

# Entrepreneurial Spirit: Acceptance and Adoption of E-Commerce in the Health Sector in Kenya

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**Abstract**—Competition from large businesses threatens the existence of Small and Medium Enterprises (SMEs) in Kenya. However, with the acceptance and adoption of e-commerce SMEs can compete with the established businesses in both local and global markets, but recent studies indicate a worrying trend on adoption of e-commerce by health related SMEs in Kenya. This research tested the effect of three contextual variables that is individual, technological, and external environmental variables on the adoption of Information Communication Technologies (ICTs) by SMEs in the health sector in Kenya. A cross-sectional survey design was used, and 172 semi-structured questionnaires were administered to the end-users. A Logit regression was applied in analyzing the influence of the three contextual factors on acceptance and adoption of ICT by SMEs. Results indicated that age, CEO's ICT knowledge, relative advantage, government policies on ICT applications, and pressure from suppliers and customers were the main determinants of ICT adoption. The study recommended that government should develop a differentiated ICT policy and incorporate compulsory training in computer applications in the national school curriculum. In addition, SMEs should set a mechanism for monitoring the changes in technological innovations as the electronic marketplace evolves.

**Keywords**— Entrepreneurship, SMEs, ICT, e-commerce, adoption, acceptance, use and e-health.

## I. INTRODUCTION

According to [69] United Nations Industrial Organization (UNIDO), most countries appreciate the role played by SMEs in ensuring broad, sustainable and diversified private sector that is capable of income generation, provision of employment to semi-skilled or even retrenched employees from both private and public sectors (UNIDO, 2004, [22] Muathe, 2010).

Small and Medium Enterprises are critical to the growth of any country and their success is important to economic growth of any country ([52] Lange et. al., 2000, [13] International Finance Corporation (2005). However, high competition posed by mature business, affects the profit and thus reducing the incentive for people to start SMEs ([22] Muathe, 2010, [50]

Kiveu, Namusonge, & Muathe, 2019). But with acceptance and use of e-commerce it ensures the survival and success of SMEs since it brings business opportunities and helps in dealing with pressure from competition ([22] Muathe, 2010, [23] Muathe, Wawire, & Ofafa, 2013, [16] Kaberia & Muathe, 2019, [34] Tawane, & Muathe, 2019). Additionally, use of ICT can result in lower prices for finished goods since it leads to reduced operation costs. The e-commerce can create innovate ways of supplying goods through global connectivity. Additionally, the website can be used as a marketing tool to provide competitive advantage and open to additional Markets that can lead to more income growth. Similarly, networked computers can ease sharing of files electronically, and increase the efficient of business operation ([37] Thong, 1999, [28] OECD, 2002, [8] DeLone, & McLean, 2003), [19] Kashorda, 2007. [22] Muathe 2010, [23] Muathe, et al., 2013).

Research on the factors influencing the adoption of ICT in most cases dwell on three categories of determinants that is, adopters' characteristics, the competitive environment, and features of the innovation in SMEs. Characteristics of the adopter include, location of SME, age of entrepreneur, CEO's ICT skills, and owner's / CEO's experience of the SMEs ([4] Chapman et al., 2000). The competitive environment can be explained by the level of firm concentration. This includes pressure from competitors that result when SMEs assume their rivals can obtain comparative advantage over them by adopting ICT in their daily activities ([38]Tung & Rieck, 2005). [25] Müller-Falcke, (2001) and [68]UNIDO, (2003) opined that competitive environment may result from such factors like supplier pressure culture pressure from customers, potential users and government policies.

[1] Bii and Gichoya (2006) observed that the adoption and utilization of ICT is still at its infancy in Kenya. [27] Nguo (2004) asserts that the absence of suitable ICT infrastructure is a hindrance to the growth of e-commerce in Kenya. Moreover, [27] Nguo opined implementing e-commerce without a supporting employees' development strategy would only result in failure or wastage of funds. [15] Kabaara (2004) noted that about 90 percent of population of Kenya resides in rural areas and thus the impact of ICT will only be beneficial to the small population in urban centers that have access to ICT

applications. In addition, Kenya's National ICT Policy has no provision for harmonizing the effort of different entities like private sector, public sector, communities and the civil society [61] Republic of Kenya, 2006, [48] Kashorda & Mbui, 2007).

In Kenya's Vision 2030 whose target is to achieve and sustain 10 percent gross domestic product, the ICT sector was identified to contributing significantly to the economic pillar ( [62] Republic of Kenya, 2007, [22] Muathe 2010, [23] Muathe, et al., 2013). Furthermore, to achieve equity and socio-economic agenda in Vision 2030 health sector is one of the central pillars ( [62] Republic of Kenya, 2007). However, as noted earlier, the decision to adopt ICT by health SMEs is as a result of the foresight of the SME owner, the training received, experience as well as how the SME owner views the effect of government policy changes and future economic status. Despite the many benefits attributed to ICT adoption, SMEs in Kenya are slow in increasing the level of adoption ( [56] METI, 2001, [32] Sun & Zhang, 2005). Thus, it becomes necessary to understand the determinants of e-commerce acceptance and use by SMEs ([23] Muathe, et al., 2013).

## II. LITERATURE AND REVIEW

### A. Health Sector and ICT Adoption

First, The ICT revolution in African counties and in effort to improve management of health services brought with it both opportunities and challenges. However, due to globalization the low income countries had no option other than to adopt e-commerce and enjoy the benefits of e-commerce and deal with the challenges ( [30] Simba, 2004).

ICT has an ever-growing impact on people's working and private lives and the healthcare sector is no exception. Moreover with advancement of e-commerce and the urge to come up with improved techniques of providing more efficient health care services, there has been enhanced use of e-commerce over the past decade ([12] Institute of Medicine, 2001). Adoption and use of ICT in provision of health services has increased over the last 20 years and the benefits of ICT in improving efficacy have been noted by governments' all over the world ([12] Institute of Medicine, 2001). Strategies at national level aimed at developing information infrastructure and infostructure to support health management have emerged worldwide ([70] USA, 2001 and [9] Department of Health and Children, 2005). The aim is to ensure there are safety and efficiency in management and access of patients' health records.

In addition, [70] USA (2001) and [9] Department of Health and Children (2005) argue that there is need of standards and policies for ensuring inter-operability and management of data to achieve consumer empowerment and self-care by providing information electronically ([35] Titus, Mburu, Korir, Muathe, & Obere, 2013). In many developed countries e-health facilities and systems are seen as key to the future provision of high quality customer-centered health services ([67] Silber, 2003, [35] Titus et al., 2013). However, the language of e-healthcare has been changing overtime ([67] Silber, 2003, [72] Waitthaka, Mburu, Korir, & Muathe, 2013, [23] Muathe, et al., 2013).

There has been change in focus of healthcare information technology (IT) from hardware and databases to innovative uses of e-commerce to improve communication and decision-making and also appreciate the benefits resulting from human factors and institutional factors ([73] WHO, 2005a). These changes are important to provision of customer-centered health care in future which could include tele-consultation, electronic patient record, tele-education, e-prescription, e-referral, tele-monitoring, tele-care, and tele-medicine services that assist in relaying patient information and indicators that would help doctors to reach a diagnosis ( [26] Mwabu, 1995, [73] WHO, 2005a). However, e-health is a topic with global interest and the current ICT improvement most is limited developed countries.

There is agreement among researchers on the important of improved e-health service as noted by [42] Eysenbach (2001) that ICT adoption come with accrued benefits that generally improves the management of health forward and backward linkages and ensuring geographically dispersed resources to be treated as if they were in central region.

To offer improved health services the developed countries have invested heavily in e-commerce applications. Hospitals in the United States for example, developed plans of using e-commerce to obtain clinical and financial data through e-commerce technologies and ensure improvement in management efficiency and better services to the customers in different ([20] Montague, 1996). In the United Kingdom, £6 200 million was invested by the government in developing a national IT programme ([6] Collins, 2004). This IT programme was meant to deliver efficient health services.

Despite these advances, there is a huge gap between the developed and the developing world in terms of e-commerce services in health related SMEs ([73] WHO, 2005a). Furthermore, provision of quality health services in Kenya and the developed countries has been widening. In the mid-1990s, for example, on average the ratio of physician was 1: 400 patients in developed economies, but on average the ratio of physician was 1: 1,000 patients in developing economies ( [74] WHO, 2005b). In some African countries, the ratio of doctors is 1:7,000 patients and this ratio goes to high of 1: 20,000 patients in rural areas ( [74] WHO, 2005b). Ironically, it is the African countries that should be implementing ICT application more aggressive than the developed countries in order to bridge the technology gap and mitigate the shortage of doctors and other health professionals through tele-medicine.

From the empirical literature reviewed, the study established numerous factors which might be worthy of further study and empirical testing of their effect on ICT adoption by SMEs. These factors include financial resources, skilled manpower, CEO characteristics, relative advantage, and compatibility. Health sector has volume of sensitive information however with ICT adoption and use this can improve management of health service. However, it looks like there is weak uniformity in how the determinants influence ICT acceptance and use in the health context in Kenya. This argument is consistent with observations of [10] Iacovou et al., (1995), [11] Igbaria, Parasuraman and Baroudi (1996), [43] Fallon and Moran's (2000) and [49] Kiarie, et al. (2006), [22]

Muathe (2010) that little attention in terms of empirical research has been given on this topic.

The current research tried to scientifically fill the research gap in previous literature and with the view that developing countries are different and the determinants of ICT acceptance and use also differ and thus are the factors affecting ICT adoption in health SMEs in Kenya. However, there is limited data and empirical literature in this subject matter and therefore the researcher selected from the past studies the variables to be analyzed in this study. These factors were CEO innovation, sex, age, education, and manager’s level of ICT knowledge. The other factors were relative advantage, complexity of innovation, compatibility of ICT systems with other factors like cost, pressure from competition, policies from government, infrastructure to support the technology, pressure from suppliers or customers, and national culture. This study used a modification of the [60] Rashid and Al-Qirim (2001) model, in the revision, the determinants of adoption of ICT were categorized as individual, technological, and external environmental factors. The main factors influencing ICT adoption and use were adopted and adapted from [7] Davis (1989) and ([71] Venkatesh et al., 2003) studies.

Based on the literature reviewed and an attempt to integrate the findings of this study with existing literature by drawing insight from earlier studies of ICT adoption by SMEs [60] Rashid and Al-Qirim, (2001), [71] Venkatesh et al.(2003), [64] Rogers, (2003), [18] Karki, and Bauer, (2004), [17] Kapurubandata, Arunatileke, & Ginige, (2004), [46] Getao, and Wausi. (2005), [39] Erdener, Ekrem, and Veysel. (2005), [40] Erumban, and de Jong, (2006), and [54] Marjan, (2006), the study conceptualized and tested the following hypotheses:

**H01:** Individual factors have positive significant effect on adoption of ICT by SMEs in Kenya

**H02:** Technological factors have positive significant effect on adoption of ICT by SMEs in Kenya

**H03:** External Environment factors have positive significant effect on adoption of ICT by SMEs in Kenya

### III. RESEARCH METHODOLOGY

The research applied a cross-sectional survey design, [53] Malhotra and Birks, (2003), [65] Saunders, Lewis, and Thornhill. (2003) and [24] Mugenda and Mugenda (2003) argues that a cross-sectional survey is used where the problem under investigation is been well crystalized and the researcher can conduct a field survey by going to the population of interest for the respondents to describe features about the problem under investigation.

The unit of analysis was made up of 17 health’s related SMEs in Nairobi City County. The 17 SMEs had a total of 1,431 employees and 172 respondents which translate to 12 percent of the total employees were selected using proportionate stratified and simple random sampling techniques ([55]Menard 1995, [3] Burns & Bush, 1998, [24] Mugenda & Mugenda, 2003, [51] Kothari, 2007, [22] Muathe, 2010). Data was collected using a semi-structured questionnaire that was administered to the ICT end-users. To

adopt is binary variable and thus Logit model was used to analyze the data since it is a more robust and it overcomes the limiting assumptions of discriminant analysis, the predicted probabilities are guaranteed to lie between 0 and 1, and the marginal effects are not constant ([2]).

Bowerman & O’ connel, 1990, [33] Tabachnick & Fidell, 1996). Furthermore, the variables should not necessary be following normal distribution curve, or linear related and have equal variance within each group. Also, the model does not assume homoscedasticity and generally has less stringent requirements. The model provides knowledge of the relationships and strengths among the variables ([33] Tabachnick & Fidell, 1996, [45] Glesne, 1998, [44] Field, 2005) and the Wald statistic tested was used to test the influence of each variable studied ([44] Field, 2005).

### IV. FINDINGS AND DISCUSSION

A Logit model was used to test the influence of the factors of e-commerce adoption on provision of health services. The factors included in the logit regression are as follows: employees age, CEO’s innovation, CEO’s ICT knowledge, relative advantage, complexity, compatibility, image, cost, trust of ICT facilities, competitive pressure, government policies, technological support infrastructure, national culture, and suppliers’ and customers pressure as indicated in Table 1.

TABLE I. TABLE 1:PROBABILITY OF ICT ADOPTION IN HEALTH SMEs IN KENYA

	$\beta$	$t=\beta/\text{S.E.}$	Wald	P-value
Age	-4.556*	-2.06	4.237	.040
Innovation of CEO	2.774	1.38	1.916	.166
CEO’s knowledge in ICT	4.236*	2.30	5.285	.022
Relative advantage	-9.939*	-2.44	5.931	.015
Complexity of ICT facilities	1.533	0.84	.707	.400
Compatibility of the ICT facilities	-3.023	-1.68	2.817	.093
Image	-.739	-1.19	1.412	.235
Cost of ICT facilities	-1.503	-1.8	3.244	.072
Security/trust of ICT facilities	-.110	-0.23	.053	.818
Competitive pressure	-.257	-0.17	.030	.862
Government policies on ICT applications	-5.749*	-2.47	6.107	.013
Technological support infrastructure	-1.028	-0.80	.636	.425
National culture	-.105	-0.09	.008	.930
Suppliers’/patients’ pressure	6.238*	2.46	6.053	.014
Observations (n)		136		
Nagelkerke R Squared		.786		
Model Chi-square	20 df)	89.779		.000
Classification Rate		94.9%		
-2 Log likelihood		40.003		
Hosmer and Lemeshow Chi-square Test	8 df)	1.804		.986
Total # steps	0			
Notes: ** $p \leq 0.01$ , * $p \leq 0.05$				

Table 1 findings indicated that chi-square was 89.779 and a P-value was 0.001 hence the model was significant in influencing adoption and use of ICT in health related SMEs in Kenya. The Nagelkerke R Squared was 0.786 which indicated that 79 % of variation in ICT acceptance could be attributed to the factors in the study and this represented 94.9% overall success rate, this was consistent with [44] Field's (2005) and [22] Muathe (2010) argument.

Furthermore, five variables met the standard threshold of 0.05 for statistical significance. However, not all estimated coefficients had the expected sign. In the individual factors category, age ( $p = 0.014$ ) and CEO's knowledge in ICT ( $p = 0.022$ ) were statistically significant in influencing ICT adoption in Health related SMEs. In the technological factors category, relative advantage was statistically significant ( $p = 0.015$ ). Finally, in the external environment category, government policies on ICT applications ( $p = 0.013$ ) and suppliers' and patients' pressure ( $p = 0.014$ ) were statistically significant. The results indicated that ICT acceptance and use by SMEs in Kenya was mostly affected by these five factors ([22] Muathe, 2010).

The coefficient of age of employees was significant but negative; this shows that as employees get older, they are less likely to adopt ICT. Hence, the risk aversion factor associated with ICT adoption increases with increase in age. This characteristic implies that old employees are skeptical to technology and resistant to change. The findings are consistent with the observation by [63] Rice and Katz (2003) and by [21] Morris et al., (2005) who opined that in a country where the employees are a bit young and homogeneous, mostly in the age bracket of between 31-40 years are more likely to adopt ICT applications. Hence, younger people have high probability of using ICT than old ones. Therefore, introduction of computer studies in the school syllabus in Kenya is consistent with these results.

The positive and significant coefficient of CEO's knowledge in ICT was as expected. It implies that CEOs with ICT knowledge enhance ICT adoption by SMEs. These findings are consistent with earlier findings of [10] Iacovou et al., (1995) and by [60] Rashid and Al-Qirim (2001) that lack of awareness of the technology by CEO's/owner's and the associated benefits was key factors influencing adoption and use of e-commerce by SMEs in Kenya.

The coefficient of relative advantage was found to be negative and significant, implying that ICT adoption is inversely related to relative advantage. Similar results have been reported by [58] Poon and Swatman (1999), [60] Rashid and Al-Qirim (2001), and [66] Seyal and Rahman (2003). The coefficient of government policies on ICT applications was found to be negative and significant, implying that lack of appropriate government policies on ICT was a hindrance to the rate of adoption. Moreover, favourable government policies on ICT applications popularize ICT applications and provide the necessary information on adoption of ICT. This finding is in support of the assertions by [5] Chepaities (1996), [60] Rashid and Al-Qirim (2001), [14] ILO (2001), [29] Palvia et al., (2002), [41] Evusa (2005), and [19] Kashorda (2007) noted

that inadequate legal and regulatory framework partially affected ICT adoption in Kenya.

Finally, the positive and significant coefficient of suppliers' or patients' pressure implies that the more the ICT suppliers' and patients' pressure on SMEs in demand for services, the more the SMEs were likely to adopt ICT. This finding is in conformity with other studies, for example, [31] Sillence, et al., (1998), [57] Poon (2000), [60] Rashid and Al-Qirim (2001) and, [47] Gibbs et al. (2003). Therefore, the Logit model results confirm that the variables which were significant affect the adoption of technology in health-related SMEs in Kenya either positively or negatively.

However, from Table 1, the findings of the CEO/owner innovation ( $p = 0.166$ ) variable was found not to be statistically significant. This implies that the CEO/owner was not the only one that made ICT decisions. Indeed, the CEOs indicated that they were willing to listen to employees' suggestions regarding ICT adoption because the employees were the end-users and needed to be listened to. In addition, the sample for this study seems to be biased towards smaller firms and the organizational structures of such firms are likely to be specialized departments that are usually associated with large business enterprises.

The results of this study indicated that the coefficients of complexity, compatibility, image, cost, trust, competitive pressure, technological support infrastructure, and national culture were not statistically significant. The findings implies that these factors were not affecting ICT adoption by health related SMEs in Kenya. But since most of the SMEs included in the research had accepted e-commerce; it appears they had taken necessary measures to deal with these factors. For example, these SMEs had taken care of issues of security on online payment by investing in secure payment systems. National culture as a factor to ICT adoption could be understood because culture is complex and takes time to change. This explains why the CEOs indicated that part of the reason why they had not fully adopted ICT was resistance to change from employees and this could be attributed to culture.

## V. CONCLUSION AND POLICY IMPLICATIONS

### A. Conclusion

The SMEs were adopting and using ICT for improving efficiency and effectiveness in their operations. Hence the findings of this research indicated that there was upsurge in acceptance and use of e-commerce in five different thematic areas, the main motivation of ICT adoption and usage was the associated benefits. The logit regression had a prediction success rate of 94.9 percent; hence this can serve as guide for e-commerce acceptance and use by SMEs in the Kenya.

### B. Policy Implications

The ICT sector should play a leading role in achieving the Vision 2030 and agenda four; SMEs should lobby the Government to encourage ICT training for the young people since age was an explanatory variable in ICT adoption. Such training should focus on technical computer skills, Internet, and other ICT applications.

Ministry of Information and Communication needs to embark on effective awareness creation of the various benefits of adopting ICT by SMEs. Since knowledge of ICT of the CEO was found to explain ICT acceptance and use. By creating awareness, the CEOs can realize the benefits of ICT and therefore, commit the enterprise resources to purchasing ICT facilities.

Since e-commerce technologies changes, re-training is required. SMEs should supplement the government effort in this matter through in-house training for all employees. Focus should also be placed on achieving a manageable level of IT literacy among the top management particularly the CEO who makes the decisions to commit the financial resources of their enterprises to ICT investment. This is because the results of the research indicated that CEO's knowledge of e-commerce was a significant in explaining ICT adoption.

ICT adoption gives SMEs relative advantage over their competitors as was found from the study, SMEs need to develop a mechanism for monitoring the changes in technological innovations. This calls for CEOs to be proactive in ICT-related matters. Players like the Kenya Medical Association should raise awareness among the medical personnel about the potential of ICT and encourage them to develop suitable programmes that support adoption. This is because adopting ICT was found to give SMEs competitive advantage over its competitors.

The SMEs should adopt ICT within a well-developed participatory ICT plan. This could make them proactive in adjusting their plans as demand and supply changes with the market environment. This could enhance their efficiency and effectiveness and could also minimize suppliers' and patients' pressure in terms of demand for services and how this affects SMEs. This is because the findings of the study were that suppliers' and patients' pressure significantly affected ICT adoption.

Health-related SMEs should develop a clear concept on the future of e-business in hospitals since suppliers' and patients' pressure was found to explain the adoption of ICT. This could enable them to continue strengthening the process of monitoring the changing needs of their customers so that they can respond proactively.

The SMEs can lobby the Ministry of Health and also the Ministry of Information and Communication to develop ICT policies that are specific to health-related SMEs. This is consistent with results of the research that the Government had not developed adequate ICT policies but rather a generalised sectoral approach policy. This will provide the health-related SMEs in Kenya with an ICT healthcare policy that could address the challenges faced in this sector.

Finally, although health is a devolved service to improve access to healthcare for Kenyans, especially Kenyans living in remote rural areas, Human Rights Groups should lobby the Government to further improve the utilization of e-health services in all hospitals through ICT adoption since Government policies was found to be significant in explaining ICT adoption.

### C. Limitation and Future Research

The study was limited to ICT adoption by SMEs within the health sector in Nairobi City County. It focused on all private health-related SMEs in Nairobi City County that had employed between 10 and 250 people hence the results cannot be generalized to the rest of the sectors. Self-reporting was used to measure ICT adoption. As argued by [36] Todd and Taylor (1995) and [54] Marjan (2006), self-reporting might create self-generated validity and thus inflate causal linkage.

The data was collected at only one point in time, which limits the possibility of drawing causal relationships [54] (Marjan, 2006). Finally, all the SMEs sampled are located in the capital city of Nairobi, which is a metropolitan and industrialized region. Hence these results cannot be generalized to the other counties in Kenya. Nevertheless, this research gives insights into the factors affecting acceptance and adoption in the health sector. Future research should consider using a longitudinal design which captures data over long period of time. The study should also sample SMEs from other sectors and counties for generation.

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