East African Scholars Multidisciplinary Bulletin
Abbreviated Key Title: East African Scholars Multidiscip Bull
ISSN 2617-4413 (Print) | ISSN 2617-717X (Online)
Published By East African Scholars Publisher, Kenya
Volume-5 | Issue-11 | Nov-2022 | DOI: 10.36349/easjmb.2022.v05i11.001

OPEN ACCESS

Review Article

Integration of Management Information Systems and Performance of Small and Medium Enterprises in Embu County

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Article History
Received: 14.09.2022
Accepted: 21.10.2022
Published: 06.11.2022

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: Kenyan's need to use information systems in order to increase efficiency of operations within their enterprises. Survival of businesses to beat competition depends on their ability to use information systems. Those SMEs that use information systems are able to compete with their rivals in larger firms. Information systems allow SMEs to cut down costs, make better products and offer quality service to customers. SMEs that have integrated information systems are able to cut down cost and provide better services to customers. SMEs in developed economies have exploited the full benefits of information systems unlike those in developing nations like Kenya. This is so because of the slow development of information systems within SMEs in developing nations. There are a number of challenges experienced by SMEs in developing countries that impedes the adoption and use of information systems. These challenges include; poor ICT infrastructure, lack of management support, inadequate user expertise and poor information storage. This study sought to investigate how these challenges affect performance of SMEs in Embu County, Kenya. The study targeted 250 SMEs with a total of 400 employees. Stratified random sampling was employed to select 80 employees from the targeted population. Primary data was collected using closed and open-ended structured questionnaires with reliability coefficient of 0.6 and above. Data was collected using drop and pick method. It was analyzed using both descriptive and inferential statistics using SSPP 20. Descriptive analyses were done using tables, graphs, mean and standard deviation. Inferential analysis was based on multiple regression models. The study revealed that SMEs had adequate ICT infrastructure that enabled them communicate effectively with their stakeholders. The study also found that staff had adequate Skills and knowledge in ICT that enabled them use ICT tools efficiently. The study concluded that ICT infrastructure, Management support, user expertise and information storage influenced performance of SMEs in Embu County. The study recommended that management of SMEs in Embu County should provide sufficient ICT infrastructure and provide training to their staff to acquire skills in ICT. It also recommended that the government of Kenya should waive taxes for ICT devices to enable SMEs procure these devices with ease.

Keywords: Integration of Management information system; SME performance; ICT infrastructure; Management support; User expertise; Skill, knowledge; Information storage.

Management Information System Integration

Management information system (MIS) is a system that collects data, process, store, retrieve data and disseminate information to managers to allow them make concrete decisions. It allows management to obtain complete, accurate, quality and reliable information at the right time. MIS allows information to flow across hierarchical levels of management to help make concrete decisions (Santosh, Indrakumar &Vijay, 2012). Management information system (MIS) allows firms identify opportunities and respond to environmental threats (Alene, 2018). It integrates

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sections and departments within an organization to facilitate online flow of information. It allows information to reach the right people in the right format, at the right speed and at the right time (Yaser, Shamsuddin &Aziati, 2014). For SMEs to be able to compete and remain afloat with global completion, they require quality business information. Access to quality business information is dictated by availability of efficient and effective information systems (Obura, 2009).

Small and Medium Enterprises

The meaning of SMEs is depended on the country in which a business operates in. SMEs can be categorized depended on the volume of sales, its total assets or a combination of both. In United States, definition of SMEs is depended on the industry in which the business operates. In manufacturing industry, SMEs is that enterprise with a maximum number of 500 employees, and in wholesales industry, SMEs is that enterprise with a maximum number of 100 employees. In Canada, SMEs is that enterprise with less than 500 employees. Globally, SMEs are generally defined as enterprises with more than 50 employees and a maximum number varying from country to country. For some countries, the maximum number is 200, while others fix their maximum number to 250 and 500 employees. Some countries categorize SMEs based on the minimum number of employees. Small enterprises are those with less than 50 employees while micro enterprises are those with 5 to 10 employees. SMEs are also defined in terms of financial assets. European Union defines a medium sized firm as that with less than 50 million EUR turn overs, a small size firm is that with less than 10 million EUR turnover, while a micro size firm is that with less that 2 million EUR turnover. According to OECD, (2016), the account balance for micro, small, and medium sized enterprises should have less than2 million EUR, 10 million EUR and 43 million EUR respectively (OECD, 2016).

Kenya defines SME according to the number of employees. Micro enterprise is those with less than 10 employees, small enterprises are those with 10 to 49 employees and medium-sized enterprises are those with 50 and 99 employees.

Statement of the Problem

SMEs have in the recent past experienced transformational change in technology in various parts of the world. This is due to the fact that many governments have implemented policies to oversee realization of ICT investment to SMEs. Similarly, the government of Kenya is inclined towards implementing policies to promote ICT growth. One way that the government has done this is through installation of fiber optic cable to provide Internet connectivity to businesses.

Alam & Noor, (2009) and Apulu, (2012), underscore the significance of ICT investment in increasing performance of SMEs, however, despite the much struggle by the government to improve the growth of ICT, SMEs in Kenya are still lagging behind in the use of ICT due to its slow adoption (Nduati, Ombui, & Kagiri, 2015) . Mwenda (2018), (Masenge, 2014) advocate that Kenya's SMEs unlike larger firms are yet to enjoy the gains of ICT owing to its slow adoption. SMEs are thus experiencing several challenges such as lack of access to the global market (KIPPRA, 2006), high transaction cost (Mwenda, 2018), and production of poor quality products (Macharia, 2009). These enterprises rely mainly on manual transmission of market information (Kinyua, 2009).

Few studies indicate that the slow rate of ICT uptake by SMEs in Kenya is due to poor ICT infrastructure, poor management support, inadequate user expertise and poor information storage (Ndiege & Wayi, 2012), (Macharia. 2009). However, there is no sufficient research that shows how these challenges affect performance of SMEs. This study aimed at assessing how these ICT adoption challenges affect performance of SMEs. The study focused on examining management information system integration and performance of SMEs in Embu County, Kenya.

Study Objectives

The study sought to investigate the following specific objectives:

(i) To determine the effect of ICT infrastructure on performance of SMEs in Embu County, Kenya.
(ii) To evaluate the effect of management support on performance of SMEs in Embu County, Kenya.
(iii) To establish the effect of user expertise on performance of in SMEs in Embu County, Kenya.
(iv) To assess the effect of information storage on performance of SMEs in Embu County, Kenya.

Research Questions

The study sought to answer the following research questions:

(i) What is the effect of ICT infrastructure on performance of SMEs in Embu County, Kenya?
(ii) What is the effect of management support on performance of SMEs in Embu County, Kenya?
(iii) What is the effect of user expertise on performance of SMEs in Embu County, Kenya?
(iv) What is the effect of information storage on performance of SMEs in Embu County, Kenya?

Scope of the Study

The study focused on 250 SMEs in Embu County that are registered with the ministry of trade and industry. The study investigated the impact of management information system on performance of SMEs in Embu County, Kenya. The sample of study was confined only to SMEs that have integrated digital systems in their businesses. The study covered small and medium enterprises. Small enterprises are those with 10 to 50 employees, medium enterprises are those with 50 to 99 employees. The sample of the study was taken from those SMEs that were in operation by the end of year (2021). This included ICT managers and employees in the 250 targeted SMEs.

ICT Infrastructure and SMEs Performance

Successful adoption and use of IS is highly dependent on effective ICT infrastructure (World-Bank, 2004). According to (Röller & Waverman, 2001), ICT infrastructure needs to be put in place in order to develop an IS project. According to Alam and Noor (2009), countries need to build robust ICT infrastructure in order to allow their firms compete on an international scale and boost their economic growth. ICT infrastructure allows expansion of market thereby increasing profitability of firms (Duncan, 1995). It enables integration of SMEs to the global business environment (Odhuno & Ngui, 2018),

Lawrence & Usman (2010), observe that lack of ICT infrastructure would lead to a loss in realizing the benefits of ICT (Lawrence & Usman, 2010). ICT infrastructure increases productivity and efficiency of firms. (Nordas & Piermartini, 2004) note that ICT infrastructure enables firms to increase their volume of trade and cut down cost. It allows firms access the global business networks (Francis & Machim, 2007).

ICT infrastructure need to be put in place for firms to realize technological global changes. ICT infrastructure allows SMEs to improve productivity, efficiency and enter new market channels (Pillay, 2016), (Makiwa, 2018). .However studies indicate that lack of ICT infrastructure is a major problem facing SMEs in developing countries (World-Bank, 2004) such as Nigeria, Botswana, South Africa and Tanzania making their survival difficult in today's global competitive environment (Mutula & Brakel 2006) (Moruf, Olusola, & Oluwaseun, 2014).

Management Support and SMEs Performance

Management support is defined as the level that the management is committed to successful adoption and use of a system (Caldeira and Ward, 2002). Management support is therefore a major contributing factor to the successful adoption of information systems (Sharma & Yetton, 2007). According to (Ramdani & Kawalek, 2007) management support involve allocation of requisite resources and provision of expertise to facilitate adoption of a new system. According to (Buruncuk & Gülser, 2012), the managers innovativeness, their participation and involvement in planning and implementation of IS plans is crucial to the successful adoption of information systems.

Gono *et al.,* (2016), Apulu (2012), Adebayo *et al.,* (2013), (Matambalya& Wolf, 2001) also note that owner manager has a vital role to play in ICT adoption. ICT adoption increases productivity of SMEs (Matambalya & Wolf, 2001). However Apulu (2012) observes that lack of management commitment and support is a major problem facing IS adoption in developing nations such as Nigeria and South Africa leading to its low uptake.

User Expertise and SMEs Performance

Employees are vital assets for the survival of firms (Nguyen, 2009), (Venkatesh & Brown, 2004), (Caldeira & Ward 2002) which have to be developed to bring success to businesses (Zhou, Li, & Lam, 2009). Users skills, knowledge and training can affect the use and adoption of IS (Thong, 2001).

A paper by World Bank establishing the link between the use of ICT and performance of firms observes that ICT skilled workforce is important for enhancing performance of firms. However, the paper notes that lack of skills and knowledge in ICT is a major problem facing firms in developing countries thus limiting their growth (World-Bank, 2004). In order to realize the gains of ICT investments, users need to have sufficient skills in ICT (Productivity-Commission, 2004).

Matambalya and Wolf (2001) argue that ICT skills are vital for enhancing performance of SMEs. The duo add that lack of skills in ICT was hindering the growth of firms and therefore workers need to be trained to acquire skills in ICT (Matambalya & Wolf, 2001).Workers require sufficient skills to be able to use ICT (Mugobi & Mlozi, 2020).

Information Storage and SMEs Performance

Barba-Sanchez *et al.,* (2021) assert that, ICT enhances communication and easy access of information. ICTs allow easy flow of information within and outside the firms (Porter & Miller, 1985). Shanker (2008) argues that the use of ICT enhances dissemination and sharing of information where buyers and sellers can communicate effectively at a reduced cost (Shanker, 2008).

Emonena (2018) argue that ICT has increased productivity of firms through sharing of information. However he notes that information flow within SMEs in developing countries is still not efficient due to the slow adoption of ICT (Emonena, 2018).

A paper by the Organization for Economic Co-operation and Development (OECD) (2004) also observes that ICT enhance effective communication and sharing of information at reduced cost (OECD, 2004). Essential information from consumers can be easily accessed thus enabling firms to enjoy competitive advantage (Prasad, Ramamurthy, & Naidu, 2001).

The use of ICT enables businesses to access market information which give them a competitive advantage (Matambalya & Wolf, 2001)(Yusuf, 2013). However (Mutula & Brakel, 2006) note that access to information is a major problem facing developing countries in Africa due to slow adoption of ICT.

Research Design

The study adopted exploratory design. Exploratory research aims at investigating a problem which has not been studied before with which scanty or no literature exists. It is meant to provide some insights into a problem without giving conclusive findings. Exploratory design was the best suited for the study since there has not been thorough investigation into the problem before.

Target Population

A population is the total number of elements needed for a study (Cooper & Schindler, 2006). The study targets a population of 250 SMEs with a total number of 400 employees. These SMEs include boutiques, restaurants, retail shops, cosmetics, Jua Kali, Agriculture located in Embu County.

Sampling Design

Sampling design is the technique employed in picking a sample of elements from a target population (Cooper, & Schindler, 2006). The study employed stratified random sampling to select a sample of 80 respondents from 250 SMEs. SMEs were stratified into clusters based on their operational activities. 250 SMEs that have integrated information systems were then purposively selected across various strata. The researcher then randomly selected a sample of 10% to 30% of respondents from each stratum forming a sample size of 80 respondents from the entire population of 400 respondents. According to Mugenda and Mugenda (2003), a sample of 10% to 30% of entire population is adequate for a study.

Table 3.1: Sample frame

SMEs categories	Sample size	% of the total sample size
Boutique	10	13
Restaurants	8	10
Retail shops	16	20
Cosmetics	14	17
Jua Kali	8	10
Transport	9	11
Agriculture	15	19
Total	**80**	**100**

Source: Kenya National Chamber of Commerce & Industry (2022)

Data Collection Instrument

The study employed primary data that was gathered from respondents using questionnaires. The questionnaire was categorized into two parts, Section A and section B. Section A captured respondent's background information and Section B captured information pertaining to the variables of the study. Data was collected using drop and pick method.

Validity of Research Instrument

According to Mugenda & Mugenda (2003), Validity examines whether a research instrument measures what it was meant to measure. Content validity examines whether the research questions universally cover all the content of a study. The researcher sought the assistance of the supervisor to establish whether the research questions satisfy content validity. Construct validity is the degree to which a research instrument measures the concept which it was meant to measure. The researcher ensured that questions carefully represented the intended concepts.

Reliability of Research Instrument

Reliability examines whether a research instrument yields consistent results when a test is administered repeatedly (Saunders, Lewis, & Thonhill, 2007)). Assessment of reliability is determined through test-retest process (Mugenda and Mugenda, 2003). The researcher determined reliability of research instrument by administering a test to 5 employees recording the scores and then re-administering the same test to the same employees two weeks later. The scores of the two tests were then compared using Cronbach Alpha Co-efficient to assess the reliability of the instrument. An alpha coefficient of not less than 0.6 indicated that the research instrument is reliable.

Data Analysis and Presentation

Descriptive and inferential statistics were used to analyze quantitative data. Content analysis was used to analyze qualitative data. Common themes emerging from open-ended questions were sorted into categories and inferences drawn from these themes to arrive at specific findings. According to (Coopers & Shindler, 2006), content analysis allows capturing of data which

cannot be captured using structured questions. Data collected from the respondents was coded, keyed in the computer and analyzed using Statistical Package for Social sciences (SPSS). Descriptive data was analyzed using frequencies, percentages, mean and standard deviation and represented into charts and tables to provide simple interpretation of the data. Inferential statistics was used to determine the relationship between independent variables and dependent variable.

FINDINGS, DISCUSSION AND CONCLUSION

The main objective of the study was to establish the influence of ICT infrastructure, management support, user expertise and information management on performance of SMEs in Embu County. The study used multivariate regression analysis in establishing this relationship. The regression equation summary is given below.

Table 4. 1: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.869[a]	.756	.737	.21708

a. Predictors: (Constant), ICT infrastructure, management support, user expertise, information storage

The table 4.1 above signifies that there is a strong positive relationship between the dependent variable and independent variables (R of 0.869). The adjusted R square is coefficient of determinant which tells us the variation in the dependent variable due to changes in the independent variable. The adjusted R squared was 0.737 indicating that 73% of the variation in SMEs performance in Embu County is explained by ICT infrastructure, management support, user expertise, and information management.

The Regression Coefficients of the study used the coefficient table to determine the study model.

Table 4.2: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		β	Std. Error	Beta		
1	(Constant)	.565	.261		2.164	.035
	ICT infrastructure	.296	.061	.374	4.885	.000
	Management support	.150	.050	.221	2.981	.004
	User expertise	.264	.052	.315	3.965	.000
	Information storage	.207	.054	.361	4.265	.000

a. Dependent Variable: performance

The Result of Regression Model was Denoted as

SMES performance = 0.565 + 0.296 ICT infrastructure + 0.150 management support + 0.264 user expertise + 0.207 information storage.

The regression equation established that all factors (ICT infrastructure, management support, user expertise and information storage) held constant performance of SMEs in Embu county was 0.565. The result of regression model indicated that there is a positive significant influence of ICT infrastructure and performance of SMEs in Embu County with $\beta = 0.296$ and $p=0.000<0.05$. This indicates that a unit increase in ICT infrastructure would lead to 29 % increase in performance of SMEs in Embu County. This findings concur with (Masenge, 2014) who states that ICT infrastructure influence performance of SMEs.The findings are also in line with (Mbataru & Wanjau, 2013), who posit that ICT infrastructure has a significant influence on performance of SMEs. The regression results also show that there is a positive and significant relationship between management support and performance of SMEs in Embu County as shown by $\beta = 0.150$ and $p=0.000<0.05$. This indicates that a unit increase in management support would lead to 15 % increase in performance of SMEs in Embu County. This findings concur with (Najjar, 2009) findings that management support has significant influence on performance of organizations. Another study by Munyao (2017) avers that management support has a positive effect on performance of firms.

The regression results also show that there is a positive and significant relationship between User expertise and performance of SMEs in Embu County as shown by $\beta = 0.264$ and $p=0.000<0.05$. This implies that a unit increase in user expertise would lead to a 26 % increase in performance of SMEs in Embu County. The findings are consistent with (Najjar, 2009) findings that user expertise has a significant influence on organizational performance. His study found that that organizational commitment to train employees to use management information systemsinfluence performance of organizations with mean of 4.53.The finding also concurs with a study by Munyao (2017), who found that there was strong relationship between ICT skills and performance of staff.

The regression results also show that there is a positive and significant relationship between

information storage and performance of SMEs in Embu County as shown by $\beta = 0.207$ and $p=0.000<0.05$. This implies that a unit increase in information storage would lead to a 20 % increase in performance of SMEs in Embu County. These findings are in line with a study by Munyao (2017), who found that information systems provide adequate storage and sharing of data that improves performance of firms.

Summary of research findings

The study aimed at investigating management information system integration and performance of small and medium sized enterprises in Embu County, Kenya. The study looked at the following specific objectives: to establish the effect of ICT infrastructure on performance of small and medium enterprises in Embu County, Kenya; to assess the effect of management support on performance of small and medium enterprises in Embu County, Kenya; to investigate the effect of user expertise on performance of small and medium enterprises in Embu County, Kenya.; to determine the effect of information storage on performance of small and medium enterprises in Embu County, Kenya. The study was carried out among 80 respondents within 250 SMEs in Embu County that are ICT integrated. The study employed exploratory research design and used primary data used was obtained from respondents through structured questionnaires which comprised of closed and open-ended questions. The questionnaires were sent to the respondents to fill using drop and pick method. Content validity which involved the use of expert opinions and construct validity was used to determine the validity of the instrument. The data collected by the questionnaire was edited, coded and entered into the Statistical Package for Social Sciences (SPSS) which aided in analysing the data.

Quantitative data was analysed using descriptive and inferential statistics while qualitative data was analysed using content analysis technique. Regression equation was used to establish the relationships between the variables.

The respondents felt that ICT infrastructure had enhanced communication within their firms. They observed that ICT infrastructure had made communication easir, cheaper and faster which enhanced efficiency of operations. They claimed that most firms were able to connect to their customers and suppliers through the Internet. The study revealed that most SMEs used mobile connectivity while a few used fiber connectivity. The respondents were of the view that ICT infrastructure had enhanced customer service.

The study found that management supported IS investments and participated in IS planning. Respondents also agreed that management facilitated necessary resources for IS investments and provided training to their staff in acquiring new skills in emerging technologies. The study also found that management suppoted IS maintenance through facilitation of regular system monitoring.

The respondents stated that many employees had requisite skills, knowledge, competency in ICT. According to the respondents, many of the staff were able to access the Internet and search for information. They stated that ICT skills, knowledge, competency and experience had enhanced efficiency of workers in the use of ICT tools.The study revealed that MIS had enhanced communication among stakeholders. The respondents observed that Internet allowed sharing of information among customers and suppliers and facilitated easier storage and access to information.

The results from the study revealed that management information system had enhanced performance of SMEs within Embu County, Kenya. Respondents felt that through the use of Internet they were able to reach customers across the globe thus expanding the market of their firms. They claimed that e-commerce and use of e- mails had helped in cutting down transactional and communicational costs which increased profitability of their firm. Similarly they also felt that the use of ICT tools had enhanced productivity of workers.

CONCLUSION

The first objective sought to assess the effect of effect of ICT infrastructure on performance of small and medium enterprises in Embu County, Kenya. The study found that ICT technologies such as Internet, website, email and mobile phones facilitated communication in their firms and enabled them to search for information from the Internet and access the global market. The study concluded that ICT infrastructure had a positive and significant influence on performance of small and medium enterprises in Embu County.

The second objective sought to assess the effect of management support on performance of small and medium enterprises in Embu County, Kenya. The study found that management support through provision of resources and training of staff was key in firms. The study concluded that management support had a significant influence on performance of SMEs in Embu County, Kenya.

The third objective sought to determine the effect of user expertise on performance of small and medium enterprises in Embu County, Kenya. The study found that skills in the use of ICT and training improved efficiency at work and allowed them to source for information from the Internet .The study concluded that user expertise had a positive and significant influence on performance of SMEs in Embu County, Kenya.

The fourth objective sought to establish the effect of information storage on performance of small and medium enterprises in Embu County, Kenya. The study concluded that information storage had a positive and significant influence on performance of SMEs in Embu County, Kenya.

RECOMMENDATION

This study makes the following recommendations: Management of SMEs in Embu County should provide sufficient ICT infrastructure in order to enhane performance of SMEs. Management of SMEs in Embu County should provide training to their staff to acquire skills in ICT in order to enhance their competence on the use of information systems. The government of Kenya should waive taxes for ICT devices to enable SMEs procure these devices with ease.

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Cite This Article: Hannah Wangechi Kamau & Josphat K. Kyalo (2022). Integration of Management Information Systems and Performance of Small and Medium Enterprises in Embu County, Kenya. *East African Scholars Multidisplin Bull, 4*(5), 233-240.