT in enterprises, leads to a substitution of ICT equipment for other forms of capital and labor which in retrospect may negatively affect return on investments for the same enterprises. Ritches & Brindley (2005) agree that application of the new information and communication technologies, and especially the Internet, offer increased effectiveness, for they encourage and facilitate direct contacting between trade partners. In retrospect, only SMEs with high turnover tend to afford reliable internet connectivity. Elsewhere, Peansupap and Walker (2005) observe that usage of advanced ICTs presupposes as a necessary condition, a reliable technical equipment and infrastructure. Coincidentally, SMEs faced with remote access to credit cannot afford the equipment and infrastructure.

There is unanimous agreement by researchers that adoption of ICT by SMEs promotes business linkages. However, SMEs usually face a comparatively uncertain environment and entrepreneurs often have a short-term time horizon. Paul and Pascale (2007) study reveals therefore that the decision to implement ICT depends on the intuition of the entrepreneur which is subject to his training and experience as well as to his optimism or pessimism making ICT adoption not an obvious option for some SMEs. Moreover, SMEs rely much more on informal information systems than larger enterprises. To get the relevant information that is needed for a rational decision is not costless especially as in SMEs usually there is only one decision maker – the owner/manager – who's personal resources (time, knowledge, capabilities) are restricted.(Paul and Pascale, 2007)

A survey by Reynolds (2012) observed that as information becomes more important and therefore more advanced, ICT adoption can be helpful for building business linkages. However, lack of finance for SMEs is a major constraint where some SMEs cannot afford to buy a computer let alone make efficient use of it in the short run or even medium term. There is also some evidence that performance of SMEs is related to ICT adoption (Tusubira and Mulira, 2008). However it is not the investment in the technology alone but the combination with other technologies and especially relevant skills that make ICT work.

According to MacGregor et al (2006), flexibility is considered to be a major source of competitiveness for SMEs compared to larger enterprises. The use of ICT could on one hand increase the competitiveness of SMEs as they enable the creation of more flexible links with trading partners because of faster and more reliable communication channels. On the other hand ICTs could help bigger enterprises to increase their flexibility through a restructuring of the organization which will enable them to adapt quicker to changing conditions. Therefore the competitive advantage of SMEs could also decline (Sife et al 2007).

Drawing from such array of conclusions, and considering that such studies above were concerned with problems influencing ICT adoption in general, and where population studied was different there was found an existing a gap for this study to close by investigating problems affecting ICT adoption in small and medium enterprises in Thika town. The study investigated the extent to which cost of ICT materials, administrative support, skills development in ICT and infrastructure affect the ICT adoption in small and medium enterprises in Thika town, Kenya.

Research Gaps

The foregoing discussion on ICT adoption shows clearly that most of the studies on ICT adoption among SMEs have been done in the developed world while studies in developing countries such as Kenya, research on factors hindering ICT adoption in SMEs is still limited or not done at all at the time of this study. Given the increasing importance of ICT and the government's increasing urge to automate its services, ICT adoption among SMEs will be the key to the growth of this vibrant sector. However, it is also notable that the Government of Kenya has not explicitly focused on ICT adoption by SMEs in the non-ICT sectors. The Government of Kenya seem to be either focused on growing ICT sector, facilitating quick and wide tax capture through online platforms, or the growth of SMEs, but not well focused on integrating the three areas to implement broad-based policies. It is agreeable then that most of the micro and small enterprises in Kenya may have vague idea of the value of ICT but lack the capability or skills to adopt them. While much research has been done on the small businesses, none has investigated factors affecting the ICT adoption in small and medium enterprises in a fast growing town like Thika town, Kenya. The study therefore focused on the factors affecting the ICT adoption in SMEs in a modest attempt to bridge this gap.

Research Design and Methodology

The study adopted a descriptive research design where the population of interest in the SMEs was visited. The design deemed appropriate because the main interest was to investigate factors affecting the ICT adoption in small and medium enterprises in Thika Town.

Descriptive design method provided quantitative data from a cross section of the chosen population. The visit to population of interest was done to administer questionnaires which were used to collect necessary data from the respondents. According to Kothari, (2008) the descriptive research collects data in order to answer questions concerning the current status of the subject under study. The target population for this study was SMEs entrepreneurs who are within Thika town area. According to data that was available in Thika town Sub County, (2012) there are 1,860 SMEs within Thika town area. Therefore the study targeted all the 1,860 SMEs within Thika town area. To obtain a sample size, the following formula, according to (Mugenda and Mugenda, 2003) was used

$$n = \frac{n_f \cdot N}{1 + n_f/N}$$

Where: n_f = the desired sample size when the population is less than 10,000

n = the desired sample when the population is more than 10,000

N = the estimate of the population size

$$n_f = \frac{384}{1 + 384/1860} = 318$$

The result was a sample size of 318 respondents

To constitute a homogenous group, the study applied stratified sampling techniques where 17% of the population in each sampling frame was selected to participate in the study. For the exact individuals to participate in the study, the researcher used simple random sampling technique as it offered every member of the population an equal chance of being included in the sample. The result is shown in Table 3.2.

SME Category	Target population	Percentage%	Sample size
Manufacturing	223	17%	38
Trade	1023	17%	175
Services	614	17%	105
Total	1860	17%	318

Table 3.2: Sample size

According to Sekaran (2010), questionnaires can be used for both descriptive and explanatory research. Therefore, questionnaires were used as the primary data collection instrument. The questionnaires were self-administered through drop and pick method to the owner-managers of the selected SMEs. Research assistants were used to assist in gathering the information. A pilot test was conducted to detect weakness in design and instrumentation and to provide proxy data for selection of a probability sample. A pilot group of 31 individuals were picked from the target population to test the research instruments which represent 10% of the target population. To assert validity of the instruments, expert opinion was requested to comment on the representativeness and suitability of questions and suggestions of corrections made to the structure of the research tools. Moreover, to establish validity of the research instrument the researcher sought opinions of experts in the field of study. This helped to improve the content validity of the data that was collected. It also facilitated the necessary revision and modification of the research instrument thereby enhancing validity. The researcher selected a pilot group of 31 individuals from the target population to test the reliability of the research instruments. In order to test the reliability of the instruments, internal consistency techniques were applied using Cronbach's Alpha. The alpha value ranges between 0 and 1 with reliability increasing with the increase in value. Coefficient of 0.6-0.7 is a commonly accepted rule of thumb that indicates acceptable reliability and 0.8 or higher indicated good reliability (Mugenda, 2008). Before processing the responses, the completed questionnaires were checked for completeness to ensure consistency. Data was then coded to enable the responses to be grouped into various categories.

Descriptive data was analysed by use of arithmetic mean and standard deviation. The Likert type scale was used using a scale of SD – Strongly Disagree; D – Disagree; N – Neutral; A – Agree; and SA – Strongly Agree as recommended by Alan (2001). During analysis of data collected by Likert scale, according to Carifio and Rocco (2007), Strongly Disagree (SD) $1 < SD < 1.7$; Disagree (D) $1.8 < D < 2.5$; Neutral (N) $2.6 < N < 3.3$; Agree (A) $3.4 < A < 4.1$; and Strongly Agree (SA) $4.2 <$

SA < 5.0. These propositions were followed in data analysis in this study in the interpretation of descriptive data obtained by use of Likert scale.

In addition, a multiple regression analysis was conducted in order to determine factors affecting the ICT adoption in small and medium enterprises in Thika town. The STATA analytical software was used for this purpose. Regression analysis was used to predict the value of the dependent variable on the basis of the independent variables. The multivariate regression equation was;

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$$

Whereby **Y** =ICT Adoption in SMEs
 X₁ =Cost of ICT Materials
 X₂ =Skills Development
 X₃ =Infrastructure on ICT
 X₄ =Administrative Support
 ε = Error term/Erroneous variables

Data presentation was done by the use of percentages and frequency tables. This ensured that the gathered information is clearly understood.

Research Findings and Discussions

A randomly selected sample of 318 respondents was chosen and a questionnaire was used to collect the data. A total of 213 responses were received, representing a 67% response rate.

To obtain demographic information of the respondents, data was sought on whether respondents were males or females. This was done to ascertain that respondents were normally distributed between the two genders because in this study, none of the gender was given preferential consideration in the selection of respondents. Additionally, respondents were asked to indicate their age bracket. Age was not a consideration in the selection of the respondents in this study. Thus, this question helped to ascertain that the ages of respondents were normally distributed. From the results 6.1 % were below 30 years old; 29.8% were aged between 31 and 40 years; 40.4% were aged between 41 and 50 years while 23.7% were aged between 51 and 60 years old. The respondents were further asked to indicate their age bracket. Age was not a consideration in the selection of the respondents in this study. Thus, this question helped to ascertain that the ages of respondents were normally distributed. From the results 6.1 % were below 30 years old; 29.8% were aged between 31 and 40 years; 40.4% were aged between 41 and 50 years while 23.7% were aged between 51 and 60 years old.

To determine the influence of cost of ICT materials on adoption of ICT in small and medium enterprises, a five point likert scale was used where 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree. Five items were developed to measure the extent of this relationship. Composite Mean was 3.57863 and Composite Standard Deviation was 0.42134. The study also sought to establish whether a majority of traders have no or limited access to ICT technological tools. The mean score was 3.50731 while the standard deviation was 0.4595077. This result indicates that the majority of the respondents agreed that a majority of traders have no or limited access to ICT technological tools. Additionally the study sought to establish whether the cost of adopting and accessing ICT is high. The mean score was 4.868421 while the standard deviation was 0.3395249. This result indicates that the majority of the respondents strongly agreed that the cost of adopting and accessing ICT is high. This observation agrees with Farrell, (2007) who asserts that SMEs have tried to integrate ICT into business environments, but they have faced a problem of high costs in purchasing ICT tools and maintenance. The view by Ernst and Young, (2011) is also supportive of this findings as they emphasize that the cost of ICT materials is an important factor in the adoption and utilization of ICT where the higher the cost of ICT materials, the slower the pace of adoption. From the foregoing, we can agree with a research done by NSDC, (2009), where it was observed that implementation of ICT in an enterprise calls for a sound financial management for the SMEs to be able to afford the costs involved therein.

The study also sought to establish whether there is poor technological infrastructure within the country generally. The mean score was 2.482456 while the standard deviation was 0.4820163. This result indicates that the majority of the respondents disagreed that there is poor technological infrastructure within the country generally. The findings disagree with a research for example by Lal (2007) who investigated the adoption of ICT in SMEs in Nigeria and found that one of the major factors inhibiting ICT adoption, diffusion and intensive utilization is poor infrastructure.

In other findings, where the study sought to establish whether there is lack of ICT awareness and training among the SME traders, the mean score was 3.859649 while the standard deviation was 0.9395649. This result indicates that the majority of the respondents agreed that there is lack of ICT awareness and training among the SME traders. Where the study sought to establish whether ICT implementation poses language and content limitations as barriers, the mean score was 4.701754 while the standard deviation was 0.9395649. This means that the majority of the respondents strongly agreed that ICT implementation poses language and content limitations as barriers. The findings agree with MacGregor et al (2006) where it was found that small business tends to avoid ICT into their business, if it is seen as complex to use.

Where the study sought to establish whether the purchase price of ICT equipment is high, the mean score was found to be 3.938596 while the standard deviation was 1.184599. This concludes that the majority of the respondents agreed that the purchase price of ICT equipment is high. Additionally, where the study explored whether the installation cost of ICT equipment is high, the mean score was 4.036842 while the standard deviation was 0.8015762. This result therefore, indicated that the majority of the respondents agreed that the installation cost of ICT equipment is high. However, where the study sought to establish whether maintenance fee of ICT equipment is high, the mean score was 2.289474 while the standard deviation was 0.9931062. This result indicated that the majority of the respondents disagreed that the maintenance fee of ICT equipment is high. The composite mean score for these items was 3.57863 while the composite standard deviation was 0.42134. Where the study sought to

establish whether financial support influences ICT adoption small and medium enterprises, the mean score was 4.140351 while the standard deviation was .8078946. This result indicates that the majority of the respondents agreed that financial support influences ICT adoption small and medium enterprises. Additionally where the study sought to establish whether technical support influences ICT adoption in small and medium enterprises, the mean score was 3.912281 while the standard deviation was .8261372. This result indicates that the majority of the respondents agreed that technical support influences ICT adoption small and medium enterprises. Where the study sought to establish whether managerial support influences ICT adoption small and medium enterprises, the mean score was 3.64386 while the standard deviation was 1.155137. This result indicates that the majority of the respondents agreed that managerial support influences ICT adoption small and medium enterprises. The respondents were asked whether skills development influence ICT adoption in small and medium enterprises. From the responses, 81.7% indicated yes while 18.3% indicated no. The study sought to determine the effect of infrastructure on the adoption of ICT in small and medium enterprises in Thika Town. This was done by use of a five point likert scale where 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree. Five items were developed to measure the extent of this relationship. The Composite Mean was 3.792983 and Composite Standard Deviation was 0.46723

In respect to the study, the implication of this result meant that the respondents agreed that the cost of ICT materials has an effect of ICT adoption in small and medium enterprises in Thika Town. This observation is congruent to Ernst and Young, (2011) who observed that the cost of ICT materials is an important factor in the adoption and utilization of ICT.

Where the study sought to establish whether there is high cost of network and internet connectivity. The mean score was 4.429825 while the standard deviation was 0.9214196. This result indicates that the majority of the respondents strongly agreed that there is there is high cost of network and internet connectivity. Moreover, where the study sought to establish whether the cost of software is high, the mean score was 4.201754 while the standard deviation was 0.9971626. This result indicates that the majority of the respondents strongly agreed that the cost of software is high. Where the study sought to establish whether the cost of computer equipment is high. The mean score was 3.657895 while the standard deviation was 0.8289982. This result indicates that the majority of the respondents agreed that the cost of computer equipment is high and the agreement connects with Seyal and Rahim (2006) who found direct and significant relationship between cost and adoption of technology.

Regression Analysis

A moderated regression analysis was conducted to explain the effect of the factors affecting ICT adoption in small and medium enterprises in Thika town, Kenya. Regression analysis was conducted using STATA analytical software. The regression model used in this study is as shown.

ICT Adoption = f (Cost of ICT materials, skills development in ICT, Infrastructure, administrative support)

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where:

y = ICT Adoption in SMEs

X_1 = Cost of ICT Materials

X_2 = Skills Development

X_3 = Infrastructure on ICT

X_4 = Administrative Support

ε = Error term

The results arising from running an ordered Probit on STATA analysis software are presented in table 4.11

Table 4.11: Ordered Probit Results for Cost of ICT materials, Skills Development in ICT, Infrastructure and Administrative Support

Adoption of ICT in SMEs	Coef.	Std. Err.	P value
Cost of ICT Materials	-0.437253	0.7901336	0.0270
Skills Development	0.3620392	0.2896499	0.0347
Infrastructure on ICT	0.2495407	0.2953548	0.025
Administrative Support	0.5709181	0.2534523	0.0399
Composite Mean = 3.68053 Composite Std Deviation 4768			
$r = 0.3729$			

The calculated correlation coefficient shows that $r = 0.3729$. According to Shirley et al. (2005), the strength of the relationship will be considered weak for $0.1 \leq r \leq 0.29$, moderate for $0.3 \leq r \leq 0.59$ and strong if $0.6 \leq r \leq 0.9$. It can, therefore, be concluded that there is a moderate positive correlation between cost of ICT materials, skills development in ICT, infrastructure and administrative support. The p-values indicate the statistical significance of the relationship. A p-value of less than 0.05 is recommended as it signifies a high degree of confidence. With all the independent variables having $p < 0.05$, this indicates that there is a significant relationship among all the four variables with the adoption of ICT in SMEs in Thika Town. From the results, a unit % increase in cost of ICT Materials would result to 44% decrease on the ICT adoption in SMEs. Additionally, a unit % increase in skills development would result to 36% increase on the ICT adoption in SMEs. A unit % increase in ICT Infrastructure would result to 25% increase on

the ICT adoption in SMEs. Lastly, a unit % increase in administrative support would result to 57% increase on the ICT adoption in SMEs. Having the composite mean as 3.68053 and the standard deviation as 0.4768, meant that the respondents agreed that cost of ICT materials, skills development in ICT, infrastructure and administrative support had a significant influence on the ICT adoption in small and medium enterprises in Thika Town. This therefore underscores the findings of the study that all the above independent variables are important factors in the adoption and utilization of ICT in Thika Town

Summary, Conclusion and Recommendations

With 88.4% of the respondents agreeing that the cost of ICT materials affect ICT adoption by SMEs in Thika town, the study established that the cost of ICT materials is an important factor in the adoption and utilization of ICT. The findings agree with the conclusions of Ernst and Young (2011). The study also found that a majority of the respondents strongly agreed that the cost of adopting and accessing ICT is high. This finding supports that of Seyal and Rahim (2006) who found a direct and significant relationship between cost and adoption of technology. The financial capacity of an enterprise was found to have a significant effect on ICT adoption. This supports the conclusions of James (2012) who proposes that make the implementation of ICT an uphill task and almost a far-fetched dream for SMEs which are running at low profits

The respondents indicated that development of ICT was very important in the running of small and medium enterprises. The research also revealed that a majority of the respondents had basic level skills in ICT. This relates to the findings of MacGregor et al. (2006) who stressed that employees of small businesses tend to lack skills and expertise to use ICT in their businesses. Additionally, MacGregor et al (2006) found that small business tends to avoid ICT into their business, if it is seen as complex to use. This is not surprising because SMEs always lack skills amongst workforce to use ICT (Spectrum, 2007). Many small and medium enterprises (SMEs) consider the creative use of ICT as a key enabler to their development (Dixon et al, 2012).

The research findings indicate that a majority of the respondents strongly agreed that the cost of computer software is high. Respondents also agreed that the cost of computer equipment is high. This supports the findings of James (2012) who reported that high cost of computer equipment, internet facilities and other ICT equipment which form the core ICT infrastructure is also affecting the adoption of ICT by SMEs. Additionally, the respondents strongly agreed that there is high cost of network and Internet connectivity. In Kenya most SMEs have shown reluctance in subscribing to high-speed broadband internet connection due to the cost factor. This is inconsistent with other studies such as Harindranath et al (2008) who in a recent survey of SMEs in the UK, found 78% of SMEs use Internet in their business. This builds on the findings of Alberto and Fernando (2007) who argued that the adoption of ICT can improve business competitiveness with internet providing numerous opportunities for SMEs to compete equally with large corporations

84% of the respondents agreed that there is a significant influence of administrative support on ICT adoption. This is in line with the findings of Sife et al (2007) who agrees that administrative support is critical to the successful integration of ICTs into learning processes. The respondents furthermore agreed that managerial support influences ICT adoption small and medium enterprises. This supports the findings of Priscilla et al (2008) who observed that guidance from

a head of department is very important in encouraging the development of computer use for the specific subject in the teaching learning environment. The study found out that the success of integrating ICT into the job interaction among staffs depends on the support provided by the leaders of the institutions. Additionally, Sife et al (2007) adds that for the adoption of ICTs to be effective and sustainable, administrators themselves must have a broad understanding of the technical, administrative and financial dimensions of ICTs in institutions

Conclusion

The study concludes that administrative support is critical to the successful integration of ICTs into learning processes. The respondents furthermore agreed that managerial support influences ICT adoption in SMEs. The study found that the cost of computer software and other ICT equipment which form the core ICT infrastructure is also affecting the adoption of ICT by SMEs. The study also unearthed that owner/managers play an important role in decision making in SMEs. Hence it can be concluded that a number of factors that affect the adoption of ICT in small organizations relate to owner/manager characteristics. The lack of knowledge on how to use the technology and the low computer literacy are other contributory factors for not adopting ICT. From the study findings, we can allude that SME owners are concerned about a return on their investments, reluctant to make substantial investments particularly when short-term returns are not guaranteed. The findings also point to lack of awareness and uncertainty about the benefits of ICT adoption in SMEs; concerns about lack of managerial support and skills; set-up costs and pricing issues; as the most significant barriers to ICT adoption. SMEs definitely have limited resources (financial, time, personnel). This “resource poverty” has an effect on the adoption of ICT, as they cannot afford to experiment with technologies and make expensive mistakes.

Recommendations

The County government of Kiambu, in which Thika Town is located should, in collaboration with possible development partners strategize on how to cut the cost of backbone internet infrastructure, which in return will lower the cost of internet connectivity. With the current dispensation of devolved government structure where counties are putting heavy premium on developing their counties, the county government of Kiambu should hold seminars to educate traders on the merits of embracing ICT in running all small organizations. The county government can also partner with Microsoft and other ICT accredited training centers to offer skills training for SME owners at subsidized rates. Additionally, the county government can partner with Jomo Kenyatta University of Agriculture, and Technology, which is in Kiambu County to offer requisite ICT training for SME owner-managers. The study therefore recommends that county governments should come up with policies that encourage and support computerization of managerial functions for micro and SMEs.

REFERENCES

- Basu, V., Hartono, E., Lederer, A. L. And Sethi, V. (2002). The impact of organizational Commitment, senior management involvement, and team involvement on strategic information system planning, *Information and Management*, 39, 512-524.
- Bhagwat, R.; Sharma, M.K. Information system architecture: A framework for a cluster of small- and medium-sized enterprises (SMEs). *Prod. Plan. Control* 2007, 18, 283–296.
- Beheshti, H.M. (2007).The impact of IT on SMEs in the United States. *Information Management & Computer Security*, 12(4), 318.
- Benitez-Amado, J., Perez-Arostegui, M.N., & Tamayo-Torres, J., 2010b. Information technology-enabled innovativeness and green capabilities. *Journal of Computer Information Systems* 51(2), 87-96.
- Cerpa , N and Verner, J. N. (2008). Case study: the effect of is maturity on information systems a strategic planning, *Information & Management*, 34(4), 199-208.
- Dixon, T., Thompson, B. & McAllister, P. (2012). *The value of ICT for SMEs in the UK: a critical literature review*, Report for Small Business Service research programme.
- Duan, Y., Mullins, R., Hamblin, D., Stanek, S., Sroka, H., Mavhado, V. and Araujo, J. (2002). Addressing ICTs Skill Challenges in SMEs: Insights from three country investigations. *Journal of European Industrial Training*, 26 (9), 430-441.
- Dutta, S. and Coury, M, E. (2003). ICT Challenges for the Arab World”, Chapter 8, in Dutta, S.,
- Gunning, J. P. (1992). The New Subjectivist Elucidation of Entrepreneurship. *Entrepreneurship, Innovation, and Economic Change*. 1(3) 7-9.
- Heneman, R. L., Tansky, J. W., & Camp, S. M. (2010). *Human resource management practices in small and medium-sized enterprises: Unanswered questions and future research perspectives*. *Entrepreneurship Theory and Practice*, 25(1), 11-26
- Harindranath, G., Dyerson, R. and Barnes, D. (2008) “ICT Adoption and Use in UK SMEs: a Failure of Initiatives? The Electronic Journal Information Systems Evaluation Vol. 11, No. 2, pp. 91-96.
- Hisrich, R. R., Peters, M. P., & Shepherd, D. A. (2008). *Entrepreneurship*, (7th Ed). New York: McGraw Hill.
- Kapurubandara, M.,& Lawson, R. (2006). “Barriers Adopting ICT and E-commerce with SMEs in Developing Countries: An Exploratory Study in Sri Lanka”, COLLECTeR '06, 9 December, 2006.

- Kirzner, I. (1967) Methodological Individualism, Market Equilibrium, and Market Process. II *Politico*. 32: 787-799.
- Kirzner, I. (1973) *Competition and Entrepreneurship*. Chicago: University of Chicago Press.
- Kirzner, I. (1982) "Uncertainty, Discovery, and Human Action: A Study of the Entrepreneurial Profile in the Misesian System." Chapter 12 in Kirzner 's (ed.). *Method, Process, and Austrian Economics*. Lexington, Mass: D. C. Heath and Company.
- Kirzner, I. (1993). *The Meaning of the Market Process: Essays in the Development of Modern Austrian Economics*, London and New York: Routledge.
- Lal, K. (2007). Globalization and Adoption of ICTs in Nigerian SMEs, *Science, Technology Society*, 12 (2), 217-244.
- Lucchetti, R. and Sterlacchini, A. (2004). The Adoption of ICT among SMEs: Evidence from an Italian Survey. *Small Business Economics*, 23 (2), 151-168.
- Lucey, T. (2009): *Management information systems*, (9th Ed), London.
- Mabert, V. A., Soni, A. and Venkataramanan, M. A. (2006). Model based interpretation of survey data: A case study of enterprise resource planning implementations, *Mathematical and Computer Modeling*, 44, 16-29.
- Mansell, R. & When, U. (2008). *Knowledge Societies: Information technology for Sustainable Development*. United Nations Commission on Science and technology for Development, Oxford University press.
- Minton, S. (2013). *Nordic Nations still top information index*. The World Paper. Available at: <http://www.worldpaper.com> Accessed December 16, 2014
- Mpofu, C. (2007): *Government Policies on SME Development in the Southern African development Community Knowledge*.
- Mokaya, S. (2013). *The Adoption of Information and Communication Technology by Small Enterprises in Thika Municipality, Kenya International Journal of Business and Social Science*, Vol. 3 No. 13; July 2012
- Mugenda, A. & Mugenda, O (1999). *Research Methods: Qualitative and Quantitative Approaches*. Nairobi: Acts Press.
- National SME Development Council (NSDC, 2009) *Definitions for Small and Medium Enterprises in Kenya*. Available at: http://www.mirc.org.my/elibrary/sme_definitions_english.pdf Accessed January 09, 2015
- Nickell, G. S. and Seado, P. C. (2006). The impact of attitudes and experience on small business computer use, *Am. J. Small Business*, 10(4), 37-47.

- Pavic, S.; Koh, S.C.L.; Simpson, M.; Padmore, J. Could e-business create a competitive advantage in UK SMEs? *Benchmarking* 2007, 14, 320–351.
- Republic Of Kenya, (2008). *Economic Survey*. Nairobi Kenya: Government Printers.
- Republic Of Kenya, (2009). *Economic Survey*. Nairobi Kenya: Government Printers.
- Republic Of Kenya, (2010). *Economic Survey*. Nairobi Kenya: Government Printers.
- Republic Of Kenya, (2012). *Economic Survey*. Nairobi Kenya: Government Printers.
- Ritchie, R. & Brindley, C. (2005) *ICT Adoption by SMEs: Implications for relationships and Management*. New technology, Work and Employment 20:3. Blackwell Publishing, Oxford UK
- Sewe, F. (2010) Factors affecting the strategic growth of Information Communication Technology (ICT) (Report no 01). Netherlands: OS Publication.
- Shiels, H., McIvor, R. and O'Reilly, D. (2003). Understanding the Implications of ICT adoption: Insights from SMEs", *Logistics Information Management*, 16(5), 312-326.
- Small Bone, D. et al (2011): Innovation and the use of technology in manufacturing Plants and SMEs: An Inter-regional comparison. Proceedings of the 24th ISBA national Small Firms Conference: Exploring the Frontiers of Small Business, Leicester
- UNCTAD (2004) "ICT as an Enabler for Growth, Development and Competitiveness", Plenary session, [online], http://www.unctadxi.org/templates/Event___69.aspx [January, 17, 2015].
- UNCTAD (2012) "ICT as an Enabler for Growth, Development and Competitiveness", Plenary session, [online], <http://www.unctadxi.org/templates/Event> Accessed December 16, 2014
- United Nation Development Program (UNDP, 2013). Stimulating SME environment. Retrieved January 10th 2015 from www.unido.org
- Vehovar, V., & Lesjak, D. (2007). Characteristics and impacts of ICT investments: perceptions among managers. *Industrial Management & Data Systems*, 107(4), p. 537–550. <http://dx.doi.org/10.1108/02635570710740689>
- Wanjau, K Macharia. N. R, Ayodo M. A,(2012) Factors Affecting Adoption of Electronic Commerce among Small Medium Enterprises in Kenya: Survey of Tour and Travel Firms in Nairobi, *International Journal of Business, Humanities and Technology*, Vol. 2 No. 4; June 2012
- World Bank, (2010). *World Bank Development Report*, Washington D.C.