

E-COMMERCE ADOPTION AMONG RETAILING MALAYSIA'S SMEs IN PERSPECTIVE OF TECHNOLOGICAL-ORGANIZATIONAL- ENVIRONMENTAL (TOE) FRAMEWORK

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Abstract

E-Commerce was an issue in Malaysia that had significant contribution towards the growth of country economic as more e-Commerce platforms were emerging in the market recently. Factors that influenced the adoption were highlighted to act as a fostering guideline for more SMEs in Malaysia to adopt e-commerce successfully in the businesses. The relationships between technological, organizational and environmental context and e-Commerce adoption

among SMEs in Malaysia were the main criterion to be determined in this research. The aim of this study was to explore the factors that influenced the e-Commerce adoption among SMEs in Malaysia in the perspective of technology-organization-environment (TOE) framework. The primary data had been obtained through questionnaire given to top management representatives (102 respondents) from random company and random categories of products or services to fill up. Location of research was retailing SMEs of services industry as it had stand for a major percentage among SMEs establishment in Malaysia, with up to 98.1% over total SMEs establishment. SPSS 20 was used for analyses. The study also pointed an important implication for e-Commerce platform vendors, especially software developer and technology consultant, as one of the results from data analysis indicated that support from technology vendors was no significance to e-Commerce adoption among retailing SMEs in Malaysia.

Keywords: *SMEs; E-Commerce; Technological, Organizational, Environmental*

INTRODUCTION

In the global business environments, small and medium-sized enterprises (SMEs) were incrementally using ICT-based electronic commerce (e-Commerce) to gain competitive advantages and access to global markets (Al-Qirim, 2003). SMEs typically showed significant contributions to the national economy, particularly in developing countries (Kotelnikov, 2007). The presence of Web 2.0 had become another channel of distribution, where it contributed to the forming of e-Commerce for businesses, especially SMEs. It was an interesting issue to probe on whether the location was still the crucial factor for businesses in promoting products or services in only physical geographic area or virtual geographic area. Large organizations had noticeably profited more than SMEs in both their improved sale and costs saving (Huff, 2000) by adopting e-Commerce in their business as additional revenue stream apart from conducting traditional brick-and-mortar physical store as more targeted customers from everywhere can always be reachable easily through the connection of Web 2.0. The top e-Commerce marketplaces in Malaysia were Lazada, Lelong.my, Zalora, Groupon, and 11street (Wong, 2015); where most of them were originated from foreign countries, mainly categorized as developed countries. Wong (2013) suggested that the internet penetration in Malaysia, Singapore and Vietnam was growing faster than world's average.

However, Sin et al. (2015) reviewed the adoption of e-Commerce in SMEs was still limited due to SMEs have different features and attributes compared with large organizations. The adoption of e-Commerce technologies by SMEs in developing countries into their business

processes (Alam and Ahsan, 2007) was due to the unfavourable social, economic, technological and political conditions that occurred in most of the developing countries (Esselaar, Miller and Esselaar, 2002). Hence, the aim of this study was to explore the factors that influenced the e-Commerce adoption among SMEs in Malaysia in the perspective of technology-organization-environment (TOE) framework. The factors that influenced the e-Commerce adoption as consequences from the research will be the determinants for SMEs as a guideline in adoption and a reference of challenges that impede the adoption process as Wong (2013) reviews Malaysia will serve as a good reference point for Southeast Asia countries for its multi-racial population, and also by having balanced market size and expansion potential.

LITERATURE REVIEW

E-Commerce

E-Commerce was one of major achievement of the application of ICT on economic grounds (Jahanshahi, Zhang and Brem, 2013). Ghamdi, Alfarraj and Bahaddad (2014) assumed that e-Commerce was made equivalent to electronic business (e-business). Nonetheless, Laudon et al.(2009) argued that there was point of difference between e-Business and e-Commerce, such as e-Commerce was a subset of e-business that supported profitable business relationships and created effective external interactions with customers, and suppliers; whereas e-Business covered e-Commerce and internal processes such as production, inventory, and risk management. Damanpour (2001) highlighted e-Commerce as any “net” business activity that transformed internal and external relationships to create value and exploit market opportunities driven by new rules of the connected economy. Kinder (2002) affirmed a more meticulous definition by stating e-Commerce as a system with purpose or processes of search, assessment and transactions, including post-transaction interactions, enabled and supported by ICT.

Business-to-Consumer Commerce (B2C)

According to Laudon et al. (2009), types of ecommerce were business-to-consumer (B2C), business-to-business (B2B), consumer-to-consumer (C2C), peer-to-peer (P2P), and mobile-commerce (M-commerce) which is paralleling to Van Slyke, Belanger and Comunale (2004).B2C commerce were the focus context of this research in probing of e-Commerce adoption in Malaysia. Previous studies had revealed that B2C commerce as a form of selling and buying between individual consumers and organization, with the reference to an online business, using similar concepts like product catalogues without the intermediary of sales personnel of the business on web-based platform(Van Slyke, Belanger and Comunale, 2004; Laudon et al., 2009; Casadesus-Masanelland Ricart, 2010).

E-Commerce Adoption by Retailing SMEs

According to Mahroeian (2012), the appearance of internet's World Wide Web (www) became the prime driver of modern e-Commerce that was a crucial source of competitive advantage for most business organizations, especially SMEs businesses. In the global business environments, SMEs were incrementally aware of the benefits and usage of ICT-based e-commerce to gain competitive advantages in order to access to global markets (Kotelnikov, 2007; Hajli, Sims and Shanmugam, 2014). Wide spreads of internet usage and ICT with intangible systems and services available enabled businesses to compete in two worlds today, which were physical world and virtual world (Wu and Wu, 2015). Concluding the prior researches, adoption of internet-based (ICT) by SMEs received overwhelming research attention all over the world (Tan et al., 2010) due to the abundant advantages of e-Commerce adoption. A shortage of research in e-Commerce adoption in developing countries was yet to be crammed (Hajli, Sims and Shanmugam, 2014).

Conceptual Theory- TOE Framework

Tornatzky and Fleischer (1990) TOE framework emphasized three principle contexts such as technology, organization and environment contexts which will affect the process of an organization adopted and accepted a new technology. Numerous studies showed that TOE framework was consistent with the Rogers' (1983) diffusion of innovation (DOI) theory as it focused on both internal and external characteristics of the organization, as well as technological characteristics in study of drivers for new technology diffusion (Ghobakhloo et al., 2011; Sin et al. 2015).

Technological Context & E-Commerce Adoption

Technology context included both internal and external technologies which comprised of available technologies in the firm and existing technologies in the market in point of views of perceived relative advantage and perceived ease of use in parallel to Roger's (1983) Diffusion of Innovation (DOI) theory and Davis's (1989) Technology Acceptance Model (TAM) respectively will be examined throughout the research. Technological context had been concluded to have a positive relationship with adoption e-Commerce (Sin et al., 2015). By summarizing Al-Qirim (2006); Hajli, Sims and Shanmugam (2014) and Clegg (2015), the relative advantage was found to be positively related e-Commerce adoption in SMEs in consistent with Rogers' (1983) DOI model and Davis' (1989) TAM. Perceived compatibility supported by DOI model (Ghobakhloo et al., 2011). Thus, technological context under this research will focus on

the perceived relative advantage, compatibility and cost used towards e-Commerce adoption among retailing SMEs in Malaysia will be reviewed.

According to Rogers' (1983), perceived relative advantage was defined as the degree to which an innovation was perceived as better than the idea it overruled where the adoption rate will be more rapid if the relative advantage of an innovation was perceived to be greater.

Rogers' (1983) defined compatibility as the degree to which an innovation was perceived as being consistent with the existing values, past experiences, and needs of potential adopters. E-Commerce compatibility in this research can be defined as the extent to which e-Commerce is consistent with the existing technology infrastructure, culture, values, and preferred work practices of the company (Beatty et al., 2001). This is also supported in a research by Sam & Hoshino (2013).

The expenses of purchasing e-commerce related software, hardware, expenditure on start-up costs, training and maintenance cost were considered as sub-element under technological context in e-Commerce adoption (Ghobakhloo et al., 2011; Sin et al., 2015).

Organizational Context & E-Commerce Adoption

Organizational context referred to the characteristics and resources of the firm, including the firm's size, degree of centralization, degree of formalization, managerial structure, human resources, amount of slack resources, and linkages among employees (Tornatzky and Fleischer, 1990). Mahrooian (2012) examined organizational readiness strongly influenced e-Commerce implementation with aspects based on managerial support and financial, logistical, and technological factors to adopt e-Commerce in SMEs in Malaysia. The aspects of information intensity, CEOs' information system knowledge, CEOs' innovativeness and business size of the organization will be in lateral to previous studies that summarized these to positive related to e-Commerce adoption in SMEs (Al-Qirim, 2006; Ghobakhloo et al., 2011; Sin et al., 2015).

Information intensity was defined as the degree of presented information to the business regarding the products and services (Ghobakhloo et al., 2011).

The technical knowledge and application knowledge on e-Commerce activities were important when considering e-Commerce adoption. If firms had these related technical strengths and knowledge, they were more likely to adopt e-commerce (Li and Xie, 2012). Management executive of an organization indeed played a critical role in decision-making (To and Ngai, 2007), it was relevant that the executives of information system knowledge-rich from an organization had paramount effects on decision for e-Commerce adoption.

Innovative CEOs would prefer to apply distinctive and risky solutions such as information system that modified the structure in which the problems generated services (Ghobakhloo et al.,

2011). Al-Qirim, (2006) and Ghobakhloo et al. (2011) found CEO's innovativeness and involvement was significant to the e-Commerce adoption in SMEs.

Business size was definable by turnover and, or number of employees was one of the most important determinants of IS adoption as it was one of the factors that favoured e-Commerce activities likely to occur (Ghobakhloo et al., 2011).

Environmental Context & E-Commerce Adoption

The statement of environmental context by Tornatzky and Fleischer (1990) included the size and structure of the industry, the firm's competitors, the macroeconomic context, and the regulatory environment. Environment context was described as arena in which a company or organization carried out its business, involving its industry's buyers and suppliers, pressure from competitors and regulations by government (Sin et al. 2015). In aspect of Malaysia context, environmental context that will be counted in the research was pressure from competition, buyer or supplier pressure, and technology support from vendors which included those e-Commerce marketplace providers.

Competition seems to be a driven factor of e-Commerce adoption in an organization (Al-Qirim, 2006). Grandon and Pearson (2004) reviewed that external context of e-Commerce adoption on SMEs was assessed through competition.

According to Clegg (2015), business partners and customers were able to generate a crucial mass of e-Commerce adopters and encouraged more sophisticated e-Commerce applications because of either perceived benefits or fear of market displacement.

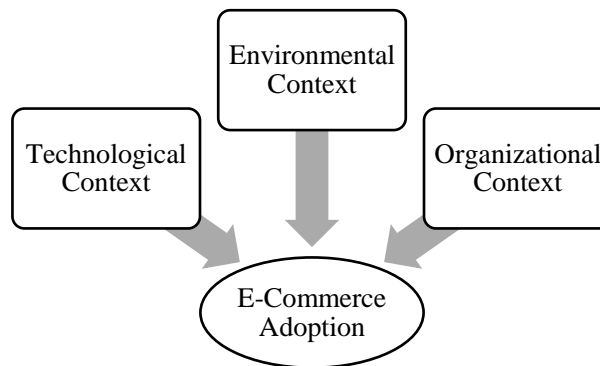
Technology vendors helped organisations to develop the capability in order to solve their problems and reach a rewarding application of e-Commerce by providing end user support on the use of e-commerce and assisted organizations to be more alerted to change (Clegg, 2015).

Hypothesis

H₀: There is no relationship between technology, organizational and environmental contexts and the e-Commerce adoption among retailing SMEs in Malaysia.

H₁: There is positive relationship between technology, organizational and environmental contexts and the e-Commerce adoption among retailing SMEs in Malaysia.

Figure 1: Research model for e-Commerce adoption among retailing SMEs in Malaysia



The objective of this research study is to explore the factors that influenced the e-Commerce adoption among SMEs in Malaysia in the perspective of technology-organization-environment (TOE) framework.

METHODOLOGY

The relationship between technological, organizational and environmental context and e-Commerce adoption among SMEs in Malaysia was the main criterion that researcher needed to explore in this research. Researcher needed to gather information on whether the technological, organizational and environmental contexts had positive relationship on e-Commerce adoption among retailing SMEs in Malaysia. Research design that being used in the research was descriptive research where a questionnaire was prepared for respondents in order to understand the firm's ecommerce adoption level. The primary data had been obtained through questionnaire where the questionnaire had been given to top management representatives (102 respondents) from random company and random categories of products or services to fill up. Location of research was retailing SMEs of services industry as it had stand for a major percentage among SMEs establishment in Malaysia, with up to 98.1% over total SMEs establishment. Cross-sectional studies were involved in the research where researcher collected data from companies of different major categories of retail in industry at random.

ANALYSIS AND DISCUSSION OF RESULTS

Chi-Square tests was used to indicate the relationship between the independent variable, technological context (TTC) which was represented by its sub-elements such as perceived relative advantages (TPA), compatibility (TCM), and cost (TC); organizational context (TOC) which was represented by its sub-elements such as information intensity (TIT), CEO's

information system knowledge (TIK), CEO's innovativeness (TCI), and business size (TBS); environmental context (TEC) which was represented by its sub-elements such as competition (TCT), buyer or supplier pressure (TBSP), and technology support from vendors (TTS); and the dependent variable, e-Commerce adoption by retailing SMEs in Malaysia (TDV).

Table 1: Chi-Square test of Technological, Organizational and Environmental Context and E-Commerce Adoption

	Value	Asymp. Sig. (2-sided)
Pearson Chi-Square(TTC- TDV)	294.008	0.010
Pearson Chi-Square (TOC- TDV)	291.684	0.000
Pearson Chi-Square (TEC- TDV)	244.271	0.018
N of Valid Cases	102	

As shown in the table above, they were analysed with a total of 102 cases through Chi Square Tests to figure out the relationship between TTC, TOC, TEC and TDV. The Sig. value needed to be 0.05 or smaller in order to be significant. In this case, the value of the sig. value of TTC and TDV, TOC and TDV, and TEC and TDV were 0.010, 0.000, and 0.018 were smaller than the 0.05, so they can be concluded that the result were significant. They provided strong evidences to against the null hypothesis.

Table 2: Model Summary of Technological, Organizational and Environmental Context and E-Commerce Adoption

Mode 1	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.370	0.137	0.110	0.47157
2	0.703	0.494	0.474	0.36271
3	0.183	0.034	0.004	0.49893

As shown in the table above, it can be concluded that the coefficient of determination (R Square) for TTC and TDV was 0.137, which was 13.7% of variance in e-Commerce adoption by retailing SMEs in Malaysia by perceived relative advantages, compatibility, and cost; the R Square value for TOC and TDV was 0.494, the R Square value for TEC and TDV was 0.034.

The remaining percentage for TTC and TDV was 86.3% (100% - 13.7%);the remaining percentage for TOC and TDV was 50.6% (100% - 49.4%);the remaining percentage for TEC and TDV was 96.6% (100% - 3.4%). These meant that the other sub-elements related to

technological, organizational and environmental contexts which were unconsidered in the research in e-Commerce adoption by retailing SMEs in Malaysia.

Table 3: Coefficients Analysis of Technological, Organizational and Environmental Context and E-Commerce

Model	Sig.	Model	Sig.	Model	Sig.
1 (Constant)	0.000	2 (Constant)	0.000	3 (Constant)	0.000
TPA	0.010	TIT	0.476	TCT	0.448
TCM	0.685	TIK	0.000	TBSP	0.885
TC	0.166	TCI	0.899	TTS	0.108
		TBS	0.578		

If the significant value of coefficient was greater than 0.05, the independent variable has no relationship to the dependent variable. According to the analysis, only TPA from the technological context and TIK from the organizational context were significant related to the technological, organizational and environmental context in e-Commerce adoption by retailing SMEs in Malaysia, as the value were less than 5% of level of confidence. TCM and TC from the technological context, TIT, TCI and TBS from the organizational context, and TCT, TBSP, and TTS from the environmental context were found not significant in e-Commerce adoption, as their significant value were relatively higher than 5% of confidence level.

Table 4: Summary of independent variables and respective significance level

Independent Variables	Sig. (p value)
TTC	0.010
TOC	0.000
TEC	0.018

In order to determine whether the H_0 or H_1 should be accepted, Chi-Square tests were employed. The Asymp. Significant (2-sided), p value from the Chi-Square tests was used in the determination of acceptance or rejection of H_1 , vice versa. For instance, if the p value of the independent variable was smaller than the confidence level at 0.05, H_0 was rejected whereby H_1 was accepted, and vice versa. In a nutshell, technological, organizational and environmental contexts had its influence with relationship existed in e-Commerce adoption among retailing SMEs in Malaysia.

CONCLUSION

In conclusion, the data were collected from 102 respondents from retailing SMEs in Malaysia, whom had direct interaction with e-Commerce activities over their business. It was analysed that the context of technological, organizational and environmental had positive direction of relationship with e-Commerce adoption, with their significant value lower than 0.05. This research had introduced the essential of factors that affecting e-Commerce adoption. Researchers could benefit from the research's results and hence, they could further propose more appropriate sub-elements and influences to investigate the extent of e-Commerce adoption. Researchers were advised to stay focus on certain factors in this research, such as perceived relative advantage, and CEO's information system knowledge while conducting future research in the context of Malaysia.

The study also pointed an important implication for e-Commerce platform vendors, especially software developer and technology consultant, as one of the results from data analysis indicated that support from technology vendors was no significance to e-Commerce adoption among retailing SMEs in Malaysia. This inhibited the growth of e-Commerce in Malaysia as technology vendors are seems not active enough in promoting their services. Proactively promoting e-Commerce by vendors could lead to more exposure of potential benefits of adopting e-Commerce among SMEs. It was important and essential for e-Commerce technology provider educated and promoted the advantageous of e-Commerce adoption over business nature through different marketing ways, such as educational talk, and valuable incentives.

Researcher recommended future researcher to narrow down the sub-elements of each context into lesser, according to the significance results from this research. It was important to note that appropriate sub-elements could be add up into the context of TOE framework in future research to review e-Commerce adoption in more perspectives. Researcher also recommended future researcher to enlarge sample size of respondents group according to sample size table developed by Krejcie and Morgan (1970) to improve accuracy of results that is able to represent the whole nation.

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REFERENCES

- Al-Qirim, N. 2006. The Adoption of e-Commerce Communications and Applications Technologies in Small Businesses in New Zealand. IEEE International Conference on Computer Systems and Applications, 2006.
- Alam, S.S. and Ahsan, M.N. 2007. ICT adoption in Malaysian SMEs from services sectors: preliminary findings", *Journal of Internet Banking and Commerce*, Vol. 12 No. 3, pp. 1-11.
- Casadesus-Masanell, R. and Ricart, J. 2010. From Strategy to Business Models and onto Tactics. *Long Range Planning*, vol. 43, no. 2 and no. 3, pp. 195-215.
- Clegg, S. 2015. A stage-oriented model (SOM) for e-commerce adoption: a study of Saudi Arabian organisations. *Journal of Manufacturing Technology Management*, vol. 26, no. 1, pp. 2-35.
- Davis, F. 1989. A technology acceptance model for empirically testing new end-user information systems, pp. 319-339.
- Damanpour, F. 2001. E-Business E-Commerce Evolution: Perspective and Strategy. *Managerial Finance*, vol. 27 no. 7, pp. 16-33.
- Esselaar, P., Miller, J. and Esselaar, M. 2002. Towards Electronic Commerce in Africa: A Perspective from Three Country Studies. *The Southern African Journal of Information and Communication*, vol. 2, no. 1.
- Ghamdi, R., Alfarraj, O. and Bahaddad, A. 2014. How Retailers at different Stages of E-Commerce Maturity Evaluate Their Entry to E-Commerce Activities? *Journal of Computer Science and Information Technology*, vol. 2, no. 2, pp. 37-71.
- Ghobakhloo, M., Arias Aranda, D. and Benitez Amado, J. 2011. Adoption of e-Commerce Applications in SMEs. *Industry Management & Data Systems*, vol. 111, no. 8, pp. 1238-1269.
- Grandon, E. and Pearson, J. 2004. Electronic Commerce Adoption: An Empirical Study of Small and Medium US Businesses. *Information & Management*, vol. 42, no.1, pp 197-216.
- Hajli, N., Sims, J. and Shanmugam, M. 2014. A Practical Model for Ecommerce Adoption in Iran. *Journal of Ent Info Management*, vol. 27, no. 6, pp. 719-730.
- Huff, S. 2000. *Cases in Electronic Commerce*. Boston: Irwin/McGraw-Hill.
- Jahanshahi, A., Zhang, S. and Brem, A. 2013. E-commerce for SMEs: Empirical Insights from Three Countries. *Jrnl of Small Bus Ente Dev*, vol. 20, no. 4, pp. 849-865.
- Kinder, T. 2002. Emerging E-Commerce Business Models: An Analysis of Case Studies from West Lothian, Scotland. *Euro Jrnl of Inn Mnagmnt*, vol.5, no. 3, pp.130-151.
- Kotelnikov, V. 2007. Small and medium enterprises and ICT. [online] Available at <http://www.apdip.net/publications/iespprimers/eprimer-sme.pdf> [Accessed 12 Dec. 2015].
- Laudon, K., Traver, C. and Interactive, A. 2009. *E-Commerce*. 5th ed. Pearson.
- Li, P. and Xie, W. 2012. A Strategic Framework for Determining e-Commerce Adoption. *Journal of Technology Management in China*, vol. 7, no. 1, pp. 22-35.
- Mahroeian, H. 2012. A Study on The Effect Of Different Factors On Ecommerce Adoption Among SMEs Of Malaysia. *Management Science Letters*, vol. 2,no. 7, pp. 2679-2688.
- Sam, MFM and Hoshino, Y (2013). Performance of ICT Industry in Six Asian Countries. *International Journal of Business Administration*, vol. 4, no. 6, pp. 96-119
- Sin, K., Osman, A., Haji-Othman, Y. and Safizal, M. 2015. E-Commerce Adoption among Small and Medium Enterprises (SMEs) in Northern State of Malaysia. *MJSS*, vol. 6, no. 5, pp. 37-43.
- Tan, K., Chong, S., Lin, B. and Eze, U. 2010. Internet based ICT adoption among SMEs. *Journal of Ent Info Management*, vol. 23, no. 1, pp. 27-55.

- To, M. and Ngai, E. 2007. The Role of Managerial Attitudes in the Adoption of Technological Innovations. *International Journal of Enterprise Information Systems*, vol. 3, no. 2, pp. 23-33.
- Tornatzky, L., Fleischer, M. and Chakrabarti, A. 1990. *The processes of technological innovation*. Lexington, Mass.: Lexington Books.
- Van Slyke, C., Belanger, F. and Comunale, C. 2004. Factors Influencing The Adoption of Web-Based Shopping: The Impact of Trust. *SIGMIS Database*, vol. 35, no. 2, pp. 32-49.
- Wong, C. 2013. eCommerce MILO: The Ultimate Guide to E-Commerce Statistics of Southeast Asia & Malaysia. [online] eCommerce MILO. Available at: <http://www.ecommerce-milo.com/2013/08/e-commerce-statistic-southeast-asia-malaysia.html> [Accessed 12 Dec. 2015].
- Wong, C. 2015. eCommerce MILO: Analysis on Top 10 Online Shopping Sites in Malaysia. [online] eCommerce MILO. Available at: <http://www.ecommerce-milo.com/2015/11/analysis-top-10-online-shopping-sites-malaysia.html> [Accessed 12 Dec. 2015].
- Wu, I. and Wu, S. 2015. A Strategy-Based Model for Implementing Channel Integration in e-Commerce. *Internet Research*, vol. 25, no. 2, pp. 239-261.