Determinants of Electronic Commerce in Pakistan: Preliminary Evidence from Small and Medium Enterprises

AFZAAL H. SEYAL, MIAN MOHAMMAD AWAIS, SHAFAY SHAMAIL AND ANDLEEB ABBAS

INTRODUCTION

The past decade has witnessed an explosive and overwhelming increase in the use of the Internet technologies especially the World Wide Web (Web) for business purposes. This has not only reshaped existing businesses but has also created tremendous opportunities for new businesses. Business organizations regardless of their size have applied Internet technological tools in a wide range of the activities such as: advertising, online delivery of products and services under the umbrella of electronic commerce (EC). Business organizations are spending heavily in the hope of getting a competitive edge over their competitors. The manifold increase in the users’ base from the total Internet revenue of US$ 40 billion in goods and services in 1996 to over US$ 1 trillion at the end of 2003 (Forrester Research 2002) has provided endless opportunities to EC to operate in the global market. Worldwide Internet research revenue has increased from US$ 834 million in 2002 to US$ 993 million in 2003 with an increase of 19% (www.eMarketer.com). Further the rapid development of the telecommunication infrastructure in recent years has provided broad network

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Abstract

This study investigates the extent of e-commerce (EC) adoption along with the factors that predict EC adoption among 54 SMEs in Pakistan. The study found that 84% of the organizations have an Internet account; whereas 46% of the organizations have claimed average to above average adoption of EC (mean = 2.76). Several of the organizational factors such as organizational culture, management support and motivation to adopt EC along with technological and environmental factors were studied. Statistics further reveal that 59% of the organizations have either an in-house or vendor supported Web server and 67% of the surveyed organizations have a homepage. Factors such as perceived benefits, task variety, organizational culture and government support remain the significant predictors of EC adoption. All other factors including management support remained insignificant. Based upon findings, we made some recommendations to policy makers and relevant authorities for devising and implementation of a strategic plan to enhance the EC adoption among SMEs.

Keywords: Pakistan, SMEs, e-commerce adoption
coverage with high quality and fast transmission. This factor has facilitated the development of the business through the use of the Internet and Web, and has presented new trends for small and medium enterprises (SMEs) to contribute strongly to national economies. The advancements in the Web usage and developments of open standards for the Internet have brought EC to the doorsteps of the SMEs. This has also helped in reducing the gap between large and small enterprises. Small businesses today are using the Internet to attract new customers, build relationship with suppliers and cut the costs of serving established clients.

While EC has become an important issue within the growth of the Internet, there have been insufficient empirical studies concerning its adoption. Despite the potential benefits of EC, studies have shown that EC has not been adopted as rapidly by SMEs, as anticipated (Iacovou et al. 1995). Researchers have noticed the slower rate of adoption in SMEs across the globe. This is due to several reasons; lack of financial resources, lack of management enthusiasm and entrepreneurship, external pressure and support (Poon and Swatman 1998).

The majority of these studies were confined to the US, Canada and Europe. Comparatively, less has been researched in Asia as a whole and studies on EC adoption in South Asia remain at the margin. However, some studies on EC were conducted in India (Sharma and Gupta 2003), in Iran (Karimi and Baghaei 2003) and in Mauritius (Kardaras and Karakostas 2001). Unfortunately scant information is available about EC adoption in Pakistan and research on EC adoption in SMEs is negligent in Pakistan. In the past some studies on EC adoption in SMEs have been conducted (Seyal and Rahman 2003) and EC adoption in Very Small Business Enterprises (Seyal 2003) in different geographical and cultural environments and work settings has also been analysed. Giving the ongoing importance to EC in SMEs, this research was undertaken in early 2003 with the main objectives to assess current level of EC adoption in SMEs and to develop and test a model that predicts the key success factors contributing toward EC adoption in Pakistani SMEs and further to validate the instruments as used in different business environments.

The rest of the paper is organized as follows. A review of previous research is followed by the theoretical framework to develop a model used in this study along with the justification to include in the study. This is followed by results and discussions. Clearly recognizing the factors that influence EC adoption in a developing country of South Asia, the paper concludes with suggesting strategies for successful implementation of EC within the SMEs.

Pattern of technology adoption in SMEs

Small and Medium Enterprises appear in all economies of the world with different business volume and with different profile. Iacovou et al. (1995) pointed out that the thirteen million SMEs in the US create 90% of the new jobs and contribute 38% of the total US gross national product. A similar situation is found in other countries such as the UK, Hong Kong, Australia, Singapore and Brunei. In the UK 90% of all the businesses fall under the category of SMEs and are responsible for millions of jobs (Towler 2002). In Hong Kong 98% of the organizations are SMEs (Chau and Jim 2002). In Singapore, about 92% of the businesses are SMEs that employ 53% of the workforce and contribute 34% to the Singapore GDP (Kendall et al. 2001). In Australia there are approximately one million SMEs that are crucial to the economy from the viewpoint of generating employment and overall growth (Sathy and Beal 2001). In Brunei 90% of the businesses fall under the category of SMEs and contribute 70% of the workforce (Seyal et al. 2001). The biggest issue of the technology development in the SMEs is that they are fragile. In the UK alone about 25% of the total stock of SMEs go out of business, with the consequential effects on jobs and gross domestic product (Towler 2002). Cragg and King (1993) agree that there are more opportunities for SMEs to adopt IT and have further concluded that SMEs have new opportunities to obtain competitive advantage by using IT effectively. The idea that IT is an exclusive enabler to achieve organizational goals in the large organizations is an old idea from the days when investment in IT and its subsequent use was confined to large businesses due to the huge initial cost of setting up Information Technology (IT)/Information Systems (IS). Nowadays, with the diminishing cost of hardware and software, more and more SMEs are investing in IT. Cragg and King (1993) further agree that more and more SMEs have now shifted the use of IT from conventional use to strategic use by developing more and more interorganizational systems (IOS) such as e-commerce, the Internet Business (I-business) and Electronic Data Interchange (EDI). However there are several impediments faced by SMEs in the successful adoption of IOS (Grover 1993).

Researchers (MacGregor et al. 1998) have suggested that SMEs have the following characteristics: small management team, strong owner influence, centralized power and control, lack of specialist staff, multifunctional management, lack of control over business environment, limited market share, low employee turnover and reluctance to take risks. Some other studies (Yap et al. 1992; MacGregor et al. 1998) suggest that most SMEs are lacking in the necessary expertise and avoid sophisticated software and applications. Certain characteristics of SMEs such as their limited resources and firm’s dependency on a few key individuals often create important challenges for development and implementation of information technology (Raymond and Magnenet 1982). Thong and Yap (1995a) identified characteristics of the firm and characteristics of new technologies adopted along with the CEO’s attitude toward the technology.
SMEs that are likely to adopt IT will normally have a CEO with positive attitude, is innovative and is knowledgeable about the development and application of IT (Thong and Yap 1995b).

Giving the ongoing importance of EC, it is equally important to study and review how to improve the EC adoption rate in SMEs. There is, therefore, strong need to conduct more studies of technology adoption especially in the area of EC and I-business in different regional economies and work environments. Clearly recognizing the factors of adoption would further help the practitioners to better implement EC adoption in SMEs. The relative importance of SMEs further demands a concise definition; as such contribution of SMEs may further be estimated on the basis of what definition for SMEs is accepted in a country. For simplicity, we stick to the definition of Yap et al. (1992) who have defined small organizations as of equal or having less than 50 employees and medium size organizations with an employee size range from 51 to 250.

Below we provide an overview of the small business environment and the technology infrastructure in Pakistan.

Business environments and technology infrastructure in Pakistan

Pakistan is one of the developing countries in South-Asia with a population of 140 million. Previously with an agriculture-based economy, the country has invested considerably in its industrial base in the past two decades. It is only in the new millennium that the country has pooled up the resources to cope with the digital world. Recently the government has set up dynamic policies to promote digital opportunities. The digital opportunity initiatives include: attracting foreign investment in IT sector; the creation of Virtual University and IT Centers; bringing up new technology-based infrastructure; promoting IT education through International Certification programmes; and a number of other important fundamental steps creating a greenhouse for nurturing Information and Communication Technology (ICT)-driven development together with economic initiatives that promise to enhance digital opportunities to accelerate the pace of business and industry growth.

The Digital Opportunity Initiative (DOI) is a compendium to unveil the new realities of use of ICT with its ability to remove geographic boundaries through its sheer pace and scale, and its to connect vast networks of individuals at minimal costs. This was made possible through the structural uplift of the telecommunication infrastructure. Pakistan has achieved an Internet penetration of 1.3 million users where universal Internet access is close in 400 cities within the country where Internet bandwidth costs have been reduced dramatically for software companies, educational institutions and call centres (Mujahid 2002). Pakistan was planned to achieve 300 million bits (Mbits) Internet backbone bandwidth by the end of 2003 (Mujahid 2002). Pakistan Telecommunication Corporation Ltd (PTCL) is the main Internet connectivity and service provider with its public switched network consisting of 90% digital switching system exchanges, fibre-optic cable backbone, digital radio systems, satellite communications and international gateway exchanges in two major cities. PTCL is the provider of infrastructure for connectivity for Internet service providers (ISPs), data-network operators, software exporters, educational institutions, universities and corporate clients.

The government of Pakistan believes that ICT can contribute to income generation and poverty alleviation. It enables people and enterprises to capture economic opportunities by increasing process efficiency, promoting participation in economic activities and networks, and creating more opportunities for employment and business. With the use of ICT, businesses can reduce the marketing and promotion costs and can marginalize operational costs by decreasing material, procurement and transaction costs resulting in lower prices for intermediate and finished goods. With the advent of the World Wide Web (WWW), ICT is creating new ways of delivering products and bringing sellers and buyers together and providing a competitive advantage within businesses. Small and medium organizations in Pakistan can get the potential benefits from the development of ICT.

In Pakistan, 90% of all private sector businesses establishments fall in the category of SMEs, these also provide 80% of the nation’s industrial labor force and contribute 40% to the GDP (www.smeda.org.pk). Small and Medium Enterprises Development Authority (SMEDA) has been established to function as the apex policy formulation. Today SMEDA’s e-market initiative is the most comprehensive business and export opportunity. Most of the SMEs in Pakistan are involved in the production of export-oriented items. These SMEs contribute 30% of the total export receipts (www.smeda.org.pk). Unfortunately, a large majority of these enterprises are involved in the export of unfinished products. On 6 June 2003 the Ministry of Information Technology & Telecom (MOITT) sanctioned the development of an online ‘Industrial Information Network (IIN)’ proposed by SMEDA to help SMEs meet the severe challenges of sustaining their international market competitiveness. The basic purpose of this project is to develop a B2B portal to cater to the needs of SMEs from various industrial sectors in the country. It entails the establishment of a sustainable Web-based development project designed to become the largest source of information generation, exchange and dissemination towards providing value-added support and services to SMEs in Pakistan. The IIN, being an EC initiative, would contribute towards the overall impact of EC on Pakistan’s economy. The
impact is estimated to be increased to US$ 2 billion (www.pide.org.pk). At present, Pakistani SMEs are facing the same problems of slow diffusion as stated by MacGregor et al. (1998). Aware of the size of the domestic market, Pakistani businesses seem to be eager to utilize Internet business techniques. However, in the absence of empirical evidence, it is difficult to assess how the Internet technology helps these SMEs to overcome the difficulties.

REVIEW OF PRIOR STUDIES

EC promises many benefits ranging from reduced cost to better communication. Because of these benefits, EC has been extensively studied. A review of existing literature on technology adoption reveals that most of the early authors have primarily focused on use of traditional IS application systems, user’s satisfaction, implementation and success with these systems. However, the overwhelming dependency of business on Internet technology has shifted the paradigm of these studies to the adoption of EC exclusively. Authors like Lederer et al. (1996), Vogel and Gricar (1998), and Poon and Swatman (1998) have investigated EC in business organizations. Once again, very few authors like Poon and Swatman have focused on EC in small business. These studies have produced mixed results. Generally the work of Poon and Swatman (1995) and Barker et al. (1997) have shown us that SMEs can benefit from EC but specific conditions need to be satisfied to achieve these benefits.

As pointed out, most of these studies on EC adoption were undertaken in western countries. There are relatively fewer studies from the Asia-Pacific region and can further be grouped into two subsets. The large numbers of these are from Australia, a country that is environmentally, economically and technologically far different from the neighboring developing economies. The earliest EC studies can be traced back to as early as 1994 (Barker 1994; Cronin 1995). Barker (1994) provided one of the first surveys on how small businesses used the Internet for business purposes. Cronin (1995) discussed how EC might change the competitive way of doing business. Some researchers have studied the pattern of IT adoption in SMEs (Fink 1998; Poon 2000). Other researchers, such as Poon and Swatman (1998) and Chong and Bauer (2000) have studied the various organizational, innovative and environmental factors that have contributed toward small business EC adoption.

The second, relatively small in number, group of studies in Asia-Pacific consists of Singapore, Malaysia, Brunei and Indonesia, the countries that have many cultural, business and organizational similarities. It will be more relevant if, while covering for the broader perspective, we classify Singapore, Malaysia and Brunei in one group. By grouping them, we can draw a better regional picture to study the pattern of EC adoption in economies that have several geographical, cultural, social and economic similarities.

Few studies on the adoption of information technology diffusion and usage have been conducted that have highlighted the pattern of IT usage within Bruneian business (Hussain 1995; Seyal et al. 1999). Seyal et al. (2003) studied EC adoption in 115 Bruneian SMEs and concluded that size of the business, perceived benefits, management support and task variety remained significant predictors of EC adoption. Several other studies in Singapore, Malaysia and neighboring Indonesia have investigated the interorganizational influences in the adoption of technology. Most studies however, did not investigate the entire range of factors and chose only a few to include in their research. In Singapore, early studies were confined to the business use of the Internet. Soh et al. (1997) studied Internet use among Singaporean business organizations and found that Internet use was slow in Singaporean business firms at the early stage. However, factors like compatibility and governmental support were significant influences comparative to relative advantages that were not perceived by the respondents as an advantage over current business practices. Similarly, most of the respondents did not perceive that innovation required complex skills for implementation.

Tan and Teo (1998) studied the factors influencing adoption of the Internet and developed a contingency model of Internet adoption. They used organizational factors (technology policy, top management support), technological factors (relative advantage, compatibility) and environmental factors (information intensity, competitive pressure and government support). They concluded that organizational and technological factors play a significant role in Internet adoption. In another study Teo and Tan (2000) studied factors such as; technological, governmental and self-efficacy and found that self-efficacy and governmental support have an impact on Internet adoption within businesses.

Utomo and Dodgson, (2001) studied the factors of IT diffusion within Indonesian SMEs and found that top managers’ level of IT knowledge, coupled with favourable attitude increase the level of IT investment that further articulates IT strategy as the dominating factors that help SMEs in bringing the possible technological changes.

In Malaysia, Valida et al. (1994) surveyed business organizations to determine IT utilization and found that IT utilization was strongly influenced by the size, nature and type of business. Sulaiman and Hong (1999) studied business use of the Internet in 80 organizations and concluded that 60% were confined to running daily processes (communications and publishing company information). Only 15% were using the Internet for EC purposes. The factors affecting non-adoption were; size of the firm, business type, ownership and location of the firm. Hayne
et al. (1998) concluded that small business were more likely to have a homepage compared to mid-sized or large business. They also concluded that foreign-owned companies were the early adopters of EC. Mukti et al. (1999) studied the pattern of website characteristics of 60 SMEs and found that most of the SMEs were convinced that having an impressive web page was good enough to inform the world about their existence. Only 7% of respondents claimed to use the Internet for inventory receiving and invoices purposing.

It is evident from the above review of the literature that studies on technology adoption have produced mixed results in the form of benefits achieved and promises that were not fulfilled due to various organizational impediments. These studies have also discussed various factors that have helped in achieving organizational goals. Based upon the literature review, we develop a model and discuss the various factors that might have significant contribution to EC adoption.

**RESEARCH MODEL AND INCLUSION OF RESEARCH VARIABLES**

On the basis of existing literature and previous Brunei-based studies (Seyal et al. 1999, 2001, 2003) on the usage of technology, a one-stage normative model, which provides the basis of research objectives, was developed. This normative model, depicted in Figure 1, is a one-stage model that relates the independent and dependent variables without any intervening variables. The relationship as shown in the model is associative rather than causal in nature. In this study, EC adoption is the dependent variable and there are eight independent variables grouped into three categories. Detailed justification for the inclusion of each independent variable in the model is given below.

**Organizational factors**

In information technology adoption, organizational factors play an important role in the adoption decision (Premkumar and Ramamurthy 1995). For this study the following organizational factors were studied:

- Organizational culture;
- Top management support; and
- Motivation to use EC.

**Organizational culture.** Over the past 20 years, Hofstede’s (1991) theory of the specific patterns in the values and beliefs that constitute culture has gained significant prominence. One of the most important aspects of Hofstede’s work is that he successfully linked his dimension of culture to management practice. Hofstede describes the central concept of an organizational culture as having a coherent set of beliefs with a set of shared core values.

Researchers (Schein 1990; Hussain 1995) have shown that an organization’s culture affects the way an organization behaves, its values and its basic underlying assumption to technology diffusion. It is evident that the culture of an organization either facilitates or impedes the process of technology diffusion. Schein (1990) studied organizational culture and concluded that an analysis of organizational culture helps in finding a favourable and unfavourable process of technology diffusion. He further suggested that for unfavourable culture, organizations should go through the cultural change to adjust the technology diffusion. Hussain (1995) studied the cross-cultural technology transfer in Brunei and suggested the importance of an organizational culture as a pre-requisite to technology diffusion and management of technology transfer. He suggested a supportive type of corporate culture to achieve success in technology transfer. Veiga et al. (2001) and Ciganek

![Figure 1. Normative research model](image-url)
et al. (2003) have discussed the role of culture in the Technology Acceptance Model (TAM) of Davis (1989) and in the context of TAM with knowledge management system and concluded that culturally induced beliefs influence the core variables of the TAM.

Organizational culture is operationalized in the present study by a construct that measured the power distance and perceived autonomy. Hofstede (1985) identified four dimensions of culture that affect individuals and organizations and the relationship among them. These dimensions highlight the most important cultural difference for organization (Hofstede 1985). The use of technology is said to be more effective when it empowers individuals to use information and decide for themselves how to use the technology in support of their duties. However, Harris (1999) studied this variable while researching attitudes of end-users but could not find the support of organizational culture with the attitudes of the end-users.

Seyal et al. (2003) used this variable in earlier work on SMEs within different geographical settings and did not get any support for this variable. However, the relevant importance of this variable in interorganizational decision-making has led us to include this to study EC adoption within different geographical and technological environments. The items for measuring organizational culture, including both power distance and perceived autonomy constructs, are adapted after Tayeb (1988).

**Top management support.** Organization structure is becoming more and more complex and with this complexity the focus has shifted to include factors that directly influence the adoption of technology within an organizational context. Among them top management support is a very commonly studied factor in IS research. It is further advocated that success of IT within an organization can be determined by considering top management commitment to IT by allocating necessary resources (Ang and Pavri 1994). Thong and Yap (1995a, b) have investigated top managers and CEO parameters in their studies and found the importance of this variable. Fink (1998) concluded that the top management factor could be important for the success of information systems within organizations. Moreover, Tan and Teo (1998) have measured top management support and found it a significant predictor of Internet adoption.

**Motivation to use EC.** Motivation theorists often distinguish between two broad classes of motivation to perform an activity — extrinsic motivation and intrinsic motivation (Vallerand 1997). Extrinsic motivation refers to the performance of an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself such as improved job performance and business gains. Prior studies have found a relationship between the perceived usefulness (extrinsic motivation) and intention to use the information systems (Davis 1989). Whereas Davis et al. (1992) in their two studies found usefulness and enjoyment (both extrinsic and intrinsic motivation) to mediate fully the effect on the usage intention of perceived output quality and found the importance of both extrinsic and intrinsic motivation to use computers in the workplace. Davis et al. (1992) agreed on both extrinsic and intrinsic motivators to be key drivers of behavioural intention to use the IS. On the other hand, Venkatesh (1999) in his research studied the role of intrinsic motivations as a lever to create favourable user perception.

Teo et al. (1999) in a study of Singaporean businesses focused on both extrinsic and intrinsic motivation for the use of the Internet. Findings demonstrated that extrinsic (PU) motivation had consistently stronger effects on all usage dimensions than the intrinsic motivation (perceived enjoyment). It is evident from the above discussion that there is support to include both of the motivations in the various IS studies. However in the context of EC adoption within SMEs we assume a role for extrinsic motivation since it is related to perceived usefulness of the innovation and small business is normally more inclined toward some measurable benefit than with the fun or enjoyment components so we decided to include the extrinsic motivational factors in our study.

Based upon these, we therefore propose the following three hypotheses:

H1. Organizational culture is positively associated with EC adoption.
H2. Management support is positively associated with EC adoption.
H3. Motivation to use is positively associated with EC adoption

**Environmental factor**

**Governmental support.** The impact of governmental policies and initiatives has been shown to have direct and indirect stimulation to the supply of information that produces faster technology. For many organizations, government has been a source of funding infrastructure (Kettinger 1994). This study investigates government’s involvement and support in EC adoption in SMEs. By establishing a governmental body, Ministry of Information Technology and Telecommunications, the Government of Pakistan has further shown its commitment in providing a legitimate and positive leadership role in developing an infrastructure to digitize its economy.

Several researchers in the recent years have studied the governmental role. Ang and Pavri (1994) found that direct intervention of the government could be considered important in promoting technological innovation although the degree of influence on firms may vary between countries. Seah and Fjermestad (1997) emphasized that both government and private sector play a vital role in supporting the pillars of EC framework. An
understanding of the roles of government as facilitator for EC would flourish and mature the strategic framework for EC. Papazafeiropoulou and Pouloudi (2000) argued that government should recognize the unique qualities of the Internet and new EC environments and should treat the different groups of stakeholders differently according to their specific need. Utomo and Dodgson (2001) in their IT diffusion among Indonesian SMEs have further confirmed that government can play an effective role as facilitator in providing assistance to SMEs that have limited IT resources. In several Singapore-based studies, researchers Yap et al. (1994) examined the impact of a government incentive programme on IT in 40 small businesses. Evidence has shown that governmental incentives in the form of economic, financial and technological support have lowered the barrier of IT adoption. Goth (1995) suggested that government could play a leadership role in the diffusion of innovation. Tan and Teo (1998) and Teo and Tan (2000) have discussed the role of government and its support for Internet adoption in their studies. Recently, Scupola (2003) showed that SMEs desire governmental intervention both in terms of influence and regulation and such intervention should concentrate on knowledge deployment, subsidies and mobilization.

Governmental support is measured in the present study by a construct used by Tan and Teo for their Singapore-based study. Based upon this we therefore propose the following hypothesis:

H4. Governmental support is positively associated with EC adoption.

Technological factors

Perceived benefits. Adoption of EC is largely based on perceived benefits. Poon and Swatman (1995) found that perceived benefits are the key reason why organizations adopt and continue using the Internet technology. Perceived Benefits are defined by a set of anticipated advantages that innovation can provide the organization. These benefits can be direct or indirect as mentioned by Chwelos et al. (2001). Direct benefits include operational cost saving and improved organizational functioning. On the other hand, indirect benefits are opportunities that are the outcome of the use of innovation such as improved customer services. A numbers of researchers in the technological innovation research field have studied this variable, along with several others, in the past (Premkumar and Ramamurthy 1995). Moore and Benbasat (1996) have concluded that compatibility of the innovation with the existing set of values and perceived benefits were the most influential determinants of the technology usage.

Chwelos et al. (2001) have developed an EDI adoption model and concluded, in addition to other findings, that higher perceived benefits would lead to greater intent to adopt information technology. The items measuring the perceived benefits are adopted by Chwelos et al. (2001).

Task variety. Task variety provides an additional dimension to the rapid adoption of an innovation and refers to the extent of diversity across the task within a single role. Goodhue and Thompson (1995) emphasized the importance of fit between use of technologies and users task in achieving individual performance impact. Information technologies are characterized by flexibility and choice of tools (Gani 1992), therefore, innovation would be more applicable and accepted where a variety of tasks were performed. Harris (1999) has studied task variety in his study of end-users’ attitudes and found support for this variable. The items in the construct measured in the present study are taken from an online EC survey (SRI 2001). Based upon these, we propose the following two hypotheses:

H5. Perceived benefits are positively associated with EC adoption.
H6. Task variety is positively associated with EC adoption.

METHODOLOGY

Design of instrument

From the review of the literature, an instrument was developed with the aim of covering the basic research objectives. The questionnaire was divided into four parts. Part A captured the data about the demographic profile covering organizational characteristics, such as, nature, type, size and revenue of business and managerial profile such as age, gender, educational level, and ownership of PCs. Part B covers information about the organizational factors. Table 1 included items measuring organizational culture on a five-point Likert scale. We have used the construct to find the extent organizational culture affects SMEs decisions to adopt EC capabilities. Items in Table 1 were adapted from Tayeb (1988). However, items were reworded to capture information about EC.

Table 2 includes items measuring top management support along with the items’ mean and standard deviation. The items of the construct were adapted from Tan and Teo (1998).

In order to assess extrinsic motivation, a construct was used with eight items but factor analysis has reduced it to five factors as in Table 3 and was adapted after Teo et al. (1999). The items were reworded to cater for this study as the original items were used in different context.

To assess governmental support, a construct was used to measure three main support items. The items were adapted after Tan and Teo (1998) for their Internet-based study in Singapore. Table 4 includes the items along with their respective mean and standard deviation.
Table 1. Organizational culture

<table>
<thead>
<tr>
<th>Items</th>
<th>Mean</th>
<th>Std. Dev</th>
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<tbody>
<tr>
<td>OC1. Employees are encouraged for team membership and are assessed in</td>
<td></td>
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<tr>
<td>team-based participation and their own contribution to team</td>
<td>4.28</td>
<td>0.99</td>
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<tr>
<td>OC2. Employees are provided with regular feedback regarding their</td>
<td>4.34</td>
<td>0.96</td>
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<tr>
<td>performance</td>
<td></td>
<td></td>
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<tr>
<td>OC4. Employees are encouraged to bring new ideas, values regarding</td>
<td>4.40</td>
<td>0.99</td>
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<tr>
<td>the work practice</td>
<td></td>
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<tr>
<td>OC5. Employees should participate more in decisions made by the boss</td>
<td>4.36</td>
<td>0.89</td>
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Table 2. Top management support

<table>
<thead>
<tr>
<th>Items</th>
<th>Mean</th>
<th>Std. Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS1. How much importance does your firm’s top management place on EC?</td>
<td>3.88</td>
<td>1.12</td>
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<tr>
<td>MS2. How much understanding has your firm’s top management of the</td>
<td>3.84</td>
<td>1.14</td>
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<td>strategic importance of EC?</td>
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<td>MS3. Within the past two years how much resources has your firm’s</td>
<td>3.62</td>
<td>1.17</td>
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<td>top management allocated for EC?</td>
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Table 3. Extrinsic motivation to adopt EC

<table>
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<tr>
<th>Items</th>
<th>Mean</th>
<th>Std. Dev</th>
</tr>
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<tbody>
<tr>
<td>EM1. Using EC reduces the running cost of my business</td>
<td>3.54</td>
<td>1.45</td>
</tr>
<tr>
<td>EM2. Using EC has increased sense of security</td>
<td>3.80</td>
<td>1.41</td>
</tr>
<tr>
<td>EM3. Using EC has facilitated my business operation</td>
<td>4.14</td>
<td>1.21</td>
</tr>
<tr>
<td>EM4. Using EC provides the information that leads to better decision</td>
<td>3.88</td>
<td>1.31</td>
</tr>
<tr>
<td>EM5. EC is found very useful for improving relationship with</td>
<td>4.06</td>
<td>1.33</td>
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<td>business stakeholders</td>
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Table 4. Government support

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<th>Items</th>
<th>Mean</th>
<th>Std. Dev</th>
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<tr>
<td>GR1. Government plays an important role in promoting EC</td>
<td>3.08</td>
<td>1.39</td>
</tr>
<tr>
<td>GR2. Existing governmental policies facilitate EC adoption by</td>
<td>3.00</td>
<td>1.25</td>
</tr>
<tr>
<td>providing an adequate telecommunication infrastructure</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5. Perceived benefits toward EC

<table>
<thead>
<tr>
<th>Items</th>
<th>Mean</th>
<th>Std. Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>PB1. Organization actually experienced competitive advantage through</td>
<td>2.94</td>
<td>1.14</td>
</tr>
<tr>
<td>EC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PB2. Organization find the ISP good business information support</td>
<td>4.04</td>
<td>0.99</td>
</tr>
<tr>
<td>PB3. Organization think that the EC has improved business performance</td>
<td>3.46</td>
<td>1.17</td>
</tr>
<tr>
<td>PB4. EC has improved organizational relationship with customers or</td>
<td>3.22</td>
<td>1.16</td>
</tr>
<tr>
<td>suppliers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The items in Table 5 are adapted from the online survey instrument (SRI). The items of the instrument measuring perceived benefits are adapted from Chwelos et al. (2001).

One of the objectives of this study is to find the factors predicting EC adoption within SMEs. Multidimensional, multi-item constructs were used to capture the information about various types of tasks accomplished.
to adopt EC. Multi-items constructs of the instrument were adapted from the online survey instrument (SRI). Table 6 included items with their descriptive statistics.

### Instrument reliability and validity

Several techniques were used to assess the Cronbach’s (1951) coefficient of reliability (a) and to assess face, construct and convergent validity. In order to ascertain face validity, an initial questionnaire was passed through routine editing after it was given to the panel of experts (academics, practitioners and business managers). They were asked to respond to the questionnaire and, based upon their comments, the questionnaire was reworded to enhance clarity. Table 7 shows the reliability coefficients and convergent validity for the various constructs.

In general, validity refers to the degree to which an instrument truly measures the constructs that are intended to be measured. There are several types of validity measures that include face validity and construct validity.

Campbell and Fiske (1959) propose two types of validity — convergent and discriminating. Convergent validity is measured by average variance extracted for each construct during the reliability analysis that should be 0.5 or 50% or better (Igbaria and Iivari 1995). Table 6 shows that all the constructs do have a considerable validity support. To further analyse for discriminating validity of these eight constructs, the principal component method with varimax rotation was used to assess the variance explained. Testing discriminant validity requires checking the cross loading of items on multiple factors. Table 8 shows that all items loaded highly on their associated constructs but not others thus showing sufficient discriminant validity.

### Data collection

The study is conducted in one of the major cities of the largest province of Pakistan, which has a strong economic and business background. The majority of the SMEs are sited here and we assume that study of these SMEs will help us in generalizing the result across the country. A questionnaire was sent to 100 SMEs selected randomly by employee size from the catalogue of participating SMEs in an industrial exhibition the previous year. As the unit of analysis in this study is the organization, responses for this study are required to be from senior management. Therefore, a method was adopted to get information from either owner or top managers of the organizations.

Out of the 100 organizations polled, 57 organizations responded. Responses from three organizations were discounted since the information had not been supplied by their top manageril level. The resulting 54 usable responses (a 54% response rate) is considered acceptable for this type of the study by Bourque and Fielder (1995).

### FINDINGS AND ANALYSIS

The 54 remaining questionnaires were analyzed using SPSS version 10 for descriptive analysis, correlation and multiple regression analysis to predict EC adoption. The data showed that about 42% of the businesses are sole
proprietors, 14% are partnership based, 22% are small corporations and 22% are limited companies. Table 9 describes the characteristics of respondent companies.

Of the organizations, 50% can be treated as small organizations and 50% are medium sized. There are 48% of the organizations with business revenue less than US$ 28,000 and 12% have business revenue less than US$ 57,000. Surprisingly, 40% of organizations have revenue around US$ 284,000. Internet knowledge is claimed by 76% of the managers of these SMEs.

The respondents were asked to assess their current level of EC adoption (dependent variable) on a five-point Likert scale — 1- not at all adopted to 5-for fully adopted. Below average use of EC was mentioned by 47% of the respondents, with 37% claiming average EC usage and about 16% of respondents having above average to full EC adoption. However, the mean EC adoption remains at 2.76 on this scale.

Determining the factors for EC adoption

In line with the principles of multivariate data analysis, we conducted a zero-order correlation between the independent and dependent variables as shown in Table 10. The correlation provides directional support for the predicted relationship and shows that colinearity among the independent variables is sufficiently low so as not to affect the stability of regression analysis (Hair et al. 1979). Task variety, perceived benefits, organizational culture and government support are significantly correlated with EC adoption. It is apparent from Table 10 that none of the variables are highly inter-correlated, so the problem of multicollinearity does not exist thus fulfilling Hair et al.’s (1979) criterion that says that variables to qualify for multicollinearity should have a coefficient of correlation 0.80 or higher.

Prior to the regression analysis data were screened for outliers. Cases with standard deviation greater than 2 and cases with missing values were removed. The result of a stepwise regression analysis is presented in Table 11 that confirmed the above result. The table data further concluded that four of six independent variables are significantly contributing toward regression equation. The effect of multicollinearity was studied by examining the VIF values for each of the regression coefficients. It was found that values for all the coefficients were all less than 10 and as such multicollinearity was not a problem to distort the regression analysis. The model has high and significant F ratio indicating good fit of the model and statistically significant in explaining the adoption of EC by SMEs. The Beta’s (standardized coefficient) indicate the relative importance of the independent variables in explaining the adoption of EC by the SMEs.
DISCUSSION OF RESULTS

One of the objectives of this study was to identify EC adoption within Pakistani SMEs. On a five-point Likert scale the mean adoption is 2.76, which shows a gloomy picture of EC adoption among SMEs but indicate consistency with similar research in developing countries of Asia and Asia-Pacific. As mentioned previously, 46% of the surveyed organizations have adopted some kind of EC. It has further revealed that there is significant difference of business use of the Internet among SMEs ($p < 0.05$). Although 93% of the businesses have an Internet account, the accounts are used mainly for email purposes. A homepage has been developed by 67% of the organizations, and 48% of the organizations either have an in-house Web server or have the use of a vendor supported Web server.

Organizational factors

Organizational culture is found to be an important factor in determining EC adoption. This is a unique finding emerging from this study as it believed that most of the SMEs lack proper organizational structure due to the strong owners'/managers’ influence on the business. The findings not only provide empirical support to the previous findings of Terpsta and David (1991) and Hussain (1995) but also reinforce the argument about the influence of organizational culture on EC adoption. However, our results are in contrast with Harris (1999) and Seyal et al. (2003). The result of regression analysis with negative coefficient has further indicated that organizational culture influence on EC adoption has an inverse relationship due to negative sign. This further suggests that an organization that is not influenced by organization culture is more likely to be an adopter and vice versa. That differs from existing results. There can be plausible reasons for that. One possible explanation is that in this study adopters possessed the necessary resources and ignored the influence of organizational culture in adopting innovations. Early adopters

<table>
<thead>
<tr>
<th>No of Employees</th>
<th>Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 50</td>
<td>Small</td>
<td>50</td>
</tr>
<tr>
<td>51—250</td>
<td>Medium</td>
<td>50</td>
</tr>
</tbody>
</table>

Industrial Classification

- Banks & Insurance: 13
- Hotel/Food Catering: 10
- Travel & Shipping: 12
- Retailers & Wholesalers: 20
- Construction: 5
- IT related Organizations: 17
- Printing & Publishing: 13
- Miscellaneous: 10

Types of business

- Sole Proprietors: 42
- Partnerships: 14
- Small Corporations: 22
- Limited: 22

Types of IT Facilities

- Availability of PC: 90
- Internet Account: 93
- E-mail: 93
- Homepage: 67
- In-house Web server: 48
- Vendor support Web server: 11
- Other IT facilities: 37

Mainly using EC for

- Info gathering: 34
- E-advertising: 11
- Business enquiries: 24
- Selling products: 20
- Buying products: 11

Watson test for autocorrelation indicated the absence of correlated residuals. Moreover, 47% of the variance is shared by the four independent variables indicating that the model is effective in predicting adoption. Thus in their final analysis hypotheses H1, H4, H5 and H6 are supported.

Table 9. Characteristics of respondent companies

<table>
<thead>
<tr>
<th>No of Employees</th>
<th>Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
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Table 10. Pearson correlation between EC adoption and antecedent variables

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task variety (1)</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management support (2)</td>
<td>0.233</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived benefits (3)</td>
<td>0.215</td>
<td>0.307*</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizational culture (4)</td>
<td>0.156</td>
<td>0.411**</td>
<td>0.339*</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government support (5)</td>
<td>-0.030</td>
<td>0.270</td>
<td>0.181</td>
<td>0.141</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Motivation to adopt EC (6)</td>
<td>0.113</td>
<td>0.267</td>
<td>0.572**</td>
<td>0.448**</td>
<td>0.457**</td>
<td>1.0</td>
</tr>
<tr>
<td>EC adoption (DV)</td>
<td>0.328*</td>
<td>0.076</td>
<td>0.461**</td>
<td>-0.178*</td>
<td>0.305*</td>
<td>0.126</td>
</tr>
</tbody>
</table>

** statistically significant at $p < 0.05$; * significant at $p < 0.01$
(although not directly measured) in our study could be regarded as EC initiators and could be assumed to be more active in adopting EC due to their resources and knowledge. Therefore, when adopting EC little consideration was given to organizational culture. Another reason could find that few organizations had adopted EC as an early adopter and the chance is that organizational culture could not be a very viable factor at the early stage. This has acted as a model for late adopters and other firms might influence them as a trend of using EC develops.

The second organizational factor, management support toward EC adoption was not found to be significant. This suggests that management support in these SMEs does not have a prominent effect on EC adoption. This might be due to the fact that management of these SMEs might have faced other external environments that have contributed to the adoption indirectly. The result is in contrast with the findings of Ang and Pavri (1994), Thong and Yap (1995a, b), Seyal et al. (1999) and Tan and Teo (1998). We measured three types of items as per Table 2. The respondents admitted that management has a good understanding of the strategic importance of EC but when the question came regarding deployment of the resources for the past two years about half of the responses were negative.

The third organizational factor extrinsic motivation to adopt EC that was introduced first time for the study could not be supported and remained as insignificant. The findings are in contrast with Davis et al. (1992) and Teo et al. (1999).

The findings of this study further indicate that organizational factors are not important in determining adoption of EC in the SMEs.

### Environmental factor

Previous researchers have studied the relative importance of government support augmenting SMEs’ decision to adopt new technology. Because of its importance, it is included in this study. Government incentives and support were found to be significant and influencing EC adoption. The greater government incentives as perceived by an organization the higher is the likelihood of an organization to adopt EC. It is mainly due to governmental dynamic policies to develop and promote the EC within SMEs. It is obvious from Table 4 that Pakistani SMEs consider governmental involvement as an important factor for EC adoption and there is statistically no difference in small and medium sized organizations. Our findings support the prior studies by Yap et al. (1994); Tan and Teo (1998) and Teo and Tan (2000) however; results are inconsistent with Seyal et al. (2003).

### Technological factors

Perceived benefits are found to be an important predictor for SMEs. The plausible reason for the relevant importance of this variable in SMEs is due to better management structure policies. The management of these SMEs considered the perceived benefits as an important pre-requisite to decide on technology adoption. If the benefits are not viable they might not decide on the technology. This might be due to the fact that in SMEs the decision-making process is always short term (Fink 1998). The organizations may pay more attention to the viable benefits. Perceived benefits can act as motivators to encourage the adoption of an innovation because direct benefits are more viable and are easier to measure. So this study supports the prior studies of Moore and Benbasat (1999) and Chwelos et al. (2001) that perceived benefits were the most influential determinants of the technology usage.

Task variety was measured by asking respondents to rate, via a Likert scale, their use of Internet business technologies (Table 6). For task variety, both small and medium firms have considerably higher mean values (small = 3.53, and medium = 4.16). Further t-test statistics have revealed no statistical difference (t = −1.88, p > 0.05) between small and medium sized firms. The item measuring ‘use of website for market research to find new products and service ideas’ has the highest overall mean both for the small and medium sized organizations. This shows that both types of the firms explored various websites information and opportunities. The study however supports the previous findings of Gani (1992), Goodhue and Thompson (1995) and Harris (1999).

---

**Table 11. Step-wise regression analysis**

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Beta</th>
<th>T-value</th>
<th>VIF</th>
<th>Significant</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational culture</td>
<td>−0.405</td>
<td>−3.476</td>
<td>1.149</td>
<td>0.002**</td>
<td>H1 supported</td>
</tr>
<tr>
<td>Government support</td>
<td>0.283</td>
<td>2.546</td>
<td>1.048</td>
<td>0.014**</td>
<td>H4 supported</td>
</tr>
<tr>
<td>Task variety</td>
<td>0.296</td>
<td>2.637</td>
<td>1.064</td>
<td>0.011**</td>
<td>H5 supported</td>
</tr>
<tr>
<td>Perceived benefit</td>
<td>0.483</td>
<td>4.071</td>
<td>1.194</td>
<td>0.000**</td>
<td>H6 supported</td>
</tr>
</tbody>
</table>

Dependent Variable (DV): EC Adoption ** Indicates Statistical significant at p < 0.05)

Multiple R = 0.469, F = 9.927, Significant = 0.00, Durbin-Watson = 1.90
CONCLUSIONS

The study was based upon a survey of 54 SMEs examining EC adoption in Pakistan. The study identified various factors predicting EC adoption within surveyed organizations. The findings support similar other regional Asia-Pacific studies and increased the generalizability of the previous researches.

At the outset, EC adoption was measured on a five-point Likert scale. The mean EC adoption was measured as 2.76 with 46% of the organizations that have adopted to some sort of the EC activities. The statistic has indicated that 67% of the organizations have a homepage that they are using only for e-advertising purposes. This further concludes that 93% of the organizations that have an Internet account are using it mainly for emailing purposes simply to contact customers or suppliers. It is obvious that some of these responding organizations have actually misinterpreted the term EC.

Organizational factors, management support and motivation were not significant predictors in determining EC adoption in SMEs. Regarding allocating resources for EC in the past two years significant differences were noticed between small and medium businesses. Small business management was resource deficient in adopting EC. Thus there is a strong need for management of small businesses to deploy resources for gearing up EC adoption. The finding of a negative relationship between the organizational culture and EC adoption in SMEs is unique and interesting. The explanation as pointed out earlier is that EC adoption in SMEs is still at early stage, with very few organizations are using it.

Under the category ‘environmental factor’, we studied government support. This was significant in determining EC adoption among SMEs. We however, believe from the basis of the result that, with different policies, the government could influence these SMEs to promote adoption to a different extent. Therefore, the government should select policies that fit the specific institutional and business environment.

Other factors studied were technological factors; perceived benefits and task variety were significant predictors that affected Pakistani SMEs. These SMEs are rapidly adopting EC where they perceive that adoption will provide benefits and/or if a variety of tasks can be accomplished through EC. The study explains 47% of the variance shared by the four factors that represent a better parsimony of the regression model than the several other studies in the Asia-Pacific region explaining variance from 37% to 45%.

In conclusion, the results of this study provides a direction of EC adoption within the SME context. As such the study is conducted on SMEs in one of the largest cities in the largest province of Pakistan. We can generalize the results to reflect the overall country-wide picture. However, in assessing these findings it should be remembered that results reported here report on a preliminary test based upon an instrument that is relatively new to the business and cultural environment with a relatively small sample. Moreover, caution should also be taken when generalizing the results to SMEs in other countries of South Asia and/or Asia-Pacific. Different cultural contexts and institutional policies may have impact on the results.

MANAGEMENT IMPLICATIONS

Based upon the results and conclusion of the study, we propose several strategies and broad policy implications for the higher management of the various agencies responsible to support and enhance SMEs in Pakistan but also to the managers of the SMEs. These managerial implications can be two fold such as at the micro and macro levels.

At the micro level, top management not only proactively encourages IT use but also should allocate necessary resources for the technology adoption that is currently missing for most of our surveyed small organizations. Although not measured by this study, we believe that managers of most small firms are not IT literate. However, they can get benefit from computer literate support staff. These support staff can indeed increase computer self-efficacy among the top management. The support staff discourages the IT anxiety of the top managers in the use of the technology. Besides support staff, private firms, IT consultants and vendors could launch the various product seminars and short workshops to provide substantial training to the managers of the SMEs. We emphasizes that qualified IT personnel are available to the end users so that technology related problems can be resolved by providing relatively easy access to expertise.

Managers of smaller firms also need to be trained on IT skills through workshops to develop their technical abilities. Training programmes such, as ‘IT for Non-IT Managers’ will further enhance the professional and technological know-how of the managers. In addition, managers must also focus more on the benefits and concentrate on variety of task, since this is a crucial factor for EC adoption. In this concern, a programme should be launched to identify diversified tasks that could be beneficial to the adopting organizations and to act as role model for late and non-adopters.

At macro level, government support and the role of the various governmental agencies must be geared up to enhance efficiency and to promote the technology within SMEs. At present Ministry of Information Technology and Telecom (MOITT) is providing support to the various SMEs from a business point of view. MOITT should now revise their role and must take a proactive approach rather than just subsidizing the SMEs. MIS division of Resource Centre of the said Ministry should
initiate the role of technology leaders. They must develop separate plans each for small and medium organizations separately. Currently, government incentives regarding finances to the SMEs is provided through Small and Medium Enterprise Development Authority (SMEDA). SMEDA should impose a condition to the small businesses to spend a reasonable amount of the available finance to setting up an IT infrastructure and to use IT as a part of business. An advisory board under the MOITT should further monitor the effective control of the resource centre in providing technical help and support especially to small business. It is, therefore, imperative that solution-based technology at reasonable price coupled with easy implementation process should be made available to these SMEs.

References


SRI (SRI Consulting, Menlo Park, CA.) [http://www.srifl.com/ecommerce/].


