E-Commerce Adoption among Small and Medium Enterprises (SMEs) in Northern State of Malaysia

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Abstract

Electronic commerce (E-commerce) which is a practice of buying, selling, transferring, or exchanging goods, information or service by means of internet has established in 1994 and until now hordes of organizations have exploited the internet to handle the information and fit in e-commerce into their business processes. This study analyses the relationship between organizational context, technological context, and environmental context towards E-commerce adoption among SMEs in Northern state of Malaysia which comprise of Perlis, Kedah, Penang and Northern part of Perak. Above and beyond, this study is conducted based on survey design and descriptive research investigation. Entire numbers of respondents collected through questionnaires are 364 CEOs or managers diversified from different sectors. The research data is analyzed using frequency analysis, reliability analysis, descriptive analysis as well as multiple regression analysis.

Keywords: organizational context, technological context, environmental context, E-commerce adoption.

1. Introduction

The manifest of the internet has created huge benefits for businesses throughout the last two decades. Masses of companies have made use of the internet to handle the information and fit in e-commerce into their business processes as e-commerce has brought numerous advantages such as reduction in costs of conducting business, penetration of new customers and suppliers, product/service quality improvement, creation of new routes or directions for distribution of the products (Pham, Pham, & Nguyen, 2011). Undoubtedly, e-commerce is beneficial for nowadays economies to transfer from the labour intensive paradigm to knowledge worker paradigm which appeared to be leading trend in the future. Many companies have acquired benefits through e-commerce adoption in their firms and these benefits not only comprehended in large organizations but also in small and medium enterprises (SMEs) (Huff, 2000).

Implementation of innovation technology and its practises are very important from the view of academicians and practitioners. Nevertheless, there are only few studies that concentrate on the adoption of e-commerce in SMEs (Grandon & Pearson, 2003; Riemenschneider, Harrison, & Mykytyn, 2003; Mirchandani & Motwani, 2001). It is undeniable that SMEs play a vital role in both developing and developed country and that e-commerce has generated a number of possible advantages. However, unexpectedly, SMEs adoption of e-commerce still limited owing to the reason that SMEs have different features and attributes compared with large organizations. The aim of this study is to determine the trend of e-commerce applications and the factors that influence the e-commerce adoption by SMEs. The factors that will be determined are crucial to the success of the adoption. Current or new business owners can focus on these factors so that they can assure the possibility of adoption and acquire benefits and conquer the challenges through the implementation of e-commerce.

2. Literature Review

2.1 Tornatzky and Fleischer (1990) OTE model

Tornatzky and Fleischer (1990) OTE framework emphasizes that three principle contexts which consist of organization, technology and environment contexts will affect the process by which an organization adopts and accepts a new technology. In general, organizational context is classified in term of numerous aspects such as firm size and scope, the centralization, formalization, complication of administrative organization, features of human resource as well as inadequate quantity of resources available while in the technology context, both internal and external technologies which comprise of available technologies in the firm and existing technologies in the market will be examined. Environment context is described as arena in which a company or organization carried out its business, involving its industry, competitors, government etc.

2.2 E-commerce

Jessup and Valacich (2006) defined E-commerce as "The utilization of Internet technologies to sustain commerce"; Drucker (2002) added that E-commerce is intensely changing market, industry organization, economies, products and services and it brings about huge influence on societies as well as politics while Schulze and Baumgartner (2001) defined e-commerce as "Purchasing and selling products or services over Internet". There are six types of E-commerce according to Turban, Lee, King and Chung (2000) and it is anticipated that Business- to- Business E-commerce (B2B) and Business- to- Customer (B2C) E-commerce dominate the major two among total categories of E-commerce. E-commerce adoption can be directly and indirectly influenced by organizational context (Lind, Zmud & Fischer, 1989; Alpar & Reeves, 1990; Thong & Yap, 1995; Rai & Patnayakuni, 1996; Mehrtens, Cragg & Mills, 2001; Seyal & Rahman, 2003; Wu, Mahajan & Balasubramaniam, 2003; Lertwongsatien & Wongpinunwatana, 2003; Elmazi, Vukaj, Gega & Elmazi, 2011), technological context (Soh et al., 1997; Thong, 1999; Seyal & Rahman, 2003; Lertwongsatien & Wongpinunwatana, 2003; Elmazi, Vukaj, Gega & Elmazi, 2011), environmental context (Lertwongsatien & Wongpinunwatana, 2003; Elmazi, Vukaj, Gega & Elmazi, 2011).

2.3 Organizational context and E-commerce adoption

Organizational factors were the most regularly used factors to investigate the effect on the decision of innovation adoption. Various studies investigated the factors under organizational context for example organizational size, centralization as factors of innovation adoption. The researches about innovation adoption in SMEs mainly used only organizational size to figure out its relationship to innovation adoption. (Lertwongsatien & Wongpinunwatana, 2003; Seyal & Rahman, 2003; Thong, 1999). Majority of the preceding researchers exhibited that organizational context had positive relationship with E-commerce adoption (Lind, Zmud, & Fischer, 1989; Alpar & Reeves, 1990; Thong & Yap, 1995; Rai & Patnayakuni, 1996; Mehrtens, Cragg & Mills, 2001; Mirchandani & Motwani, 2001; Wu, Mahajan, & Balasubramaniam, 2003; Lertwongsatien & Wongpinunwatana, 2003; Lip-Sam & Hock-Eam, 2011; Elmazi, Vukaj, Gega & Elmazi, 2011 and Shah Alam, Ali & Mohd Jani, 2011). Thus, hypothesis is proposed as below:

H₁: There is a positive relationship between organizational context and E-commerce adoption among SMEs in Northern state of Malaysia.

2.4 Technological context and E-commerce adoption

Technologies are apparently one of the main features that have influence on the decision to adopt innovation system. Five innovation elements which consist of relative advantage, complexity, compatibility, observability and triability that have influence on organizational innovation adoption was identified by Rogers (1962). On the other hand, Tornatzky and Klein (1982) studied using the five innovation elements and observed that attributes of relative advantage, compatibility and complexity possessed more influence on innovation adoption than the other two attributes which are observability and triability. There are numerous variables associated with technological context for instance network security issues (Doherty & Fulford, 2006; Jones & Beatty, 1998), expenses of purchasing e-commerce related software, hardware, and expenditure on system amalgamation, preliminary start-up costs etc. Throughout the prior studies that have been conducted, it illustrated that there was a positive relationship between technological contexts with the implementation of

E-commerce (Thong, 1999; Mirchandani & Motwana, 2001; Lertwongsatien & Wongpininwatana, 2003; Grandon & Pearson, 2003; Mac Gregor & Vrazalic, 2008; Gilaninia et al., 2011; Elmazi, Vukaj, Gega & Elmazi, 2011; Shah Alam, Ali & Mohd Jani, 2011; Wanyoike, Mukulu & Waititu, 2012; Saffu, Walker & Mazurek, 2012).

H₂: There is a positive relationship between technological context and E-commerce adoption among SMEs in Northern state of Malaysia.

2.5 Environmental context and E-commerce adoption

Environmental context is considered as external factors and it is defined as the arena in which a company carried out its business (Tornatzky & Fleischer, 1990). Innovation adoption is possible when the organizations encounter difficulty and swiftly shifting environment (Pfeffer & Leblebici, 1977). By referring Premkumar and Roberts (1995), features of environmental context that include competitive pressure, buyer's and supplier's pressure and support from technology vendor may affect the adoption of e-business. Previous studies also examined that the determinants of innovation adoption includes information and competition intensity (Grover, 1993; Thong, 1999; Zhu, Kraemer, & Xu, 2003; Lertwongsatien & Wongpinunwatana, 2003). Other external factors for instance varying customer needs, government law and regulation, competition and rapid changing technologies will also induce the organization to adopt innovation system (Ungan, 2004). Majority of the previous researchers exhibited that environmental context had positive relationship with E-commerce adoption for instance Lertwongsatien and Wongpinunwatana (2003), Grandon and Pearson (2004), Lip-Sam and Hock-Ean (2011), Elmazi, Vukaj, Gega and Elmazi (2011) as well as Saffu, Walker and Mazurek (2012). Based on research carried out by Lertwongsatien and Wongpinunwatana (2003) in Thailand, it divulged that E-commerce adopters are probable to espouse innovate system if they are in intense surrounding atmosphere.

H₃: There is a positive relationship between environmental context and E-commerce adoption among SMEs in Northern state of Malaysia.

3. Research Methodology

The proposed research method involved a survey of CEOs or managers among small and medium enterprises (SMEs) in Northern state of Malaysia to investigate how organizational context, technological context and environmental context influence E-commerce adoption among SMEs. Quantitative research is selected in this study as it is vital in the aspects that it can examine pre-detailed concepts, paradigms and hypothesis that constitute a theory and provide arithmetic data to further demonstrate the result of the research. The appliance selected for this particular study is solely focuses on questionnaires seeing that the questionnaire method is more comprehensive and it is applicable in this study in order to obtain relevant data to testify the hypothesis of the study. Therefore, a self-structured questionnaire would be distributed to CEO or manager in SMEs of Northern state of Malaysia to gather the essential primary data. Probability sampling which is simple random sampling will be adopted in this study as it has slightest bias and tenders the most generalizability. The questions are categorized and structured under the independent variables discussed in the literature review. Over half of the items used in this questionnaire are therefore specifically developed for this study based on literature in research journals, newspaper and article in magazine. Subsequently, the questionnaires were distributed to potential respondents by researcher via electronic interface which is e-mail chiefly. However, in order to collect additional response surveys from respondents, a quantity of the questionnaires were distributed personally by researcher to the respondents. Furthermore, there were a number of optimistic feedbacks acquired through social media channel for instance Facebook. In order to achieve sample size suggested by Cavana, Delahaye and Sekaran (2011), more than 300 questionnaires were sent out for this research.

Figure 1: Theoretical Framework

4. Analysis & Findings

A total of 364 questionnaires were distributed and only 283 questionnaires were collected. Overall, the response rate is about 77.75% and it is predicted that the non-response reasons might be due to technical failure while delivering questionnaire to the respondents, the server error of respondents' domain or the e-mail account that author tried to reach does not exist anymore and so on. Among 283 respondents, 163 (57.6%) are males while 120 (42.4%) are females. Data also supported a findings that more than half of respondents which is approximately 58.3% do not own their company website while there are only 41.7% which is 118 respondents possess their own company website.

4.1 Descriptive Statistics

Table 2 shows the mean for all variables which ranged between 1.8409 and 3.0313. Mean for organizational context is 2.8281, technological context is 2.9844, environmental context is 3.0313 and the extent of E-commerce adoption is 1.8409, indicates the respondents average agreed with the questions in general in terms of organizational context, technological context and environmental context. Conversely, for the extent of E-commerce adoption, majority of the respondents are not at all used or occasionally using the E-commerce in their organization.

Table 2: Descriptive Analysis

Variables	Mean	Standard Deviation
Organizational context	2.8281	1.01537
Technological context	2.9844	0.62119
Environmental context	3.0313	0.50775
The extent of E-commerce Adoption	1.8409	1.00735

From Table 2, it can also be seen that the value of standard deviation for organizational context is 1.01537, which is large from mean value which reveals that standard deviation value for organizational context less concentrate or being modest. It is added that standard deviation value for the extent of E-commerce adoption is large as well from mean value which is 1.00735. It demonstrates that the data is less concentrate or moderate. In the meantime, standard deviation for technological context is 0.62119 and environmental context is 0.50775. For that value, responses from respondents are acknowledged as concentrated as the values are smaller from mean value.

4.2 Reliability Analysis

The number items of each variables and the Cronbach Alpha were showing in Table 3. In this study, any item that was not significant will be deleted in order to obtain the highest reliability of the measurement. Regarding Sekaran (2009), the nearer the figure of reliability coefficient to 1.00, the better the appliance generally whereas reliability over 0.80 is good and those less than 0.60 is measured to be poor.

Table 3: Reliability Analysis

Variables	Number of Items	Cronbach Alpha
Organizational context	8	0.986
Technological context	8	0.968
Environmental context	4	0.833
The extent of E-commerce Adoption	11	0.967

Thus, all variables were accepted according to Table 3, which ranging from 0.833 to 0.986 which the first independent variable (Organizational context) obtained the highest reliability coefficient.

4.3 Regression Analysis

As shown in Table 4, the standard coefficient is 0.451 for organizational context, technological context is 0.240, and environmental context is 0.083. The value of R-Square indicates that 50.2% of the variance in the extent of E-commerce

adoption can be predicted from the variables of organizational context, technological context as well as environmental context.

Table 4: Regression Analysis (Dependent variable: The extent of E-commerce adoption among SMEs)

Serial	Independent Variables	Beta	Significance value (Sig.)
1	Organizational context	0.451**	0.000
2	Technological context	0.240**	0.000
3	Environmental context	0.083	0.159
<div style="display: flex; justify-content: space-between;"> <div> $R^2 = 0.502$ Adjusted $R^2 = 0.497$ F Change = 93.889 Sig. = 0.000^b </div> <div> } Model Summary } ANOVA^a </div> </div>			

Meanwhile, the p-value is compared with the alpha value (normally 0.05) and if small, it can be presumed that the independent variable constantly expect the dependent variable. Regarding *Table 4*, it can be revealed that the two independent variables which are organizational context $p = 0.000$ and technological context $p = 0.000$ show a statistically significant relationship with the extent of E-commerce adoption among SMEs and they can be used to reliably predict the extent of E-commerce adoption among SMEs in Northern state of Malaysia while environmental context $p = 0.159$ is not significant and cannot be used to reliably predict the extent of E-commerce adoption among SMEs.

In a nutshell, organizational context and technological context have significant influence on E-commerce adoption except for environmental context.

Table 5: Summary of the Hypotheses testing results from Multiple Regression Analysis

Hypothesis	Remarks
There is a relationship between organizational context and E-commerce adoption among SMEs in Northern state of Malaysia	Supported
There is a relationship between technological context and E-commerce adoption among SMEs in Northern state of Malaysia	Supported
There is a relationship between environmental context and E-commerce adoption among SMEs in Northern state of Malaysia	Not supported

Table 5 acutely presents summary of the hypothesis testing results from Multiple Regression Analysis. The first hypothesis which is 'There is a relationship between organizational context and E-commerce adoption among SMEs in Northern state of Malaysia' is supported while second hypothesis which is 'There is a relationship between technological context and E-commerce adoption among SMEs in Northern state of Malaysia' is supported as well. Nevertheless, the third hypothesis which is 'There is a relationship between environmental context and E-commerce adoption among SMEs in Northern state of Malaysia' is not supported as the p-value is high which illustrates that the relationship between environment context and the dependent variable is less significant compared to other two independent variables that are organizational context and technological context.

5. Discussion and Conclusion

From the finding of the study (See *Table 5*), organizational context has a significant influence towards E-commerce adoption among SMEs in Northern state of Malaysia. The result was supported by previous studies conducted by Thong (1999) as well as Thong and Yap (1995) which illustrated that organizational context had an important positive impact towards organization information system adoption. Furthermore, Jantan et al. (2001) has accomplished a study to investigate the effect of organizational context on innovation adoption and discovered that CEO's technological knowledge have positive influence on adoption of Advanced Manufacturing Technology (AMT). Besides, the result showed that there is also significant influence of technological context towards implementation of E-commerce among SMEs. The outcome of this study validates prior studies which discovered that technological context was a significant forecaster for implementation of E-commerce among SMEs (Mac Gregor & Vrazalic, 2008; Shah Alam, Ali & Mohd Jani, 2011; and Wanyoike, Mukulu & Waititu, 2012).

However, the third independent variable which is environmental context cannot be used to reliability expect the dependent variable and this finding is primarily supported by research completed by Chang (2006) in Taiwan whereby it illustrated that environmental context did not considerably contribute to the model for predicting the extent of E-commerce adoption from the entire series of predictors. Furthermore, this finding is also verified by former study under OTE model

that environmental context is not significant to e-business adoption whereby the $\beta = -0.06$, $t = -0.35$, $p < 0.10$ (Suhaiza, Noorina & Yusof, 2008). It could be owing to cultural differences and Malaysian is still in conservative mindset which makes them reluctant to change (Harn, Khatibi, & Ismail, 2006).

6. Limitations and Recommendations

There are some limitations in this research including the sample size itself is relatively small and a larger sample size is desirable to accurately evaluate the perception of the SMEs in Northern state of Malaysia towards E-commerce adoption. Therefore, it is suggested that future research can be done in larger sample size that allows higher response rate for more robust statistical analyses. Moreover, another limitation of this study is the use of solitary respondent for every organization. In this case, only CEOs or managers are selected to collect the data. Though CEO is the one that has the authority to make decision in SMEs, one person's influence cannot stand for the strategy for entire organization entity. Moreover, the information given by the CEO may create self-report bias or prejudice that might influence the study findings. Parenthetically, it is suggested in future research that more models can be adopted to test the applicability of numerous models used for instance Technology Acceptance Model (TAM), Diffusion of Innovation (DIT), Theory of Planned Behaviour (TPB) or Unified Theory of Acceptance and Use of Technology (UTAUT) in order to provide more comprehensive perception between the models. Furthermore, it is also recommended that SEM can be employed in future study in order to obtain more enhanced result.

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