DETERMINING BUSINESS ENVIRONMENTAL FACTORS IN ICT ADOPTION BY SMES OWNER MANAGERS IN RURAL KENYA

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Abstract

This study intended to analyse the Business environmental factors that influence ICT adoption by Small and Medium Enterprises (SMEs) owner managers in rural Kenya with special reference to Nyeri County and identifying the knowledge gap therein. Under a mixed method research design a sample of 216 SMEs owner/managers were drawn from the list of 5428 SMEs 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. A questionnaire, an observation and a focus group discussion (FGD) guide were used to collect both qualitative and quantitate data. The quantitative data was analyzed using SPSS while the qualitative data was thematically analyzed. The study established that Environmental context influences ICT adoption by SMEs in rural areas of Nyeri County. This study could be used by 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 and development policies, strategies relevant in enhancing ICT adoption and usage in the SME sector in rural Kenya.

Keywords: ICT, ICT Adoption, SMEs, Environmental Context, Kenya

INTRODUCTION

In Kenya small enterprises have not embraced Information and communication technology (Mokaya, 2012). This is in agreement with the viewpoints of Levy, Powell, and Yetton (2001) that SMEs have not fully grasped use of ICT. Mokaya (2012) further concludes that most small scale entrepreneurs believe that the cost of ICT tools and equipment's is high and thus discourages them from investing in them. He further argues that although most small scale entrepreneurs are aware of the existence of ICT, they still do not find the necessity for such technologies in their enterprises (ibid).

In Kenya Small enterprises play a significant role in employment and wealth creation as well as poverty reduction (Republic of Kenya, 2002). Furthermore they also serve as seedbeds for large scale entrepreneurs, and facilitate the process of adjustment in large enterprises, contribute to more balanced socio-economic development; emerging as competent suppliers of products and services previously not available in the market place.

Small enterprises operate in an environment characterized by fragmented and incomplete information on the awareness of markets, technology, policy, regulations and finance. This affects entrepreneurial activity since the absence of information impinges on the scope for discovery and exploitation of profitable business opportunities. In the context of globalization, information is the basic requirement for enterprise creation, growth and survival; and ICT is capable of easing information gaps in the business sector. ICT enhances SMEs efficiency, reduces costs, and broadens market reach, locally and globally; resulting in job creation, revenue generation and overall country competitiveness. Small enterprises are generally seen as being at a disadvantage to larger businesses. They are characterized by limited availability of resources in terms of time, money and expertise (Wymer and Regan, 2005).

According to the Kenya national ICT policy which was approved in January 2006 by Communication Authority of Kenya (formerly CCK) is the regulator of the whole of the ICT sector (Republic of Kenya, 2006).Therefore, there is clarity on the matters of ICT development which will ensure increased growth in the sector. But it is imperative to note that ICT may not be a panacea for all business development problems, but it facilitates the creation of enormous business growth opportunities to small enterprises. It increasingly empower SMEs sector in the participation in the knowledge economy by encouraging and facilitating connectivity; helping to create and deliver products and services on a global scale, and providing access to new markets and new sources of competitive advantage to boost income growth. They fell that they had limited financial resources.

The SME sector provides 85% of the direct and indirect employment as well as part-time and full time jobs too many Kenyans both in urban and rural areas. According to Kenya's Vision 2030 wholesale and retail trade is one of the key sectors in economic development of Kenya. This is because the sector is the link between production and consumption, both of which are expected to expand substantially. Most of the employment in trade is found in the informal sector, (Republic of Kenya, 2007).

On the globalization end, information is a basic requirement in enterprise creation, growth and survival. Information Technology is therefore capable of bridging and easing information gaps in the business sector. Small and Medium Enterprises (SMEs) are a vibrant and a growing sector in most economies around the world. Global economic conditions have spurred the rise in the SMEs over the last 10-15 years. This is seen not only in UK, USA, Australia and Europe, but also in Africa, Latin America, Korea and Indonesia Levy and Powel (2005). Small and Medium Enterprises are often considered as a single group by researchers and policy makers, but they are heterogeneous with adverse needs and objectives. For many owners of small businesses lifestyle choice is the reason that they start them up. For other entrepreneurs, it is the excitement and risk of growing an empire. Between these extremes there are other reasons for people wanting to own their own business least of which is to have their own pension plans or something to pass on to their children(ibid).

Information is critical for the management and business growth. Knowledge about competitors and customers is essential to understand the future direction of business development. Harnessing this resource is important and yet, difficult. One means of tackling it is through the development of organization information systems that 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).

The available research suggests that small businesses differ in many key ways from larger organizations. They are for example, more likely to: Have simple and highly centralized structures, expenses severe financial constraints on growth, lack of trained personnel recourses, and take a short-range management perspective imposed by volatile competitive environment Welsh and White (1981).To achieve the goals of Kenya's 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 union. This is due to the fact that most of the Kenya employees work in the informal sector. The constraints limiting the availability and accessibility of relevant technology to MSE are further compounded by the general low investment in research and development (Republic of Kenya 2007).

Purpose of study

This study was meant to shed light in understanding the Business Environmental Factors that influence ICT adoption by SMEs owner managers in rural Kenya-A case of Nyeri County. According to Outlook (2011), SMEs in Kenya create 85 percent of the total employment. But interestingly they only contribute about 20 percent of the total GDP. This study therefore attempted to fill the knowledge gap by analyzing the Business Environmental Factors that influence ICT adoption by SMEs owner managers in rural Kenya.

Furthermore, the results from this study added value to the existing literature in the field of ICT adoption by the SME sector. It can also be used by ICT consultants and vendors in targeting the SMEs with positive ICT characteristics or better still the ones that are yet to adopt ICT. Finally the same results can be used by the government in the development of ICT training and development policies, strategies relevant in enhancing ICT adoption and usage in the SME sector that operate in rural Kenya. In Kenya, about 79 per cent of its population live in rural areas and relies on agriculture for most of its income (IFAD, 2011) eking a living through subsistence farming and running Small and Medium Enterprises. Therefore, the results arising from this research identified the salient business environmental factors that influence the entrepreneurs in the Small and Medium Enterprises sector to adopt ICT.

Scope of the Study

The study focused on selected Small and Medium Enterprises in the rural areas of Nyeri County with an aim of analyzing the business environmental factors as determinants of ICT adoption by SMEs owner/managers in Nyeri County using both Diffusion of Innovation (DOI) and Technological, Organizational and Environmental (TOE) framework. The study was carried out between the period April 2016 and June 2016.

Limitations of the study

Most of the SME owner/managers treated their business information as confidential and hence were reluctant in giving the required information due to their fear of being victimized by organizations such as Kenya Revenue Authority, County government tax collection personnel or worse still they thought that the information may end up in the hands of their business rivals. To overcome this inhibition the researcher and his data enumerators carried with them an introduction letter from Kabarak University Graduate School so as to assure the target respondents that the information collected from them was treated as confidential and would be used for academic purposes only.

The roads terrain was rough and in some places wet and slippery and this proved quite a challenge to both the researcher and his assistants. To overcome this challenge it was found imperative to use motor bikes or walk if possible whenever it was not assessable using a motor vehicle.

LITERATURE REVIEW

This section covers a review of the relevant literature as it relates to business environmental factors that influence ICT adoption and use by the SMEs in rural Kenya. Furthermore, the section will also specifically examine the SME characteristics and contextual issues that are relevant in explaining the adoption and usage of ICT among SME owner- managers in a rural set up situated in a developing country like Kenya.

Adoption of ICT by SMEs and its Impact in Rural Areas

A lot of studies have been carried out on factors influencing the adoption of ICT in SMEs but there has been limited research in the area of ICT adoption in rural based SMEs and therefore the literature does not adequately address the issue. Therefore many rural communities lack modern ICT infrastructure to compete in the new global society on ICT adoption matters. So for the rural community to remain economically viable and at the same time improve the quality of life there is need for them to have access and capability to utilize technology According to Jaganathan, Mahmood,Ahmad, and Ahmad (2014).

Even though the SMEs contribute heavily to the nation's economic development research on the rural based SMEs is still lacking. The fact that there is limited research in the rural areas could mean that SMEs are facing numerous challenges in adopting ICT. 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).

Perceived benefits can be considered as one of the factors that could affect ICT adoption in the SME sector. According to Giovanni and Mario (2003) ICT offers a firm a wide range of benefits in the improvement of their competitiveness such as providing mechanisms for getting access to new market opportunities and specialized information services. They further argued that it is difficult for SMEs to exploit ICT potentials due to their lack of awareness of the

benefits to be derived. To them the smaller the enterprise, the greater this problem becomes, since most small companies are not using information technology for their activities Giovanni and Mario (2003).

The Information Communication Technology (ICT) enables the improvement of information and knowledge management inside the firm and also increases the speed and reliability of transactions for both business-to-business and business-to-consumer transactions. OECD further explained the opportunities offered by ICT like an organization can exchange real-time information and build closer relationship with suppliers or business partners and customers (OECD, 2004).

Therefore ICT adoption in rural settings has the potential to improve quality of the firms and is an increasingly essential dimension for the firms to improve their competitive edge. Without adequate access to ICT, SMEs especially those 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).

Environmental Factors influencing the adoption and use ICT by SMEs

This sub section covers the factors that influence the adoption and use of ICT by SMEs in particular. Examples of such factors are the technological, organizational and environmental factors among others. Then the researcher reviewed in detail relevant previous research and then identifies the gap in the literature the study sought to contribute to.

Environmental context

The factors that influence ICT adoption by SMEs under the Environmental Context are market scope, industry, competitive pressure and external ICT support. According to Ramdani et al. (2013) the Environmental Context can be claimed to have a high impact on SMEs' adoption of Enterprise Applications. In this context market scope operational meaning is that area which a firm chooses to carry out its business operations. They further found that competitive pressure which is under environmental context is significant in ICT decision making in SMEs ICT adoption. According to Tan et al., (2012 environmental factors provide significant forces for ICT adoption by SMEs where the issues relating to market climate and the firm's standing in the market directly influence the uptake of technology. This study by Tan et al., (2012) found that the Governmental support is another important environmental characteristic for technological innovation. Furthermore Mpofu et al. (2013) in a study carried out in South Africa ICT adoption was found to be on the basis of the perceived benefits and driven by pressure from customers, competitors, employees and technology suppliers. The same study suggested that the various

ICT applications were adopted mainly on the basis of their perceived benefits in improving their business efficiency; competitiveness; planning; management; communication; emailing; security; cash handling and billing purposes as well as online advertising and market sourcing. According to Tan et al., (2012) the competitor can also be one of the important external factors considered in ICT adoption. So ICT adoption decision can be influenced by the relative advantage gained by the firm compared to their competitors.

According to Gono et al. (2013) the pressure that some of the firms come under from their customers to use inter-organizational information systems is enormous. In that study "some of the firms interviewed indicated that if they win a long term contract with a large organization or government department they adopt the needed ICT, streamline their systems or seek upgrades to facilitate customer demands. Further still Gono et al. (2013) found that "one benefit of having ICT knowledge in-house is better management of the relationships with ICT suppliers" (p.14). This also "offers the firm the ability to decide which ICT is suitable for their firm" (p.14).

Finally according to Ramdani and Kawalek (2008), industry, market scope, competitive pressure, and external IT support are factors impacting SME adoption of Enterprise Systems.

RESEARCH METHODOLOGY

The study was carried out in Nyeri County. The capital of Nyeri County is Nyeri Town which is situated about 150 km north of Nairobi, the Kenya's capital city. A mixed method research design was used where both qualitative and quantitative data was concurrently collected and analyzed. A sample of 216 Small and Medium Enterprises owner/managers in the rural areas of Nyeri County were drawn from the list of 5428 Small and medium Enterprises located in rural areas and licensed by the Nyeri County government. A simple random sampling was carried in order to come up with the list of targeted sub-counties and a stratified random sampling which was based on business categories in each sub-County was carried out. The study used and open ended and a closed-ended questionnaire was used to collect both qualitative and quantitate data. An observation schedule was also used in gathering data through live situations whereas data collection guide was used in collecting qualitative data from Focus Group Discussions. All the research instruments were self-designed and are based on a serious literature review. The unit of analysis was the SMEs' owner managers or their senior staff in Nyeri County.

Before embarking on data analysis data editing was undertaken in order to check for questionnaire completeness and accuracy (e.g. where necessary the researcher asked for additional information). The data processing and analysis was carried out using SPSS

(Statistical Package for Social Sciences) software where descriptive and inferential statistics were computed presented using tables and followed by the requisite discussions.

Reliability of Research Instruments

In order to assess the internal consistency among research instrument items, this study used Cronbach"s alpha coefficient. This helped in testing whether the variables are within the acceptable range of between 0 and 1. According to Mugenda (2003) the alpha value ranges between 0 and 1, whereby reliability increases with the increase in value. A Coefficient of 0.6-0.7 is in most cases accepted rule of thumb that indicates acceptable reliability whereas 0.8 or higher indicate good reliability (Ibid). The closer the Cronbach Alpha coefficient is to 1.0, the greater the internal consistency of the items in the scale and the closer the Cronbach coefficient is to zero (0), the less the internal consistency of the items in the scale. In this study the lowest alpha adopted was 0.5 upwards. The results for all the variables were above the 0.5 with overall value being 0.906. These results indicated that the research instruments were reliable and acceptable for the research.

Data Analysis Approach

In this study mixed method analysis was used. This meant that using both quantitative and qualitative analytical techniques as this were a single research study (Johnson and Christensen, 2008). Creswell (2009) is of the same opinion since he argues that analysis occurs both within the quantitative (descriptive and inferential numeric analysis) and the qualitative (description and thematic text or image analysis) approach and often between the two approaches.

The unit of analysis was the SMEs' owner managers or their senior staff in Nyeri County. However, the individual information about the respondents who filled in the questionnaire was gathered. Before the data was analyzed the researcher made sure that the data being analyzed made sense and the analysis was guided by the underlying theoretical framework. First and foremost, before conducting the data analysis, data editing was undertaken in order to check for questionnaire completeness and accuracy (e.g. where necessary the researcher asked for additional information).

After data cleaning then it was categorized for ease of use in the advanced analysis techniques. Furthermore, the complete questionnaires were coded and transcribed in the computer using the SPSS software. After the data transcription I then ran a series of descriptive statistics on data namely mean scores, standard deviation, percentages, and frequencies distribution.

RESEARCH FINDINGS ND DISCUSSION

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

Business Environmental Factors as determinants of ICT adoption by SMEs

This study covered the business environmental factors as determinants of ICT adoption by SMEs owner/managers in rural Kenya, with specific reference to Nyeri County, in central Kenya. Specifically the findings refer to the respondents rating on external ICT support, market scope and competitive pressure.

Multiple regression analysis was used in testing the explanatory power of the study's conceptual framework. The regression equation used in this study is shown in table 1.

Table 1: The Multiple Regression Equations

Objective	Hypotheses	Data Analytical Methods	Interpretation
To determine the relationship between environmental context and ICT adoption.	H_0: ICT adoption and usage is not significantly influenced by business environmental factors.	$Y = \beta o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$ Where: βo = intercept Y = ICT adoption $\beta_1, \beta_2, \beta_3, \beta_4$ and β_5 are beta coefficients for H_o $X_1 X_2, X_3$ and X_4 represent dimensions of environmental context ε is the error term	r, r^2 and p-values

The correlations for these variables and the regression models are presented in this section. In order to test the study hypotheses with certainty, correlation and multiple regression analysis were carried out.

Environmental factors and ICT adoption

The environmental factors were measured by external ICT support, competitive pressure and market scope. The data for analysis was obtained using a Likert type scale of 1-5 where 1= strongly disagree, 2 = disagree, 3= neutral, 4= agree and 5= strongly agree. ICT adoption focused on both customer focus and innovations. The study objective for this part sought to determine the relationship between Business environmental factors and ICT adoption. The third hypothesis was tested for this objective.

In a study that was carried out by Goode and Stevens (2000) it was found that the business sector that a firm operates was found as a factor that consistently influence the adoption of technology in that firm.

H0$_3$: ICT adoption is not significantly influenced by Business environmental factors

Table 2: Correlation Results for Business environmental factors and ICT adoption

		ICT adoption	Business environmental factors
ICT adoption	Pearson Correlation	1	.624**
	Sig. (2-tailed)		0
	N	177	138
Business environmental factors	Pearson Correlation	.624**	1
	Sig. (2-tailed)	0	
	N	138	153

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

The results of the Pearson's correlation presented in Table 2 indicate that Business environmental factors had a significant positive effect on ICT adoption where r =.624 at p=0.000< 0.01.

Table 3: Regression results for Business environmental factors and ICT adoption

Model		R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
						R Square Change	F Change	df1	df2	Sig. F Change	
dimension0	1	.641^a	0.411	0.398	0.47338	0.411	31.179	3	134	0	2.187

a. Predictors: (Constant), market scope, competitive pressure, external ICT support competitive pressure
b.Dependent Variable: ICT adoption

Table 4: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	20.961	3	6.987	31.179	.000^a
	Residual	30.028	134	0.224		
	Total	50.988	137			

a. Predictors: (Constant), market scope, competitive pressure, external ICT support competitive pressure
b.Dependent Variable: ICT adoption

Table 5: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.789	0.194		9.234	0	1.406	2.172					
	External ICT support	0.137	0.054	0.216	2.558	0.012	0.031	0.243	0.508	0.216	0.17	0.617	1.621
	Competitive pressure	0.104	0.12	0.066	0.865	0.389	-0.134	0.342	0.351	0.075	0.057	0.763	1.31
	Market scope	0.332	0.06	0.457	5.518	0	0.213	0.45	0.609	0.43	0.366	0.64	1.564

a.Dependent Variable: ICT adoption

The results of the linear regression analyses presented in table 5 show that R value was equal to .641 indicating there is a positive relationship between Business environmental factors and ICT adoption. The R squared (R^2) value was equal to .411 meaning the factors making up Business environmental factors can explain 41.1% of the variation in ICT adoption. So both R^2 and the path coefficients indicated that the data supported the adopted model.

External ICT support

External ICT support had a significant positive effect on ICT adoption with β =.137 at p=.012< 0.05. In this study none of the respondents has a formal ICT services contract but during FGD some of them stated that they still seek ICT support services from the local ICT facilities vendors. According to Gono and Özcan (2013) "the main reasons for engaging external ICT consultants were a lack of ICT knowledge and skills, especially accounting knowledge which shows a positive association with ICT usage in firms and technology". However, most of the SMEs may not afford this type of consultancy services due to scarcity of financial resources. It is for that matter that Bradshaw et al (2012) noted that some SMEs do not have the appropriate ICT skills and abilities to select and implement major new systems and thus they engage ICT vendors or consultants due to a lack of ICT competences. In one of the FGD meetings that one of the participants said: "It was the vendor who sold me my computer who showed me how to use it and even now he is the one that I consult wherever I encounter any problem with it" FGR1-1

This statement is in agreement with the findings by Delone, (1988) who found that ICT vendor can assist firms in bridging the ICT adoption related knowledge gaps. These findings also confirms the findings by Arend and Wisner (2005) who found that that at times a larger

supplier or customer may force the SME to join the supply chain with any failure leading the larger counterpart finding another partner. So this type of pressure may force the SME to accept technological changes forced on them by larger partners.

However, these findings are contrary to those of Alshamaile (2013) who found that in the context of SMEs in the region of study, external computing support, significantly and negatively affected the adoption of cloud computing services. In that study it was found that the more external support is available the less likely SMEs may be to adopt cloud computing. The researcher's explanation to these findings is that whereas suppliers aim to may be support their customers they are oftenly negatively perceived as focusing on the sales rather the needs of the SMEs and thus making the SMEs to take a defensive position and therefore skeptical when it comes to external support.

Market Scope

In this study the market scope had positive effect on ICT adoption with β = .332 at p=.000<0.05. In this study few of the respondents (firms) intending to adopt ICT stated during the FGD that they would like to do so in order to expand their markets. In normal circumstances smaller firms may need ICT in order to reach wider markets. But with limited resources it is hard for them to achieve this noble objective. These findings were contrary to those of Yoon (2009) who did not find this factor to have any significant positive influence on intention to adopt ICT.

Competitive Pressure

In this study Competitive pressure had no significant effect on ICT adoption with β = .104 at p=.389>0.05. These finding are in agreement with those of Alshamaile, (2013) who found that competitive pressure did not affect SMEs' adoption decisions. Many participants in this study indicated that competitive pressure was not a significant factor during their ICT adoption decision making.

In FGD meeting one respondent stated that: "When making a decision to buy or not to buy a computer the issue of whom else is using ICT in order to beat me in the business competition did not occur in a rural set up and the only one operating a chemist. I just wanted the computer to make my daily business operation easy through automation. There was no competitive pressure to think about" (FGFR-).

However in a study carried out in Iran it was found that competitive pressure significantly and positively affects the adoption of E-Commerce (Elbertsen and Van Reekum, 2008). It is imperative to note that in a competitive environment, competitive pressure may come from some of their customers to use inter-organizational information systems of ICT services for

efficiency reasons. The outcome of this study is contrary to the findings by Gono and Özcan (2013) who found that some of the firms that they interviewed disclosed that "if they win a long term contract with a large organization or government department they adopt the needed ICT, streamline their systems or seek upgrades to facilitate customer demands". So their findings further show that customer and supplier pressure plays a huge role in the adoption of ICT with 63% of SMEs owner managers believing this to be true. So in almost similar findings Levy and Powell (2005) found that SMEs decision to adopt or not to adopt ICT is driven by the needs of their clients. Furthermore, according to Lin, (2006) EC adoption in SMEs is significantly and positively affected by competitiveness of environment. The results imply that ICT adoption is affected differently by the various Business environmental factors variables.

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

The absence of serious competitive pressure among SMEs may lead to the low rate of ICT adoption by the firms. This trend is not in the interest of business growth. In order to overcome this problem the ICT vendors and service providers should encourage small businesses in all ways by offering their potential and existing customers opportunities to try their products(ICT facilities) or services before encouraging or persuading them(SMEs) to adopt ICT. This would give the firms' owner managers the opportunities to determine the level of compatibility and complexity of the product/services in order to reduce the perceived risks. Such demonstrations by service/product providers can use relevant successful relevant case studies and hence show the benefits of adopting ICT. Such demonstration can easily lead to competitive pressure and hence lead to more diffusion of technology.

CONCLUSION

The results of the linear regression analyses showed there was a positive relationship between Business environmental factors and ICT adoption. On the overall the results imply that ICT adoption is affected differently by the various Business environmental factors variables. Therefore, the findings from this study suggest that environmental factors play a significant role in influencing ICT adoption by SMEs in the rural areas. After analyzing and interpreting the data the researcher was able to relate and support the research findings from prior research conducted elsewhere across different industries in different countries and therefore concluded that the results from this study can easily be generalized. This study further proved that by using the TOE framework more than one context can be responsible for the decision to adopt a new

ICT innovation by SMEs. For example this study examined the technological, organizational and environmental contexts and therefore this thesis provides additional support with respect to the applicability of a combination of both the TOE framework and DOI in investigating ICT innovation adoption among SMEs.

Theoretical Contribution

This study used the Technological Organizational, Environmental (TOE) framework and Diffusion of Innovation (DOI) combined as a theoretical basis. The use of this theoretical basis and highlighting the determinants of ICT adoption by SMEs is a major contribution of this study to a growing body of literature insights to future research on organizational innovation adoption by SMEs particularity on those that operate in rural Africa.

Therefore, the results from this study has shown that a combination of both TOE framework and DOI can be used as a theoretical basis for determining and understanding the factors that influence ICT adoption by SME. This will enrich knowledge and understanding of the innovation adoption process in an African rural set up during this era of rapid development of new technologies.

Lastly the results from this study gave clear empirical evidence that environmental factors influence ICT adoption by SMEs in different ways.

Contribution in Methodology

This study used mixed research approach 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 represents a paradigm shift from the approaches used in most of the past studies in the field of ICT adoption by SMEs which are 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 factors that influence ICT adoption by SMEs in their business environment. When armed with this knowledge the SMEs owner/managers could use the information about the relevant environmental factors as a road map to plan their ICT adoption and implementation. This can be done by identifying how ICT adoption can make easy for them to accomplish tasks with speed and accuracy, increase productivity and greater control in their daily business operations.

Contribution on Government Policies and Regulations

In order for the SMEs to succeed in ICT adoption and use, appropriate government policies and regulations are very important. The findings from this study presents some useful information for policy makers in the government of the day. Such results can inform and guide policy development and implementation.

RECOMMENDATIONS

1. This study highly recommends that the Kenyan central government to stick to its National Information and Communication Technology policy of 2006 which recommends the provision of a policy framework and adequate legislation to support e-commerce(ROK, 2006). The results from this study could guide the policy makers and planners in provision of e-Government services and its integration with the private sector ICT systems. The on their own cannot achieve their intention to adopt ICT or minimize the challenges of ICT adoption. They need serous government to put in place the necessary infrastructure, develop and implement the necessary policies.

2. The relevant authorities and their development partners should consider coming up with strategies of cutting down the cost of ICT facilities and internet Infrastructure. This would help in lowering the cost of such facilities and internet connectivity leading to the SMEs affording them.

3. The county government of Nyeri, ICT facilities vendors and consultants should consider holding seminars to educate business owners and their staff on the advantages of adopting and using ICT in running their firms. The government can look for development partners who can assist towards achieving these goals.

4. The Nyeri County and the central government should consider opening ICT Business Services Centres to act as resource/Service centres with full internet connectivity for dissemination of information to SMEs. Such centres should be manned by trained business councilors. These centres would provide affordable ICT services to the SMEs.

5. In order to enhance the widespread adoption of ICT applications systems the vendors should cooperate with SMEs whose owner/managers are innovative and have a positive attitude towards ICT use in their businesses. This would go a long way towards improving the compatibility of ICT applications systems with the existing ones within their firms.

SUGGESTIONS AREAS FOR FURTHER RESEARCH

This study was meant to expand new and relevant knowledge about the ICT innovation adoption among SMEs in rural areas. The results from this study are an important contribution

in the pursuit of gaining more knowledge about ICT adoption in the SMEs sector. Even though it has fulfilled its aim and objectives, the researcher found it prudent to suggest the following areas of further research:-

1. This study used the mixed methods approach and therefore the researcher recommends that a similar research could be carried out in either Kenyan or rural area in Africa using other research paradigms like quantitative or qualitative research approach in different sectors, industries and in different countries. This would provide data for comparison purposes. Such studies can be anchored on some of the theories like the theory of Planned Behaviour (TPB) and The Technology Acceptance Model (TAM

2. Finally future research could look on how both internal and external pressure can influence SMEs to adopt ICT.

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