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A FRAMEWORK FOR E-COMMERCE ADOPTION BY SMES IN DEVELOPING COUNTRIES

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Abstract
The study for e-commerce adoption indicates viable and practical solutions from e-commerce for organizations to meet challenges of a changing economic environment to enhance competitiveness. Much of this research relates to developed countries ready to spring on new approaches. However, developing countries seem to fall far behind. The few available studies related to SMEs in developing countries reveal a delay or failure on the part of SMEs to adopt ICT and e-commerce technologies. Various factors identified as causes for this limitation can be broadly classified as Internal Barriers and External Barriers. An exploratory pilot study and interviews were conducted and results analyzed using frequency distribution tools, with a view to developing a framework that will eTransform SMEs in developing countries. The study presents an eSME roadmap to determine the current stage of ICT sophistication and e-commerce adoption level for SMEs in developing countries. The road map also provides a guide to SMEs to plan and develop support activities and requirements for attaining a desired level of ICT and e-commerce adoption. Findings from this study reveal that a large number of SMEs have adopted ICT but at a rudimentary level, not a single SME has an e-commerce site where transactions are initiated and accomplished electronically. Lack of skills, lack of awareness of benefits of e-commerce and low return on investment were discovered as major barriers. The study recommends conscious effort by Government and other industry stakeholders to strategize and develop support measures for ICT and e-commerce adoption in developing countries.

Keywords: E-commerce, SME, Adoption, Developing Countries, Barriers and Support

Background to the Study

The slow rate of e-commerce adoption and diffusion by SMEs sector especially in developing countries has led to a variety of studies. These studies have reported that

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SMEs are generally lagging behind to large organizations as far as the adoption and usage of e-commerce is concerned (Simpson & Docherty, 2004). The development of Information and Communication Technology (ICT) and Electronic Commerce (e-commerce) Technologies are increasingly becoming important tools for SMEs to revive corporate management and promote growth of the national economy (Kapurabandra 2009). However, SMEs in developing countries specifically appear to face significant and unique challenges in adopting these technologies, which can enhance their fortunes.

A review of the literature indicates that several studies have been carried out on factors inhibiting adoption of ICT and e-commerce in developed countries. These studies have looked at organizational perspectives, owner / manager perspectives and environmental perspectives (Mehrtens, Cragg and Mills, 2001). Among these are studies that investigate the facilitators / inhibitors affecting adoption (Chen, 2003; Al-Mashari, 2001). Most barriers detected are more specific and pronounced with SMEs in developing countries

Many inherent constraints to e-commerce adoption by SMEs in developing countries, subscribe to barriers: internal and external to organizations, making it essential to examine them in depth. The impediments within the organization hindering adoption of technologies are Internal Barriers while other impediments outside the organization related to infrastructure, political, legal, social, and cultural barriers are External Barriers. Some barriers are more significant at certain stages. The rate of progression differs depending on the various barriers predominant at each stage. For an SME to successfully adopt the technologies and electronically transform (eTransform), these barriers need to be addressed. It is assumed that SMEs move through increasingly mature stages with respect to the way IT is used in their internal and external processes (Kapurabandra, 2009).

There are an interesting and growing number of studies addressing e-commerce adoption within the specific context of SMEs (Budhwani, 2001). This paper contributes to the ability to understand factors that inhibit ICT and e-commerce adoption by SMEs in Nigeria, a developing country with huge economic potentials. Believing that research findings from Nigeria will prove to be useful for other peculiar developing countries, it explores how the barriers could be overcome by way of support activities. This paper fills the gap of research from developing countries by first discussing the barriers and later discussing required support for SMEs to adopt.

Theoretical Framework

Barriers to ICT and E-commerce Adoption by SMEs

Previous studies which investigate barriers that effect SMEs adoption of ICT and e-commerce have identified a variety of factors, which can be grouped into several

categories. A number of authors (Chen, 2003; Mehrtens, Cragg and Mills, 2001) group factors into three major categories; owner manager characteristics, firm characteristics and cost and return on investment.

Other factors, such as the current level of technology usage within the organization related to the characteristics of the organization, also affect adoption of e-commerce (Kapurabandra 2009). The OECD (1998) has identified that: lack of awareness; uncertainty about the benefits of electronic commerce; concerns about lack of human resources and skills; set-up costs and pricing issues; and, concerns about security as the most significant barriers to e-commerce for SMEs in OECD countries. Low use of e-commerce by customers and suppliers, concerns about security, concerns about legal and liability aspects, high costs of development, limited knowledge of e-commerce models and studies which investigate barriers that affect SMEs adoption of ICT and e-commerce have identified a variety of factors, which can be grouped into several categories. A number of authors (Chen, 2003; Mehrtens, Cragg and Mills, 2001), group factors into three major categories: owner / manager characteristics, firm characteristics, and costs and return on investment.

Diversity among owner / managers, the decision makers for SMEs, reflects on a number of factors towards adoption of e-commerce technologies concluding that factors affecting adoption relate to owner / manager characteristics. A significant factor here is little or no knowledge, firstly of the technologies, and secondly of the benefits from such technologies. Lack of knowledge on methodologies, and unconvincing benefits to the company are among other factors (Courtney, Cloete and Fintz, 2002).

Barriers to E-commerce Adoption in Developing Countries

Organizations adopting ICT and e-commerce in developing countries face different issues and problems such as: the lack of telecommunications infrastructure, lack of qualified staff to develop and support e-commerce sites, lack of skills among consumers 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 (Ah-Wong, 2001; Budhwani, 2001).

SME studies of e-commerce in developed countries indicate that issues faced by SMEs in developed countries can entirely be different (Huff & Yoong, 2000; OECD 1998). Organizations adopting ICT and e-commerce in developing countries face problems like: 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 (Ndyali 2013; Kapurabandra 2009). Lack of telecommunications infrastructure includes poor Internet connectivity and the underdeveloped state of Internet Service Providers.

Absence of legal and regulatory systems inhibits development of e-commerce in developing countries. A study of SME adoption of e-commerce in South Africa found that adoption is heavily influenced by factors within the organization (Courtney, Cloete and Fintz, 2002). Lack of access to computers, software / hardware, affordable telecommunications, low e-commerce use by supply chain partners; concerns with security and legal issues; low knowledge level of management and employees; and unclear benefits from e-commerce were found to be major factors that inhibit adoption. While a study in Nigeria revealed that Cost is a major barrier for SMEs to adopt ICT; other inhibiting factors also include availability of ICT infrastructure; government support; Management support and business size (Irefin, Abdul-azeez and Tijani, 2012). They emphasized that ICT adoption and utilization is predicated on availability of physical infrastructure, legal and regulatory issues, adequate research and development, and proper policy. All these can be put in place only when there is adequate support from the government. This finding also concurs with the result of the study conducted in Nigeria by Irefin, Abdul-azeez and Tijani (2012).

Thus, available literature reveals significant factors dealing with internal and external barriers that can be grouped to develop a framework for supporting the adoption of e-commerce technologies. The summary of barriers to e-commerce adoption by SMEs in Nigeria is shown in Table 1 below. It combines empirical findings from various areas in literature; the barriers are categorized into a model of

Table 1 - Categorisation of Barriers to E-commerce Adoption in Nigeria

	Factors	Source
Internal Barriers	Owner / Manager Characteristics	Looi, 2005; Molla et al., 2005;
	Firm Characteristics	Thong et al., 1996; Looi, 2005; Mehrtens et al., 2001
	Return on Investment	Cloete et al., 2002; Looi, 2005;
External Barriers	Infrastructure	El-Nawawy et al.,1999; Looi, 2005, Panagariya,2000
	Political	Farhoomand et al., 2000; Irefin et al., 2012
	Economic	Irefin et al., 2012; Lawson et al., 2003
	Socio-cultural	Farhoomand et al., 2000; 2004; Molla et al., 2005
	Legal & Regulatory	Bingi et al., 2000; Panagariya, 2000; Schmid et al., 2001

Support to Overcome Barriers

Even though there is a considerable corpus of literature on barriers to adoption of ICT and e-commerce, it cannot be denied that there is paucity of literature on the support activities required by SMEs to overcome the barriers. This section provides a review of the available literature on necessary support activities to help alleviate the barriers. Lawson et al. (2003) suggest that the barriers could be overcome with the help of government and industry associations providing information to raise awareness, train, participate in the diffusion process and work with good consultants. This, to some extent is active in the UK, though it appears to be insufficient (Simpson, 2004). With the help of a survey carried out on 192 SMEs, along with five case studies investigating barriers at the initial Web design and development stages, the importance of support agencies in eliminating or alleviating the deterrents was revealed (Elsammami, 2001).

The lack of technical skills amongst owner managers of SMEs, requiring external advice and support was found to be significant with yet another survey. However, it was concluded that such support and advice does not necessarily have to be from experts (Budhwani, 2001). The same study observed SME dependence on government and industry groups for expert specialist advice although the small number that requested such advice were disappointed with available personnel who seemed to lack knowledge of e-commerce.

The Electronic Commerce Infrastructure Info-Communications Development Authority of Singapore (IDA) offers support to business organizations in the form of a legal and regulatory framework, an incentive system of investment and tax breaks, which are designed to encourage e-commerce development and investment (Staff, 2002). Similarly, a study of SMEs in Nigeria found that they need support with better telecom infrastructure, conducive legal environment, tax concessions allowing for deeper penetration of computers, adequate research and development and proper national policy on e-commerce (Irefin, Abdul-azeez and Tijani 2012).

A careful study of barriers in Table 1 and the support activities discussed above, led to the model shown in Figure 1 below.

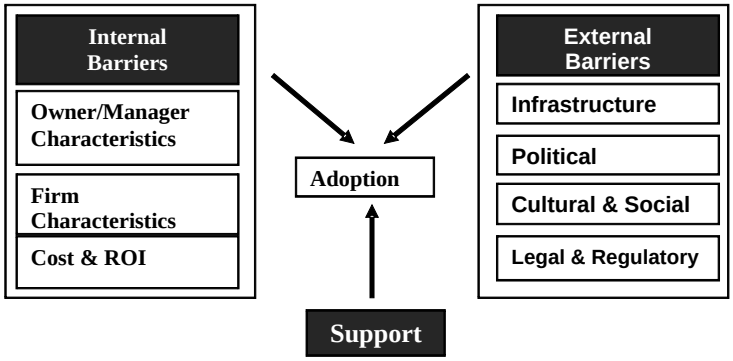

Figure 1 – Model for E-commerce Adoption

Research Methodology

Empirical research in this area being limited, an exploratory investigation utilizing qualitative and quantitative evidence was considered most suitable. The study selected Adamawa, Taraba and Bauchi States in North-East Nigeria with a high density of SMEs. The National council on industry, defined enterprise in Nigeria based on number of employees. This research considers enterprises with 11-300 employees as SMEs (Udechukwu, F. 2003). The study was conducted in two stages: preliminary pilot interviews and a survey. The interview focused on perceptions of the drivers and inhibitors to adoption of e-commerce technologies. A semi structured face-to-face interview with 15 SME owner / managers was made. While a random sample of SMEs from the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN) database with varying size, type and market segments in various industry sectors was chosen for the survey. Overall, 150 questionnaires with questions using a 5-point likert were personally addressed to the owner / managing director through random sampling from a list of SMEs operating within the region. In total 98 responses were received, while 4 were incomplete, resulting in 94 usable responses. This provided a response rate of 62.7%, considered adequate for the analysis. The study data was analyzed using SPSS statistical tool. The frequencies, valid percentages, mean and standard deviation of data on internal and external barriers to e-commerce adoption by SMEs and the internal and external support activities were analyzed.

Results Discussion

Analysis of Survey Data

More than 70% of the respondents (94% males and 6% females) were either professionally qualified or graduates. T-test analysis showed no significant difference based on gender and level of education. There was consensus for support in various forms and directions to address the barriers faced in adopting ICT and e-commerce technologies.

A vast majority, 67% of the respondents have adopted ICT, but at various different levels in the adoption ladder. Some respondent organizations are quite advanced while some are at the entry level. Respondents generally agreed that ICT is important and is advantageous. Moreover, it has become an essential and important status symbol, which enhances the image of the company and hence become an indispensable commodity. Most organizations used desktop applications mostly word-processing and Excel, with about 61.1% of SMEs having access to Internet connections.

It was revealed that there is a slow but steady trend towards the usage of e-mail for communications; internally within organizations and externally with customers and suppliers.

Table 2 - Internal Barriers to E-commerce Adoption by SMEs

Barriers	Frequency	Valid %	Mean	Std
Employees lack the required skills	72	76.6	4.06	0.48
Security concerns with payments over internet	61	64.9	4.16	0.57
Cannot give any financial gains	43	45.7	4.22	0.81
Not suited for the products	38	40.4	4.15	0.87
Not suited to the way we do business	41	43.6	4.15	0.90

Table 3 - External Barriers E-commerce Adoption by SME

Barrier	Frequency	Valid %	Mean	Std
Cultural Barriers				
Lack of popularity for online marketing & sales	44	46.8	4.35	0.68
Infrastructure Barriers				
Low Internet penetration in the country	42	44.7	3.93	0.75
Poor speed & quality of telecommunications	38	40.4	3.89	1.07
Inadequate infrastructure in the country	46	48.9	3.73	0.93
Relatively high cost of internet access	49	52.1	3.49	1.14
Unreliable power supply	47	50.0	3.88	0.70
Political Barriers				
Unstable economic climate in the country.	36	38.3	3.87	1.08
Constant change of government rules and regulations	46	48.9	4.45	0.56
Social Barriers				
The lack of available information on e-commerce	49	52.1	4.48	0.50
No one shop facility for services	30	31.9	2.63	1.44
Senior Management in other sectors lacking in ICT knowledge	44	46.8	3.52	0.94
Lack of reliable expert help at a reasonable cost	54	57.4	3.87	0.92
Legal & Regulatory Barriers				
Little support from government / with policies	61	64.9	4.24	0.54
Inadequate legal framework for e-commerce	34	36.2	3.67	1.10
No simple procedures and guidelines	53	56.4	4.20	0.63
Lack of suitable software standards	37	39.4	3.84	0.92

Table 4 - Internal Support for E-commerce Adoption by SMEs

Internal Support	Frequency	Valid	Mean	Std
Advice & direction with regard to ICT & e-commerce	35	37.2	3.77	0.86
Guidance to overcome risks associated with implementing	38	40.4	4.04	0.77
Awareness building / educating in ICT & e-commerce	57	60.6	4.00	0.70
Assist SMEs with guidelines for appropriate hardware and software	54	57.4	4.11	0.64

Table 5 - External Support for E-commerce Adoption by SMEs

External Support	Frequency	Valid	Mean	Std
Improving national infrastructure (telecom, road, etc)	59	62.8	4.33	0.51
Provide form of financial assistance to help SMEs	47	50.0	4.02	0.89
Government to take leadership & promotion	49	52.1	4.30	0.91
Provision of tax incentives	48	62.3	4.10	0.64
Improve low computer and Internet penetration	34	44.2	3.96	0.84
Improve low bank account & credit card penetration	40	51.9	4.13	0.71
Enforce suitable software standards	38	49.4	4.09	0.81
Improve collaboration among the SMEs	34	44.2	4.16	0.83

Analysis of survey results reveal that lack of skills, lack of awareness of benefits and return on investments prevent SMEs from adopting ICT and e-commerce technologies. While awareness and education is ranking top for support by respondents, it is typical for a developing country like Nigeria trying to implement technologies. It reflects on other internal barriers too and the significance of awareness and education to counter this barrier.

“Lack of popularity in online marketing” and “low internet penetration” rate is high in the list of external barriers. Improving ICT diffusion in Nigeria can address this problem. 'Inadequate infrastructure' impedes SMEs as reinforced by their request for “improvement of national infrastructure” raking very high on the support needed. SMEs in Nigeria are adversely affected by the high cost and unreliable service of infrastructure services such as electricity and telecommunications. Policy inertia and the lack of legal and regulatory framework also rank high and enforce constraints on SMEs. There is also need for one-stop shop facility that can help SMEs access

information, technology, markets and the much needed credit facilities. Therefore, Government, academia and industry sectors can take leadership roles in promotion of ICT by conducting awareness and training, provision of technical and non-technical support to SMEs.

SMEs Level of Sophistication

IT sophistication is determined by how information technology is used with appropriate process in an organization by looking at how people, processes and technology interact (Ginige et al., 2001).

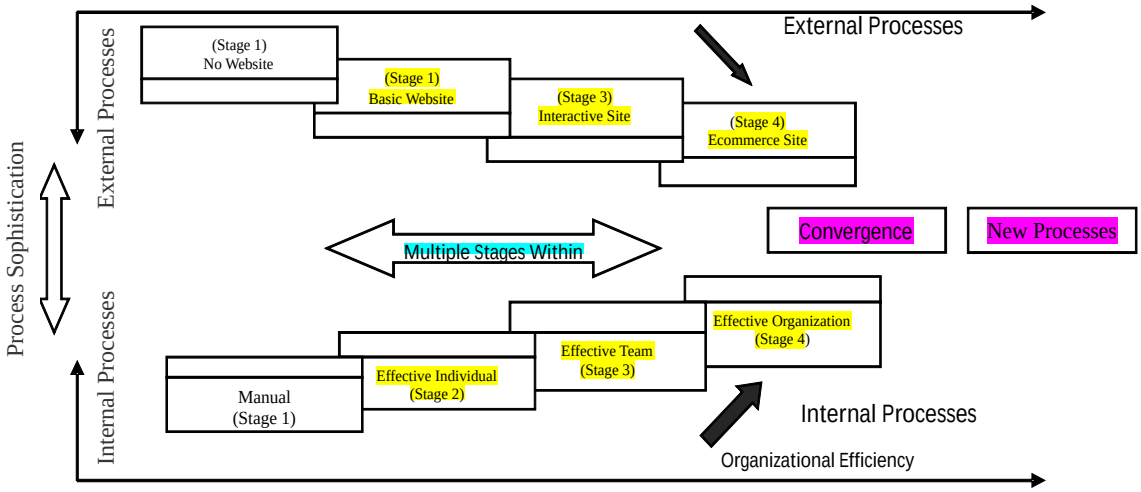

Figure 2 - eSME Roadmap for SMEs in Developing Country, Nigeria (Adapted from Ginige et al., 2001)

Table 6 – Stages on the eSME Roadmap (Adapted from Ginige et al., 2001)

Process	Stage #	Stage	Description
Internal	Stage 1	Manual	Computers are not used in the organization. All the processes are conducted manually.
	Stage 2	Effective Individual	Individuals using computers and stand alone productivity software such as accounting packages, spread sheets, etc. May use e-mail.
	Stage 3	Effective Team	Computer network being used in functional units such as accounting, production. People work in teams using a network.
	Stage 4	Effective Organizatio n	All computers in the organization are networked, and the databases and information systems are interlinked. Enterprise wide applications are used for purchasing, manufacturing, sales, accounting, etc. Information is shared across the enterprise.
	Stage 1	No Website	The organization does not have a website
	Stage 2	Basic Website	The organizat ion has its own domain name and brochure-ware type of website hosted. Has an ISP for marketing purposes.

External	Stage 3	Interactive Website	Existence of a website providing two –way flow of information. Answers to structured queries online ordering, order tracking etc.
	Stage 4	E-commerce Website	The organization should have a secure Web server to facilitate financial transactions or a link to a payment gateway to process online payments.
	Stage 5	Convergence	The organization has achieved integration of all information it needs to support all business processes and to interact with its business partners.
	Stage 6	New Processes	The organization has achieved integration of all information it needs to support all business processes and to interact with its business partners.

The survey data was analyzed to determine the number of SMEs that fell into each of the sub stages. Table 7 below shows the number of SMEs within each of these sub stages. The majority of the SMEs fell into the initial stages. None of the SME organizations fell into the advanced stages of the eSME Roadmap.

Table 7 – Number of SMEs in Sub-stages E-commerce Adoption

External Processes	No Website	Basic Website	Interactive site	E-commerce site
	66 (70%)	19 (20%)	9 (10%)	0
Internal Processes	Manual	Effective Individual	Effective Team	Effective Organization
	23 (24%)	45 (48%)	26 (28%)	0

E-commerce Adoption Framework for SMEs

Identifying barriers and support activities to adoption of e-commerce technologies by SMEs in Developing Countries necessitated the need to develop the eSME framework in figure 3 below. A configuration of the e-commerce adoption barriers and available support activities determines the current stage of an SME which includes; the current strategy, processes, technology, applications and skills set. It involves both the internal and external barriers as well as the internal and external support activities. Therefore, a convergence of identified subset of barriers inhibiting an SME from attaining the desired stage in the eSME roadmap in figure 2, with a subset of support activities required to ameliorate barriers will enable an SME attain the desired stage in the eSME roadmap.

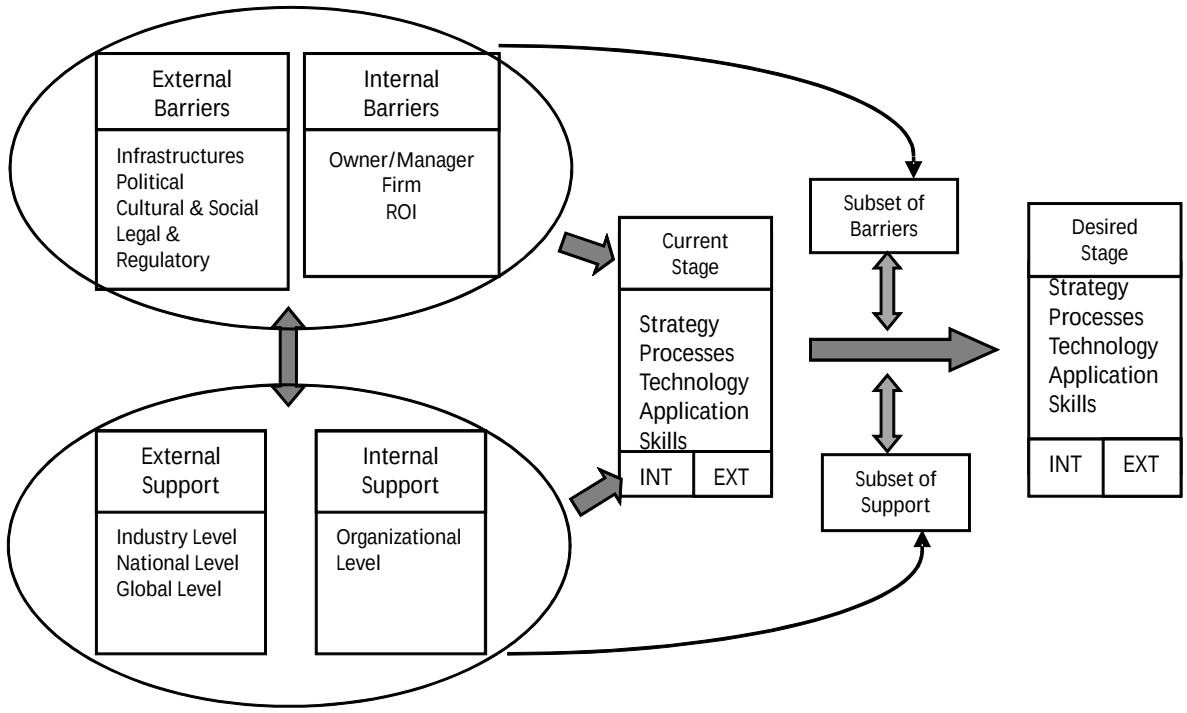

Figure 3 – eSME Framework

Discussion of the Findings

The eSME framework illustrated in Figure 3 provides guidance and advice to the SMEs on how to successfully carry out eTransformation and providing an insight into the eTransformation journey. It helps understand various stages to go through as well as progressive transformation of business processes. The eSME Roadmap assumes that organizations move through increasingly mature stages with respect to the way IT is used in their internal and external processes to involve the organization in a variety of e-commerce activities. The rate of the progression through the stages can occur in rapid sequence or they can be very slow. This can be attributed to the various barriers predominant at each stage impeding the SMEs. The problems and issues inherent to each stage need to be resolved before the organization successfully advances to a more mature stage. The empirical studies in this paper have shown that the SMEs have to live with most of the external barriers, which require government intervention to speed up the process.

The eSME Roadmap shown in Figure 2 will facilitate an SME to ascertain the company's current level of ICT and e-commerce sophistication and determine the current stages they are in. They can also determine where they would like to progress next, by examining the eSME Roadmap. The framework would facilitate the SME owner / managers, policy makers, and industry organizations seeking to implement strategies for adoption of ICT and e-commerce. It would enable rational, informed decisions regarding the uptake of e-commerce.

Conclusion/Recommendation

This paper provides an understanding of the challenges faced by SMEs at different levels of ICT sophistication in developing countries. It examines barriers faced at different stages while identifying support activities required. The eSME Roadmap articulates stages of maturity and therefore offers much more gradual transition. This approach is well suited for SMEs who are constrained by resources and cannot handle large changes.

The models provided in this study will enable SMEs to identify their current stage, the barriers that are holding them back from moving to the next desired stage, and also the support required to progress to the next stage. The stages are the foundation of the eSME Roadmap. It can help trace the evolution of an organization and ensue the support providers align their support services to meet the requirement of each stage of the evolution process. Awareness of the strategy, processes, technology, applications, and skills they need to adopt in the process would help the SMEs plan their eTransformation process in a strategic manner.

The results clearly indicate the necessity to provide support to SMEs if they are to successfully adopt ICT and e-commerce. Accordingly, necessary support to overcome or alleviate the barriers discovered need to be recognized. Therefore, both industry and government need to step in with new strategies, awareness and support to help SMEs adopt e-commerce.

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