

# ICT Adoption Among SME Entrepreneurs in the Furniture Industry

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## ABSTRACT

*Information and communication technology (ICT) plays a vital role especially in supporting process innovation, in manufacturing as well as in the service industries. This can be confirmed for the furniture sector. Appropriate ICT can help firms reduce costs by enhancing their internal processes, improving their product and distributing their products. In Malaysia, furniture industry has become one of the country's most economically important sectors. The total value of furniture products export of Malaysia has increased gradually from in 2003 to 2007. This sector is dominated by small and medium sized enterprises. About 2000 companies are involved in the furniture industry belonged to the SMEs. The objective of this study is to examine the adoption rate of ICT among the SME entrepreneurs in the furniture industry. It was found that a majority of the companies surveyed did use computers but their usage is very basic. They are not fully utilising the capabilities of ICT.*

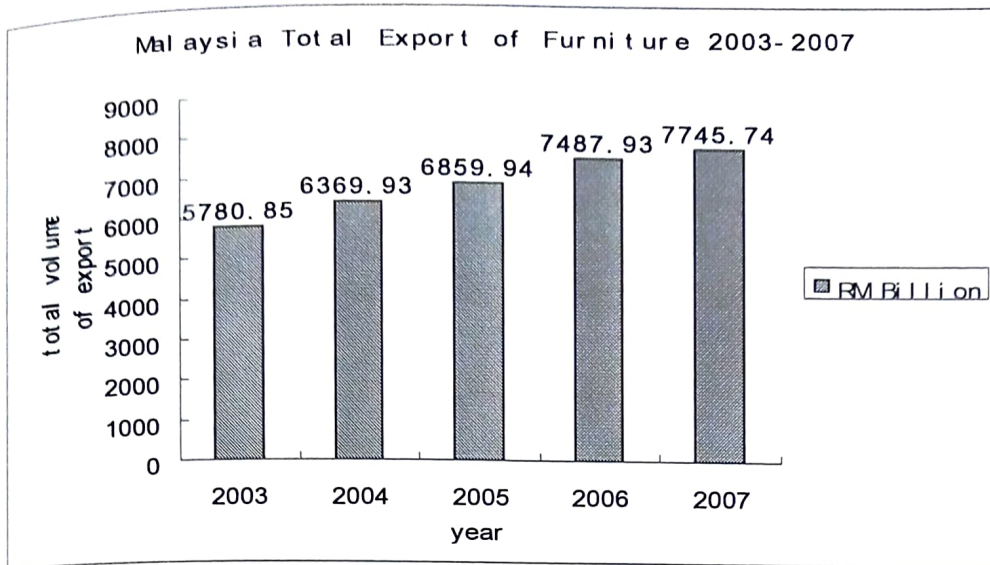
**Keyword:** *Information and communication technology (ICT), Small and Medium sized enterprises (SME), entrepreneurs, furniture industry.*

## **INTRODUCTION**

The accelerated development of information and communication technology (ICT) in the decades of the 1980s and 1990s and in the early part of the twenty-first century is one of the principle factors affecting economic, social and political process across the globe (Mansell, 2002; Singh, 2005). The ability to turn this information into knowledge and to use them wisely is where the distinction lies (Prapoo, 2007). This is where ICT plays the important role of obtaining that information and then it's up to relevant party to process the information and use it wisely as knowledge to their advantage. Appropriate ICT can help firms reduce costs by enhancing their internal processes, improving their product and distributing their products (Kotelnikov, 2007). ICT has made it possible to reach out for this information or knowledge easily with the emergence of various technologies in the past decade. The ability to share knowledge and information around the world is tremendous with all this technology advancement. Currently, Information and technology (ICT) plays a vital role especially in supporting process innovation, in manufacturing as well as in the service industries. This can be confirmed for the furniture sector (Data bank, 2008). Malaysia has embarked on number of measures to ensure that ICT play a vital role in the society (Prapoo, 2007).

In Malaysia, the furniture industry has become one of Malaysia's most economically important sectors (MFPC, 2007). The total value of furniture products export of Malaysia has increased from RM 5,790.05 million in 2003 to RM 7,745.74 million in 2007 (MFPC, 2007). This is seen in Figure 1. According to the Malaysia Timber Industry Board (MITB), there are about 750 furniture export and manufacturing companies in Malaysia, with another 1500 smaller concerns playing a supporting role. Under Second Master Plan (1996-2005), Malaysian furniture industry has been recognized as a "target industry" and has become one of new growth sectors of the economy. All these companies belonged to the Small and Medium sized Enterprises. The exports of Malaysia's furniture rose from year to year (as listed in figure 1).

Figure 1: Malaysia's Total Export of Furniture 2003-2007



Source: Malaysian Furniture Promotion Council (MFPC, 2008)

A speedy changing and highly competitive global market is putting pressure on Malaysia furniture manufactures. Malaysia furniture industry may lose market share in global market due to the big competitors such as China, Vietnam and Indonesia. Therefore, minimized lead time and product innovation are the key success factors for business to remain competitive and response to such challenges. Furniture companies need to pursue innovation strategies based on quality, differentiation of products, creativity as well as improved customer service. Due to this situation, the furniture industry has made much investment in the areas of mechanization of production processes, design and creation, advertising and communication technology.

This study investigates factors that affect the diffusion and adoption of ICT in local furniture industry. According to past studies, there are many factors driving ICT adoption such as infrastructure of company (electricity level, existing ICT adoption), social and economic structure (personal income, inflation, and income inequality), education (illiteracy rate), characteristics of firms (age, size industry specialization, and human capital), environment, level of competition between the firms in the same industry, technology spillover and others.

The widespread usage of ICT in firms' business processes is expected to have helped improve the labour productivity. Theoretically, the improvement is translated into economic growth. In addition, innovation

comes not only from Research and Development (R&D) but also from acquisition, adoption and use of new technologies comprises in capital investment. Especially the new ICT can make contribution to productivity, innovation and economic growth in all industrial sectors. The purpose of this study is to investigate the drivers of ICT adoption. It focuses on four research objectives as follow:

1. To determine the relationship between the characteristics of the firm and the adoption of ICT.
2. To investigate the relationship between inter-firm collaboration and the adoption of ICT.
3. To determine the relationship between human capital and the adoption of ICT.
4. To investigate the relationship between government assistance and the adoption of ICT.

## **LITERATURE REVIEW**

Innovative firms have begun to exploit the potential of ICT. These firms have implemented ICT into their quality management, production processes, even in marketing and customer services. Competing in global markets requires firms not only to optimize cost structures, maximal efficiency, and products or services of excellent quality but also the ability to communicate effectively and cooperate with business partners and potential customers.

The age of firms is also a main factor to drive adoption of ICT in firms characteristic. According to Databank (2008), firm age has negative relationship with ICT enabled innovations. Within the group of firms that practice e-collaboration, firms founded before 1998 are less likely to introduce ICT enabled-innovations than firms founded 1998 onward. Sunil & Nazrul (2006) found that the age of the firm has a very high negative impact on their inclination to adopt ICT. According to Ssewanyana & Busler (2007) the computer usage and internet usage of the older firms is higher. According to Joseph & Micheal, (2007), the computer usage and internet usage of the older firms (>20 years) is higher than the younger firms.

Firm size is most commonly used in the empirical literature on ICT adoption because it is easy to observe and it serves as a proxy for several things (Geroski, 2000). A stylized fact supported by a large empirical literature is that the adoption of ICT is more likely when the size of firms is larger. Large firms can earn higher profits from adopting new technology in comparison with small firms. Given the high risks and costs of early adoption they are in a better position to adopt new technology because they have fewer financial constraints and because they are likely to be less risk averse. A positive correlation between firm size and ICT adoption was found in a number of empirical studies (Fabiani, Schivardi & Trento 2005; Morgan, Colebourne & Thomas 2006; Teo & Tan, 1998; Thong, 1999). Hannan and McDowell (1984), Sommers (1980) and Rose and Joskov (1990) found a positive influence of firm size on adoption propensity across various sectors. In contrast, Lefebvre et. al. (2005) Love et.al. (2005) and Teo, Tan and Buk (1997) have found the relationship between size and the rate of ICT adoption to be weak and not significant.

The use of electronic networks may lead to a higher probability of firms collaborating in innovative activities and it may increase the amount of collaborative relations they have. The use of ICT applications supporting inter-firm collaboration and information exchange comprise necessary inputs for ICT-enabled innovative output, i.e. re-engineered processes, new products or distribution channels (Databank, 2008). Furniture firms that use ICT applications to exchange information or collaborate with business partners are more likely to introduce ICT enabled innovations than firms in the same sector that do not use such applications. There are evidences suggesting that technology diffusion is geographically localized and information spillovers decline as distance between firm increases (Jaffe et al., 1993; Jaffe & Trajtenberg, 1999; Eaton & Kortum, 1999; Keller, 2002).

Moving towards knowledge-based economy, there is a need or demand for skilled workforce who are competent and experienced in the field of ICT. Continuous skills development and life-long learning are the new requirements imposed by a knowledge-intensive environment (Prapoo, 2007). This is where the demand for skilled workforce arises whereby organizations are always on the lookout in employing skilled workers. The presence of high-skilled workers fosters innovation and facilitates ICT adoption at firm level (Arvanitis, 2005; Bresnahan, Brynjolfsson, &

Hitt, 2002, Fabiani, Schivardi & Trento 2005; Falk, 2005; Bayo-Moriones, & Lera-López, 2007). The empirical research states that the greater the extent of government support, the more likely firms will adopt the internet (Ssewanyana & Busler, 2007). The government has introduced a number of policies on ICT in the past seven years. The result shows that there many firms that had really benefited from this policy. There were also some firms that had not benefited from the policy, which may be due to the nature of business they were carrying out. According to Okon et.al. (2006), insufficient funding by the government is one of the major factors affecting the effective adoption of ICT.

## **METHODOLOGY**

### **Procedure**

The study investigates the adoption of ICT in local furniture industry. This study represents an initial study to examine the adoption rate of ICT among the furniture industry. A total of 55 companies took part in this initial survey. The furniture manufacturers are located mainly in Johore, Selangor, Sarawak, Perak and Malacca (MIDA 2011). For the purpose of this initial study, furniture companies from Malacca and Johore has been selected for this survey. Details of the companies were obtained from the local state authorities. In each firm, the owner of the company or the person authorized by the owner will complete the questionnaire. The companies were selected based on the nature of their sector, ie, hardwood and rubber wood together with their number of employees.

Companies employing less than 5 employees are being categorised as Micro, while companies having between 5 and 50 employees are considered to be Small. For companies having between 51 and 150 employees, they are considered to be Medium. Questionnaires were distributed to the companies and to be completed by the person in charge, such as the Manager.

The questionnaire is divided into two sections, the demographic particulars and the survey questions/statements for the variables. The framework consists of four independent variables which are characteristics of firms, inter-firms collaboration, human capital and government assistance.

These independent variables are used to examine the factors of the ICT adoption. The questionnaire takes about 20 minutes to complete.

The data from the respondents were tested for instrument reliability normality. This was to ensure that the data was reliable and normally distributed and all variances were equal. The reliability analysis result of Cronbach's alpha measurement in this research is 0.784. The results indicated that all the data was reliable and all the factors had an acceptable consistency. There are altogether 30 items.

### **Descriptive Analysis**

From the 55 companies that participated in this study, majority of the companies are in the wooden furniture category, which is approximately 64% or 35 companies. The wooden furniture production is the mainstay of Malaysian furniture industry. In general most companies are already using computers. From the total of 55 companies, 56.4% of companies do not update their computers to the latest version while 43.6% of respondents update their computers. From this survey, it indicates that majority of companies use email, which approximates 85.5% or about 47 companies. There were only 14.5% or 8 respondents that do not use email. A total of 60% or 33 of total respondents have their own company website. There were 22 companies that do not own a website. The major type of external connection using by companies are DSL broadband (streamyx) which is 58.2% or 32 companies. There were 41.8% or 23 of companies are using modem (TMnet). The results show that most companies do adopt ICT.

Table 1: Demographic Profile of Targeted Furniture Companies

Furniture Manufacturing	Frequency	Percent
<i>Specialization</i>		
Wooden Furniture	35	63.6
Metal Furniture	11	20.0
Plastic Furniture	7	12.7
Mattress	2	3.6
<b>Total</b>	<b>55</b>	<b>100.0</b>
<i>Number of Employees</i>		
Less than 10	2	3.6
More than 10 but less than 50	5	9.1
More than 50 but less than 100	35	63.6
More than 100 but less than 150	13	23.7
<b>Total</b>	<b>55</b>	<b>100.0</b>
<i>Age of companies</i>		
Less than 5 years old	5	9.1
Between 5 and 10 years old	20	36.4
Between 10 and 15 years old	25	45.5
More than 15 years old	5	9.0
<b>Total</b>	<b>55</b>	<b>100.0</b>
<i>Number of computers</i>		
1-10	11	20.0
11-20	6	10.9
21-30	20	36.4
30 and above	18	32.7
<b>Total</b>	<b>55</b>	<b>100.0</b>
<i>Is the computer updated to the latest version</i>		
Yes	24	43.6
No	31	56.4
<b>Total</b>	<b>55</b>	<b>100.0</b>

## RESULTS AND DISCUSSION

The results indicate that the size of the company is positively related with number of employees using computer, computer usage and internet usage of the company. There is a significant relationship between these variables. The bigger the size of the company, the more number of employees are using computers and the longer the company use computer and internet. The age of the company is positively related with the computer usage and internet usage. The older the company is established, the longer the company use computer and internet. The small firms face limitations in



the capital investment. Their tendency of risk averse and conscious of uncertainties when adopting the ICT (Baldwin & Diverty 1995; Baltelsman, van Leeuwen . & Nieuwenhuijsen 1996; Gretton, Gali & Parham 2002) restricts the adoption of ICT. According to Geroski (2000), large firms can earn higher profits from adopting new technology when compared with small firms. Large firms have less financial constraints to adopt ICT and likely to be less risk averse. The effective adoption of several ICT technologies requires a substantial investment of resource.

Table 2: Correlation between Size and Age of the Company and ICT adoption

		Number of employees using computer	Computer Usage of the company	Internet Usage of the company
Size of the company	Pearson Correlation	.817(**)	.568(**)	.574(**)
	Sig. (1-tailed)	.000	.000	.000
	N	55	55	55
Age of the company	Pearson Correlation		.440(**)	.411(**)
	Sig. (1-tailed)		.000	.001
	N		55	55

\*\* Correlation is significant at the 0.01 level (1-tailed)

Table 3: Correlation between Companies' Size and Level of Inter-firms Collaboration

		Level of inter-firms collaboration
Size of the company	Pearson Correlation	.608(**)
	Sig. (1-tailed)	.000
	N	55
Computer usage of the company	Pearson Correlation	.600(**)
	Sig. (1-tailed)	.000
	N	55
Internet usage of the company	Pearson Correlation	.632(**)
	Sig. (1-tailed)	.000
	N	55

\*\* Correlation is significant at the 0.01 level (1-tailed)

According to the results, there is a positive relationship between size of the company and level of inter-firms collaboration. Computer and internet usage of the company was found to be positively related with level of inter-firms collaboration. Based on the review of past studies, ICT has a direct impact on process innovation in companies by facilitating links between different companies. ICT assist inter-organizational systems integration and collaboration by providing the change to transfer technical knowledge and exchange information. The finding of this objective is in conformity with past studies. ICT allows companies to create communication infrastructures which can facilitate production networks and enable business partners to perform collaborative work (McAfee, 2006). Based on the study of Databank (2008), ICT-enabled inter-organization systems collaboration and integration can improve company's innovation capabilities by providing chances to exchange information, share learning, and transfer technical knowledge. By adopting ICT for information exchange and integration, it allows companies to optimize the value chain.

Table 4: Correlation between Human Capital Skills and ICT

		<b>Number of employees using computer</b>
Share of employee with college or university degree	Pearson Correlation	.527(**)
	Sig. (1-tailed)	
	N	55
		<b>Staff recruiting with general ICT skill</b>
Size of the company	Pearson Correlation	.244(*)
	Sig. (1-tailed)	.037
	N	55

\* Correlation is significant at the 0.05 level (1-tailed)

\*\* Correlation is significant at the 0.01 level (1-tailed)

The table shows that the share of employee with college or university degree is positively related to the number of employee using the computer. There is a significant relationship between these variables. The more educated the employees are, the higher the number of employees using computers. Size of the company is positively related with staff recruiting with general ICT skill. There is a significant relationship between size of the company and staff recruiting with general ICT skills. ICT adoption also requires education and training for the proper use of the technology

(Cohen & Levintha, 1989). The finding is consistent with previous studies. The presence of high-skilled workers fosters innovation and facilitates ICT adoption at firm level (Arvanitis, 2005; Bresnahan, Brynjolfsson, & Hitt, 2002; Fabiani, Schivardi & Trento 2005; Falk, 2005; Bayo-Moriones, & Lera-López, 2007 2007). The employees are required to have some understanding of ICT and be able to use them in their working life in order to carry out their task effectively and efficiently.

Table 5: Correlation between Level of Government Assistance and Computer Usage

		Number of computers	Number of employees using computer	Computer usage of the company	Internet usage of the company
Level of government assistance	Pearson Correlation	-.257(*)	-.358(**)	-.380(**)	-.406(**)
	Sig. (1-tailed)	.029	.004	.002	.001
	N	55	55	55	55

\* Correlation is significant at the 0.05 level (1-tailed).

\*\* Correlation is significant at the 0.01 level (1-tailed).

## RECOMMENDATION

All four correlations were found to be negatively related to level of government assistance. The more the level of government assistance, the less would be the usage of computers and the internet. The findings are in contrast with previous empirical studies. The result indicates that the government did not do well in improving and the implementation of ICT. It is important that government within a region play that critical role to ensure that adequate policies and initiatives are in place and enabling environments are created to encourage the adoption of ICT. Mowery and Rosenberg (1979) suggested that government policies that develop the ability of the firm to compete in the marketplace have a strong positive influence on technology development strategy at the corporate level. These policies include direct research and development (R & D) funding, agency level research policy, investment tax credits, industrial policy and R & D tax credits.

For future research purposes, it would be beneficial to study the adoption rate of furniture companies based on the different sectors that

they are in. Since there are different sectors, it would increase and improve the knowledge by studying the adoption rate of ICT based on these diverse categories. The different sectors use different methods of production. The wooden based companies use more of labour especially in the hardwood furniture industry. Those in the rubber wood companies use a mix between labour and machines. Although, this study is only in the initial stage, it did provide an insight to the furniture manufacturers. The total value of furniture products export of Malaysia has increased from RM 5,790.05 million in 2003 to RM 7,745.74 million in 2007. This showed the potential income earner for the country. ICT plays a vital role especially in supporting process innovation, in manufacturing as well as in the service industries. Results from the study would help policy makers to improve the sector better.

## **CONCLUSION**

Based on the study, it was found that most of the companies are already using computers however, not all of them are fully utilising the capabilities of ICT. Not all of them have a website. They do not update their computers regularly. Contrary to the results of previous studies, the level of government assistance seemed to have a negative relationship with the usage of ICT. In order to improve the implementation of ICT, government should provide adequate support on the ICT development. Telekom Malaysia(TM) can increase internet penetration rate by providing access to the areas currently un-served. This can be carried out with a joint-effort between TM and the Malaysian government. The government should encourage or introduce more furniture companies to use the Human Resource Development Fund (HRDF) and Technology Acquisition Fund to invest in new technologies and train their staffs into the latest ICT skills.

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