

# State and Extent of Electronic Commerce Adoption among SMEs in Kenya

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## ABSTRACT

Research has shown that small and medium-sized enterprises (SMEs) are rapidly adopting the Internet and e-commerce. However, there is little systematic research into how such companies are adopting this new technology especially in developing countries. This research addresses the existing gap by seeking to understand how SMEs in Kenya are adopting e-commerce, through an exploration of their state and extent of adoption. A quantitative survey research approach was adopted in this study that provided a suitable environment whereby SME Owners or Managers responded on issues openly. A questionnaire comprising five parts, each of the first four had questions using a 5-point Likert scale, while the fifth captured the profile of the firm. The data was analyzed using frequency distributions and descriptive statistics. Some hypotheses were tested empirically. The results indicate that SMEs have an average e-commerce adoption rate of 59% with latent differences in individual e-commerce applications adoption and industry sectors. The results further shows that only 34% of the firms surveyed have attained the integration stage in adoption. The SMEs e-commerce adoption at promotion stage (13%) and provision stage (26%) sum up to give a combined adoption rate of 39% which represent the marketing function.

**Keywords:** *E-commerce adoption, small and medium enterprises.*

## 1. INTRODUCTION

There has been significant research on electronic commerce (e-commerce), but most of the studies have been conducted in developed countries in Europe and United States [9]. However, most of the world's population exists in developing countries. Little emphasis has been placed on studying the adoption and utilization of e-commerce in Small and Medium-sized Enterprises (SMEs) [10]; [17]; [30]. E-commerce has been making significant contributions to reduction in costs of doing business, improved product or service quality, new customer and supplier penetration, and generation of new ways or channels for product distribution [28]. Due to global reach of e-commerce, SMEs in developed countries have started adopting e-commerce in their business; but SMEs in many other developing countries including Kenya, are still slow to adopt and use Information Technology (IT) or e-commerce in their day-to-day business operations [1].

The concept of e-commerce has been broadly written and defined in various ways [22]. E-commerce is defined as the process of buying, selling, transferring or exchanging products, services and /or information through computer networks, including the Internet ([7]; [35]; [13]; [34]). This involves the electronic trading of physical and digital goods, quite often encompassing all the trading steps such as online marketing, online ordering, e-payment for digital goods, online distribution and after-sales support activities. E-commerce is developing in the world and influencing all industries. This phenomenon has been expanding because of the use of the Internet worldwide [5]. Electronic transactions between enterprises have the potential to positively change the way they operate, especially for SMEs.

The definition of Small and Medium Enterprises (SMEs) varies in different countries and studies but is usually based

on number of employees, assets or a combination of the two. For the purposes of this study, SMEs are defined as organizations with less than 251 employees ([31]; [18]). SMEs appear to encounter many challenges in adopting new technologies. The cost of implementation, security, perceived customer readiness, lack of knowledge of IT and e-business are some of the challenges encountered by SMEs in adopting electronic business technologies [(Department of Enterprise, Trade and Employment, 2004) cited in Emma et al. [6].

## 2. BACKGROUND INFORMATION

### A. Related Works

Despite the importance of e-commerce for economic growth, in developing countries, the adoption of e-commerce and the academic researchers are still limited [19]. Compared to large firms, the inability to correctly assess the impact and benefits of e-commerce makes SMEs more cautious about investment and cultural change involved. Besides the weakness on the part of some SMEs to adopt e-commerce, some SMEs especially in developing countries have been able to adopt e-commerce successfully [25].

A number of studies investigating users' perceptions about new or existing software or other technological solution have used Technology Acceptance Model (TAM). The model gives a good perception about how users or potential users evaluate the solution and its adequateness in general Mramba, et al., [21]. TAM posits two factors, Perceived Usefulness (PU) is defined as the degree to which an individual believes that using a particular system would enhance his or her job performance without regarding other limitations and Perceived Ease of Use (PEOU) which is defined as the degree to which a person believes that using

a particular system would be free of effort, this describes the users' expectations of how easy the application is to use [4]. TAM summarizes that an individual's intention to adopt a particular piece of technology is determined by the person's attitude toward the use of technology. Attitude, in turn, is determined by eliminating the vulnerable risks. TAM proposes that perceptions or beliefs regarding an innovation are instrumental when developing attitudes that will lead to system utilization behavior. The relevancy of TAM to this study is that the adoption of e-commerce can be influenced by PU and PEOU. TAM further states that the user must be comfortable with the technology deployed, although expecting external variable factors affecting acceptance, which is beyond the user control.

There are several steps that should be taken to adopt the Internet and e-commerce in general, although there are opinions that e-commerce will only be adopted as just for the sake of having e-commerce [2]. The important fact however, is that e-commerce adoption is a process which is normally segmented into various phases and definitely not a once off event. They have been referred to as technologies that are easier to adopt, or adoption ladder with stages model showing that most SMEs only see value at the bottom of the ladder [14]. In an organization e-commerce is always in one of the large number of possible "states of adoption" [3]. These states vary from less advanced to more advanced. It is believed that stages of growth models generally reflect on the maturing nature of the use of information systems (IS) in organizations and the maturing of models is considered a popular approach to explain adoption while making use for descriptive or prescriptive purposes ([24]; [16]).

Although the SMEs have adopted many types of e-commerce applications, they might be at different stages of adopting those applications in accordance with the level of complexity. In order to classify SMEs according to their stage of e-commerce adoption, a conceptual framework is needed. Ho [11] proposed a model that he used to evaluate

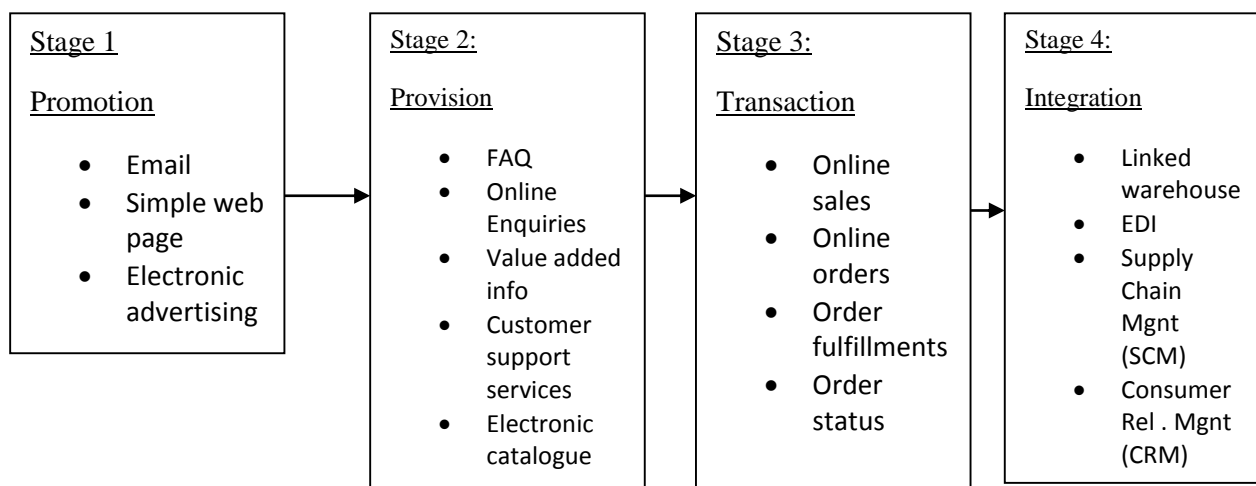
the value of the commercial websites from different parts of the world. In his study he categorized usage of e-commerce into promotion of products and services, provision of data and information and processing of business transactions. This model was later developed further by Lawson et al. [15] but without much modification to study the adoption of e-commerce by SMEs in Australia.

Stone [33] categorizes e-commerce adoption into the early stage (Access, Publish and Interact), the Integrating stage (Integrate Internally and Integrate Externally) and the Advanced stage (Adapt Dynamically). Another model proposed dividing the stages of e-commerce development into presence, portals, transactions integration and enterprises integration Rao et al. [29]. N. Muhd. NA Rahman et al. [23] proposed a model which divides the stages of e-commerce development into pre-publish, publish, interact, transactions and integrations.

It is noted that the model suggested by NA Rahman et al. (2013) is similar to the one proposed by Rao et al. [29], except for inclusion of the pre-publish stage and renaming the other stages. Based on Technology Acceptance Model and the models of stages of e-commerce adoption in SMEs, the research questions engenders to answer firstly, what is the extent of e-commerce adoption among SMEs in Kenya and secondly, how does the state of e-commerce adoption compare among different SMEs sectors in Kenya.

## B. Conceptual Framework

Although the reviewed models (Ho, Lawson, Stone, Rao, NA Rahman) provide criteria for classifying the state of SMEs e-commerce adoption, they were not based on a developing country in early stages of e-commerce adoption like Kenya. Hence in it was necessary to develop a context specific conceptual model for analysis, evaluation and quantification e-commerce adoption with four stages (Figure 1).



**Figure 1:** Conceptual model of stages of e-commerce adoption.

Adoption is evaluated according to business undertaken on-line, rather than the technology features or platforms utilized ([26]; [36]). Hence we propose the model in Figure 1 to evaluate the state of e-commerce adoption by the SMEs in Kenya.

### Hypotheses

The hypotheses on whether there is any significant difference in e-commerce adoption among different industry sectors and whether there is any significant difference in the e-commerce adoption of individual e-commerce applications were tested as follows:

In the light of existing literature we state the Null hypotheses  $H_0$  and  $H_a$  the alternative hypotheses were stated as follows:

$H_0$ : there is a difference in e-commerce applications adoption by SMEs among different industry sectors on average

$H_a$ : there is no difference in e-commerce applications adoption by SMEs among different industry sectors on average.

In the case of the adoption of individual e-commerce applications by all SMEs we set the following hypothesis:

$H_0'$ : there is a difference in e-commerce application adoption of individual applications by SMEs on average

$H_a'$ : there is no difference in e-commerce application adoption of individual applications by SMEs on average

## 3. RESEARCH METHODOLOGY

In order to underpin the research an intensive literature review was done. This was followed by a study which used a quantitative survey approach to collect data, and descriptive statistical analysis to realize comprehensive results. The research purposes and questions of this research can be described as both exploratory and confirmatory; hence a sectional survey approach was adopted. This design was suitable because the research intended to gather information from a large number of respondents in different industry sectors which are located in selected regions over a wide geographical area. We also tested several hypotheses empirically. The primary data in this study was obtained through a simple survey questionnaires that were distributed among 135 SMEs in Kenya for them to answer research based questions that addresses the gaps identified through the literature review.

The response rate was 88%. The Cronbach's Alpha test was utilized in order to test reliability (the degree to which an instrument measures the same way each time under the same condition with same subject) of instrument.

This being a country wide research, a representative sample was purposefully chosen from five regions across the country. The five regions chosen included Nairobi, Central, Eastern, Nyanza and Western. The research focused on SMEs that had already started utilizing some form of e-commerce applications. The sectors involved in the research were selected in advance to enable more focused data

collection and analysis. It was noted that Nairobi region had the highest number of registered SMEs, therefore using purposive sampling it was included and then four other regions were picked at random. A random number was generated for each of the remaining seven regions and then they were sorted in ascending order. Finally, the first four were selected. The population for this research is defined as all SMEs registered Kenya that were using e-commerce during the sampling time frame. The SME in this study is defined an organization that has between 10 and 250 employees [12]; [8].

A number of owners or first-line managers of SMEs, were asked to participate in the survey, which resulted in a total sample size of 135 respondents, with the questionnaire being delivered to them by Research Assistants.

Data analysis in this research was conducted using Statistical Packages for Social Sciences (SPSS) software version (17.0). The outcome was tabulated, and frequency distributions were used to describe the number as well as the types of e-commerce applications being implemented. Frequency distributions were also used to evaluate the stage of e-commerce adoption by the respondents. Hypotheses were tested to determine whether there is a difference in e-commerce adoption among different industry sectors and also among individual e-commerce applications.

## 4. RESULTS AND DISCUSSION

Analysis of organizations maintenance support shows that 46.6% of the sampled SMEs depend on their own IT staff, 16.3% depend on vendors while the balance never indicated their source of support which could mean they have no support at all. At least 58.6% of organizations offer on-job training, 11.2% depend on training from local colleges, 43.1% depend on In-house training while 15.5% did not report any form of training source. The organizations were randomly drawn from Nairobi, Central, Eastern, Western and Nyanza regions of Kenya. Out of the 119 firms surveyed, 13% of them are at promotion level, 26% are at the provision stage, 27% are at the transaction stage while 34% have moved on to the integration stage (Table 1).

**Table 1:** State of E-commerce adoption.

Adoption stage	Frequency	Percentage (%)
Promotion	16	13
Provision	31	26
Transaction	32	27
Integration	40	34
Total	119	100

In order to understand better the e-commerce application adoption the various applications have been grouped into six categories. The percentage adoption of each application as well as for each category has been computed and tabulated accordingly (Table 2). The categories listed include Marketing, Advertising, Customer service, Order and delivery, Payment system, and Mobile-commerce. The alpha coefficient for the six items is 0.829, suggesting that the items have relatively high internal consistency.

**Table 2: Adoption of e-commerce applications.**

E-commerce Applications	Percentage (%)	
	In Use	Not in Use
<b>Electronic Marketing</b>		
Research on Consumer preferences	85	15
Evaluation of new suppliers	74	26
Research on Competitors	78	22
<b>Electronic Advertising</b>		
Displaying Co. information on products & services	87	13
Web site hosted by another company	45	55
Web hosted by own sever	60	40
Advert on 3rd party website	31	69
Electronic Catalogues	57	43
<b>Consumer Support Service</b>		
Online help (FAQ)	69	31
Online help-product update	73	27
Handling customer feedback	72	28
Personal email communication	82	18
Online application/ registration	62	38
<b>Order and Delivery</b>		
Processing sales order online	53	47
Coordinating procurement online	51	49
Tracking incoming and outgoing goods delivery	34	67
Electronic Data Interchange (EDI)	44	57
<b>Payment System</b>		
Electronic Fund Transfer (EFT)	69	31
Online Credit Processing	38	62
Smart Cards	55	45
Prepaid Cards	49	51
<b>Mobile Commerce</b>		
Banking & Finance services	87	13
Wireless Advertising	53	47
Games & entertainment	31	69
Working from home/out-of office	42	58

From the statistics in Table 2, the extent of adoption in electronic marketing is considered high as 85% of the firms surveyed implemented research on consumers' preferences, 74% carry out evaluation of new suppliers and 78% are doing research on competitors. The adoption rate in electronic advertising is average, although 87% display company information on products and services, only 45% have their Web site hosted by another company. Those whose Web site is hosted by own sever is 60%, 31% advertise on third party website and 57% have electronic catalogues. It is apparent that most companies are providing some support services to their customers through the Internet as 69% of them have Online frequently asked questions (FAQ) service, 73% provide Online help-product update, 72% are handling customer feedback online, 82% use personal email communication and 62% Online application as well as registration. Although order and delivery application comprises some of the most important functions of companies, the uptake is surprisingly low. For instance only 53% engage processing sales order online, 51% coordinate procurement online, only 34% firms track incoming and outgoing goods delivery and 44% Electronic Data

Interchange (EDI). The relatively lower adoption above could be explained by the concerns they have over security of online credit transactions.

From the data obtained, 69% of firms use electronic fund transfer (EFT), only 38% carry out online credit processing, 55% make use of smart cards and 49% use prepaid cards. The slow uptake of payment system could be explained firstly, in terms of concerns over insufficient security for online credit (50.5%). Secondly, the introduction of M-Pesa (mobile money) which is a mobile-phone based money transfer [13] and micro-financing service, launched in 2007 by Vodafone for Safaricom and Vodacom, the largest mobile network operators in Kenya and Tanzania [31] together with other mobile money services including Airtel Money and MobiCash, may have taken over a large part of the traditional payment system business. For instance, M-Pesa service has spread quickly, and by 2010 had become the most successful mobile phone based financial service in the developing world.

As the statistics reveal 87% of SMEs are using mobile banking & finance services, 53% use wireless advertising, 31% enjoy games & entertainment over their mobile sets and 42% engage in working from home and/or out-of office.

This result on analysis of state of e-commerce adoption is shown in Table 2. It is noted that SMEs in Kenya are at just above average state of e-commerce adoption. This result is further corroborated by splitting the sample into high, moderate and low level of adoption based on the number of applications that have been adopted where those firms which are using less than 9 applications are classified as low adoption, firms with between 9 and 17 application as moderate adoption and those with 18 to 25 applications as high adoption group. The outcome is shown in Table 3.

**Table 3: Extent of e-commerce adoption.**

	Frequency	Percentage	Valid Percentage
Low Adoption	19	16.0	16
Moderate Adoption	60	50.0	50
High Adoption	40	34.0	34
Total	119	100.0	100

### Adoption of e-commerce application per sector

Table 4 shows the adoption of e-commerce applications per sector for the nine sectors considered in the study expressed as percentages.

The result indicates that on the average the adoption of e-commerce in the nine sectors sampled during the study is 59%. The sector usage of e-commerce in descending order were; Finance and Insurance 71%, Sales and Marketing 69%, Health Services 67%, Manufacturing and Construction 59%, Education 58%, Media and ICT 57%, Hospitality 57%, Transport 48%, and, Agriculture & Food processing at 47%. Similarly, the outcome shows that the adoption of individual application varies as follows (given in descending order); Marketing 78%, Customer service 71%, Advertising 55%, Payment System 54%, Mobile Commerce 53% and Order & Delivery at 46%.

## 5. CONCLUSION AND RECOMMENDATION

This research investigated the state and extent of e-commerce adoption among SMEs in Kenya. It also sought to determine whether there was a significant variation in e-commerce adoption among different industry sectors and whether there was a significant difference in individual e-commerce application adoption across all sectors.

The quantitative survey research method utilizing a questionnaire was used to collect data. The data gathered was then analyzed using various statistical tools in order to provide answers to the research questions that had been raised earlier. The research questions were (a) What is the extent of e-commerce adoption among SMEs in Kenya, (b) How does the extent of e-commerce adoption compare among different SMEs sectors in Kenya.

Pertaining to the extent of e-commerce adoption, the results showed that considering only those SMEs in Kenya that have adopted some form of e-commerce application the rate of adoption is 59%. It was also observed that a majority of those SMEs had only adopted mainly the basic applications. Indeed, the adoption of advanced applications like online payment system, order processing as well as EDI is at a relatively low level. The results have indeed adequately answered the first research question. The findings imply that more efforts are needed to help and encourage SMEs in Kenya to speed up e-commerce adoption, particularly the more advanced applications.

Regarding the second research question, descriptive statistical analysis was performed using the collected sample data. Based on the mean scores of the adoption of applications per sector (Table 4), the hypotheses set in section 2 were tested.

The last column of Table 4 shows the mean e-commerce adoption per industry sector. There are clear differences in the figures shown, thus  $H_0$  is supported.

The last row of Table 4 shows the mean e-commerce adoption per individual application. There are clear differences in the figures shown, thus  $H_0$  is supported.

It can be concluded that adoption of e-commerce varies among industry sectors, having the Finance & Insurance sector leading, followed by Sales and Marketing, while Agriculture and Food processing is at the bottom of the nine. Looking at e-commerce adoption of individual applications across all sectors, it can be observed that there are variations in individual e-commerce application adoption. The most popular e-commerce application being Marketing, followed by Customer service and the least among the six considered was Order processing. The above findings have basically answered the second research question.

	Industry Sector	Sample Size	Marketing (%)	Advertising (%)	Customer Service (%)	Order & Delivery (%)	Payment System (%)	Mobile Commerce (%)	Mean (%)
1	Manufacturing and Construction	14	81	56	76	48	43	53	60
2	Media and ICT	15	80	56	73	32	40	60	57
3	Health services	13	74	63	80	56	75	54	67
4	Sales and Marketing	18	93	51	66	74	76	54	69
5	Transport	9	70	41	63	41	37	37	48
6	Education	14	76	59	81	27	43	63	58
7	Hospitality	11	76	49	67	43	59	50	57
8	Finance and Insurance	14	81	71	81	57	71	66	71
9	Agriculture and Food processing	11	70	45	55	34	39	39	47
	Mean (%)		78	55	71	46	54	53	59

There is need to investigate further the cause of the observed variations by in e-commerce adoption by examining the adoption of individual industry sectors. Further research is also recommended into the hindrances of e-commerce adoption in specific industry sectors in order to provide strategies that will increase the extent of e-commerce adoption.

The SME managers in Kenya can be described as having a very positive disposition towards e-commerce adoption. This disposition of SME managers/owners should be harnessed to promote e-commerce adoption, through relevant policy and regulatory framework.

It can therefore be stated that there is a difference in e-commerce applications adoption by SMEs among different industry sectors on average, and there is a difference in e-commerce application adoption by SMEs of individual applications by SMEs on average in Kenya.

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