

Determinants ICT Adoption by SMEs Owner Managers in Rural Kenya An Organizational Context Perspective

Dominic Wagura Wambaria

School of Business and Economics
Kabarak University, Nakuru
Kenya

Prof. Peter B. Kibas, PhD. FKIM. MISBE (UK),

School of Business and Economics
Kabarak University, Nakuru
Kenya

Dr. Irene Cherotich Asienga (Phd)

School of Business and Economics
Kabarak University, Nakuru
Kenya.

Abstract

The purpose of this study was to analyze the Business organizational factors that determine ICT adoption by SMEs owner managers in rural Kenya-A case of Nyeri County. A mixed method research design was used where both qualitative and quantitative data was concurrently collected and analyzed at the same time. A sample of 216 Small and Medium Enterprises owner/managers were drawn from the list of 5428 Small and medium Enterprises located in rural areas and licensed by the Nyeri County government. Both simple random sampling and stratified random sampling were used in picking both sub-counties and business categories respectively. In order to get the participants in Focus Group Discussion (FGD) purposive sampling method was used. This was to ensure that only those participants with relevant information participated in the discussions. An open ended and a closed-ended questionnaire, an observation schedule and a focus group discussion (FGD) guide were used to collect both qualitative and quantitative data. The quantitative data was analyzed using the Statistical Package for Social Sciences (SPSS) software while the qualitative data was thematically analyzed. The study established that organizational factors influences ICT adoption by SMEs in rural areas of Nyeri County. This study can be used by the government, ICT consultants, and vendors in the development of ICT policies and ICT sales strategies respectively. Finally, the same results can be used by the government in the development of ICT training, strategies relevant in enhancing ICT adoption and usage in the SME sector in rural Kenya.

Keywords: Information communication technology (ICT), Small and Medium Sized, Enterprises (SMEs), ICT adoption, Organizational context

Introduction

According to Levy, Powell, and Yetton (2001) SMEs have not fully grasped use of ICT while Mokaya (2012) argues that a majority of small scale entrepreneurs view the cost of ICT tools and equipments as high and thus a discouragement to investing in them. In Kenya Small and medium enterprises also facilitate the process of adjustment in large enterprises, contribute to more balanced socio-economic development; and thus serve as suppliers of products and services previously not available in the market place. In most cases, the business environment that the Small enterprises operate in is characterized by fragmented and incomplete information on the awareness of technology, markets, policy, regulations, and finance. It is therefore this environment that affects entrepreneurial activity as the absence of information impinges on the scope for discovery and exploitation of profitable business opportunities.

However, it is imperative to note that ICT enhances SMEs efficiency, reduces costs, and broadens market reach, locally and globally; which results in job creation, revenue generation, and overall country competitiveness. The SMEs are characterized by limited availability of resources in terms of time, money and expertise (Wymer and Regan, 2005).

The Kenya, national ICT policy Communication Authority of Kenya is the regulator of the whole of the ICT sector in Kenya (Republic of Kenya, 2006). It is therefore clear that in Kenya there is clarity on the matters of ICT development which can ensure increased growth in the sector. However, it is imperative to note that ICT may not be a panacea for all business development problems, but it serves as a facilitator in the creation of business growth opportunities to small enterprises. Therefore, it increasingly empowers the SMEs sector to participate with ease in the knowledge economy. This takes place through facilitation of connectivity; creation and delivery of products and services on global scale. On globalization information is a basic requirement in enterprise creation, growth, and survival. Therefore, Information Technology is capable of bridging and easing information gaps in the business sector. Small and Medium Enterprises (SMEs) is a highly growing sector in most economies around the world. This is the case not only in UK, USA, Australia, and Europe, but also in Africa, Latin America, Korea and Indonesia Levy and Powel (2005).

The availability of Information is critical for prudent management and business growth. The availability of knowledge on competitors and customers is very essential in understanding the future direction of business development. Therefore, harnessing this resource is very important and yet, difficult. However, one can handle this difficult situation through the development of organization information systems that would enable the collection and dissemination of data, information, and knowledge. Organizations are increasingly using information technology to deliver outputs from such systems. Data, information, and knowledge can all enhance competitiveness Levy and Powel (2005).

Accordingly, to the results from available research small businesses differ in many key ways from larger organizations. For example, they are more likely to: Have simple and highly centralized structures, expenses severe financial constraints on growth, lack of trained personnel resources, and take a short-range management perspective imposed by volatile competitive environment Welsh and White (1981).

In order for Kenya to achieve, the goals of her Vision 2030 there is need to have “access to information on market trends through enhanced use of electronic communication media, particularly the internet and mobile phones. This is because most of Kenyans work in the informal sector. However, there is low investment in research and development in this sector which leads to poor availability and accessibility of relevant technology by SMEs (Republic of Kenya 2007).

Purpose of study

This purpose of this study was to shed light in understanding the Determinants ICT adoption by SMEs owner managers in rural Kenya in organizational context perspective and their influence on ICT adoption by SMEs owner managers in rural Kenya. According to Outlook (2011), SMEs in Kenya create 85 percent of the total employment. However, despite these rare feet they only contribute about 20 percent of the total GDP. This study therefore is a deliberate attempt to fill the knowledge gap by analyzing the Determinants of ICT adoption by SMEs owner managers in rural Kenya and their influence on ICT adoption by SMEs owner managers.

Literature review

This section covers a review of the relevant literature on Business organizational factors that determine ICT adoption by SMEs owner managers in rural Kenya and other parts of the world. It will also specifically examine the SME characteristics and where necessary cover contextual issues that are relevant on matters pertaining to the adoption and usage of ICT among SME owner- managers in rural based enterprises in a developing country like Kenya.

Adoption of ICT by SMEs and its Impact in Rural Areas

A lot of studies have been carried in the area of ICT adoption by SMEs but there has been limited research in the area of ICT adoption in rural- based SMEs and hence there is a serious scarcity of this type of literature covering most developing countries like Kenya.

It is imperative to note that many rural communities in Africa and particularly in Kenya lack modern ICT infrastructure to compete in the new global society on ICT adoption matters. So in order for the rural community to remain economically viable and ensure an improvement of the quality of their lives there is need for them to have access and capability to utilize technology. Even though the SMEs contribute heavily to the nation's economic development research on the rural based SMEs is still lacking. These SMEs also face the challenges which are unique mainly from a spatial perspective Arenius and Cleriq (2005).

The Information Communication Technology (ICT) is a crucial requirement for sustainable economic development in the rural areas and therefore when it is applied to the rural based businesses there is improved communications, increased participation, and dissemination of information and shared knowledge among the small business community Narula, and Arora (2010).

ICT Adoption Perceived benefits

According to Giovanni and Mario (2003) ICT adoption offers a firm improvement of their competitiveness such as providing mechanisms for getting access to new market opportunities and specialized information services. However, the two scholars argued that it is difficult for SMEs to exploit ICT potentials due to their lack of awareness of the benefits to be realized from the utilization of such technology. So to them, the smaller the enterprise, the greater this problem becomes as most small companies may not be using information technology for their activities (Giovanni and Mario,(2003). Furthermore, the other benefit of using ICT in business operations is that it enables the improvement of information and knowledge management inside the firm and increases the speed and reliability of transactions for both business-to-business and business-to-consumer transactions. According to Organization for Economic Co-operation and Development (2004) the opportunities offered by ICT like an organization can exchange real-time information and further build closer relationship with suppliers or business partners and customers.

Therefore, ICT adoption SMEs in rural settings is an increasingly essential dimension for the firms to realise their competitive edge in the market. Unfortunately without adequate access to ICT SMEs in the rural areas may not be able to fully participate and survive in the increasingly highly volatile and dynamic markets Jaganathan et al. (2014).

Organizational Context

The factors that fall under this context are , ICT experience ,organizational readiness, top management support and organization size. Organizational context has a positive impact on SMEs' adoption of ICT. Size, top management support, and organizational readiness have been found to be significant organizational factors in determining ICT adoption by SMEs owner/managers. The size of the firm plays an important role in ICT adoption. Another significant organizational factor is organizational readiness suggesting that without sufficient technological and financial resources, SMEs are unable to adopt Enterprise Applications, Ramdani et al. (2013).

According to Gono, Harindranath, and Ozcan (2013) "the level of education in the SME, cost of ICT and related training, and the lack of skills in the country are all factors that put weight on SMEs' owner-managers in making decisions regarding ICT adoption. The availability of trained employees within an organization and more so within the country, facilitates the acceptance of new ICT" (p.13). So according to this study the firms that have highly trained individuals within their firm understand and perceive ICT adoption from an informed perspective.

Furthermore, the study by Gono et al. (2013) found that most of the SMEs owner-managers felt that the top management support can play a critical role in the primary decision making when it comes to ICT adoption by the firm. According to Mpofu, Milne, and Watkins-Mathys (2013) the financially more stable SMEs adopt more and better ICT applications, and are more growth-oriented than the financially constrained ones. He further found that a strong financial support, the background experiences, ICT and business knowledge of the highly skilled owner managers played a crucial role in the decisions to adopt or not to adopt ICT at the SMEs under study. In another study by Ramdani, B. and Kawalek, P. (2008), it was found that in addition to the technological characteristics top management support, organizational readiness, IT experience, and size are also factors impacting SME adoption of Enterprise Systems.

Research methodology

The study site was in Nyeri County formerly the capital of Central Province in Kenya. It is situated about 150 km north of Nairobi, the Kenya's capital city. In this study, a mixed method research design was used. In this type of research design both qualitative and quantitative data was concurrently collected and analyzed. A sample of was 216 of Small and Medium Enterprises owner/managers in the rural areas of Nyeri County was picked. This sample was drawn from a list of 5428 Small and medium Enterprises located in rural areas and licensed by the Nyeri County government. The study also used simple random sampling and stratified random sampling in getting the list of targeted sub-counties and business categories in each sub-County respectively. The data collection instruments used in collecting both qualitative and quantitative data were: an open ended and a closed-ended questionnaire and an observation schedule, whereas a Focus Group Discussion(FGD) guide was used in collecting qualitative data from Focus Group Discussions

Reliability of data collection Instruments

In order to assess the consistency and reliability of research instrument items, Cronbachs alpha coefficient was used in this study. This was meant to test whether the variables are within the acceptable range of between 0 and 1. Mugenda (2003) posits that the alpha value ranges between 0 and 1, whereby reliability increases with the increase in value. In most cases, a Coefficient of 0.6-0.7 is the accepted rule of thumb that indicates acceptable reliability whereas 0.8 or higher indicate good reliability, Mugenda (2003). The lowest alpha adopted in this study was 0.5 upwards. In this, study the results for all the variables were above the 0.5 whereas the overall value was 0.906. Therefore going by these results it is in order to conclude that the research instruments were reliable and acceptable for the study.

Data Analysis

This study as stated earlier used mixed method analysis where both quantitative and qualitative analytical techniques were used since this was a single research study (Johnson and Christensen, 2008). According to Creswell (2009) in this type of study data analysis occurs both within the quantitative (descriptive and inferential numeric analysis) and the qualitative (description and thematic text or image analysis) approach and in most cases between the two approaches.

The data editing and cleaning was carried out before embarking on quantitative data processing and analysis using the Statistical Package for Social Sciences (SPSS) software. The study used both descriptive and inferential statistics in presenting tables and which was followed by the qualitative data analysis which was thematically analyzed before embarking on the discussion of the study findings, conclusion and recommendation followed.

Research findings and discussion

The results from this study are presented using both descriptive and inferential statistics. The study target population consisted of the SMEs in agricultural products & inputs, wholesale & retail trade, manufacturing, hotels and restaurants, financial and other services.

Business Organizational Factors that determine of ICT adoption by SMEs in rural Kenya

The study covered the business organizational factors that determine ICT adoption by SMEs owner/managers in rural areas of Nyeri County. The data analysis is based on the respondents rating on external ICT support, market scope, and competitive pressure.

Hypothesis Testing

The regression equation used in the study is as shown in table 1.0.

Table 1.0: The multiple regression equations

Objective(s)	Hypotheses	Data Analytical Methods	Interpretation
To determine the relationship between Organizational context and ICT adoption.	H ₀ : ICT adoption and usage is not significantly influenced by the organizational factors.	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$ Where: β_0 = intercept Y = ICT adoption $\beta_1, \beta_2, \beta_3, \beta_4$ and β_5 are beta coefficients for H ₀ X_1, X_2, X_3 and X_4 represent dimensions of organizational context ϵ is the error term	r, r ² and p-values

Source: Researcher

H0: ICT adoption is not significantly influenced by Organizational factors

In order to test the study hypotheses correlation and multiple regression analysis were carried out. The organizational factors were measured by IT experience, top management support, organizational location, and firm size. A Liker type scale of 1-5 where 1= strongly disagree, 2 = disagree, 3= neutral, 4= agree and 5= strongly agree in obtaining data. The variables for ICT adoption consisted of both customer focus and innovations.

Table 2.0: Correlation Results for Organizational factors and ICT adoption

		Organizational factors	ICT adoption
Organizational factors	Pearson Correlation	1	.337**
	Sig. (2-tailed)		0
	N	188	166
ICT adoption	Pearson Correlation	.337**	1
	Sig. (2-tailed)	0	
	N	166	177

** . Correlation is significant at the 0.01 level (2-tailed)

Source: Researcher 2016.

Table 2.0 shows that there is a positive and significant relationship between Organizational factors and ICT adoption with r=0.337 at p=0.000<0.01. The results imply that Organizational factors increases whenever there is a corresponding rise in the ICT adoption by the firms.

Table 4.34: Regression results for Organizational factors and ICT adoption

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				Sig. Change	F	Durbin-Watson
					R Square Change	F Change	df1	df2			
Dimension 0	1	.524 ^a	0.275	0.257	0.54076	0.275	15.259	4	161	0	1.604

a. Predictors: (Constant), firm size, top management support, organizational location, IT Experience

b. Dependent Variable: ICT adoption

Source: Researcher 2016.

Table 3.0: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.848	4	4.462	15.259
	Residual	47.079	161	0.292	
	Total	64.927	165		

a. Predictors: (Constant), firm size, top management support, organizational location, IT Experience

b. Dependent Variable: ICT adoption

Table 3.0: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B		Collinearity Statistics		
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF	
(Constant)	1.663	0.248		6.717	0	1.174	2.152			
1	organizational location	0.07	0.04	0.124	3.766	0.002	-0.008	0.148	0.919	1.088
	IT Experience	0.101	0.076	0.104	1.332	0.185	-0.049	0.25	0.737	1.357
	top management support	0.388	0.06	0.469	6.524	0	0.271	0.506	0.873	1.145
	firm size	-0.093	0.06	-0.118	-1.544	0.124	-0.212	0.026	0.77	1.298

a. Dependent Variable: ICT adoption

Source: Researcher 2016.

The results of the regression analyses in Table 3.0 indicate a positive and significant relationship between Organizational factors and ICT adoption. The bivariate statistics are: $R = .524$ and $R^2 = .275$. Therefore, the bivariate correlation accounted for 27.5 % of the variance in ICT adoption. The model was significant with F ratio of 15.259 at $p=0.000 < .001$.

Organizational location

The results of the study revealed that organizational location is significantly influences ICT adoption. Its p-value $=0.002 < 0.005$ and t statistics=3.766. Therefore, there is a significant relationship between organizational location and ICT adoption. This means that the business location can influence ICT adoption.

Experience on ICT use

The results of the study revealed that IT experience insignificantly influences ICT adoption. Its p-value $=0.185 > 0.05$ and t statistics=1.332. Therefore, there is an insignificant relationship between IT experience and ICT adoption. This means that the prior IT experience cannot influence ICT adoption.

Prior ICT experience was discussed at length during the FGD and the common response was that the prior experience had no influence on the participants' decision to acquire the adopted technology in their firms. This was found to have been caused by the fact that most of them had adopted very basic ICT facilities like mobile phones, electric calculators among others, which were a familiar to them even before they started their current businesses. Therefore, the adopters were quite comfortable when using this familiar technology.

“When I decided to buy a mobile phone for use in my M-PESA business I did not need anybody any prior experience on how to use it as I already had another one for my personal use. I knew how to use a mobile phone. So this influenced my decision to adopt it” (FGR-).

In the Iranian study mentioned above CEOs' Information System knowledge and experience was not found to affect E-Commerce adoption (Ghobakhloo, et al, 2011).

Top management support

The results of the study revealed that top management support significantly influences ICT adoption among SMEs in the study. Its p-value $=0.000 < 0.005$ and t statistics=6.524. Therefore there is a significant relationship between top management support and ICT adoption. The results of the study revealed that top management support as measures of Organizational factors significantly influences ICT Adoption.

Thus top management support is very essential in assigning the necessary resources needed for the ICT adoption. During the Focus Group Discussion most of the respondents also confirmed that top management plays a significant role in deciding whether to adopt and use ICT facilities or not. These findings confirmed those of Gono and Özcan (2013) whose findings “reveal that the owner-manager in consultation with the top management (i.e. top-management approach) had a vital role in ICT adoption decision making.”

This also builds well into Nduati et al, (2015) whose findings in their study was that 84% of the respondents agreed that there was a significant influence of administrative support on ICT adoption. In this study, the researchers found that managerial support influences ICT adoption in SMEs. Furthermore, according to Caldeira and Ward, (2002) Management support is the degree to which an individual is of the opinion that organizational management is committed to the successful implementation and use of a system. According to Djatikusumo (2014), “small firms’ CEOs have a greater power over their employees to make decisions or to develop a firm’s strategies. It can be assumed that in small firms, management support is very important because most key decisions and corporate objectives and strategies are strongly influenced by the involvement of the owner or CEO”. Also according to Jeyaraj, Rottman, and Lacity, (2006) top management support has been found to be one of the best predictors of IT adoption by organizations.

Furthermore ,the findings by Sife et al (2007) agrees with those of this study in that administrative support is critical to the successful integration of ICTs into learning processes. So managerial support influences ICT adoption by small and medium enterprises. But these findings are contrary to those of Alshamaile (2013) who found that top management support is statistically insignificant. Thong et al., (1993) had similar findings to those of Alshamaile (2013).

During the FGD, most of the respondents were either owner managers or their senior staff. When the researcher asked them how they decided to adopt the ICT facilities in their firms some said they heard about the technology from their business peers and investigated about the new technology and then bought them. Furthermore, others learnt about the ICT facilities from their staff, investigated and then bought them. All in all the top management played a cardinal role in the ICT adoption decision making. “I bought my first lap top because I heard about it from my business peer and friend. He talked big about it. ”It is small and easy to carry. Furthermore, you can carry it and use it whenever you are. After all, it is not very expensive as you can buy a second hand one which is as good as new “he stated. From that moment, I decided to consult a computer dealer who was my former classmate in high school. On the strength of his advice, I bought my first laptop. As the owner of the firm I did not need to consult anybody this” (FGR-5).

Therefore, top management plays a key role in undertaking responsibilities such as running daily activities, receiving their firm’s reports, monitoring, making strategic decision making and distributing firm’s resources.

Firm size

The results of the study revealed that firm size does not influence ICT adoption among SMEs. Its p-value =0.124>005. Therefore, there is no significant relationship between the firm size and ICT adoption. So the results of the study revealed that the firm size as a measures of Organizational factors does not significantly influence ICT Adoption

According to Zhu and Kraemer (2006) firm size represents many essential aspects of the organization such as resource availability, decision agility and prior technology experience. In most cases, larger firms are assumed to have more financial resources, experience, skills among others. However, according to Jambekar and Pelc (2002), small firms, due to their size, can be more innovative and flexible enough to adapt their actions to the quick changes in their environment. However, on the other hand larger firms, have multiple levels of bureaucracy which can slow down decision-making processes (Oliveira and Martins, 2011). The size of a firm is one of the most critical determinants of an innovator profile (Rogers, (2003). However, according to Lee and Xia (2006) empirical results on the correlation between the ICT innovation adoptions are mixed. For example, a study carried out by Ramdani and Kawaiek (2007) reported a positive correlation while that done by Goode and Stevens (2000) reported a negative correlation. It is relatively easier to coordinate ICT innovation adoption in a small firm unlike in a big firm where the levels of bureaucracy are a big inhibition.

During the FGD some respondents felt that the fact that their firms were small enabled them to respond to change in business environment as fast as possible with ease. One of the respondents said:

“My kiosk is very small with limited resources and therefore we can adapt to any change in our business including adopting the technology that I can afford. I do not need to consult anybody if I want to buy a new mobile phone for the benefit of my business. I control my business’ destiny “(FGR-).

The VIF values indicated that there was no problem of multicollinearity ($VIF < 10$) hence a model of four predictor variables could be used in forecasting ICT Adoption. Therefore, hypothesis H_0 which is that ICT adoption is not significantly influenced by Organizational factors was rejected and hence acceptance of the alternative one. So, ICT adoption is significantly influenced by Organizational factors.

Conclusion

The overall results of the linear regression analyses showed there was a positive relationship between Business organizational factors and ICT adoption. Therefore, these results imply that ICT adoption is affected differently by the various Business organizational factors variables. Therefore, these findings suggest that business organizational factors play a significant role in influencing ICT adoption by SMEs in the Kenya rural areas. Therefore, the results from this study can easily be generalized.

Contribution in methodology

A mixed research approach was used in this study where both quantitative and qualitative data was concurrently generated, analyzed, and reported made the study to benefit from the strength of the two paradigms of quantitative and qualitative research. This approach represents a clear paradigm shift from the approaches used in most of the past studies in the field of ICT adoption by SMEs in rural areas. The past research methods were biased towards either purely quantitative or qualitative research approaches.

Contribution on organizations management

The findings from this study may help managers to evaluate possible adoption of the right ICT facilities through the increase of their awareness about the organizational factors that influence ICT adoption by SMEs in their business environment. This can be done through ensuring that they would be ICT adopters understand easy ways of using ICT in accomplishing tasks with speed and accuracy, hence increasing productivity and greater control in their daily business

Contribution on government policies and regulations

The findings from this study can help policy makers and implementers in the government of the day in developing prudent ICT policies that favor the SME sector...

Recommendations

1. This study highly recommends that the Kenyan central government implements the recommendations of National Information and Communication Technology policy of 2006 which are: the provision of a policy framework and adequate legislation to support e-commerce (ROK, 2006). The results from this study could go a long way in guiding and giving a useful input on this matter.
2. The stakeholders who consist of the government, the private sector county, and the development partners should consider coming up with strategies of cutting down the cost of ICT facilities and internet Infrastructure. This would lower the cost of such facilities and internet connectivity which would enable the SMEs to afford them.
3. The government should consider opening ICT Business Services Centers (IBSC) that would act with full internet connectivity for dissemination of information to SMEs that would act as resource/Service providers to the SMEs centers. Such centres should be manned by trained business councilors. These centres would provide affordable ICT services to the SMEs.

Suggestions areas for further Research

1. The researcher recommends that a similar research could be carried out using other research paradigms like quantitative or qualitative research approach in different sectors, industries in different countries and then compare with the results from this study that used mixed research method. Such studies could be grounded on some of the theories like the theory of Planned Behaviour (TPB) and The Technology Acceptance Model (TAM).
2. Finally future research could investigate whether both internal and external organizational pressure can influence SMEs to adopt ICT.

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