

An Exploratory Study of SME Barriers for Adoption of ICT and e-commerce in the Developing Countries - an empirical pilot study of Sri Lanka

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Abstract

Embracing ICT and e-commerce for stability in international markets and competitive advantage are becoming imperative for Small and Medium Enterprises (SMEs) to survive in a global economy. Yet, SMEs in developing countries, forming the backbone of the economy, are relatively slow in adopting ICT and e-commerce. Literature reveals many significant reasons contributing towards this reluctance. This paper looks into more in-depth information about the reasons why SMEs in Sri Lanka – a developing country in Asia, are reluctant to adopt ICT and e-commerce technologies. The barriers were identified through a pilot study of 17 SMEs carried out in Sri Lanka. It identifies the similarities and differences between the SMEs in developing countries and the developed. The author hopes to develop a methodology to effectively help e-transform SMEs in developing countries.

Keywords:

E-commerce, SMEs, ICT, adoption, developing countries, factors, barriers

INTRODUCTION

The emergence of the Internet has allowed Small- and Medium-sized Enterprises (SMEs) to compete effectively and efficiently in both domestic and international markets (Poon and Swatman, 1999). It is a well-known fact that e-commerce and Internet technologies can benefit an organisation (Akkeren and Cavaye, 1999). Developing countries have the potential to achieve rapid and sustainable economic and social development by building an economy based upon an ICT enabled and networked SME sector capable of applying affordable yet effective ICT solutions (UNDP, 2004)

In their handbook Heeks and Duncombe (2001) discuss the opportunities that Information Communication Technologies (ICT) provide for SMEs in developing countries. SMEs, vital to the economy in any country, are very often recognized as an economy growth engine (Brouthers et al, 1998). They often occupy strategic positions in the economy, positions for which large companies lack the flexibility. The SME sector plays a significant role in its contribution to the national economy in terms of the wealth created and the number of labour employed (Rashid et.al, 2001). With the development of ICT and shift to the knowledge based economy e-transformation and introduction of ICT is becoming an increasingly important tool for the SMEs both to reinvigorate corporate management and promote growth of the national economy (UNDP, 2004).

It is widely accepted that it is important for business to embrace ICT and e-commerce technologies. This is more pronounced in the case of SMEs. The adoption of ICT and e-commerce technologies is vital for their on-going survival. It gives them the competitive advantage and enables them to compete with larger organisations, and to operate on an international scale.

Despite advances in information technology and acceptance by large organisations of such technologies, the same level of adoption is not evident among SMEs (Bode & Burn, 2002; Knol & Stroeken, 2001). This low level of adoption, often impedes the SMEs in developing countries in particular, the much needed exposure or leverage. This also suggests that SMEs face significant and unique challenges in adopting ICT and e-commerce (Marshall. N. et.al, 2000).

This paper focuses on the barriers for adoption of ICT and e-commerce more specifically to the SMEs in developing countries. This, it does, with a description of a pilot study carried out in Sri Lanka to investigate the barriers and inhibitors to adopt ICT and e-commerce by SMEs. Sri Lanka was chosen as the test bed as it is a developing country struggling with its economy but on its way to an e-society. The research findings from Sri Lanka could prove to be useful with other developing countries of a similar nature.

This paper will first outline a review of current research about ICT and e-commerce technology adoption. Then a framework summarising current knowledge is presented. A brief description of the research methodology used to carry out the empirical study is given next. This is followed by the analysis of results. The paper concludes with discussions on conclusions, limitations, and future areas of research.

LITERATURE REVIEW

SMEs in Sri Lanka

SMEs are extremely important to the economy of any country. They play a critical role in economic development. This is more pronounced in the case of developing countries. Sri Lanka is no exception.

Different countries use different parameters to define SMEs. Some use the number of persons employed, amount of capital invested, amount of turnover or nature of the business (Gamage, 2003). In Sri Lanka there is no clear definition of an SME as government agencies use various different criteria to define SMEs (Cooray, 2003; Gamage, 2003). The main criteria used are the number of employees, the size of fixed investment, and the nature of the business and the sector (Cooray, 2003). In Sri Lanka, The National Development Bank (NDB), the Export Development Board (EDB), and Industrial Development Board (IDB) use value of fixed assets as the criterion for definition, whereas the Department of Census and Statistics (DCS), Small and Medium Enterprise Development (SMED), and the Federation of Chambers of Commerce and Industry (FDCCI) use the number of employees as the criteria. The World Bank defines enterprise size in Sri Lanka based on the number of employees: those with fewer than 49 employees are small; those with 50-99 employees are medium-sized; and those with more than 100 employees are large.

For this study we consider the following criteria to define the SMEs in Sri Lanka.

Table 1: Definition of Terms: SMEs and MEs (adapted from European Union, 2003;Gamage, 2003)

Micro Enterprises	Within SMEs Category, micro enterprises are enterprises with fewer than 10 employees
Small Enterprises	Small enterprises have between 10 and 49 employees
Medium sized enterprises	Medium sized enterprises have fewer than 250 employees

The SMEs in Sri Lanka perform a strategic role, by accounting for a very high percentage of the total number of business establishments. The 2004 mission statement of the International Labour Organisation (ILO) reported that 75% of Sri Lanka's labour force was employed in the SME sector (including the agricultural sector). A more recent World Bank survey on Sri Lanka records approximately one million people working in the manufacturing sector while the Survey of Industries finds around 400,000 working in establishments employing 25 or more workers. These numbers suggest that SMEs contribute substantially to employment and income generation (World Bank Survey, 2003).

While the domestic market is the main outlet for SMEs in Sri Lanka, they make a significant contribution towards exports. Although direct exports from this sector may not be large, SMEs play an important role as indirect exporters. There are a large number of SMEs that manufacture export products or parts, with larger entrepreneurs coordinating such arrangements and handling the direct exports. Coir based products, wood, handicrafts, leather products, plants and foliage are examples of such arrangements involving SMEs which are sub-contracted by large-scale exporters (World Bank Survey, 2003).

An ambition of the Sri Lankan is to enjoy a leading position on the electronic highway in the year 2005. This ambition is implemented in the 'e-Sri Lanka' program, which should provide Sri Lankan SMEs 'a ramp to the digital highway' and stimulate e-commerce and e-business.

Barriers to ICT and E-commerce Adoption in SMEs

This section outlines recent literature on the barriers/inhibitors for adopting ICT and e-commerce by SMEs.

Research works investigating the 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 (eg: Chau, 2001; Mehrtens et al., 2001)

identify factors relating to three major categories, owner/manager characteristics, firm characteristics, or to costs and return on investment.

The owner/managers play an important role in decision making in SME organisations. Hence it can be concluded that a number of factors that affect adoption of e-commerce have to do with the owner/manger characteristics. Iacovou et al. (1995) found that the owner's lack of awareness of the technology and perceived benefits is a major barrier to a take up of e-commerce. The lack of knowledge of how to use the technology and low computer literacy are other contributory factors for not adopting e-commerce (Kirby and Turner, 1993). Julien and Raymond (1994) discuss how the owner's level of assertiveness in decision making would affect the adoption of e-commerce. If the owner is subjective and refers to the opinions of experienced people who recommend the adoption of e-commerce into the organisation, then he is also more likely to accept their opinions (Harrison et al., 1997). Mistrust of the IT industry and lack of time are two other factors that affect the decision to adopt e-commerce (Akkeren and Cavaye, 1999).

SME owners are concerned about a return on investments, reluctant to make substantial investments when short-term returns are not guaranteed (Akkeren and Cavaye, 1999).

There are some other factors related to the characteristics of the organisation, which affect adoption of e-commerce. Iacovou et al., 1995 found that the current level of technology usage within the organisation affects process of adoption.

In another study by OECD (1998), it has identified lack of awareness, uncertainty about the benefits of electronic commerce, concerns about lack of human resources and skills, set-up costs and pricing issues, concerns about security, as the most significant barriers of e-commerce for SMEs in the OECD countries.

As summarised by Courtney and Fintz, (2001) there are several other factors that affect the adoption of e-commerce. These are, low use of E-commerce by Customers and Suppliers, concerns about security aspects, concerns about legal and liability aspects, high costs of development and computer and networking technologies towards e-commerce, limited knowledge of e-commerce models and methodologies, and accrued benefits to the company of which the trade is unconvinced.

SMEs have limited resources (e.g. financial, time, personnel). This "resource poverty" has an effect on the adoption of e-commerce. They cannot afford to experiment with these technologies and make expensive mistakes (EBPG, 2002).

Barriers for e-commerce in Developing Countries

It is revealed that less attention with SME e-commerce research has been paid to developing countries with different economic, political, and cultural circumstances. Identifying the differences is an initial step to understand the process of technology adoption. This is particularly important if governments believe that electronic commerce can foster economic development (Martha Garcia-Murillo, 2004).

SME studies of electronic commerce issues in developed countries [Corbitt et al; Huff and Yoong, Mehrtens et al.] indicate that electronic commerce issues faced by SMEs in developed countries can be totally different from those experienced by SMEs in developing countries. Organisations adopting ICT and e-commerce in developing countries face a number of challenges that are specific to them and are more pronounced than would be the case in developed countries. Some of the inhibitors for e-commerce efforts in developing countries are the 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 (Anigan, 1999; Bingi et al., 2000; Panagariya, 2000), Kapuruandara et.al, 2004). Lack of telecommunications infrastructure includes poor Internet connectivity, lack of fixed telephone lines for end user dial-up access, and the underdeveloped state of the Internet Service Providers.

Cultural barriers in some countries may also exist to reject the acceptance of e-commerce as a way of doing business (Bingi et al, 2000). In countries like Sri Lanka, India for instance, shopping is a social activity, and personal, face-to-face contacts with sellers is an important part of the shopping experience. Distrust of what businesses do with personal and credit card information is an e-commerce issue in any country, but, in countries where there may be good justification for such distrust, it could become a serious obstacle to e-commerce growth (Anigan, 1999, Elkin, 2001). Lack of developed legal and regulatory systems also would inhibit the development of e-commerce in developing countries.

Cloete, Courtney, and Fintz (2002) in their study of SME adoption of e-commerce in South Africa, found that adoption is heavily influenced by factors within the organization. There, lack of access to computers, software, other hardware, and telecommunications at a reasonable cost; low e-commerce use by competitors and 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 the major factors that inhibit adoption.

Dedrick and Kraemer (2001) in their study of e-commerce in China, found that there are many significant barriers to adopt e-commerce. Limited diffusion of computers, high cost of Internet access, and a lack of online payment processes were found to directly inhibit e-commerce. Inadequate transportation and delivery networks, limited availability of banking services, and uncertain taxation rules indirectly inhibit e-commerce.

El-Nawawy and Ismail (1999) in their study of electronic commerce adoption by SMEs in Egypt found that the main factors contributing to the non-adoption of electronic commerce in Egypt are awareness and education, market size, electronic commerce infrastructure, telecommunication infrastructure, financial infrastructure, legal system, government role, pricing structure, and social and psychological factors.

Schmid et al. (2001) suggest that the main electronic commerce issues facing SMEs in Argentina are awareness, access to hardware, infrastructure, organisational culture, financial issues. A comparison of the two studies in Argentina and Egypt, (both developing countries) suggests that the key factors of electronic commerce adoption in developing countries are: awareness, telecommunication infrastructure, and cost. It also suggests that SMEs in developing countries share similar issues. The Internet and electronic commerce issues of SMEs in Samoa are consistent with the studies conducted in other developing countries (Schmid et al., 2001; El-Nawawy and Ismail, 1999).

In a study of Sri Lankan SME capability to adopt electronic commerce conducted by the Sri Lankan Business Development Centre (2002), key factors inhibiting the adoption of electronic commerce by SMEs were identified as; lack of knowledge and awareness about the benefits of electronic commerce, current unpreparedness on the part of SMEs to adopt electronic commerce as a serious business concept, lack of exposure to IT products and services, language barrier and lack of staff with IT capability, Web-based selling not seen as practical, limited use of Internet banking and web portals, inadequate Telecommunications infrastructure. Added to these the online payments remain an obstacle as the online credit card payments in Sri Lanka are governed by a limit of US\$500 – US\$1000. Therefore, it is difficult to purchase high value goods and services online or to purchase large quantities of goods and services online.

The barriers discussed above are summarised in the Table 2.

Table 2: Summary of E-commerce Adoption Barriers

Barriers to E-commerce Adoption	Reported by
High cost of E-commerce implementation; Internet technologies too expensive to implement	Iacovou et al (1995); Fielding (1996); Lawrence (1997); Puroo & Campbell (1998); Van Akkeren & Cavaye (1999); Riquelme (2002); Quayle (2002)
E-commerce too complex to implement	Fielding (1996) ; Quayle (2002)
Low level of existing hardware technology incorporated into the business	Lawrence (1997)
SMEs need to see immediate ROI and E-commerce is a long-term investment	Lawrence (1997); McGowan & Madey (1998)
Organisational resistance to change because of the fear of new technology amongst employees	Lawrence (1997); Van Akkeren & Cavaye (1999)

Preference for and satisfaction with traditional manual methods, such as phone, fax and face-to-face	Lawrence (1997); Poon & Swatman (1999); Venkatesan & Fink (2002)
Lack of technical skills and IT knowledge amongst employees; Lack of computer literate/specialised staff	Iacovou (1995); Lawrence (1997); Damsgaard & Lyytinen (1998); Van Akkeren & Cavaye (1999); Quayle (2002); Riquelme (2002); Chau & Turner (2002)
Lack of time to implement E-commerce	Lawrence (1997); Van Akkeren & Cavaye (1999); Walczuch et al (2000)
E-commerce is not deemed to be suited to the way the SME does business	Iacovou et al (1995); Abell & Limm (1996); Poon & Swatman (1997); Hadjimanolis (1999);
E-commerce is not deemed to be suited to the products/services offered by the SME	Hadjimanolis (1999); Walczuch et al (2000); Kendall & Kendall (2001)
E-commerce is perceived as a technology lacking direction	Lawrence (1997)
Lack of awareness about business opportunities/benefits that E-commerce can provide	Iacovou et al (1995); Quayle (2002)
Lack of available information about E-commerce	Lawrence (1997)
Concern about security of E-commerce	Abell and Limm (1996); Puroo & Campbell (1998); Hadjimanolis (1999); Van Akkeren & Cavaye (1999); Poon & Swatman (1999); Quayle (2002); Riquelme (2002)
Lack of critical mass among customers, suppliers and business partners to implement E-commerce	Abell and Limm (1996); Hadjimanolis (1999)
Lack of awareness of perceived benefits	(Iacovou et al, 1995; Kirby and Turner, 1993).
Lack of awareness of the technology	(Kirby and Turner, 1993; Thong and Yap, 1995).
Lack of Assertiveness	(Julien and Raymond, 1994; Harrison et al, 1997)
subjective norm	(Harrison et al, 1997).
Lack of Organisational readiness	(Iacovou et al, 1995).
external pressure to adopt IT	(Thong and Yap, 1995; Iacovou et al, 1995).
Dependency on customer/supplier	(Kirby and Turner, 1993)
cost of adopting / using IT short to medium term return	Akkeren. J, Cavaye A.L.M, (1999).
The lack of knowledge of how to use the technology, low computer literacy	. (Kirby and Turner, 1993).
Mistrust of the IT industry, lack of time	(Akkeren and Cavaye, 1999).
lack of awareness, uncertainty about the benefits of electronic commerce, concerns about lack of human resources and skills, set-up costs and pricing issues, concerns about security	(OECD, 1998)

Low use of E-commerce by Customers and Suppliers. Concerns about security aspects, Concerns about legal and liability aspects, high costs of development, Limited knowledge of e-commerce models and methodologies. Unconvinced of benefits to the company.	(Courtney and Fintz, 2001)
limited resources (e.g. financial, time, personnel	(EBPG, 2002).

The above literature survey on the SME barriers for e-commerce adoption reveal that there are many significant factors which affect the adoption of e-commerce technologies. These factors can be grouped to develop a framework for investigations. This paper proposes the following framework for this purpose. The barriers for the SMEs in adopting ICT and e-commerce can be broadly categorised into Internal and External issues.

Internal: SME has control over and the ability to change the internal factors within the organisation. Eg. lack of time or resources, lack of awareness on the part of the owner/ manager. Internal barriers could be further categorised into Individual (owner/manager) and Organisational (firm) barriers. These can be addressed

External: Barriers that cannot be resolved by the SME Company. They have no control over these, and are compelled work within the constraints. Eg. Inadequate telecommunication infrastructure etc. Some of these barriers could be addressed by SMEs working together. The SMEs can get together irrespective of the industry sector they are in, to form clusters to share the expenses, resources, facilities etc. or the SMEs from the same industry sector can work together. To address certain other external barriers governmental intervention may be required.

The pilot study reported in this paper, attempts to provide more in-depth information about the factors/barriers in the context of SMEs in Sri Lanka. By identifying the major barriers the second stage of this study proposes to develop a methodology that would address the internal factors and would work within the external constraints.

RESEARCH METHODOLOGY

As very little research has been carried out on SMEs in Sri Lanka, we chose an exploratory pilot study to help find out the barriers and inhibitors to adoption of ICT and e-commerce among the SMEs. Face to face interviews are most suitable for this type of exploratory study because the researcher can adapt the questions as necessary, clarify doubts, and ensure that the responses are properly understood (Sekaran, 2000). This is of particular importance as the potential interview participants may not have a clear understanding about ICT, e-commerce and its applications. Furthermore, face to face interviews allow the researcher to explore issues raised by the respondents, which generally is not possible through questionnaires or telephone interviews.

This study was carried out in July 2005, through a face to face, semi structured interviews of 17 SMEs. This random sample which was chosen from a list maintained by the Export Development Board of Sri Lanka is representative of SMEs from various industry sectors, engaged in different businesses in the western province of Sri Lanka. The western province was selected as this province boasts the highest density of companies using ICT. No restriction based on type of industry was made. It was also important that the organisation had adopted at least one of the following parts of ICT: phone, fax, packages, and basic office packages (Word, Excel etc), Internet searching and browsing, e-mail, or a Web site. The interview guide line was developed mainly based on primary literature and the proposed framework.

The owner/managers were interviewed as they are the decision makers of the SME organisations. They were interviewed to get first hand information about their use of ICT and e-commerce, their perceptions and the barriers for adopting it. Each interview lasted nearly one hour. Each of the interviews was recorded, subsequently transcribed and subjected to qualitative content analysis. This involved categorisation of responses into certain themes, some of which were inherent in the interview questions, and some of which emerged through the interviewees' responses to questions posed.

DISCUSSION OF RESULTS

87% percent of the participating companies were categorized as service companies, and the remaining 23% as manufacturing companies. 35 % of the participants have a static website mainly used for advertising purposes. Most of these Websites are not updated regularly. None of the participants uses the Website for buying or selling. 767% of the participants have Internet and e-mail facilities in their organisations. 52 % use the Internet for browsing and searching, and also use e-mail as the preferred medium of overseas communication. 62% of them have ADSL connections and 25% dial-up connections. While majority of participants have Internet access, only 43% allow every user to access the Internet.

The following factors which surfaced as barriers for adoption of ICT and e-commerce are categorised according to the framework discussed.

Internal <i>Individual/ owner manager</i>	Lack of awareness about business opportunities/benefits that E-commerce can provide, Lack of available information about E-commerce, Lack of awareness of the technology, Lack of knowledge and awareness of available systems, Lack of access to expert help and reliable advise, lack of time and resources, E-commerce is not deemed to be suited to the products/services offered by the SME , SMEs need to see immediate ROI and E-commerce is a long-term investment, E-commerce is perceived as a technology lacking direction, Lack of Assertiveness, Concern about security of E-commerce, Fear of expansion, Unconvinced of benefits to the company, subjective norm, Lack of trust of the technologies, lack of skills
Internal <i>Firm</i>	Lack of technical skills and IT knowledge amongst employees, Lack of time to implement E-commerce, Lack of Organisational readiness, E-commerce is not deemed to be suited to the way the SME does business, customers, suppliers not connected (channel conflict), Lack of staff, time to investigate technology and new systems, Low use of E-commerce by Customers and Suppliers, lack of awareness of IT and minimal use of it, In-house IT expertise, Language barriers, Company culture, Lack of computer literate/specialised staff , Low level of existing hardware, technology incorporated into the business, Preference for and satisfaction with traditional manual methods such as phone fax and face-to-face , Organisational resistance to change because of the fear of new technology amongst employees, Limited knowledge of e-commerce models and methodologies
External	Costly internet, Inadequate telecom infrastructure, limited teledensity, unreelable telecommunications and power supply, Limited band width, Unstable economy, Cultural and linguistic differences, Political uncertainty, High cost of E-commerce implementation, High cost of telephone facilities, Insufficient number of available telephone lines

Lack of awareness is the most important barrier, cited by almost 88% of respondents. This is significant for majority of owner/managers, who described themselves as having basic computer literacy but had no idea what technologies were available, how e-commerce technology could benefit their businesses or if it would suit their business needs. It was a major concern, as they are the decision makers of their organisation. A process of education and training of the owner/manager can overcome these barriers. Education and training is viewed as being crucial to addressing the lack of readiness of SMEs in adopting and developing their electronic business capabilities (Chau, 2001).

The second most cited reason that could inhibit the adoption of e-commerce is the cost. Respondents in our study were concerned about the cost of internet, cost of equipment and cost of e-commerce implementation. SMEs who are poor in resources cannot afford to experiment with these technologies and make expensive mistakes (EBPG, 2002). It may be possible to overcome this by working together and forming clusters.

The inadequate telecom infrastructure was the third most frequently cited barrier, chosen by 83% of respondents. Respondents that chose this barrier were more advanced in their usage of ICT and used e-mail and internet hence may be more likely to have experienced this problem.

The remaining barriers was cited by less than 70% of respondents. Even though they are considerably important, it was evident that the above three are amongst the key factors affecting adoption. These support the findings of previous research and also suggests that SME's in developing countries share similar issues (Schmid et al.; El-Nawawy and Ismail; Boalch and Bazar). It also indicate that these key issues are totally different from that of developed countries (Corbitt et al.,1997; Huff and Yoong,2000; Mehrtens et al,2001.; Poon and Swatman,1999) where organisational readiness and external pressure is considered as two of the main factors.

Thus the author's research has identified the existence of significant barriers to adoption of ICT and e-commerce for SMEs, which is supported by academic literature on the topic. However, this requires thorough and further investigation of the barriers, recognition of the significance of each barrier and a methodology to alleviate them.

CONCLUSION:

Most participant SMEs in the pilot study are in the early stages of ICT and e-commerce adoption and the majority expressed their eagerness to embrace it further. As commonly found in previous studies (Schmid et al., 2001; El-Nawawy and Ismail, 1999) in developing countries, lack of awareness appears to be amongst the major barriers of SMEs in adopting e-commerce. They were very keen to be aware and knowledgeable about the benefits ICT and e-commerce can bring to their organisations, how and where ICT and e-commerce can be used. We found that most SMEs are aware the market will become more dynamic, competitive, and global, and that there is an increased need to use the ICT and e-commerce in their business.

There has been a lack of research undertaken in Sri Lanka to determine SMEs' barriers for adoption of ICT and e-commerce. This pilot study has shown that while the SMEs agree that adoption is essential in today's business, they are hindered from adoption as they are plagued with many constraints, some of which are more specific to developing countries like Sri Lanka. The next stage of the study outlined in this paper is to investigate some of the issues that have emerged in more detail to analyse their significance further. This pilot study will serve as a framework and a guideline in designing further research. Furthermore, it is felt that there is a need to find methodologies which address these barriers to help successfully e-transform the SMEs in developing countries.

This paper contributes towards knowledge in the following areas. Firstly, it reviews the existing barriers for SMEs in developing countries found in various literatures. Secondly, it categorizes barriers in two ways: factors that can be solved within the organisation and the factors that cannot be resolved within the organisation. Finally, the paper recognises that the study requires further investigation to find solutions to the research question in discussion.

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