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Factors impacting the adoption and use of ICT in the Malaysian SME sector

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Abstract

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Keywords

Factors, impacting, adoption, use, ICT, Malaysian, SME, sector

Disciplines

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Factors Impacting the Adoption and Use of ICT in the Malaysian SME Sector

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Abstract

A review of extant literature reveals that little attention has been given to research into the level of ICT infrastructure among SMEs, as well as examining the factors that limit the use of ICT in these organizations. Earlier studies have mainly focused on the services sector. Hence, there is a need to conduct further empirical research across a range of industry sectors to better understand the challenges confronting SMEs that hinder the adoption and use of ICT. The aim of this paper is to conduct an empirical investigation to identify the barriers that limit the adoption of Information and Communication technology (ICT) among (SMEs), in Malaysia. This investigation is conducted using a sample of 100 Malaysian firms. Despite the current government effort in regard to ICT incentives and grants, results reveal that the major hindrance for using ICT among Malaysian SME businesses include finance, employee education including ICT skills, high cost of ICT infrastructure and shortage of skilled human capital. This paper suggests, based on the empirical results that more work needs to be undertaken by government and policy makers to encourage ICT adoption among SMEs as competition from other countries, especially China and India is rising and this could be seen as a threat to Malaysian SMEs.

JEL classification: M10, M13

Keywords: ICT, SMEs, Technology Adoption, Malaysia

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Introduction

SMEs in Malaysia have experienced rapid development during recent years and have played a major role in the economic development of the country. Malaysian SMEs contribute around twenty seven percent (27.3%) of total manufacturing output, twenty six (26%) percent to value added production, approximately twenty seven (27%) per cent of fixed assets and employ thirty nine (39%) per cent of the country's workforce (SMIDEC, 2002; Saleh and Ndubisi, 2008).

In spite of their roles in terms of contribution to exports, employment and economic development in Malaysia, SMEs face many important challenges compared to their larger counterparts. Saleh and Ndubisi (2008) identified a plethora of challenges facing Malaysian SMEs, such as, limited access to resources from financial institutions; human capital constraints; high level of international competition due to globalisation; competition from Multinational Companies (MNCs) and new competitors; and limited access to ICT.

The development of ICT (such as the Internet and e-commerce) provides enormous opportunities for small businesses to conduct their business activities online. According to the OECD (2004), ICT has the potential to enhance communication within a company, leading to better and more efficient resource management. Additionally, ICT applications such as Enterprise Resource Planning (ERP) provide businesses with a viable source to store, share, and utilize acquired business knowledge and know-how.

The Malaysian government has emphasized the importance of the adoption and use of ICT among SME businesses, particularly as ICT becomes a crucial tool in the increasingly competitive global economy. Hence, the government has initiated strategies to boost the development of Malaysian SMEs, evidenced in the second industrial master plan (IMP2), and the seventh and eighth Malaysian Plans (Government of Malaysia, 2001; Saleh and Ndubisi, 2008). In addition, to complement the second industrial plan (IMP2) which expired in 2005, the Malaysian government has developed a third industrial master plan (IMP3, 2006-2020), which coincides with the country's vision for industrial development to the year 2020. This

plan envisages a fully developed and knowledge rich society, with emphasis on the significance of ICT and its development in order to position Malaysia to compete effectively in the international arena (Johan, 2005).

Given the focus of this paper on ICT adoption by SMEs, it is worth noting here that the Malaysian government has also initiated a number of new measures to enhance SME capabilities and quality services. In this regard, a number of customer service centres and one-stop centres have been established. For example, in 2005, the Malaysian Chinese Association (MCA) launched a one stop ICT centre to facilitate SME transformation, leveraging on the benefits of ICT as well as encouraging the development of ICT-based SMEs (MCA, 2005). Moreover, the 2006 budget introduced business incentives in strategic areas such as ICT industries, biotechnology and high technology manufacturing to better prepare Malaysia for the challenges it faces in terms of global competition and other external challenges (BNM, 2005). In addition, businesses adopting ICT and multimedia services have been given business incentives such as tax exemption up to fifty per cent. The Malaysian government continues to support the development of soft technology to the education, and the manpower in the country. Despite these initiatives, the majority of SMEs underutilize ICT applications in comparison with other developed nations. For example, according to the Small and Medium sized Enterprises (SME) association of Malaysia (2002), only thirty percent (30%) of Malaysian SMEs have a website, compared with eighty (80%) percent of SMEs in Europe and America. At the national level, Malaysia is also underutilizing ICT in business generally, compared with developed nations. For example, seventy (70%) and eighty (80%) percent of SMEs in UK and USA, respectively, have access to Internet facilities (Lawson, *et al.* 2003).

This notion is supported by Alam and Mst. (2007). Other Asian countries such as Singapore, Thailand and China are at a higher level of development in terms of ICT adoption readiness. According to Alam and Mst., the poor performance of SMEs in regard to ICT adoption is due to a variety of reasons such as, lack of ICT expertise, high cost and high staff turnover. This indicates that Malaysian SMEs need to have a better plan in terms of ICT adoption, and the government needs to provide greater support in this regard. Having access to the Internet and broadband connection facilities does not necessarily mean that SMEs can or will get involved in business

activities online, as this requires expertise such as IT skills among staff and education so that businesses understand the importance and value of incorporating ICT in their business operations. Such a move will also require development of ICT strategic plans.

In addition to the problems discussed above, there are a number of identified barriers that prevent SMEs from adopting and using ICT. According to Lawson *et al.* (2003), ICT barriers can be classified into “technical” and “social” barriers. Technical barriers include factors such as lack of telecommunications infrastructure and concerns over how to deal with privacy and security issues. Social barriers on the other hand, centre on a lack of IT skills among staff and insufficient knowledge about the benefits of conducting business online. Earlier studies on Malaysian SMEs have focused mainly on levels of ICT usage, perceptions about ICT and ICT adoption readiness. A review of relevant literature reveals that little attention has been given to research into the level of ICT infrastructure among SMEs, as well as examining the factors that limit the use of the Internet in these organizations. Additionally, earlier studies have mainly focused on the services sector. Hence, there is a need to conduct further empirical research across a range of industries to better understand the challenges confronting Malaysian SMEs that hinder the adoption and use of ICT. By identifying these challenges, the Malaysian government may be in a more informed position when developing future policy that better supports and enables SMEs to adopt and leverage on the benefits that ICT presents. To this end, the current study seeks to develop an understanding of the major factors and challenges facing Malaysian SMEs that inhibit adoption and use of ICT as a starting point for government policy making.

The paper is structured as follows. Section 2 centres on a discussion on SMEs in Malaysia. This is followed by a review of extant and more recent literature in regard to ICT. Section 4 discusses the research methodology and survey instrument. Section 5 presents and discusses the empirical results. Section 6 provides a conclusion and recommendations for policy makers.

Malaysian SME Sector

As indicated earlier, SMEs in Malaysia play a vital role in the country's development as well as being an important driver in reducing poverty. According to the Malaysian Chinese Association (MCA, 2005), SMEs comprise 92 per cent (92%) of the 700,000 registered firms in Malaysia and account for 33 per cent (33%) of the total working population.

SMEs in Malaysia can be classified into three broad categories. The first category comprises manufacturing & manufacturing related services, the second category includes primary agriculture and the third includes service sectors (BNM, 2004). According to BNM, in order for an enterprise to be considered an SME, the two points to be considered are the annual sales (turnover) as well as number of full time employees, as detailed in Table 1. According to SMIDEC (2002) and Saleh and Ndubisi (2008), Malaysian SMEs accounted for more than 90 per cent (90%) of all manufacturing organisations. Additionally, around 40 per cent (40%) of Malaysian SMEs in this sector are in the resource-based sector (Johan, 2005). In terms of the service sector, there are around 192, 527 organisations, of which around 98 per cent (98%) are SMEs (Department of statistics and Saleh and Ndubisi, 2008). As depicted in Table 2, wholesale and retail trade is the largest group in the service sector, accounting for eighty eight percent (88.8%) of participating SMEs. This is followed by education and health sectors, then professional services (such as legal, accounting, engineering, etc) and selected services (such as hotels and other lodging places, etc).

[Insert Table 1 about here]

[Insert Table 2 about here]

Literature Review

As indicated earlier, according to a report by the OECD (2004), ICT applications are important to every business as they provide various benefits across a wide range of intra and inter firm business processes as well as transactions. Additionally, ICT and the internet could well assist in reducing transaction costs and increasing the speed and reliability of transactions. The use of the internet for e-commerce can also

provide benefits in terms of reducing inefficiencies resulting from lack of coordination between businesses. For example, internet-based B2B interaction and communication could reduce “information asymmetries” between supplier and buyers and bring a closer relationship between trading partners (Moodley, 2002 and OECD, 2004).

Several factors have been identified in the literature which impact on the uptake and use of ICT among SMEs¹. Corso *et al.* (2003) identified a number of factors that hinder ICT adoption such as, lack of financial resources, and manpower. Dholakia and Kshetri (2003) support this notion, arguing that there are many factors that affect ICT adoption among SMEs, including internal as well as external factors. Internal factors include knowledge about ICT, past experience, belief in the benefits of ICT adoption and use and size of the firm. External factors include telecommunications infrastructure and competition, for example. Additionally, the impact of ICT usage could depend on culture and this may differ between countries (Spanos *et al.*, 2000). Therefore, we attempt to compare the findings of this study with earlier findings from studies on Australian SMEs to determine whether there are any similarities or differences in regard to ICT barriers, knowledge and use of the internet among SMEs. Other factors such as availability of resources and government policies which could affect the use of ICT may also differ across cultures.

Kapurubandar *et al.* (2004) argue that many businesses in developing countries are still uncertain about utilization of e-business. The authors argue that SMEs should recognize the potential benefits that ICT presents. Table 3, below details some of the barriers to ICT growth among both developed and developing countries. As indicated, the resources which are available for developing countries in terms of support for ICT adoption are lagging behind those of developed nations. For example, in terms of infrastructure, developed countries are better situated (e.g. in terms of easy access to phones, the internet and other infrastructure) in comparison with developing countries. Another important issue is culture, where there is a high digital literacy rate in developed countries vis-à-vis the developing ones.

[Insert Table 3 about here]

¹ For a detailed review on the literature in regard to adoption of ICT among SMEs, see Alhashmi and Saleh (2006)

Khalil (2001) argues that technological innovation and high productivity are important elements in any business organization. Hence, being innovative, adopting new ICT practices and making use of them are some of most significant and important issues confronting SMEs. Recent empirical research on Malaysian SMEs shows that only 15 per cent (15%) of Malaysian SMEs have integrated some form of internet applications into their business practices (Omar and Hamid, 2006). Omar and Hamid (2006) suggest that internet technology could provide a good solution for Malaysian SMEs and propel them into innovation. Furthermore, Alam and Mst. (2007) also examined the level of ICT adoption among Malaysian SMEs. Their study focused predominantly on testing the level of ICT integration among ICT companies, mainly in the services sector. The findings of this study were based on a sample of 180 SMEs. The study found that most of the respondents were not overly concerned about increasing the level of ICT use in their business operations. Alam and Mst. also found that the majority of respondents are unwilling to use ICT in their organizations for a range of reasons. For example, a lack of understanding of the importance of ICT and incentives from the government. However, one of the key findings of this study is that, there is still a lack of awareness among Malaysian SMEs about the importance of utilization of ICT for business purposes.

A study by Zailani *et al* (2006), found that firms with a positive attitude towards the adoption of ICT will gain benefits of effective knowledge management. In terms of organizational and environmental factors that affect technology adoption, the authors found that these factors have a positive effect on ICT adoption.

As discussed, there are many barriers that prevent the adoption and use of ICT among Malaysian SMEs. Earlier studies have mainly focused on the level of ICT usage generally, business perceptions of and readiness to adopt ICT. Hence, there is a need to conduct further empirical research in this area to develop a better understanding of the level of ICT adoption and use, in particular internet technology among SMEs in Malaysia as well as the factors that inhibit the uptake and use of internet technology in their business activities.

Methodology

This study is empirical in nature and is based on sample data which was obtained by means of a survey instrument distributed to 500 SMEs. The sample includes SMEs from industry sectors such as manufacturing and services. Information on the sample SMEs was obtained from the Federation of Malaysian Manufacturers (FMM) directory in 2006.

The Survey Instrument

The instrument used in this study is based on a questionnaire developed and validated by Lawson *et al.* (2003) in a study of ICT adoption and use by Australian SMEs. The instrument consists of four sections: profile of the firm; usage of the internet and computers; planned use of the internet and difficulties in conducting business online. Characteristics of the level of IT usage has been divided into four parts (1) ICT and electronic commerce infrastructure, (2) network infrastructure, (3) Internet infrastructure (4) website and EC capability. The aim of this study is to replicate Lawson's study with Malaysian SMEs in order to conduct a comparative analysis of the results of the Australian and Malaysian studies.

The survey was distributed to managing directors and CEO's of 500 randomly selected Malaysian SMEs. This was considered reasonable on the basis that the level of IT or internet usage within an organization is best understood by top-level executive teams. The sample of SMEs utilised in the study was considered representative, in that it was not limited to organizations undertaking any particular type of business. However, due to resource limitations, the sample was restricted primarily to SMEs located in the state of Selangor, which has the largest number of SME businesses in the country (SMIDEC, 2006). The questionnaire was accompanied by a stamped self-addressed return envelope to expedite return of the completed questionnaire. A total of 100 SMEs responded to the questionnaire, representing a response rate of twenty per cent (20%).

The cover page of the questionnaire consisted of information on the survey, its aims as well as how the issue of confidentiality in regard to data collected on the respondents would be handled. The questionnaire comprises nine sections – section A

contains questions related to the details of the firm. Section B includes questions relevant to ICT and electronic commerce infrastructure. Section C consists of questions related to network infrastructure. Section D consists of questions in regard to internet infrastructure. The questions in Section E and F relate to web site and electronic commerce capability as well as ICT. The last three sections of the questionnaire consist mainly of questions on future plans of the firm in regard to ICT; factors that limit the use of ICT within the firm; and ICT infrastructure initiatives.

Empirical Results

A frequency distribution analysis was conducted for the items in Section A (demographics of the respondents). As displayed in Table 4, the majority of the sample of SMEs are in the manufacturing industry (64%), followed by wholesale and retail (26%). The remainder represent the agriculture industry (10%). Table 4 also indicates that most of the SMEs were established during the past 3 to 10 years (47%), while seventeen per cent (17%) each, have either been in operation for less than 1 year, or more than 10 years. The remaining nineteen per cent (19%) of firms surveyed have been in business for the past one to three years.

In regard to the location of SME headquarters, the bulk of respondents are headquartered in the state of Selangor (91%). The remaining 9% are located in the state of Wilayah Persekutuan Kuala Lumpur (5%) and in other states (4%). In terms of employee numbers, eighty three per cent (83%) of respondents have ten to nineteen employees, while another seventeen per cent (17%) of SMEs have twenty to forty nine employees. In terms of availability of computers, all of the SMEs surveyed have at least one computer in their organization.

[Insert Table 4 about here]

ICT and Electronic Commerce Infrastructure

As detailed in Table 5, below, the majority of SMEs have some form of computer infrastructure in their organization. This comprises desktop computers, laptops, palmtops and server technology. The most frequently adopted technology is palmtops (73%), followed by server technology (70%), then desktops (61%) and finally laptops (60%).

[Insert Table 5 about here]

Skills shortage and disaster recovery

Table 6 below, details areas of skills shortage identified by respondents and how they plan to deal with this shortage in the future. The results of the survey reveal that all SMEs suffer from skill shortages in their organizations. As detailed in Table 6, seventy four percent (74%) of firms are experiencing a shortage in computer skills, twelve percent (12%) of respondents identified shortages in staff skilled in web applications, and fourteen percent (14%) of SMEs have a skills shortage in database applications. In regard to how SMEs plan to deal with these shortages, the majority of SMEs (66%) indicated that hiring staff already trained in these areas was one way of dealing with the skills shortage problem. Others however, indicated that they would use a range of strategies such as outsourcing (16%), training existing staff (12%) or hiring short term contractors (6%). The majority of respondents (92%) stated that they currently have no formally documented computer disaster recovery plan in place.

[Insert Table 6 about here]

Staff Skilled in the Use of Office Productivity Tools

Table 7, below details the level of employee skills in the use of office productivity applications such as MS-Office, database management, web browsing, web-design, statistical packages, project management, and email application. The results indicate that more than 50% of employees have skills in MS-Office applications (23%), database management (40%), web browsing (43%), web-design (e.g. front page)(39%), statistical packages (53%), project management (36%), and email (39%). On the other hand, fifteen (15%) per cent, twenty nine (29%) per cent, ten (10%) per cent, three (3%) per cent, six (6%) per cent, twenty four (24%) per cent, and sixteen (16%) per cent respectively, of the firms responded that none of their employees had skills in word processing, database skills, web browsing, web-design, statistical packages, project management and utilizing e-mail respectively. In regard to the number of ICT based employees, the analysis reveals that ninety two (92%) per cent of firms surveyed, employ between five to nine ICT skilled employees, while a small percentage (8%) employ between ten and nineteen ICT skilled employees. The results also indicate that none of the 100 SMEs who responded to the survey, employ more than nineteen ICT skilled employees.

[Insert Table 7 about here]

Network infrastructure

As detailed in Table 8, all respondents indicated that they are using LAN technology in their organization. Additionally, eight per cent (8%), thirty three per cent (33%) and fifty nine per cent (59%), respectively, of firms reported that they have than ten, less than ten, or less than five of their computers connected to a LAN. All firms

indicated that they use a LAN to share printers and transfer data files. A small percentage (8%) of respondents state that they use a LAN for accessing computer applications, file storage, shared directories and accessing customer and inventory information.

In regard to availability of enterprise resource planning (ERP) systems and intranet facilities, all respondents reported that they have not yet implemented ERP or intranet technology. In terms of internet infrastructure, it interesting to note that all firms surveyed have an internet connection. This is not surprising given that internet connection costs have dropped significantly in recent years in Malaysia. However, only three per cent (3%) have an ADSL based Internet connection, while the remaining ninety seven percent (97%) use an ISDN Internet connection. In terms of the use of the internet for financial transactions with banking institutions, the majority of respondents, a staggering eighty three per cent (83%) indicated that they do not use the internet for this purpose. The main use of the internet is for smaller banking transactions and communication with banking institutions or for emailing information to customers and/or suppliers. This is likely due primarily to the fact that there are still a number of factors impacting the intention of Malaysian SMEs to conduct transactions online such as, privacy, security and trust. In respect to placing orders online, the majority of respondents (85%) indicated that they do not use the internet for this purpose. A low four per cent (4%) of respondents indicated that they use the internet for other business purposes.

[Insert Table 8 about here]

ICT Industry Involvement and Future Plans

In terms of the number of respondents involved in the ICT sector, only eight per cent (8%) of all respondents indicated that they operate in the ICT business sector, while the remaining ninety two per cent (92%) represent businesses outside this sector. Of those SMEs in the ICT sector, five firms are involved in software development, one in website development and the remaining two are in the computer hardware and software sales wholesale business. The majority of respondents (92%) outsource their ICT needs to other firms. This is possibly due to the fact that there is an identified skills shortage in this area within the SMEs surveyed.

Seventy four percent (74%) of SMEs surveyed indicated that they believe ICT has the potential to improve their competitive position, indicating that respondents have some understanding of the importance of ICT to the future success of their business operations. In regard to future intention to implement ICT to improve business competitiveness fifty per cent (50%) of SMEs stated that they intended to do so, while the remaining fifty per cent (50%) were not as keen. Government, business agencies and associations may have a role to play in this regard in terms of encouraging SMEs to put a plan in place to enhance their adoption and use of ICT to enhance and improve their business operations.

Interestingly, all respondents cited financial and employee education/ICT skills as the major hindrance to adoption and use of ICT in their organization. This indicates that the high cost of ICT infrastructure and lack of skilled human capital are still beleaguering problems for SME businesses in Malaysia. Other factors cited included

time (7%), employee availability (38%), incompatibility problems (3%) and ability to make high level ICT implementation decisions (19%).

In terms of plans to implement ICT in the next few years, the major systems earmarked for implementation include computer hardware (51%) and software (30%).

A further five per cent (5%) plan to implement electronic procurement, seven per cent (7%) LAN network technology and seven per cent (7%) will implement websites.

[Insert Table 9 about here]

[Insert Table 10 about here]

[Insert Table 11 about here]

Discussion and Conclusion

This study has examined the level of ICT infrastructure among Malaysian SMEs and identifies the barriers to adopting ICT, the planned use of ICT and staff training programs. The instrument used in this study is based on earlier research by Lawson *et al.* (2003). The aim of the current study was to extend Lawson et al's work by conducting a similar survey of Malaysian SME businesses. This study contributes to existing knowledge in a number of areas. . To the authors' knowledge, there are few studies that incorporate ICT elements in examining the barriers that impact ICT adoption among Malaysian SMEs. The purpose of replicating Lawson et al's (2003) was to ascertain whether or not, there are major differences between the characteristics of ICT adoption and use among SMEs in Australia and Malaysia.

The Malaysian study found empirical evidence to support the notion that, despite the vast majority of the firms already using computers in their organizations and being connected to the internet are impacted by ICT shortages such as employee computer skills, lack of adoption of web applications, databases, and other business applications. Another interesting finding is that, despite the majority of SMEs surveyed that use the internet to interact with their suppliers; the same SMEs were not

keen to use the internet for transactions with financial institutions due to perceived concerns over privacy and security.

This study also found that there are a number of factors that hinder SMEs willingness to use ICT in their organization. Among the major hindrances are finance, employee education levels, in particular, in relation to ICT skills, the high cost of ICT infrastructure and non availability of skilled human capital present major challenges for Malaysian SMEs in the adoption of ICT. These findings are consistent with the earlier findings by Lawson *et al.* (2003) in the case of Australian SMEs. One of the key findings of this study is that, the majority of SMEs suffer from skill shortages especially in the area of ICT. These findings are consistent with earlier studies of Malaysian SMEs . For example, Alam and Mst. (2007) found that most SMEs experience a lack of skilled IT personnel. However, the current study identifies areas of skills shortages and provides guidance on how to deal with skills shortages. For example, one of the surprising results in this study is that a majority of SMEs are experiencing a shortage in computer skills and have no formally documented computer disaster recovery plan in place. Again, this is probably due to the high cost of hiring talented IT personnel and the limited resources available to SMEs. Another interesting finding in this study is that a majority of SMEs in Malaysia use the internet for small banking transactions and communication with suppliers and/or customers. This indicates that Malaysian SMEs are still hesitant to use the internet for other purposes such as large financial transactions with banking institutions. This is probably due primarily to the fact that there are still a number of factors impacting the intention of SMEs to conduct transaction online. Additionally, all respondents in this study report financial and employee education/ICT skills as the major hindrance to adoption and use of ICT in their businesses. These findings are consistent with earlier studies on Malaysian SMEs (see for example, Alam and Mst., 2007).

Policy Implications

In terms of plans and policies associated with ICT shortages, the majority of the respondents agreed that hiring trained staff may well assist in this regard. Additionally, respondents indicated that they were interested in implementing a

formal ICT plan. The government, business agencies and associations are well positioned to assist in this regard, by developing programs to advise SMEs on the benefits of developing future plans to enhance their usage of ICT. In order to improve the innovativeness and competitiveness of SMEs. Governments in developing nations need to work towards improving infrastructure including easy access to the internet, IS and IT applications and systems, among other business resources.

For example, government departments and agencies could facilitate more widespread use of ICT and e-commerce uptake by small business; educate SMEs on the incentives available to assist them in this regard; increase basic ICT skills and develop a framework that supports programs focused on higher level ICT skill development for educational institutions, businesses and individuals.

Adoption of ICT is an important driver for business growth, increased profitability and viability, therefore, more work needs to be done by policymakers to incorporate ICT adoption by SMEs at the national policy and strategy levels. SMIDEC is doing an excellent job in supporting SMEs, however, more work needs to be done in this regard as competition from other countries especially China, India and other Asian countries is a real and imminent threat. Additionally, the Malaysian government needs to work closely with SMEs in promoting the benefits of ICT adoption and to offer incentives for SMEs to promote ICT use within their business, particularly in high value areas such as product design.

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Table 1: Malaysian SMEs

<i>Category</i>	<i>Micro-enterprise</i>	<i>Small enterprise</i>	<i>Medium enterprise</i>
Manufacturing, manufacturing-related services and agro-based industries	Sales turnover of less than RM250,000 <i>or</i> fewer than five full-time employees.	Sales turnover between RM250,000 and RM10 million <i>or</i> between five and 50 full-time employees.	Sales turnover between RM10 million and RM25 million <i>or</i> between 51 and 150 full-time employees.
Services, primary agriculture and information and communication technology (ICT)	Sales turnover of less than RM200,000 <i>or</i> fewer than five full-time employees.	Sales turnover between RM200,000 and RM1 million <i>or</i> between five and 19 full-time employees.	Sales turnover between RM1 million and RM5 million <i>or</i> between 20 and 50 full-time employees.

Source: Compiled from BNM (2004) and Saleh and Ndubisi (2008)

Table 2: Malaysian SMEs: Services Sector

<i>Segment</i>	<i>Total Number of Participating Companies</i>	<i>Total Number of Participating SMEs</i>	<i>Percentage of Participating SMEs (per cent)</i>
Education and Health	8,558	8,438	4.5
Professional Services	5,548	4,840	2.6
Selected Services	4,146	3,844	2.1
Transportation and communication	3,908	3,473	1.9
Computer industry services	283	186	0.1
Wholesale and retail trade	170,046	165,640	88.8
Telecommunications	38	7	0.0
Total	192,527	186,428	100

Source: Data compiled from Department of Statistics and Saleh and Ndubisi (2008).

Table 3: Accessibility of resources in developed countries vis-à-vis developing countries

<i>Developed countries</i>	<i>Developing countries</i>
Infrastructure: Reliable and adequate Infrastructure (e.g. ICT, telecoms, cheap and easy access to internet and phones)	Inadequate infrastructure
Economy: Financially stable	Lacking financial resources and unstable
Cultural and social issues High digital literacy rate	Low or poor literacy rate

Business culture: Virtual trading	Face to face trading
Regulatory: Adequate government, industrial, internet and other relevant	Inadequate policies or sometimes do not exist

Source: Compiled from Kapurubandara et al. (2006) and Alhashmi and Saleh (2006)

Table 4: SME Demographics

1. Industry sector	Frequency	Percentage
Agriculture	10	10.0
Manufacturing	64	64.0
Wholesale	11	11.0
Retail	15	15.0
2. Year of establishment		
Less than 1 year ago	17	17.0
1-3 years ago	19	19.0
3-10 years ago	47	47.0
More than 10 years	17	17.0
3. Head office location		
Selangor	91	91.0
Kuala Lumpur (KL)	5	5.0
Other states	4	4.0
4. Number of employees		
10 to 19	83	83.0
20 to 49	17	17.0
5. Availability of computers		
	100	100.0

Table 5: ICT Infrastructure

	Frequency	Percentage (%)
Number of desktops		
100 %	61	61.0
More than 50%	28	28.0
Less than 50%	9	9.0
None	2	2.0
Number of laptops		
100 %	60	60.0
More than 50%	21	21.0
Less than 50%	16	16.0
None	3	3.0
Number of palmtops		
100 %	73	73.0
More than 50%	9	9.0
Less than 50%	12	12.0
None	6	6.0
Number of servers		
100 %	70	70.0
More than 50%	15	15.0
Less than 50%	8	8.0
None	7	7.0

Table 6: Skills shortage and disaster recovery

	Frequency	Percentage (%)
Skills shortage in the organization		
Yes	100	100.0
No	nil	nil
Areas of skills shortage		
Computer skills	74	74.0
Web applications	12	12.0
Databases	14	14.0
Number of employees employed on full or part time basis?		
5 to 9	92	92.0
10 to 19	8	8.0
Plans to deal with skills shortage		
Hire trained staff	66	66.0
Train existing staff	12	12.0
Hire short term contractors	6	6.0
Outsource work	16	16.0
Availability of documented computer disaster recovery plan		
Yes	8	8.0
No	92	92.0

Table 7: Firms' satisfaction with level of ICT and e-commerce infrastructure

	Frequency	Percentage (%)
Employee ICT skills		
Office productivity software eg. MS Office		
100 %	4	4.0
More than 50%	23	23.0
Less than 50%	58	58.0
None	15	15.0

Databases		
100 %	1	1.0
More than 50%	40	40.0
Less than 50%	30	30.0
None	29	29.0
Statistical packages		
100 %	5	5.0
More than 50%	53	53.0
Less than 50%	36	36.0
None	6	6.0
Project management		
100 %	4	4.0
More than 50%	36	36.0
Less than 50%	36	36.0
None	24	24.0
Web browsing		
100 %	14	14.0
More than 50%	43	43.0
Less than 50%	33	33.0
None	10	10.0
e-mail (e.g. outlook)		
100 %	7	7.0
More than 50%	39	39.0
Less than 50%	38	38.0
None	16	16.0
Web design (e.g. front page)		
100 %	43	43.0
More than 50%	39	39.0
Less than 50%	15	15.0
None	3	3.0

Table 8: Network infrastructure

	Frequency	Percentage (%)
One or more LANs	100	100
Number of computers connected to LANs		
Above 10	8	8.0
Less than 10	33	33.0
Less than 5	59	59.0
LAN use		
Sharing a printer	100	100.0
Sharing files	100	100.0
Accessing applications		
None	92	92.0
Accessing applications	8	8.0
Individual file storages		
None	92	92.0
File storage	8	8.0
Concurrently working on files in shared directory		
None	92	92.0
Shared directory	8	8.0
Accessing a customer database		
None	92	92.0
Accessing a customer database	8	8.0
Accessing inventory or stock information		
None	92	92.0

Accessing inventory information	8	8.0
ERP use to support organization		
No	100	100.0
Intranet		
No	100	100.0
Internet connection		
Yes	100	100.0
Dial-up account		
None	100	100.0
ADSL connectivity		
None	97	97.0
ADSL	3	3.0
ISDN connectivity		
None	3	3.0
ISDN	97	97.0
Cable connectivity		
None	100	100.0
Ability to transact electronically with customers		
None	100	100.0
Ability to transact electronically with interstate/overseas departments		
None	100	100.0
Transact electronically with suppliers		
Suppliers	100	100.0
Transact electronically with Malaysian tax office		
None	100	100.0
Transact electronically with banks		
None	9	9.0
Customers	2	2.0
Banks	89	89.0
Main use of the internet		
E-mail	100	100.0
For banking transactions		
None	83	83.0
banking	17	17.0
For placing orders		
None	85	85.0
Ordering goods	15	15.0
Main use of internet for other purposes		
None	96	96.0
others	4	4.0
Website		
No	100	100.0

Table 9: ICT Industry Involvement and Future Plans to Implement ICT

	Frequency	Percentage (%)
Organization involved in ICT business		
Yes	8	8.0
No	92	92.0
ICT business areas		
Software development	5	5.0
Website system development	1	1.0
Computer hardware and software sales wholesale	2	2.0
Outsourced ICT development		
Yes	92	92.0
No	8	8.0

If you have enough resources do you believe ICT can improve your business competitiveness?		
Yes	74	74.0
No	26	26.0
Plans to enhance business competitiveness via ICT?		
Yes	50	50.0
No	50	50.0

Table 10: Factors limiting the use of ICT

	Frequency	Percentage (%)
Finance	100	100.0
Time		
None	93	93.0
Time	7	7.0
Employee education and ICT skills	100	100.0
Employee availability		
None	62	62.0
Employee availability	38	38.0
Employee attitude	100	100.0
None	100	100.0
Incompatibility with business system		
None	97	97.0
Incompatibility	3	3.0
Knowledge to make high level ICT decisions		
None	81	81.0
Knowledge	19	19.0
Knowledge to implement high level ICT decisions		
None	100	100.0

Table 11: Planned ICT infrastructure implementation

	Frequency	Percentage (%)
Computer hardware	51	51.0
Software	30	30.0
Electronic procurement	5	5.0
LAN network	7	7.0
Website	7	7.0