

Factors Influence SMEs in Malaysia to Adopt e-Commerce: Moderating Roles of Perceived Strategic Value

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Abstract: Small medium enterprises are corner stone to most of developing countries and it is widely recognized, unfortunately, e-Commerce adoption in Malaysia is low it is 28% of 965 participant involved into e-Commerce activities. This research applied framework named Technological Organizational Environmental (TOE) with four predict variables named perceived barriers, management support, organization readiness and competitor pressure to investigate the potential factors influence e-Commerce adoption among Small and Medium sized Enterprises (SMEs) in Malaysia. After apply filtering criteria, total of 200 datasets are valid and use statistical tool, smart PLS Version 2.0 M3 to generate the statistical result. Based on the result, management support, organization readiness and competitor pressures have strong influencing power to e-Commerce adoption. In this research, the R^2 value is 0.529 which is 52.9% of variance in adoption on e-Commerce can be explain with these three predict variables.

Key words: e-Commerce, SMEs, adoption, structural equation modeling, predict variables

INTRODUCTION

There are no standard definition for the term e-Commerce and it has many definition from difference perspective views from academicians, practitioners, researchers (Ghobakhloo *et al.*, 2011; Grandon and Pearson, 2004; Zakaria and Hashim, 2003). According to Philip (2003)'s e-Business definition is the use of electronic means and platforms to conduct a company's business". Napier *et al.* (2005) claimed that now a days people used to interchange the meaning of e-Business and e-Commerce, therefore he extended the scope of e-Commerce into broader sense to encompass not only the buying and selling of goods but also include delivery and exchange of information, provide customer service pre-sale and post-sale, the collaboration with business partner and the effort to improve productivity within organizations. "Although, Hashim (2009) claimed that there are many e-Commerce definitions but there are two distinct characteristics used to describe e-Commerce. First, e-Commerce performs business activities with using electronic medium such as information sharing, buying and selling. The second characteristic is technology enable these activities.

There are immerses of e-Commerce benefits literatures reviews available in developed countries. Conversely, in developing countries, people failure to reap benefits from the technology (Kshetri, 2007). e-Commerce is adopted

but from the evidence shows in developing countries, SMEs is limited to e-Commerce and website (Alam *et al.*, 2011; Grandon and Pearson, 2004; Hashim and Noor, 2014; Omar *et al.*, 2011) SMEs are looking some benefits from these technologies such as transaction capabilities enable their business. In fact, SME business owner/managers especially in developing countries still do not know and understand strategic value of e-Commerce on their businesses. Therefore, it is a worth to investigate factors influence small medium sized enterprise to adopt e-Commerce. This study would like to look into three issues to fill the gaps in the literature reviews what is the current e-Commerce adoption level which factors have influencing power to adoption. Does perceived strategic value has moderation effects on e-Commerce adoption.

Literature review: In most of the developing countries, Small Medium Enterprises (SME) performs as vital to countries economic. Similar to e-Commerce situation, there is no standard definition for SMEs for respective countries, it depends and subjective to both government and academic debate, the special circumstances of the SME sector. MacGregor and Kartiwi (2010) and Meredith (1992) any definition of SME have to include a quantitative components that makes into account staff levels, sales turnover, assets together with financial and non-financial measurements, the description must include qualitative components that reflects how the business is

organized and how it is operate. In Malaysia, SME is defined with number of employees and turnover sales. Small sized of manufacturing sector is the sales turnover from RM300,000 to <RM15 million or full-time employees from 5 to <75; medium sized of manufacturing is sales turnover from RM15 million to not exceeding RM40 million or full time employees from 75 to not exceeding 200.

In Malaysia, Small Medium Enterprise (SME) constitute the majority of the business establishments in Malaysia at 97.3% (Zainul, 2013) and they contribute about 32% of GDP and 59% of total employment. In July 2013, National SME Development Council (NSDC) had redefined new Small Medium Enterprises (SME) definition this is due to the economic change since year 2005 such as price inflation, structure change and business trend (NSDC, 2014).

Problem statement/research problem: According to the Association Chinese Chambers of Commerce and Industry of Malaysia (ACCCIM) 2012 SMEs report, there are 28% of the 965 respondents involved into e-Commerce activities, 24% of the respondents stated they are planning to have e-Commerce in future (Bernama, 2012). The level of e-Commerce adoption is low which shows that it do not reach target setting (Saleh and Ndubisi, 2006).

In the SMEs Master Plan year 2012 B 2020, the government had identified six factors to boost up SME's performance and key challenge of SMEs. innovation and technology adoption: access to national innovation system, low commercialization and R&D, poor technology take up; access to financing: limited non-banking avenues, poor credit worthiness, lack of know-how and resources legal regulatory environment: licensing and permit, complying to regulation, legislation disincentivising formation and growth; human capital development: workforce lack of readiness, low utilization of existing training, non competitive rewards and benefits; market access: procurement by government and large companies, information barriers for export, limited focus on marketing and branding, low bargaining power; infrastructures: trade clearance and facilitation system, low and infrequency trade volume (NSDC, 2014).

Alam and Noor (2009) mentioned that it is estimated about 30% of 600,000 local SMEs have website to perform activities and IT relevant daily whereas other remain unchanged. Although, many SMEs have website but they still at fundamental level they use it for communication and promoting products and services (Ang *et al.*, 2013). In the fact of report, although SMEs have company

website but some of the website are not fully functional or utilize, the usage of website is just remain corporate image and disseminate company information only but not for data transaction activities (Ang *et al.*, 2013). e-Commerce enable SMEs to gain competitive advantages but in developing countries, e-Commerce still at decisive stages (Jehangir *et al.*, 2011). In most of developing countries, the e-Commerce adoption still limited to e-Mail and website web pages (Hashim and Noor, 2014).

Mehrtens *et al.* (2001) mentioned that the organization's decision to adopt innovations is depend on numbers of factors. In any organization, the decision maker has greatest autonomy power to determine organization's future development they are business owners, Chief Executive Officer (CEO) top management or senior executive but they always encounter a dilemma of decision making either adopt or reject an innovation technologies into an organization. There are many factors influence the decision of adoption of e-Commerce for example, attitude, education background by knowing the latest technology, internal and external of organization and environmental. This study will examine various factors caused SMEs to adopt e-Commerce and derived a model that to assess organization's capability to participate into economic.

Model construction

Perceived barriers: Slow e-Commerce adoption in developing countries will lead to some technologies issue to innovative technology adoption. Perceived barriers is one of the favor studies that innovative adoption, especially in developing countries (Alam *et al.*, 2004; Hunaiti *et al.*, 2009; Kartiwi and MacGregor, 2007; Khatibi *et al.*, 2003; Kshetri, 2007).

Perceived barrier is a negative action toward innovation adoption. There are some concepts about barriers. Kshetri (2007) view barriers from three perspective view: economic, socio-politic and cognitive. Economic barriers are positive economic feedback occurs in the presence of increasing returns to scale; socio-politic barriers are in terms of formal and informal institutions of the country; political barriers are applied in an organized way by formally specific groups; cognitive barriers are factors are related to mental maps of human (individuals) and organizational decision makers". From technology's perspective view, Khatibi *et al.* (2003) listed down major technological issues related to technology adoption. Although, there are many concepts about barriers but these barriers are still remain give the negative impacts to organization.

- H₁: there is a negative relationship between perceived barriers and e-Commerce adoption

Organization readiness: Iacovou *et al.* (1995) separated organization readiness into two groups: financial and technological resources of the firm. Iacovou *et al.* (1995) defined the term of financial readiness as a financial resource for EDI to pay for installation costs, implementation of any subsequent enhancement, ongoing expenses during usage (such as communication charges, usage fees, etc.) technological readiness as a the level of sophistication of IT usage and IT management in an organization. Organization readiness reflects the organization's capability or the level of use innovative technology and skills. Organization does not has such capabilities to implement innovative technologies that show that they are low readiness. Organization has less readiness will encounter another problem when implement new innovation which required higher initial costs to support it (Wang and Tsai, 2002). Wang and Ahmed (2009) mentioned that in real business world, small organization always encounter problem to implement new innovative technology which they have insufficient financial resource, besides that small organization also experience difficulties to gain external debt or equity finance due to the market structures:

- H₂: there is a positive relationship between organization readiness and e-Commerce adoption

Management support: Management support is another favor study factor toward technology adoption. Al-Qirim (2007) mentioned that a top management support entails providing essential involvement and motivational aspect for the successful introduction of the innovation. Leaders are important because they will influence to extend of using innovative technologies and they know the role of innovative technologies (Tarafdar and Vaidya, 2006). Top manager as change agent within organization and determine company's future development. The support from managers is important too which will indirectly influence the organization to adopt. In organization, top manager perform as change agent which will influence the organization toward technology adoption. Ifinedo (2011) mentioned that if top manager is aware of the importance of technologies they will influence the team members to adopt, else vice versa. The management level also plays very important roles which they convey the technology important message to the members within the social system, hence it will reduce the technology resistance and increase the adoption level:

- H₃: there is a positive relationship between management support and e-Commerce adoption

Competitor pressure: Chong (2006) mentioned ASMEs are usually characterized by a high level of environment uncertainty that includes fluctuations in interest rates, reliability of supply and competition". Lin and Lin (2008) mentioned that competitor pressure is one of the factor reside in environment context and it also recognize as one of the factors to determine to innovation adoption. In order to gain competitor advantage in the same industries, the organization has to take some unknown technological risks and benefits from the technologies to improve their position in the market. In the perfect competitive market when the level of rivalry is getting increase (To and Ngai, 2006) and unpredictable marketing techniques from competitor, besides that products and technology also keep on changing. Outstanding performance in the competitive market, attract some focus from their respective competitor to keep an eye on their action (To and Ngai, 2006) therefore organization tend to adopt technology to keep themselves always get the latest information from the market to enhance their decision making:

- H₄: there is a positive relationship between competitor pressures and e-Commerce adoption

Perceived strategic value: There are few studies about perception members in organization on strategic value of e-Commerce (Pham *et al.*, 2010; Sutanonpaiboon and Pearson, 2006). Pham *et al.* (2010) mentioned that it is very important to understand IT's business value in organization and there is a need to formulate up a method that appropriate represent IT'S value in business context. Based on the theory, diffusion of innovation (Rogers, 1983; Sutanonpaiboon and Pearson, 2006) had formulate up the equation, perceived strategic value as summation of perceived benefits minus summation of perceived cost over time periods:

$$SV_i = \sum_{t=1}^{t=n} PB - \sum_{t=1}^{t=n} PC$$

Where:

SV = Strategic value for specific innovation

PB = Perceived benefits obtained from specific innovation

PC = Perceived costs invested into specific innovation

i = A particular innovation

t = Time

Subramanian and Nosek (2001) are first people who created an instrument to validate the strategic values that an information system may provide. There are three elements inside perceived strategic value namely.

Operational support: Reap operational efficiency benefits and aid operational strategy through cost reduction, improved customer service, improved support to operations and other related strategies.

Managerial productivity: Provide better access to information, help in the management of time, provide a means to use generic methods and models in decision making and improve communication among managers through the use of electronic calendars, electronic mail, project management tools or access to internal and external databases.

Strategic decision aid tools: Information systems support strategic decisions. Grandon and Pearson (2003a, b) had validate this instrument in two countries: Chile (Grandon and Pearson, 2003b) and US (Grandon and Pearson, 2004).

Propose model formulation: In diffusion and adoption researches, most of the theories focus on individual adoption of innovation technologies which are determined by various factors. Among these framework diffusion of innovation (Rogers, 1983) and technological organizational environmental framework (Tornatzky and Fleischer, 1990) received the most attentions. Diffusion of innovation: diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system (Alam *et al.*, 2008; Betty and Jones, 2001; Premkumar and Roberts, 1999).

Technological organizational environmental: In this framework, it contains three contexts namely, technology context organizational context and environment context used to explain the phenomena of innovation adoption (Ghobakhloo *et al.*, 2011; Ifinedo, 2011; Kuan and Chau, 2001; Oliveira and Martins, 2010; Sila and Dobni, 2012). Technological organizational environmental framework is chosen due to it is flexible framework, therefore any relevant factors have flexibility to put inside respective contexts to explore their studies. The second reason is this framework is consistence with roger's diffusion of innovation (Ghobakhloo *et al.*, 2011; Sila and Dobni, 2012). Besides that it can used for many application, such as e-Commerce, e-Business, virtual market, EDI and etc. Last but not least, it will not mislead the research because

it has three difference contexts views, compare to other framework such as technology acceptance model (Davis, 1989) which only rely on technological issues. Sutanonpaiboon and Pearson (2006) mentioned the decision to integration innovation into organization is determined by perceived strategic value that can be achieved through investment not individual's perceptions.

MATERIALS AND METHODS

Data collection and procedures: The unit of analysis is focus on manufacturing sector. The data information are retrieved from government agency, SME Corporation Malaysia and simple randomly technique to select target audiences. In order to determine the sample size for this research followed general rules of the minimum number of respondent is start from 5:1 ratio of the number of predictor variables. Joseph *et al.* (1992) stated acceptable range from 5 B 15, as a result, 10:1 ratio concept is applied in this study which same as the minimum size of sampling propose by Henseler *et al.* (2009). There are seven variables, therefore the minimum samples size requires is 70. There are 3000 self-administered questionnaires were used to collect data from respective respondents. After 160 days we had received 337 of datasets after process and applied filtering criteria (i.e., non-adopters, service sectors, incomplete questionnaires are excluded) a total of 200 datasets are valid and used for data analysis.

All questionnaires were adapted from previous literature reviews (Ainin and Noorismawati, 2003; Iacovou and Dexter, 1995; Tan *et al.*, 2010; Ifinedo, 2011; Subramanian and Nosek, 2001).

In this research, Partial Least Square (PLS) techniques of structure equation model were used. SmartPLS2.0 M3 was used for data analysis and processing the data (Ringle *et al.*, 2014). According to Ifinedo and Scotia (2012) Smart PLS Asupport two measure model the assessment of the measurement model and the assessment of the structural model. One of the advantages of using PLS techniques, it can avoid small sample size issue to process data (Henseler *et al.*, 2009).

RESULTS AND DISCUSSION

Convergent validity: Is established when the score obtained with two different instrument measuring the same concept are highly correlated. Sekaran and Bougie (2009) Table 1 shows the measurement model there are three items: factor loadings, composite reliability and Average Variance Extracted (AVE) to assess convergence validity.

Table 1: Propose model

Variable name/item	Main loading	AVE	CR
Adoption (ADT)			
ADT1	0.803	0.671	0.942
ADT2	0.814		
ADT3	0.787		
ADT4	0.834		
ADT5	0.830		
ADT6	0.832		
ADT7	0.825		
ADT8	0.828		
Competitor Pressure (CP)			
CP1	0.597	0.643	0.876
CP2	0.847		
CP3	0.886		
CP4	0.844		
Organization Readiness (OR)			
OR1	0.919	0.854	0.959
OR2	0.928		
OR3	0.930		
OR4	0.921		
Perceived Barriers (PBar)			
PBar1	0.781	0.626	0.943
PBar10	0.684		
PBar2	0.763		
PBar3	0.837		
PBar4	0.854		
PBar5	0.848		
PBar6	0.785		
PBar7	0.744		
PBar8	0.815		
PBar9	0.785		
PSV_MP1	0.840		
Managerial Productivity (PSV-mp)			
PSV_MP2	0.874	0.730	0.931
PSV_MP3	0.871		
PSV_MP4	0.838		
PSV_MP5	0.848		
PSV_OS1	0.830		
Operational Support (PSV-os)			
PSV_OS2	0.805	0.768	0.952
PSV_OS3	0.894		
PSV_OS4	0.910		
PSV_OS5	0.918		
PSV_OS6	0.896		
PSV_SD1	0.907		
Strategic Decision (PSV-sd)			
PSV_SD2	0.881	0.782	0.956
PSV_SD3	0.896		
PSV_SD4	0.911		
PSV_SD5	0.847		
PSV_SD6	0.863		
Top Management (TM)			
TM1	0.887	0.814	0.946
TM2	0.931		
TM3	0.894		
TM4	0.897		

Convergent validity is the degree to which multiple items to measure the same concept are in agreement. Joseph *et al.* (1992) stated the benchmark value for main loading value is at least 0.5 (≥ 0.5) else it will be remove from respective constructs. The second condition is the value for composite reliability must be at least 0.7 (≥ 0.7) which indicate the internal consistency of data within construct (Ifinedo and Scotia, 2012; Joseph *et al.*, 1992). The third condition is the value Average Variance Extract (AVE) must be at least 0.5 (Ifinedo and Scotia, 2012). Based on above listed guidelines, Table 1 satisfied all the stated benchmark value.

Table 2: Discriminant validity analysis

Variables	ADT	CP	OR	PBar	PSV-mp	PSV-os	PSV-sd	TM
ADT	0.819							
CP	0.533	0.802						
OR	0.570	0.429	0.979					
PBar	-0.154	0.157	-0.147	0.971				
PSV-mp	0.580	0.443	0.493	-0.026	0.854			
PSV-os	0.628	0.486	0.451	-0.015	0.780	0.877		
PSV-sd	0.607	0.443	0.433	0.032	0.847	0.791	0.884	
TM	0.697	0.433	0.610	-0.181	0.598	0.611	0.542	0.902

Table 3: Path co-efficient and hypothesis testing

Path	Beta	SE	t-values	Decision
CP->ADT	0.280	0.059	4.747	Support
OR->ADT	0.153	0.067	2.288	Support
PBar->ADT	-0.091	0.074	1.235	Not support
TM->ADT	0.468	0.064	7.330	Support
Moderation effects				
PBar×PSV-mp->ADT	0.503	0.247	2.035	Support
PBar×PSV-os->ADT	0.451	0.224	2.016	Support
PBar×PSV-sd->ADT	0.607	0.271	2.242	Support

Discriminant validity: Discriminant validity “is established when based on theory, two variable are predicted to be uncorrelated and the score obtained by measuring them are indeed empirically found to be so”. Sekaran and Bougie (2009). Table 2 displays the discriminant validity results. Ifinedo and Scotia (2012) mentioned that there are two condition must be satisfied before it is to be confirm the validity, first is the value of the AVE at least 0.5; secondly, the square root of the AVEs (the value inside diagonals) are larger than all other value either row wise or column wise. From Table 2 results show the square root of AVE range from 0.745-0.932 which fulfilled the above recommend value, therefore, we concluded the measurement model shows adequate convergent validity and discriminant validity.

Access to the model: Table 3 shows the result of the entire propose model which included path coefficient beta value (β) (the strength of relationship between independent value and dependent value) square R (R^2) and t-value (path analysis). In this research, the R^2 value is 0.579 which is 57.9% of variance in adoption on e-Commerce can be explain with top management support obtained β value = 0.468 and t-value = 7.33, organization readiness obtained β value = 0.153 and t-value = 2.288 and competitor pressure obtained β value = 0.280 and t-value = 4.747). It is surprisingly, Perceived Barriers is found not significant. Besides that interaction result are generated (refer to appendix) and found that PSV has moderation effects on perceived barriers whereas other variables do not have any impacts. Based on the result, this shows the parsimony propose model has a high predict power and useful in explaining the phenomena factors which has some influencing power to small medium enterprises to adopt e-Commerce (Fig. 1).

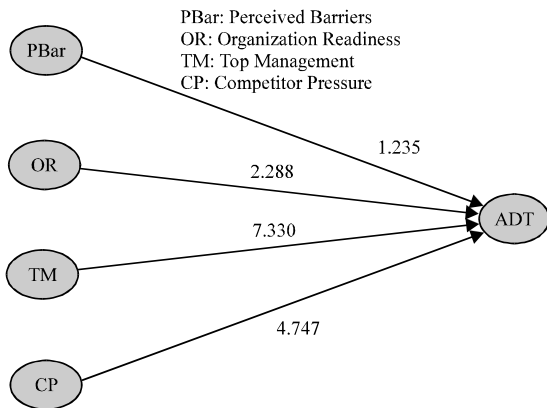


Fig. 1: Path co-efficient and hypothesis testing

This research applied Technological Organizational Environmental (TOE) framework to assess the factors influencing small medium enterprises in Malaysia to adopt e-Commerce. Based on the result, it shows that management support, organization readiness and competitor pressure are significant to adoption.

Organization readiness is significant in this research. Unlike large organization, small medium sized enterprises have limited resources such as technical and financial, therefore they are very concern the resource allocation so that the organization able to get optimize the operation which same as (Pearson and Grandon, 2005). He point out and cited (Iacovou *et al.*, 1995)'s statement that mentioned that "economic costs and lack of technical knowledge are two of the most important factors that hinder IT growth in small organizations". Management support is another significant factor in this research. The empirical data shows that the higher favor management attitude will to higher innovative adoption which same as previous literature view on management support is has some impacts to adoption (Ifinedo, 2011).

Competitor pressure also is another significant factor influence e-Commerce adoption which same as Lin and Lin (2008) mentioned that "when firms face strong competition they tend to implement more aggressively" and bear some risks to gain some competitive advantage with using e-Commerce technologies to improve their market position.

Perceived Barriers in this research is not significant. This can be explained about e-Commerce application itself, e-Commerce can be ranging from simple web presence till as complex as Electronic Data Exchange (EDI) therefore difference e-Commerce application brings difference tangibles and intangible benefits to the organization. Cho (2006) mentioned that "without clear and tangible benefits, managers will hesitate on the

issue of adoption". There are three elements in perceived strategic value, managerial productivity, operational support and strategic decision aid tools. Managerial productivity helps provide more information via various access tools to increase their productivity. However when the application tools is getting complex and complicate, it will increase the level of barriers that caused to manager hesitate to adopt innovation.

Operational support is second elements inside PSV construct. Operational Support helps reaps benefits such as improve customer services, support related business activities from operational. In Malaysia, e-mail is widely accept IS application in most of the organization (Hashim and Mat, 2012; Omar *et al.*, 2011). Saffu *et al.* (2007) mentioned that e-mail is important at early stage of adoption which link to potential clients, suppliers and in his study also proved that SME adopt e-Commerce in a set of sequential stages as Chong (2006). She mentioned that adoption as "a continuum involving a range of progressive developments and a broadening variety of applications". When the e-Commerce development are getting increase it also will increase the level of complexity issue and investment cost, hence it will reduced the favor by adoption innovation technologies.

Strategic decision is third elements in PSV construct. Strategic Decision enable IS support strategic decision and help make decision for manager. It has same scenarios to above two elements which are negative moderation effects on perceived barriers. Based on the negative moderation effects that it reveals SMEs in Malaysia are in dilemma state about technologies, although, SMEs adopt fundamental e-Commerce technologies such as website, e-Mail. In fact they are having higher expectation (Hashim and Mat, 2012) and also demand more technologies have transitive capability (Hashim and Noor, 2014).

CONCLUSION

The research objectives are achieved. The concept of PSV reveals most of SMEs encounter technology barriers when they are try to extend to the next level of e-Commerce development. Therefore, more technical training, incentives and supports are need to help SMEs to increase their confident level by using e-Commerce applications, hence to reduce technology phobia among SMEs. However, there is still a limited study about perceived strategic value researches especially in Malaysia context. The study reveals new opportunities to study barriers from various perspective views that will hindrance to e-Commerce adoption. The finding result will served as benchmark score for adoption research in

developing countries context. This research has some limitation, firstly there are four observe variables are used to assess factors influence small medium sized enterprises to adopt e-Commerce in Malaysia which provide us certain constraints and limitation in this particular study. In facts there are many unknown factors still uncovered which need require our more attention and studies.

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