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AN EMPIRICAL STUDY OF IT INNOVATION ADOPTION AMONG SMALL AND MEDIUM SIZE ENTERPRISE IN MALAYSIA

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ABSTRACT

This study used Entrepreneurial Event model as a base model to investigate SME owners' perception toward IT innovation adoption and use. Since this model investigates the individual's intention toward taking action, it would be interesting to test and validate this model in an individual's intention toward technology acceptance. This study revised and validated the model in a new context and tried to examine the effect of perceived desirability, propensity to act and performance expectancy on behavior intention to adopt and use IT innovation in SMEs companies. Questionnaires were distributed to collect data from Malaysian industries in Kuala Lumpur. 412 completed questionnaires were available in this study, and SEM techniques were applied for data analysis. Results showed that perceived desirability, propensity to act and performance expectancy have a significant positive influence on behavioral intention, and also found that experience moderated the relationship between determinants and behavior intention.

Keywords: Entrepreneurship, Innovation Adoption, Malaysia, Small and Medium Size Enterprise.
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INTRODUCTION

Small and Medium Enterprise (SME) is considered as the backbone of industrial development around the world, playing a vital role in economic growth (Alam, 2007). Over the years, SMEs are becoming more prominent in contributing to economy growth, more so in developing countries. The definition of Small and Medium sized Enterprises (SMEs) in Malaysia is based on annual sales turnover (not exceeding RM25 million), and the number of full-time employees (150 full time employees) or shareholders' funds (NSDC) (SME Corp Malaysia). Approximately 90% of Bursa Malaysia companies fall into the SME category and they contribute 32% to the national GDP, employing 38.9% of the country's workforce (SMIDEC, 2002). In many researches, it is found that SMEs can expand their businesses by taking proper advantage of IT innovation. IT innovation has a positive effect on a business organization's performance for profitability, market share and value as well as productivity. Proper usage of IT innovation by SMEs facilitates efficiency and position improvement in the marketplace competition.

According to Swanson (1994), IT innovations can be categorized in three set models: Type 1 involves change in system development process, restricted to the functional IS core (new development tools or programming teams). It influences other parts of business indirectly (e.g., IS administrative task). Type 2 involves the outcomes of development processes (services) which involve supporting the administrative core of the organization by using IT, such as financial accounting system and lastly, Type 3 which includes IT based innovations, changing available computing capabilities, integrating IS products and services with core business technology and influencing business administration. It consists of those innovations where the use of IT affects either business functions or core business process of the organization. IT based innovations consist of new software and hardware architectures services, and new telecommunication capability. It influences the whole business, is more strategic and offers competitive advantage through product or service differentiation or low cost production to early adopters (Porter, 1985). The three sets of innovations are mutually dependent in a way that an innovation in one type may spawn innovation in others (Lyytinen & Rose, 2003; Swanson, 1994).

According to Rogers (1983), adoption is the decision to make full use of an innovation as the best course of action. Researches around the globe have shown that IT adoption by SMEs is still low and have not reached expectations (Pavic, et al, 2007; Yu, 2006). Review of literature shows that Malaysian SMEs are relatively slow in IT innovation adoption and only 5% of Malaysian SMEs have fully automated IT and communication operations, and only 30% have any form of enterprise level ICT solutions (Malaysia international report 2010).

In assessing the determinants of IT adoption in SMEs, a number of studies have considered the technological, environmental, organizational and individual aspects of the business organization (Rashid, 2001). In the context

of entrepreneurship, Shapero and Krueger (1993) developed a model that measures the entrepreneurial intention toward venture creation or perform behavior. This is an intentional model that measures the individual's dimension toward taking action. Using this model to test individual's perception towards technology acceptance and validating the model in new context is the objective of this paper. We added performance expectancy as a new variable in the model since in technology acceptance context, usefulness of new technology is considered an important characteristic that encourages people to adopt and use new technology in their job. The current study attempts to examine the effect of perceived desirability, propensity to act and performance expectancy on behavior intention to adopt and use IT innovation in SMEs companies.

THEORETICAL BACKGROUND

The Entrepreneurial Event Model (SEE)

One of the first intention- based and comprehensive academic models that Shapero theorized in 1982 is the Entrepreneurial Event Model (see Figure 1). Shapero's model posited that "inertia guides human behavior until something interrupts or displaces that inertia". Shapero posits that displacement can be negative (job loss, job dissatisfaction), or positive (getting an inheritance, support from a customer or partner) where individuals are attracted to an innovation and initiates action. Studies have shown that perceived desirability, perceived feasibility, and propensity to act explains half of the variance in intention towards taking action, and perceived feasibility explaines the most variance (Krueger, 1993). Shapero explained how perception is critical in this process and that new circumstances can change the perceptions of an individual. The premise is that the decision to perform an entrepreneurial activity requires a pre-existing attitude toward the activity as desirable and feasible as as well as the propensity to act on an opportunity (Shapero 1982; Krueger & Brazeal, 1994; Krueger 2000, 1994, 1993; Mhango, 2006). Intentions toward the behavior predicts any planned behavior while in turn, certain attitudes predict intention. Attitude are relevent to our underestanding of how exogenous factors influence entrepreneurial intentions(Devonish et al., 2010). In SEE, Shapero added a volitional element to intention, to account for these phenomena (Kruger, 1993; Krueger et al, 2000). It means that without perceiving a likelihood of taking action, an individual is unlikely to have a serious intention toward a behavior. On the other hand, intention must be reasonably well formed to predict behavior, and it is not possible without a significant propensity to act. Shapero also posited that propensity to act is likely to have some indirect influence on relationship on the model, and suggested to test these effects in other researches. Propensity to act influences intention through experience and attitude toward intention. With a low propensity to act, attitude is less predictive on intention and action. However, when the propensity to act is high, taking action is more likely to be seen as feasible and desirable, and experiences have a greater effect on attitudes (Krueger, 1993). According to this theory, we can consider business creations as an event that can be clarified with the interaction between initiatives, abilities, management, relative autonomy and risk (Guerrero et al, 2008).
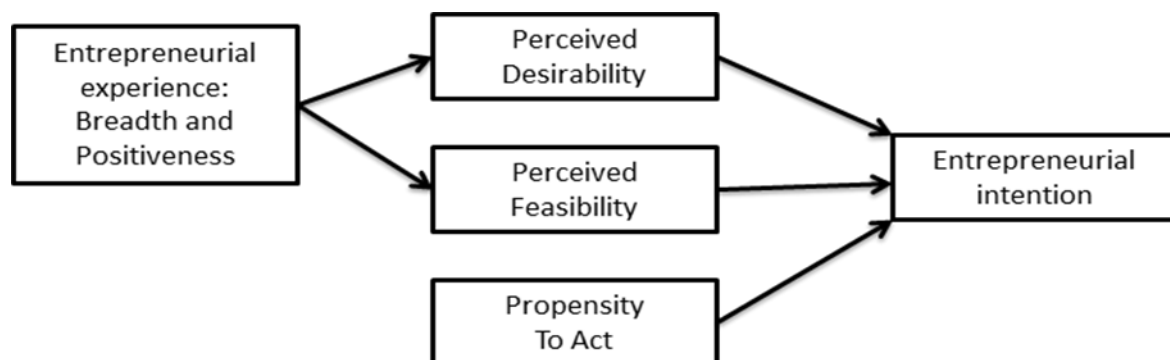

Figure 1. : Shapero's Entrepreneurial Event Model (*SEE*) [source Krueger (1993)]

Shapero defined perceived desirability as "a degree to which an individual finds the prospect of starting a business to be attractive". Perceived desirability (attitude and social norms) is similar to social norms, and it is related to what significant others (friends, peer groups, family) think of the behavior. For example, social pressure that places a high value on use IT innovation will encourage a person to form favorable perceptions of desirability and social pressures opposed to it will create unfavorable perception of desirability. Perceived feasibility refers to the extent to which "an individual feels personally capable of starting a business or performing the task". Perceived feasibility is similar to perception of behavioral control in Theory of Planned Behavior and much like Bandura's self efficacy theory (Krueger 1993). Propensity to act is defined as the "personal disposition to act on one's decisions". Therefore, it shows volitional aspect of intentions (I will do it).

Innovation Adoption

Innovation adoption refers to an individual or organization's decision and the choice they make to accept or reject an existing innovation, and passes through a sequence of stages before the acceptance of a new product. Based on Roger's (1995, cited in Knol & Stroken, 2001) definition, innovation adoption is "the process through which an individual or another decision making unit passes from knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation, of the new idea, and to confirmation of this decision" (Roger, 1995; Knol & Stroken, 2001). The adoption decision takes place at the micro-economic level and the potential adopter of the innovation often is an enterprise, a vision, or an individual.

The adoption process includes two main sub-processes: initiation and implementation. Actual adoption decision occurs between the initiation and implementation stage. The initiation process includes all activities related to recognizing a need, becoming, awareness of innovation and evaluating its appropriateness which leads to adoption of the innovation. Therefore organizations become aware of the innovation and an attitude forms toward it, and evaluation of new technology or idea affects their intention (Kamal, 2006). The adoption is considered as problem solving, in which an existing idea is adapted to deal with recognized needs and identified problems within an organization (Damanpour & Wischnevsky, 2006).

Model and Hypothesis

This paper used the Entrepreneurial Event model (Shapero & Krueger, 1993) as a base model to investigate SMEs owners' intention toward IT innovation adoption and use of IT innovation in their companies. We considered perceived desirability, propensity to act and performance expectancy as determinants toward behavior intention to adopt and use IT innovation. We did not consider perceived feasibility in the model because people do not have skill and ability with new technology in the market and maybe they have skill with the basic information technology. Literature shows that previous experience with the information technology makes it easier for people to accept and they consider it as the key to success of the information technology. Venkatesh et al. (2003) considered it as a moderating variable that affects the relationship between the determinant and behavior intention (Messineo & DeOllos, 2005). Therefore we consider experience as moderating factors that influences the relationship between determinants and behavior intention to adopt and use IT innovation. Figure 2 shows the research model.
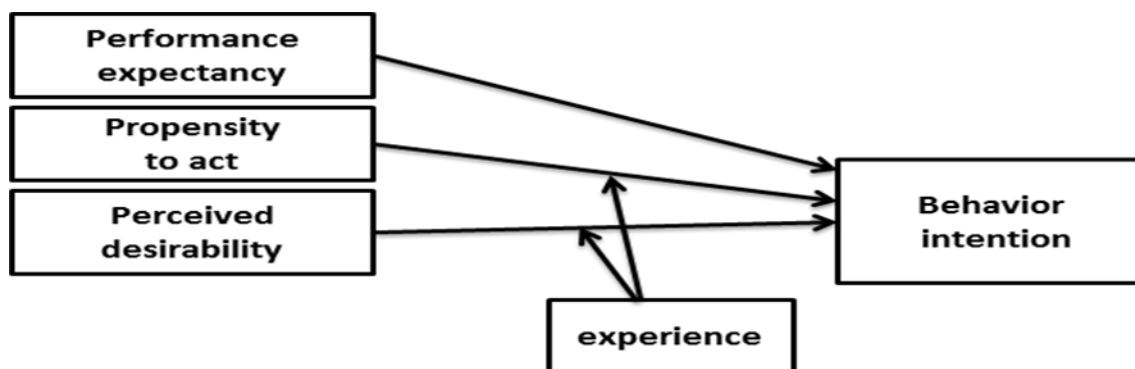

Figure 2: Research framework

Perceived desirability is defined as the degree of attraction that SME owners have toward IT innovation adoption, and their attitude toward new technology. If they have a positive attitude toward IT innovation, they will adopt and use it in their companies, and if they have a negative experience with new technology, they would not be interested to adopt and use it in their job. The hypotheses in the present study were stated as following:

H1: SMEs owners' perceived desirability will have a positive effect on their intention to adopt IT innovation in their job.

H1a: The effect of perceived desirability on behavior intention to use IT innovation will be moderated by experience.

Propensity to act in this research is define as the SME owners' decision to act. It shows that they decide to adopt and use IT innovation in their job.

H2: SMEs owners' propensity to act will have a positive effect on their intention to adopt IT innovation in their job.

H2a: the effect of propensity to act on behavioral intention will be moderated by experience.

Performance expectancy is considered an important factor for SME owners when they decide to use IT innovation. Venkatesh et al. (2003,2010) defines performance expectancy as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance". SMEs owners would not intend to adopt IT innovation if they do not expect it to improve their job performance.

H3: SME owners' feeling of performance expectancy will have a positive effect on their intention to adopt IT innovation in their job.

Table 1: Characteristics of the Respondents

Characteristics	Number	Percentage (%)
Gender		
Male	306	74.3%
Female	106	25.7%
Age		
≤20	44	10.7%
20-29	83	20.1%
30-39	169	41.0%
40-49	80	19.4%
≥50	36	8.7%
Education		
Primary/secondary	19	4.6%
Diplomas	107	26%
Degree holder	191	46.4%
Master's and PhD	95	23.1%
Educational Background		
IT educated	153	37.1%
Non-IT educated	259	62.9%
Industry type		
Manufacturing	65	15.8%
Service	134	32.5%
Education	43	10.4%
Telecommunication	46	11.2%
banking and finance	28	6.8%
agriculture	9	2.2%
others	87	21.2%

RESEARCH METHDOLOGY

The present study develops a research framework to predict intention to adopt and use IT innovation by SME owners in their business. Questionnaires were designed to gather information about the constructs in the research model at the level of single SMEs in Kuala Lumpur Malaysia. We chose managers or owners of the company because most influential people affecting innovation and change in organizations are top managers (Damanpour, 2006). The questions that measure perceived desirability and the propensity to act was adopted from Krueger (1993), and Krueger, Reilly, and Carsrud (2000). Some words were modified to suit to the context of the study. Items that measure performance expectancy were adapted from Venkatesh et al.(2003). A Likert scale is appropriate when the research needs to measure the respondents´ attitude toward constructs (McDaniel & Gates, 2005). Thus, the 7 point Likert type scale (1=strongly disagree to 7 strongly agree) was built to gather the information. The questionnaires were distributed based on probability sampling to the SME owners who are involved in providing professional services in the areas of manufacturing, telecommunication, education,

banking and finance, service, and agriculture. A total of 1000 questionnaires were sent to SME owners, and 412 complete questionnaires were collected with a respondent rate of 41%.

Respondent's Profile

A total of 412 respondents completed the survey, of which 306 (74.3%) were males and 106 (25.7%) were females. With regard to education, 19 (4.6%) had primary/secondary qualifications, 107 (26%) had Diplomas, and 191(46.4%) were degree holders, and Masters and PhD holders together were 95 (23.1%). In terms of type of industry, most respondents worked in the service sector 134 (32.5%). Regarding educational background, we can observe that 153 (37.1%) of the total samples were IT educated and 259 (62.9%) were not IT educated.

DATA ANALYSIS AND RESULTS

The reason for performing factor analysis is to determine whether the data can be condensed or summarized into a smaller set of factors. In this study, explore factor analysis in SPSS using principle component method with varimax rotation was performed. To identify component factors having eigenvalues greater than one, and verifying whether the questionnaire items properly mapped the corresponding construct. All reliability estimations having Cronbach alphas coefficient of a scale should be above 0.7. The Cronbach's alpha coefficient for all dimensions exceed 0.75, indicating high content consistency between the questions relating to each of the constructs (see Table 2). Additionally, two types of tests were used in this evaluation: Bartlett's sphericity test, which has a significance level of .000 as an indicator that the underlying structure of the data is acceptable, and the Kaiser-Meyer-Olkin (KMO), which is recommended to exceed 0.6, is used with the result statistic of .932; therefore all items on each scale were correlated.

Table 2: Factor Loading And Cronbach's Alpha Value

Variables	Factor loading	Cronbach Alpha α
Perceived desirability		
Using IT innovation in my business is much more desirable for me.	.820	.927
I would enjoy the personal satisfaction of using IT innovation in my business.	.818	.923
Using IT innovation would increase quality of work in my business.	.788	.922
Using IT innovation in my business is an attractive idea.	.757	.922
Using IT innovation in my business is an attractive idea.	.740	.924
Propensity to act		
I will learn to operate IT innovation in my business.	.799	.934
I will use IT innovation to achieve more opportunity in my business.	.790	.921
I will use IT innovation because I cherish the feeling of a useful service.	.755	.937
I will use IT innovations that enable me to run my business successfully.	.749	.942
Performance expectancy		
I find the IT innovation to be useful in my business.	.807	.916
Using the IT innovations enable me to accomplish tasks more quickly.	.889	.895
Using IT innovation increase my productivity.	.809	.888
Using IT innovation, increase my chances of getting more benefit in my business.	.886	.904

Confirmatory factor analysis was conducted through AMOS 16.0 to test the measurement model to explain how measured variables logically and systematically represent constructs involved in a theoretical model. All the constructs, independent and dependent variable run together. The final fit for the first model in the calibration sample shows a fairly good fit with the data collected, with GFI= 0.923, AGFI=0.893, TLI=0.960, CFI=0.967, RMSEA=0.068, and CMIN/DF=2.913.

Hypotheses Testing

The Structural Equation Modeling (SEM) technique was used to test a set of relationship between independents and a dependent variable. Once an acceptable measurement model is available, the structural model evaluation should be able to start. A similar set of model fit indices was used to test the structural model. The results of the structural model show that the model achieved a good level of fit, χ^2 = 282.583, χ^2 / df = 2.913, GFI = 0.923, AGFI=0.893, TLI = 0.960, CFI = 0.967, RMSEA = 0.068. The results also reported that 79.7% of the variance associated with behaviour intention was accounted for by its three predictors: performance expectancy, perceived desirability, and propensity to act.

Testing the Hypotheses on Behaviour Intention

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Testing the relationship between the determinants and the behavior intention, regarding to the perceived desirability on the behavior intention, Hypothesis 1 was supported. It means that if SMEs owners have a positive attitude toward using IT innovation in their companies, they would be interested to adopt and use IT innovation in their job. In Hypothesis 2, results show that propensity to act is positively significant on the behaviour intention because β is equal to 0.370 (p = 0.000). It means that if SME owners decide to adopt and use IT innovation in their job and they persist in their decision, the probability to use IT innovation is higher. As for Hypothesis 3s the results supported the hypothesis and shows that if SME owners perceived that using new technology would increase their job performance they will adopt and use it in their job.

Table 3: Hypothesis Testing on Behavior Intention

Hypotheses				β	S.E.	C.R.	P	Support
H1	PD	→	BI	0.359	0.058	5.955	0.000*	Yes
H2	PTC	→	BI	0.370	0.062	4.855	0.000*	Yes
H3	PE	→	BI	0.220	0.050	3.597	0.000*	Yes

β: Standardized Regression Weight;   S.E.: Standardised Error;   C.R.: Critical Ratio;   *: p< 0.05
PE: performance expectancy;   BI: Behavior Intention;   PD: perceived desirability;   PTC: propensity to Act

Testing the Hypotheses on Moderating Effect

To test the hypothesized moderation model in the SEM, two group models can be used in the core model. Therefore, the sample was split into two groups for testing moderating the effect of experience. The first group has previous experience to use information technology and the second group do not have any experience with information technology. To identify the moderator effect, Hair, et al (2006) suggest to check the chi square value differences across the two groups while the parameter (β) is constrained to be equal and without constrain.

Based on the findings, the result supported that experience has a moderating effect on the perceived desirability and propensity to act toward behaviour intention. Hypothesis H1a was partially supported as regression weight (β) is significant. Results show that SME owners who do not have any previous experience to use information technology, its effect will not be significant and they would not really be interested to adopt and use IT innovation in their company. The propensity to act toward behaviour intention's result shows that experience influences the relationship between propensity to act and behaviour intention and this supports the moderating effect of experience on the model. Hypothesis H2a was supported, as regression weight (β) is significant.

Table 4: Hypotheses Testing on Moderating Effects

	Hypotheses	β	C.R.	P	Support
Experience/no experience					
PD→BI	**H1a**				Partial Supported
Experience (n = 339)		0.365	5.602	0.000*	
no experience (n = 73)		0.227	1.221	0.222	
PTC→BI	**H2a**				Yes
Experience (n = 339)		0.342	4.326	0.000*	
no experience (n = 73)		0.675	2.323	0.020*	

β: Standardized Regression Weights;   C.R.: Critical Ratio   *: P ≤ 0.05

CONCLUSION AND IMPLEMENTATION

The current study revised and validated the Entrepreneurial Event model in a new culture and context, and results show that the model is a robust model, fit to be tested in different cultures and contexts. Adding performance expectancy makes the model more powerful to test on different perspectives of technology acceptance. Based on the results of the current study, perceived desirability, propensity to act, and performance expectancy, all positively influenced the behavior intention. Perceived desirability was an important variable to influence behavior intention, followed by propensity to act. Regarding the performance expectancy, results showed that perceived usefulness of IT innovation is an important factor that SME owners consider when they want to adopt and use new technology in their jobs. If SME owners have a positive feeling toward new technology, they would adopt and use it in their companies. At the same time, if they decide to use IT innovation and they persist on their decision, the probability to adopt and use IT innovation would be higher. In the first stage, SME owners consider IT innovation as an opportunity to gain competitive advantage and were interested to use it, and after that they will consider if using new technology helps them gain profit in job

performance and increase profitability. This result confirmed the Entrepreneurial Event Model in the IT innovation field, it performed very well.

The result of two independent variables, perceived desirability and propensity to act is consistent with the previous studies in the entrepreneurship area (Krueger & brazeal, 1994; Krueger et al., 2000; Coduras et al., 2008; Veciana et al., 2005; Shook & Bratianu, 2008; Meeks, 2004; Guerrero et al., 2008), and shows that if perceived desirability and propensity to act is high, the probability to take action is high. The result of performance expectancy is consistent with the theories in technology acceptance context (Venkatesh et al., 2003). It confirms the idea that if the new technology or idea that is introduced to the company improves the work condition and enhances profitability, SME owners would be more interested to use it. Therefore, the usefulness of IT innovation is an important factor that SME owners consider when they are deciding to use it in their job.

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