Journal of Social Sciences 1 (3): 188-193, 2005
ISSN 1549-3652

Perceived Benefits of E-Commerce Adoption in the Electronic Manufacturing Companies in Malaysia

Syed Shah Alam, A. Ali Khatibi, Hishamuddin Bin Ismail and Ismail Ahmad
Multimedia University, Malaysia

Abstract: This study examines the major benefits that motivating to adopt e-commerce in the electronic manufacturing companies in Malaysia. The major benefits of e-commerce adoption include improved customer service, better inventory control and lower marketing and distribution costs, reduced cycle time, increased market reach and reduced operation costs. Despite the hype of the e-commerce business, the benefits realized from e-commerce adoption among firms is unclear in terms of perceived versus realized benefits. This study examines the perceived benefits of e-commerce usage by the electronic manufacturing companies in Malaysia. This paper also differentiates the perceived benefits between the different demographic groupings.

Key words: Malaysia, e-commerce, adoption, manufacturing company, multimedia super corridor

INTRODUCTION

E-commerce has several benefits over the normal manual trade. As the reach of Internet is vast, the company can sell goods to a larger number of people. Moreover, both large and small organisations can reach a customer who is physically too far away. There are numerous and wide varying prediction as to the potentiality of doing business on e-commerce and to adopt Internet technologies. E-commerce technologies include searching for products, services and information, advertising and the buying, selling and paying for products and/or services. It is established that e-commerce technologies provide a cost-effective way for organizations to market their business, launch new products, improve communications, gather information and identify potential business partners.

The value of worldwide EC is expected to reach by 2004, range from a prediction of $963 billion by ActiveMedia Researcher to Forester Research's prediction of $4 trillion and IDC Research projects spending will reach $2.8 trillion (e-commercetimes). Despite this high potential, Asian businesses are still reluctant to infuse EC into their business process. Asia as a whole appears less engaged in EC compared to the United States and Europe. One apparent explanation could be that many Asian countries tend to be less developed than Western countries. A more complete explanation of the lag, however, must include related problems that Asian penetration, inefficiently-managed telecom monopolies, language barriers, hierarchical corporate cultures and often intrusive and bureaucratic governments[1].

In spite of inertia, several Asian countries (e.g. Hong Kong, Malaysia and Singapore) are in the process of creating IT infrastructure that will facilitate EC innovation and are attempting to remove the above mentioned barriers. These countries are aware that the next several years will see tremendous growth in business-to-business networks in order to maximise resources and economise on costs given the potential offered by EC. Businesses that fail to take advantage of technological advances will decline[2].

Malaysia has already considerably shifted her agriculture based economy to industry based one in order to stand the challenge of the twenty first century. The latest industrial initiative taken by the Malaysian Government after 1997 was to encourage the firms that are more knowledge-intensive than production-intensive in order to transform Malaysia into a country based on knowledge-economy (K-economy). Malaysia's workforces are well on the right track to make their economy on information dominated one. The employment opportunity create by the information sector accounts for 28% of the total workforce at the end of 1998 and it is expected to grow 38% by the end of 2003[3]. The Multimedia Super Corridor (MSC) has, moreover, attracted much attention for the development and implementation of EC in the business.

Electronic commerce is being increasingly used by commercial firms or organization to advertise and market both goods and services all over the world. Manufacturers of far-off countries can offer their products or services with information related to product capabilities and benefits, content or components, price, production schedules, delivery and payment conditions. The electronic industry in Malaysia has turned into a leading and major manufacturing sector contributing a largest share to the total manufacturing output, exports and employment. With the help of EC this sector can expand its market share in the global business arena. That is why, the adoption of electronic commerce, particularly the Internet as a platform for the business, is considered in this research.

Corresponding Author: Syed Shah Alam, Lecturer, Faculty of Business & Law, Multimedia University, Malaysia

Benefits of EC adoption include improved customer service, better inventory control, lower marketing and distribution costs, reduced cycle time, increased market reach and reduced operation costs[4-6]. Other benefits include global connectivity, high accessibility, scalability, interoperability and interactivity[7,8].

Technology benefits relate to automated processes embedded in the EC applications that contribute to direct savings in costs and time. Technology benefits aim to automate manual process therefore improving administrative costs and reducing errors. The impact of technology benefits is measured as improved speed of delivery and market reach[9,10].

Operational benefits refer to the quality of information flow, (such as timely, accurate, correct and complete) customer service derived from reduced administrative costs, from the automated processes. Operational benefits contribute to increased efficiencies and can be easily identified and measured in specific dollar amounts as realized benefits. For example, e-commerce systems such as; EDI, intranets and Extranets assist buyer-seller trading partner relationships and improves supplier reliability by improving delivery performance, thus ensuring an acceptable quality and correct quantity of goods[11]. The impacts of operational benefits are information, effective inventory control management, reduced costs, timely marketing and improved cycle time[2,7,12].

Relationship-related benefits refer to positive past experiences that firms experience with their trading partners and consumers that permit organizations to communicate openly, share information, trust their customers and commit to long-term investments. Relationship-related benefits cannot be easily measured as they related to subjective perceptions of their trading partner trust but they still play an important role in EC success. Relationship related benefits are measured in the following ways: improved customer service, open communications, improved reputation and increased trust among trading partners[13]. The main purpose of this study was to investigate the major benefits perceived by the electronic manufacturing companies in Malaysia and to compare the major benefits between demographic groupings.

MATERIALS AND METHODS

Given the lack of empirical research in this area especially in Malaysia, an exploratory investigation was considered the most method[14]. The research method was adopted from the combination of qualitative and quantitative approach as suggested by Miles and Huberman[15]. This approach begins with initial qualitative survey and then followed up by detailed interviews. Unfortunately in Malaysia, there is no detail database about internet users in industry[16], stratified random sampling procedures were designed for this study.

The sample size derived for the Federation of Malaysian Manufacturer (FMM, 2000) listed members of electronic manufacturing companies in Penang and Klang Valley areas. The list included the company's total employees, annual turnover and year of incorporation of business. Due to the time and cost constraints it was not possible to collect the data to use a simple random sample from the original databases of the firms and a stratified random sampling method was attempted in order to carefully identify firms from the two groups. The target groups were SMIs and large scale industry considered based on the number of employees in the industry is most commonly used in management research[17-19]. The SMIs industries are classified as those industries with total workforce of less than 150 employees and the companies with annual sales not exceeding RM25 million[20]. From the each group 25% of industries were selected and asked over telephone to provided time and date for responses. But about 5% of industries close or shifted their business as mentioned the address and telephone number by the FMM. Thus, finally 194 companies were selected and collected primary data through questionnaire.

Respondents were asked to indicate all relevant choices from a list of ten major benefits perceived by other researches that could motivate the EC adoption. In addition, respondents asked other questions to identify Internet based activities were being used by the electronic manufacturing companies in Malaysia. Those questions included were, years of manufacturing experience, years of Internet experiences, their number of employees, types of companies. The structure of questionnaires follows the five point Likart Scale ranging from least important to most important was used to measured the expression of their perceived experienced on EC.

Data analysis techniques: Data were collected on demographic variables are processed and reported in percentage through the descriptive analysis. Descriptive analysis refers to the transformation to describe a set of factors that will make them easy to understand and interpret[21,22]. T-test was carried out to determine if there is any significant difference on perceived benefits between different demographic groupings.

RESULTS AND DISCUSSION

Respondents profile: Table 1 shows the total profile of respondents considered for this study. The following sub-sections provide the discussion of the respondent's profile.

Years of Internet experience: The respondents of this study were electronic manufacturing companies in Malaysia. With regards to the Internet usages, the sample population was divided into two groups, less than 7 years and more than 7 years of Internet usage. This survey shows that, less than 7 years Internet users are the largest portion of the sample with a total of 130 respondents (67.0%). The other group, 7 years and above had 64 respondents (33.0%).

Types of companies: It is expected that multinational companies are the highest level of electronic manufacturing companies in Malaysia. This is because, most of the companies are multinational companies and they are selling their goods in the global markets. For this reason, consideration has also been given to provide response to the questions on types of companies. In the present study multinational companies are the highest level of respondents (58.3%), followed by local companies (30.4%) and joint venture companies (11.3%).

Years of manufacturing experience: The highest level of respondents from the 194 companies in the survey is the 7 years and above goods manufactured companies with a total of 139 companies (71.6%), followed by the less than 7 years companies with a total of 55 companies (28.4%).

Size of the companies (based on total employees): With regards to employees, Table 1 shows the two major groups that compose the sample. The small and medium -scale industries (SMIs) are classified as those industries with total workforce of less than 150 employees. This group composed the highest portion of the sample, 123 (63.4%). The second group was of those from large-scale industries with work force more than 150 employees. They comprised 71 (36.6%). Based on this sample, it is noted that the largest group of the respondents were those from the SMIs.

Size of the companies (based on annual sales): With regards to annual turnover, the sample population was divided into small and medium-scale (SMIS) and large-scale industries. The SMIs are classified as those industries with annual turnover less than RM6,000,000. This group comprised largest respondents with a total of 112 (57.7%). The large-scale industries group comprised of 82 companies (42.3%). This section gives the support to the past section where company sizes are divided based on the employees. This study found that SMIs are the largest group of respondents for this research.

Activities on the internet based EC: Table 2 shows the EC activities usage by the electronic manufacturing companies in Malaysia. This section also accomplishes the first specific objective of this study. There are many activities used by the Internet based EC in the businesses. Some main activities are discussed here.

Table 1: Respondents profile

Demographic Variables	No. of respon.	%	Cumulative %
Years of Internet experiences			
Less than 7 year	130	67.0	67.0
7 years and above	64	33.0	100.0
Types of Companies			
Local Companies	59	30.4	30.4
Multinational Companies	113	58.2	88.7
Joint Venture Companies	22	11.3	100.0
Size of the Companies (based on total employees)			
Small and Medium scale Industries	123	63.4	63.4
Large scale Industries	71	36.6	100.0
Years of manufacturing experiences			
Less than 7 years	55	28.4	28.4
Above 7 years	139	71.6	100.0
Size of the Companies (based on annual sales)			
Small and Medium scale Industries	112	57.7	57.7
Large scale Industries	82	42.3	100.0

Table 2: E-Commerce applications

EC applications	Total companies	% of Cases
Buying	56	28.9
Procuring	79	40.7
E-mail	193	99.5
Seeking Information	190	97.9
Selling	41	21.1
Distribution	53	27.3
Promotion	78	42.2
Direct Marketing	34	17.5
Advertising	107	55.2
Transactions	73	37.6
Public Relation (PR)	62	32.0
Customer Services and Support.	149	76.8

Respondents were asked to indicate the EC application used by the electronic manufacturing companies is Malaysia. For this study twelve activities were considered and they are as follows:

Off all the respondents more than 99% (99.5%, 193 companies) indicated e-mail as the main activities used by them. 97.9% (190 companies) respondents indicated that, they were using Internet based EC for seeking information purposes. A total 149 company (76.8%) indicated were using EC for customer service and support purposes. The 28.9% (56 companies) used EC for buying raw materials from other businesses or suppliers. Out of 194 companies 41 companies (21.1%) used both for selling and transactions purposes. Total 107 companies of 55.2% used EC as a medium of advertising their goods. Out of 194 companies, 78companies used EC as a tool for promotion of goods (42.2%). Followed by 40.7% (79 companies), 37.6% (62 companies), 27.3% (53 companies) and 17.5% (34 companies) used EC for procuring, public relations (PR), distribution and direct marketing purposes, respectively.

Major benefits in different demographic groupings: Here, the outcome of the "t" tests on the major benefits in different demographic groupings is presented. The purpose of this analysis is to investigate if there is a significant difference between the major benefits to adopt EC in Malaysian electronic manufacturing companies between different demographic groupings.

Difference of major Benefits according to the years of Internet experience: Table 3 shows the results of means and standard deviations and the t value of differences in means between groups using Internet for less than five years and more than five years for major benefits.

From the result, it appears that all the t values of major benefits are less than the critical t value indicating that there are no significant differences between respondents using Internet for less and more than five years, at critical t value of 1.960 for the sample size of 194 and a 95% confident level.

Since to date the Internet, to date has invaded almost every aspects of communication. Particularly it can replace or supplement everything form television to telephone[23]. The Internet, in a very short period of time has proven to be a more powerful resource for business information.

Table 3: Results of t tests for difference of major benefits of adopting EC between those using the Internet for less than seven years and more than seven years

Benefits	Years of Internet experience	N	Mean	SD	t value
Ability to reach globally	Less than 7 years	130	4.2154	.7572	-1.149
	Above 7 years	64	4.3438	.7393	
No time barriers	Less than 7 years	130	4.1154	.6180	-1.074
	Above 7 years	64	4.2188	.6539	
Enhance Image	Less than 7 years	130	3.1231	1.0193	-.112
	Above 7 years	64	3.1406	1.0369	
Low cost communication	Less than 7 years	130	4.0231	.8395	-.194
	Above 7 years	64	4.0469	.7222	
Direct link with customers and suppliers	Less than 7 years	130	3.8615	.8045	-.344
	Above 7 years	64	3.9063	.9380	
Future business tool	Less than 7 years	130	3.9077	1.0149	.009
	Above 7 years	64	3.9063	1.0498	

Source: Computed from Survey Data

Differences in major benefits according to the years of manufacturing experience: Table 4 displays the results of means, standard deviation and t values of differences in means between respondents producing electronic goods for less than and above seven years for major benefits.

In this regard, it appears that all the t values of major benefits are less than the critical t value indicating that there is no significant difference between respondents producing electronic goods for less than and more than seven years, at critical t value of 1.960 for the sample of 194 and a 95% confident level.

However, it shows that there less than seven years and above seven years groups and display a greater than critical t value (1.960) on enhance image and low cost communication, which signifies significant difference for the benefits of enhance image and low cost communication. This may due to the fact that large portion of respondents of this study is in this group (139 respondents) and they found that Internet based EC is a low cost communication medium, where many companies are using it to advertise their products and services[24].

Table 4: Results of t tests for difference of major benefits of adopting EC between those groups producing electronic goods for less than seven years and more than seven years

Benefits	Years of manufacturing experience	N	Mean	SD	t value
Ability to reach globally	Less than 7 years	55	4.3273	.7214	.810
	Above 7 years	13	4.2302	.7643	
		9			
No time barriers	Less than 7 years	55	4.1091	.6851	-.561
	Above 7 years	13	4.1655	.6090	
		9			
Enhance Image	Less than 7 years	55	3.3636	1.0249	2.028
	Above 7 years	13	3.0360	1.0101	
		9			
Low cost communication	Less than 7 years	55	4.2545	.7750	2.478
	Above 7 years	13	3.9424	.7964	
		9			
Direct link with customers and suppliers	Less than 7 years	55	3.9273	.8575	.525
	Above 7 years	13	3.8561	.8475	
		9			
Future business tool	Less than 7 years	55	3.7273	1.0795	-1.545
	Above 7 years	13	3.9784	.9961	
		9			

Source: Computed from Survey Data

Difference in major benefits between Small-scale and Large-scale industries (based on employees): Table 5 displays the result of means and standard deviations and t value of difference between small-scale and large-scale industries for major benefits.

It appears that all the t values of variables are less than critical t value indicating that there is no significant difference between small-scale and large-scale industries in relating to major benefits in adopting EC. The critical t value is considered of 1.960 for the sample size of 194 and at a 95% confidence level.

The main reason why there is no difference between small-scale and large-scale industries, because they have taken advantage of this new technology of EC business as a strategic weapon and to be more effective in their business[23].

Table 5: Results of t tests for difference of major benefits of adopting EC between small-scale and large-scale industries (based on employees)

Benefits	Type of the company	N	Mean	SD	t value
Ability to reach globally	Small-scale	123	4.2114	.7602	-1.131
	Large-scale	71	4.3380	.7357	
No time barriers	Small-scale	123	4.1545	.6009	.145
	Large-scale	71	4.1408	.6823	
Enhance Image	Small-scale	123	3.0650	1.0768	-1.145
	Large-scale	71	3.2394	.9175	
Low cost communi-cation	Small-scale	123	4.0244	.8343	-.145
	Large-scale	71	4.0423	.7452	
Direct link with customers and suppliers	Small-scale	123	3.8699	.8774	-.137
	Large-scale	71	3.8873	.8026	
Future business tool	Small-scale	123	3.9267	1.0014	.330
	Large-scale	71	3.8732	1.0681	

Source: Computed from Survey Data

Table 6: Results of t tests for difference of major benefits of adopting EC between small-scale and large-scale industries (based on annual turnover)

Benefits	Type of the company	N	Mean	SD	t value
Ability to reach globally	Small-scale	112	4.1786	.7736	-1.722
	Large-scale	82	4.3659	.7116	
No time barriers	Small-scale	112	4.1607	.5781	.289
	Large-scale	82	4.1341	.6954	
Enhance Image	Small-scale	112	3.0714	1.0285	-.914
	Large-scale	82	3.2073	1.0151	
Low cost communi-cation	Small-scale	112	4.0357	.8157	.097
	Large-scale	82	4.0244	.7852	
Direct link with customers and suppliers	Small-scale	112	3.8482	.8826	-.537
	Large-scale	82	3.9146	.8043	
Future business tool	Small-scale	112	3.9375	1.0593	.480
	Large-scale	82	3.8659	.9783	

Source: Computed from Survey Data

Difference in major benefits between small-scale and large-scale industries (based on the annual turnover): Table 6 displays the results of means, standard deviations and t values of differences in means between respondents of small-scale and large-scale industries in the electronic manufacturing companies in Malaysia.

In this regard, it appears that all the t values of major benefits are less than the critical t value indicating that there is no significant difference between respondents of small-scale and large-scale companies, at critical t value of 1.960 for the sample size of 194 and a 95% confident level. It is because both small-scale and large-scale industries seem to have similar reason for using EC. In this study, it is reported that both groups are using Internet for e-mailing, seeking information, providing customers services and support (Table 6).

CONCLUSION

This study showed that Internet communication costs, ease link with suppliers and customers, as a tool for future business, omitted of time barriers and global presence are the major factors affecting the adoption of EC in the business in Malaysia. These factors identified from the previous studies mentioned earlier in this study.

The demographic differences between years of Internet usage, years of manufacturing experience and the type of the company (both of base on employees and annual turnover) were not very evident in this study, except manufacturing experiences. This may be because the fact that the sample respondents were basically already experienced in the Internet business and thus they would have some similar experiences. However, in view of enhance image through Internet business between two groups of manufacturing experience have different thinking on benefits perceived by the manufacturing sectors. Moreover, the fact that most of the companies are using Internet for communicating purposes with their customers and suppliers. It indicated the bright future of EC adoption in Malaysia.

Malaysia is the most vibrant and promising market of Internet products and services from both the supply and demand sides. Malaysia has already considerably shifted her agriculture based economy to industry based one in order to stand the challenge of the twenty first century. The latest industrial initiative taken by the Malaysian Government after 1997 was to encourage the firms that are more knowledge-intensive than production-intensive in order to transform Malaysia into a country based on knowledge-economy (K-economy). The Multimedia Super Corridor (MSC) has, moreover, attracted much attention for the development and implementation of EC in the business. Based on the present infrastructure, characteristics and the strength Malaysia has given more priorities for EC development. Although the manufacturing industries are reluctant to use this new technology it has the greatest potential for growth of a world-scale Internet economy. Further, Malaysia is catching up to world levels of IT and

business practices. In time, Malaysia will foresee ably be advanced in all sectors of EC practices and will contribute new technologies for the world market.

Although the survey is concentrated on a particular industry and particular area in Malaysia, the results are generally consistent with previous research. The findings indicate that much still needs to be done before EC expands to the 'mass-market'.

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