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Factors Intricate the adoption of e-Commerce by Small-medium sized Enterprises (SMEs) in Tanzania

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Abstract.

E-commerce can enable medium, small-sized enterprises in emerging markets to gain greater bargaining power for innovation in Tanzania's economic growth, despite its limited capital and mobility. The rationale for the e-Commerce definition emanates from the fact that Tanzania has lagged behind in acquiring, adopting and using e-Commerce. Many factors could be responsible for the low usage of e-Commerce among the SMEs in Tanzania. In order to determine the factors that inhibit the adoption of e-Commerce, SMEs were confronted in their quest to indicate the factors intricate the adoption of e-Commerce, among those were: Organizational factor, Environmental factor, Political and legal (regulatory policies) factor and Communication factor, followed by lack of ICTs tools, lack of financial resources, online security and several other reasons. At the same time, the research provides insights into understanding e-Commerce adoption by SMEs in the context of Tanzania.

Keywords: LCD, SMEs, intricate, e-Commerce. Barriers and e-Commerce adoption.

1. Introduction

The dawn of the 21st century saw a great leap in the evolution of Information communication technology and e-Commerce is increasingly being recognized as a powerful enabler of economic and social development [1]. The small businesses sector has been recognized as a significant sector in employment creation, income generation, and poverty alleviation and as a base for industrial development. The aim of this study is not to showcase best-practice in e-Commerce adoption cases from the developing country context but rather, the study aims to depict the potential barriers adopting e-Commerce in which SMEs exist in a developing country scenario, how they started the business, and how they grapple with pertinent issues regarding e-Commerce and its development in the firms. One hand and on the other, reflect on how the phenomenon of e-Commerce has been understood and applied in Tanzania context.

However, the adoption of e-Commerce by SMEs remains critical despite the fact that the use of e-Commerce is still low in Tanzania compared to other countries in the world but it is growing at a staggering pace [2]. Least Developing Country (LDC) including Tanzania lag behind developing countries in the adoption of appropriate technologies and enabled applications in ICT and e-Commerce, They are often understudied with regards to

phenomena such as e-Commerce, partly because of political instability within certain countries, the poor collaboration of the private sector and tertiary institutions which influences the potential for research, and the lack of requisite human and technical resources to offer programs and do research into e-Commerce [3].

The main objective of the study is to point out the factors/barriers that intricate for Tanzanian SMEs to adopt e-Commerce. To be more specific, the study focuses on Organizational, Environmental, Communication and Political& Legal factors that affect adoption of e-Commerce. Firstly, Organizational factor are found to be more influential than environmental factors in the early stages of e-Commerce adoption [4]. Secondly, Organizational leaders view innovation as a source of organizational change, growth, and effectiveness [5]. Thirdly, internal factors are 'imminent and not satisfactorily recognized'. Fourthly, there are few studies identifying factors that determine organizations' need for innovation and 'consequently our understanding of why some organizations adopt innovative techniques and others do not is incomplete' [3]. Among other issues that SMEs markets needed a high degree of human communication and SMEs occupy small and clearly defined niche markets that do not need global connectivity through experimentation as inhibitors to e-Commerce adoption [6]. Organizations adopting e-Commerce in emerging countries which includes Tanzania, face problems such as lack of telecommunications infrastructure, lack of qualified staff to develop and support e-Commerce sites, lack of skills among consumers needed in order to use the Internet, lack of timely and reliable systems for the delivery of physical goods, low bank account and credit card penetration, low income, and low computer and Internet penetration [7]. The objectives for this study are to find out the factors that intricate the adoption of e-Commerce in Tanzanian SMEs and to propose some recommendations for applying e-Commerce successfully. The work begins by examining the nature of SMEs and e-Commerce followed by discussing the factors intricate SMEs adopting e-Commerce based on the study.

2. Related Work

2.1 Small and Medium Enterprises (SMES) in Tanzania

Some of the international economies depend mainly on the role of SMEs in supporting the national economy in developed countries such as Europe, North America, and Asia. SMEs contribute significantly to the economies of the, representing Tanzania, around 70% of all businesses, and providing the main source of jobs and income for Tanzanian people. SMEs account for a greater proportion of economic activity and international development organizations are active [6]. In Tanzania, SMEs historically played a relatively significant role in the process of economic development. The definition of SMEs is not uniform; it varies across countries and in some countries, the definition differs further between sectors. Number of people employed and size of capital, sales, assets, etc. are used to classify enterprises into micro, small, and medium. The Tanzanian Ministry of Industry (MOI) classified SMEs based on labor and investment costs criteria. Small and medium enterprises are defined as those having 4-50 workers, respectively. As to the ceilings for investment costs, they are set at Tshs5 million and Tshs10 million for small and medium enterprises, respectively[6][8]. See the table below

Table 1: Small business category in Tanzania

Category	Employee	Capital invest in Machinery (Tsh)
Micro Enterprises	1-4	up to 5 mil (2,788 U$D)
Small Enterprises	5-49	above 5 mil to 200 mil (2,788-111,544 U$D)
Medium Enterprises	50-99	above 200 mil.to 800 mil (111,544 - 446,179U$D)
Large Enterprises	100+	above 800 mil (446,179 U$D)

Source: (E. Tongora, 2014) [9].

2.2 e-Commerce in Tanzania

This study views e-Commerce as a form of innovation in which parties interact electronically to perform one or more of the following functionalities depending on their contextual resources and constraints: first, communication, such as delivering information, products/services, or payments via telephone lines, computer networks, or any other means; Second, the application of technology toward the automation of business transactions and workflow. Third, the meeting of the desire of firms, consumers, and management to cut service costs while improving the quality of

goods and increasing the speed of service delivery. Fourth, the provision of the capability of buying and selling products and information on the Internet and other online services [10]. Other study on e-Commerce in Tanzania reported that the diffusion of ICT has been less extensive among SMEs mainly because of little awareness of E-Business and E-Commerce [11]. As a result, the SMEs lack ICT infrastructure, e-Commerce platforms and reliable business information which contribute to difficulties in successfully participating in global markets. As for SMEs that have some form of e-Commerce, some face payment system problems because the existing international debit and credit card payment system is accessible only to those with bank accounts thereby limiting the growth of a number of SMEs. Also another study shows that Tanzanians have the ability to participate in e-Commerce, but there is need for an improved national image for e-Commerce to bring in the element of trust and discipline within, and before the international communities [12].

2.3 Technology Acceptance Model (TAM)

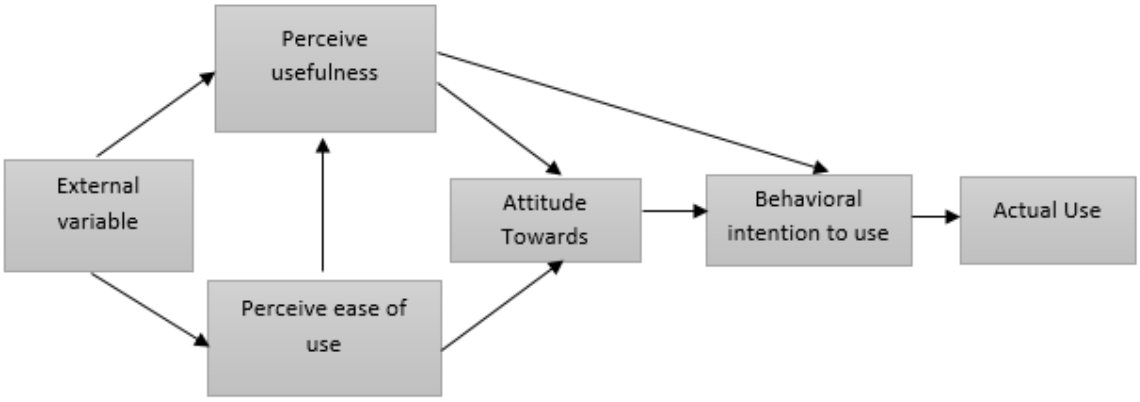

Figure 1: Original technology acceptance model (TAM). Source: (Davis F.D, 1989) [16].

Technology Acceptance Model (TAM) is one of the most frequently employed models for research into new information technology acceptance. The TAM suggests that when users are presented with a new technology, a number of factors determine their decision about how and when they will use. TAM was initially proposed by Davis (1989). It comprises two beliefs, which determine attitudes to adopt new technologies. In TAM, 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 whereas, Perceived Ease of Use (PEOU) is the degree to which an individual believes that using a particular system would be free of physical and mental effort [13]. The Authors identified four factors that influence electronic commerce adoption: organizational readiness, external pressure, perceived ease of use, and perceived usefulness. [14]

3. Research Methodology

Although there is a body of literature vis-à-vis SMEs barriers in adopting e-Commerce, studies into the adoption and successful implementation of e-Commerce in Tanzania is comparatively new [15]. Since SMEs are often acknowledged as the engine of national economic growth, it is relevant to investigate why SMEs in Tanzania have not taken up the many opportunities of e-commerce considering the rapid growth of online businesses in the developed countries. Since SMEs are often acknowledged as the engine of national economic growth, it is relevant to investigate why SMEs in Tanzania have not taken up the many opportunities of e-commerce considering the rapid growth of online businesses in the developed countries.

3.1 Research question and conceptual model

1. *What is the determinant intricate the e-Commerce adoption by SMEs, also prevent the SMEs from considering e-Commerce in Tanzania?*
2. *What are the likely e-Commerce implementation concerns that may also prevent a successfully implementation of e-Commerce SMEs in Tanzania?*

The main goal of this study is to investigate the barriers that intricate the e-Commerce adoption by SMEs in Tanzania. A framework for e-Commerce barriers in SMEs was adopted and questionnaire was designed to collect the needed information to achieve our research objective and goal.

3.2 Research philosophy and questionnaire design

The adoption and Implementation of e-Commerce is alike to the acquisition level of ICT. The study also dived and investigated into the determinants of e-Commerce (Internet) adoption with regards to SMEs. A total of four potential barriers that intricate the adoption of e-Commerce identified in the study whereby the Structured questionnaire was used for the secondary data collection in which Participants were tasked to select their most significant barriers with regards to e-Commerce adoption in their SMEs. The design of the questionnaire reflects the barriers from the mathematical model. A sample of 98 respondents were selected for this study inthe regions of Tanzania with the highest urban population and cultural and economic hub of the country with about one-half of the manufacturing sector being located there (ie Dar es salaam) [12]. It is also the region with the highest presence of ICT use and therefore does serve as a representative. The mainly part of the questionnaire used a five-point Likert-type scale and YES or No to obtain the SMEs perception (willingness and readiness) adopting e-Commerce. The scale required individuals to make a decision regarding their level of agreement, starting from 'strongly agree' (1) 'to strongly disagree' (5). The other part also contains five point like type scale from highly important (1) to highly unimportant (5). The last part of the questionnaire used also five-pointliket-type scale from strongly agree (1) to strongly disagree (5) and YES or NO to identify the barriers and check what ways could be used to improve the adoption of ICT and e-commerce by SMEs in Tanzania. Finally, the data collected was tested, analyzed and interpreted using SPSS software.

3.3 Justification for the variables (preliminary studies)

The above variables were chosen based on earlier studies which suggested that there could be a relationship between the variables (barriers) and e-Commerce adoption on the whole. Their choice therefore gives this research an opportunity to prove whether the earlier findings/assertions could be right. A number of literatures have also been cited in this section to typify cases where barriers has had an influence on e-commerce adoption

This preliminary model is mathematically presented as;

$$Y = \alpha 0+\alpha 1x1+\alpha 2x2+\alpha 3x3+ \alpha 4x4 +\varepsilon;$$ *where*

x1 - *Communication barrier, x2 -Environment barrier, x3 - Organization barrier, x4 - Political and legal barrier, Y- e-Commerce, and* ε *- Provision for error*

The preliminary test based on the data collected from the questionnaire which tested the dependency between two of the independent variables (barriers) and e-commerce revealed that there was for majority of the cases dependency between them.

4. Analysis and findings

4.1 Reliability measure

This part of the research presents an analysis of the data gathered through the questionnaires administered to respondents Cronbach's alpha reliability coefficient normally ranges between .00 and 1.0 However, there is actually no lower limit to the coefficient. The closer Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the data.

Table 2 Reliability statistics

Barriers	Cronbach's Alpha	Standardized Cronbach's Alpha	No of Items
Communication/Technological	.861	.862	8
Environmental	.844	.846	9
Organizational	.685	.687	8
Legal and Political	.746	.743	7

Source: Scores from SPSS own research

From the scores of the Cronbach's alpha presented in table above, there is very good internal consistency from the questionnaire used in this research. The analysis takes into consideration the various questions from the questionnaire which examines the various barriers. The scores from the table above indicate that the Cronbach scores range between 0.685 (acceptable) to .86 (excellent). In other words, it is clear that all the questions measure in different phenomena and there is a very insignificant inconsistency worth considering

4.2 E-Commerce and existence adoption barriers on SMEs in Tanzania

This part of the concentrates on the results from main section of the questionnaire, which examines the relationship between the e-Commerce (ICT) and four potential factors/barriers that intricate for SMEs to adopt e-Commerce.
The following paragraphs will be examining each of the logistic models that help describe the relationship between the dependent variables E-Commerce (ICT systems) and the various independent variables (the adoption barriers). Each accounting will be present and the results from SPSS discussed with particular attention to the scores.

The following table summarizes the test of dependency between the e-Commerce (ICT tool) and barriers intricate by SMEs to adopt e-Commerce in Tanzania. The table equally takes into consideration the barriers: Communication barriers, environmental, organizational, and legal & Political barriers on. Cross tabulation is performed in the SPSS program to determine whether there is any dependency as well as the strength thereof.

Table 3.Dependence between e-Commerce (e-Com) and the barriers

Relationship	p-value	Chi-square	Phi statistic	Crammers statistic	Cochran statistic	Mantel haenszel	Alpha
e-Com&Communication	.034	4.490	-.214	.214	.034	.414	0.5
e-Com& Environment	.040	4.201	-.207	.207	.040	.439	
e-Com& Organization	.721	.128	.036	.036	.721	.219	
e-Com &Legal Political	.014	6.062	-.249	.249	.014	.307	

Source: Created on the basis of research data

This part examines the relationship between the e-Commerce (Internet) and barriers (Communication barrier, Environmental barrier, Organizational barrier and Legal/Political barrier). The main objective here is to find out if any of these barriers play role in the adoption of e-Commerce by SMEs in Tanzania

4.2.1 E-Commerce & Communication barrier

The SPSS application starts the model by summarizing all its data, all the data are available. It is indicated that 98 respondents participated in this research with all of them providing a complete set of responses to the questions representing a 100%. 80 (81.63%) respondents chose responses indicating the presence of communication barrier existed to their organization while 18(18.37%) indicated absences of communication barrier in their organizations and only one respondent out of 98 organization used the Internet only
Table 3.which is about the chi-square tests presents the research with an opportunity to establish a relationship between the e-Commerce and communication barriers. The null hypothesis can be rejected once the p-value is lesser than or equal to the alpha value. The following are the hypotheses for this model

Ho*: The adoption of e-Commerce by SMEs in Tanzania does not depend on Communication barrier*

Ha*: The adoption of e-Commerce by SMEs in Tanzania depends on Communication barrier*

From table 3, the p-value is 0.034 and it is a little smaller than the value of alpha which in this case is 0.05. This gives a good basis for the null hypothesis to be rejected. This, in other words means that the adoption of e-Commerce by SMEs in Tanzania depends on the communication barriers. The symmetric values here lend credence to the fact that there is a dependency between e-Commerce and Communication barriers. The Phi and Cramer scores of negative and positive 0.214 respectively indicate the association between these variables

Cochran has a value of 0.034 while Mantel-Haenszel has a value of 0.414. This confirms the results obtained earlier by the Chi-square tests supporting the rejection of the null hypothesis.

4.2.2 E-Commerce & Environmental barriers

In the case of this environment barrier as well, all the respondents provided the data required. 19(19.39%) respondents indicated the absence of environment barrier from their organizations while 79 (80.61%) indicated the presence of environment barrier in the organization. The following are the hypothesis

Ho*: The adoption of e-Commerce by SMEs in Tanzania does not depend on environment barrier*

Ha*: The adoption of e-commerce by SMEs in Tanzania depends on environment barrier*

The results from table*3:* shows that Chi-square has a value of 4.201 at 1 degree of freedom. The p-value associated with this score is 0.04 which is lesser than the value of alpha (0.05). The null hypothesis can thus be rejected meaning the adoption of e-Commerce by SMEs depends on the environment barrier. The symmetric measures presented in table 3 (Phi and Cramer's V) while confirming the association of these variables, the symmetric measures make it clear there is association between two variables and significant (represented by a value of 0.207 respectively).

The p-values of the (0.034) and Mantel-Haenszel (0.414) measures correspond to the chi-square results presented Cochran earlier. These values one is higher than the value of alpha and another value is lesser than the value of alpha.

4.2.3 E-Commerce & Organization barriers

In the case of organization barrier, all the respondents provided the data required. 11(11.22%) respondents indicated the absence of organization barriers from their organizations while 87(87.78%) indicated the presence of organizational barriers in the organization.
The following are the hypotheses:

Ho*: The adoption of e-Commerce by SMEs in Tanzania does not depend on organizational barrier*

Ha*: The adoption of e-Commerce by SMEs in Tanzania depends on organization barrier*

The p-value (0.721) in table 3 is greater than the value of alpha (0.05). This allows for the acceptance of the null hypothesis implying that the adoption of e-Commerce by SMEs in Tanzania does not depend on the organizational barriers.
Cramer and Phi's measures have both confirm the values of 0.036 thus highlighting a weak relationship between e-Commerce and organization barriers.

The Cochran and Mantel-Haenszel measures have values of 0.721 and 0.219 respectively. These scores are also higher than the value of alpha and this lays further potency to the chi-square value presented earlier.

4.2.4 e-Commerce & Political and legal barriers

This assesses whether or not the political and legal barriers of respondents have any impacts on the choice of e-commerce (ICT). Out of 98 respondents 85 (86.73%) admitted the existence of political and legal barriers and 13(13.27%) indicated the absence of these barriers. The following are hypotheses of this model

***Ho**: The adoption of e-Commerce by SMEs in Tanzania does not depend on political and legal barriers*

***Ha**: The adoption of e-Commerce by SMEs in Tanzania depends on political and legal barriers*

In reference to table 3, the null hypothesis is rejected. This is because the p-value of the test is 0.014 and is lesser than the value of alpha. The value for the chi-square is 6.062 at a df of 1. That means that the adoption of e-Commerce by SMEs depends on the legal barrier.
The nature of the relationship is confirmed in the symmetric measures table where the indication is given that this dependency by phi and crammers V is significant (represented from negative to positive of a value of 0.2490). The test of conditional independence also has the values for the Cochran and Mantel-Haenszel measures at 0.014 and 0.307 respectively, of which are unable to detect the association

4.3 Logistic regression for internet

The purpose of this logistic regression model is to establish the relationship between a discrete variable (e-Commerce) and a predictor which is non-linear (Barriers). This model will assess the effects multiple explanatory variables on the outcome variable. The following tables present the information derived from the running of this model in the SPSS application. Regression model shows that 99% of the respondents said that Internet is not used in their organizations while only 1% said Internet is used in their organizations.

Table 4: Variable in the equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-4.575	1.005	20.714	1	.000	.010

Source: Generated from SPSS based on the questionnaire data

In table4 it can be seen that the intercept-only model is ln (odds) = -4.575. If both sides of this expression are exponentiated, the predicted odds will be [Exp (B)] = .010. The predicted odds of the absence of internet (ICT) is .010. Since 1 of the subjects affirmed the use of e-Commerce and 97 denied the use of the e-Commerce thus making the observed odds 1/97 = .010.

Table5:Omnibus Test of model coefficients

		Chi-square	df	Sig.
Step 1	Step	6.661	4	.155
	Block	6.661	4	.155
	Model	6.661	4	.155

Source: Generated from SPSS on questionnaire data

The omnibus test of model coefficients gives a chi-square of 6.661 and a p-value of 0.155 at 4df. This is a test of the null hypothesis that the inclusion of all the independent variables to the model does not change the ability of the model to predict the response chosen by the respondents of the research. At the p value of 0.155, there is the indication that these independent variables do not have a strong impact on the adoption of e-Commerce by respondents

Table 6. Model summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	4.499[a]	.066	.611

Source: Generated from SPSS on questionnaire data

The model summary table presents -2 Log likelihood statistic. This statistic measures how poorly the model predicts the decisions - the smaller the statistic the better the model. The figure for this statistic is 4.499 the difference between the model with the intercept and the chi-square of the omnibus statistic (4.499+6.661). The value of the -2 Log likelihood statistic for the model with the intercept = 11.16. The Cox and Snell measure gives the value 66% representing the proportion of the dependent variable explained by the logistic model while the Nagelkerke measure gives 61.1% representing the relationship between the predictor and predictions

Table 7. Hosmer and Lameshow Test

Step	Chi-square	df	Sig.
1	.000	3	1.000

Source: Generated from SPSS on questionnaire data

The Hosmer and Lemeshow test shows how well the model fits the data. At a value of 0.50, the statistic can be said to provide a good fit for the data. In this case, the value is 1.000 is acceptable score and provide a good fit for the data

Table 8. Variables in the Equation

								95% CI for EXP(B)	
Step 3		**B**	**S.E**	**Wald**	**df**	**Sig**	**Exp(B)**	**Lower**	**Upper**
	Communication	-16.493	5394.578	.000	1	.998	.000	.000	.
	Environment	-.861	5722.222	.000	1	1.000	.423	.000	.
	Organization	18.277	10404.286	.000	1	.999	86614571.233	.000	.
	Legal &Political	-16.974	3911.426	.000	1	.997	.000	.000	.
	Constant	-19.376	10404.286	.000	1	.999	.000		

Variable (s) entered on step 1: COMM, ENV, ORG and LEGAL & POL

Source: Generated from SPSS on the questionnaire data

The Variables in the Equation table (above), shows the logistic coefficient (B) for each predictor variable. The logistic coefficient is the expected amount of change in the logit for each one-unit change in the predictor. The logit is what is being predicted; it is the odds of membership in the category of the outcome variable with the numerically higher value (here a 1, rather than 0). The closer a logistic coefficient is to zero, the less influence it has in predicting the logit. From this model the Organization barrier will have the greatest chance of predicting the presence or absence of e-Commerce (ICT) in *an organization, followed by Environment, Communication and legal and political barriers*.

5. Future research

This research in the future hopes to propose a method or solution for this for quantifying barriers in ICT and ecommerce endeavor. At the moment, some barriers are classified under different titles. This research will seek to uncover and measure such barriers which are culturally oriented of ICT adoption and effects on SMEs but also to analyze possible effects of ICT adoption and implementation on cluster of enterprises

6. Conclusively

Studying e-Commerce over the years has further proven how essential it can be to SMEs in Tanzania. However, it is important to mention that SMEs are not fully exploiting the potential of e-Commerce adoption in Tanzania, in our main findings was the fact that the main constraint to e-Commerce usage remains too high investments and/or usage costs due to the SMEs faces various e-Commerce barriers adoption. The most potential barriers that intricate thee-Commerce adoption in Tanzanian context, it is pointed out and are caused by political & legal barrier, environment barrier, communication barrier and organization barrier which are internal and external issues

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