

## Applying the Theory of Perceived Characteristics of Innovating (PCI) on ICT Adoption in the SMEs in Malaysia

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**Abstract:** The purpose of this study is to gain a deep understanding of the factors which influence the adoption and usage of ICT by SMEs in Malaysia. Businesses around the world are using ICT to improve business competitiveness. ICT provides a numerous opportunity for SMEs to compete equally with large corporations. This study uses Moore and Benbasats perceived characteristics of innovating (PCI) constructs to determine factors that influence the SMEs adoption of ICT. Data are collected through self administered questionnaire and the sample consists of 214 manufacturing SMEs in the southern region in Malaysia. The multiple regression analysis results indicate that compatibility, perceived ease of use, image and security have significant influence ICT adoption intention. The implications of the study are discussed and further researches are suggested.

**Key words:** ICT adoption, SMEs, PCI model, Melaka and Johor, Malaysia.

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### INTRODUCTION

As the world economy continues to move toward increased integration as a result of advances in information communications technology, and the increasing reduction in trade barriers, some of the greatest opportunities for small businesses will derive from their ability to participate in the regional and international markets (Mutula and Brakel, 2006). Adoption of the ICT is considered to be a means to enable these businesses to compete on a global scale, with improved efficiency, and closer customer and supplier relationships (Chong *et al.*, 2001). In this respect, SMEs should consider information and communication technology (ICT) as an important approach in their business to take competitive advantage from the global markets (Mutsaers *et al.*, 1998). Moreover, ICT is a resource of SME which may help them to access and contribute to in order to enhance its competitiveness (Swash, 1998).

The key drivers of Malaysian SMEs sustainable growth are the Malaysian Government policy towards SMEs has, over the last few years, placed emphasis upon the knowledge economy and information communication technology (ICT). This policy clearly indicates a new approach for the stability of SMEs compare to the last few decades (Alam, 2009, Alam and Kamal, 2009).

This paper aim at investigate the factors that influence ICT adoption by small and medium enterprises (SMEs) in manufacturing industries of southern area in Malaysia. A variety of internal and external factors have been identified as preventing many SMEs from keeping away the implement of ICT. The study, which is reported in this paper, provides more in-depth information about the reasons that influence ICT adoption intention for their business activities. By identifying the major reason may help industry or government to provide appropriate information and support thus enhance ICT usage. Most of the empirical research is based on large companies, and SME in fact are characterized by the lack of knowledge about the real advantages of ICT could add to their business (King and Teo, 1994; Palvia *et al.*, 1994). After the discussion of ICT usage, conclusion is drawn along with significant recommendation to improve ICT utilization amongst SMEs.

In this study I use Moore and Benbasat's (1991) perceived charactics of innovating (PCI) to examine the major factors of ICT adoption in the SMEs in Malaysia. These constructs have used in some other studies such as IT research (Karahanna *et al.*, 1999; Moon & Kim, 2001; Pavlou, 2003), e-Commerce research (Van Slyke *et al.*, 2004) and e-Government (Carter & Belanger, 2007). Based on the past researches, PCI constructs are proposed as useful indicators of ICT adoption in SMEs in Malaysia.

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## **2. Malaysian SMEs and ICT Usage:**

Small and medium enterprises (SMEs) play a vital role in the Malaysian economy and are considered to be the backbone of industrial development in the country (Saleh and Ndubisi, 2006, Ramayah *et al.*, 2002). Small and medium sized enterprises (Hashim, 2000) are defined as firms employing full-time employees 150 or with annual sales turnover not exceeding RM25 million, and play a significant role in the country's economic development, particularly in the manufacturing sectors (Ramayah *et al.*, 2002). As of December 2005, a total of 600,000 SMEs were registered in Malaysia (SME bank). They contribute 27.3 per cent of total manufacturing, 25.8 per cent to value-added production, own 27.6 per cent of fixed assets, and employ 38.9 per cent of the country's workforce (SMIDEC, 2002). There are 192,527 establishments in the services sector, and 186,728 (or 96.7 per cent) of these are made up of SMEs in Malaysia (DOS). According to Yusoff (2004) the services sector grew by 6.8% in 2004, driven by higher consumer spending and a record level of tourist arrivals. Growth emanated from strong expansion in all sub-sectors with transport and communication in the lead at 8.4% followed by wholesale and retail trade, hotels and restaurants (7.1%) and finance, insurance, real estate and business services (6.5%). Together with new growth areas in information and communications technology (ICT), the services sector was able to maintain its premier position in terms of its share of GDP at 57.4%. Malaysian businesses, small and medium-sized enterprises (SMEs) have been relatively slow in web adoption. According to Lee (2005) there are about 30 per cent of SMEs in Malaysia have a web presence and use IT extensively in their daily operations. This reflects a poor rate of IT adoption among the estimated 600,000 local SMEs. Most SMEs perceived the barriers of implementing IT into their business operations as expensive initiative, risk, complex procedure, technical expatriate, and customer services (Yeung *et al.*, 2003; Chong *et al.*, 2001; Pires and Aisbett, 2001). According to Soh *et al.* (1997) if SMEs in Malaysia adopt the ICT, the potential commercial functions that could be performed include, marketing themselves both locally and globally, gathering business information and consumer feedback, providing customer support and conducting electronic transactions. On the other hand, if ICT implementation will be successful, it would have severe repercussions on small businesses with their limited resources (Chong *et al.*, 2001).

According to Lim (2006) most SMEs in Malaysia realize that ICT is critical to the productivity and performance of their companies. But, implementation and maintenance of these ICT systems is restricted due to inability to handle, owing to high staff turnover and lack of ICT project management expertise. He also stresses that, many Malaysian family-based SMEs are still operating their business the conventional way. Consequently SMEs which have invested in ICT systems fail to implement and maintain these systems successfully. Similarly, Tan (2006) argues that ICT in Malaysia is facing big challenges due to the slow adoption of technology by SMEs in Malaysia. He also suggests that SMEs must learn to adopt technology to increase their global competitiveness.

## **3. Theoretical Foundation of the Study:**

Adoption of innovation has two levels. Firstly, innovation must be purchased, adopted and acquired by an organisation. Secondly, it must be accepted by the ultimate users in that organisation and community. According to Dos Santos and Peffer, 1998 information systems research indicated that organisations that adopt a technology at different times may have distinct perceptions regarding the adoption of a particular technology.

Information systems implementation depends on specific social, cultural, economic, legal and political contexts, which may differ significantly between countries (Stiglitz, 1998; Shore, 1998; Spanos *et al.*, 2002) that limit the generalization of research results from developed countries to developing country contexts (Dewan and Kraemer, 2000; Clarke, 2001). This justifies an empirical investigation of Malaysian SME managers' awareness, perception and organizational readiness or concerns about their current and potential use of EC to uncover the factors that encourage or deter EC adoption. Moreover, this will contribute to confirm past findings of a limited research attempts in developing country context (Molla Licker, 2005a, 2005b) and possible generalization on the adoption of e-commerce (Spanos *et al.*, 2002). Information Systems (IS) researchers have made significant efforts in building theories to examine and predict the determinant factors of information technology (IT) acceptance (Agarwal and Prasad, 1998). Existing models of IT acceptance have their foundations from several diverse theories, most noticeable innovation diffusion theory, where individuals' perception about using an innovation are considered to affect their adoption behavior (Agarwal and Prasad, 1998; Rogers, 1995; Moore and Benbasat, 1991). Other important theoretical models that attempts to explain the relationship between user beliefs, attitudes, intentions, and actual system use include perceived characteristics of innovating (PCI) (Moore and Benbasat, 1991), the theory of reasoned action (TRA) Ajzen and Fishbein, 1985), the theory of planned behavior (TPB) (Ajzen 1991) and the technology acceptance model (TAM) (Davis, 1989; Davis *et al.*, 1989).

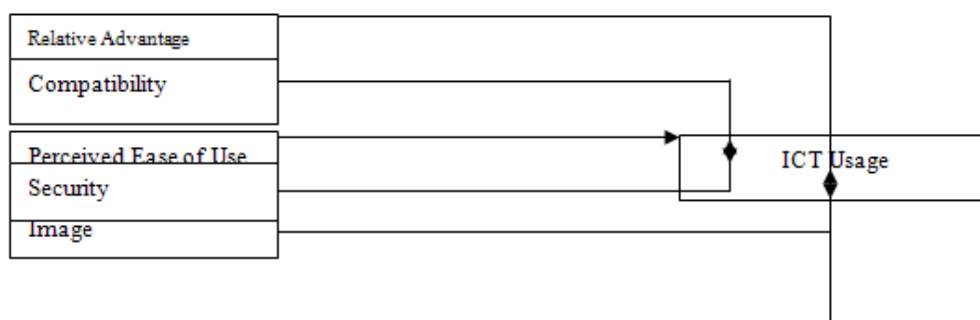
These theories and models offer foundations for planning, executing and evaluating the technology adoption. The TAM (Davis 1989) represents an adaptation of the TRA, originated by Fishbein’s study (Fishbein & Ajzen, 1975) and Theory of Planned Behavior (PB). The major determinants are perceived usefulness and ease of use, but evidence regarding perceived ease of use remains inconsistent (Agarwal and Prasad 1999; Davis 1989; Dishaw and Strong 1999; Gefen and Keil 1998; Igbaria *et al.* 1996; Moon and Kim 2001). Furthermore, other researches (e.g., Bhattacharjee 2001a; Ma and Liu 2004; van der Heijden, *et al.*, 2003) indicate that ease of use has a greater effect on acceptance up to a certain threshold. That is, with more experience, the impact of ease of use on intention declines. Because our research focuses on intentions, I assume all participants already have IT experience, which implies other factors may be more important than ease of use. Moreover, many studies simplify TAM by dropping attitude and studying just the effect of perceived usefulness and ease of use on intention to use (Venkatesh and Davis 2000; Venkatesh *et al.*, 2003; Gefen and Straub 2000; Leader *et al.* 2000; Teo *et al.* 1999; Premkumar and Bhattacharjee 2008).

Studies of adoption and diffusion of innovations have been undertaken since the late nineteenth century in various social science disciplines (Ostlund, 1973; Brockman and Morgan, 1999). Rogers’ (1995) theory was developed based on the Moor and Benbasat’s (1991) perceived characteristics of innovating (PCI), which is used frequently in information systems research to explain user adoption of technological innovations. Diffusion refers to “the process by which an innovation is communicated through certain channels over time among the members of a social society (Rogers 1995).” An innovation is “an idea, practice or object that is perceived as new by an individual or other unit of adoption (Rogers, 1995).” Moore and Benbasat (1991) identify eight PCI factors that influence the diffusion of an innovation: relative advantage, compatibility, ease of use, result demonstrability, image, visibility, trialability and voluntariness.

Based on the previous studies (Karahanna, 1999; Moore & Benbasat, 1991; Plouffe *et al.*, 2001; Tornatzky & Klein, 1982; Van Slyke *et al.*, 2004; Carter & Belanger, 2007) I study the effects of relative advantage, compatibility, ease of use, image and perceived security on SMEs intention to use ICT service. Tornatzky and Klein (1982) suggest that relative advantage, compatibility and ease of use are the most relevant constructs to adoption research. Security is another most important factor that influences ICT adoption. Thus, in this research I include these four constructs in this study. Relative advantages is “the degree to which an innovation is seen as being superior to its predecessor”, Compatibility refers to “the degree to which an innovation is seen to be compatible with existing values, beliefs, experiences and needs of adopters”, and perceived ease of use is “the degree to which a person believes that using a particular systems would be free of effort (Davis, 1989).” Technology based research cover image is another important factor, so we also include image in our research model. Image refers to the “degree to which the use of the innovation is seen as enhancing to the company image.”

**4. Research Model:**

Figure 1 presents the research model that summarises the constructs discussed above.



**Fig. 1:** Research Model.

**5. Hypotheses:**

Previous studies on technology adoption (Karahanna *et al.*, 1999; Moon & Kim, 2001; Carter & Belanger, 2007; Alam *et al.*, 2007) have shown relative advantage, compatibility, perceived ease of use and image have positive relationship with use intentions and negative relationship between security and use intentions. We expect the nature of these relationships to remain the same in the context of this research. Therefore, based on the previous study, five hypotheses are posited (Table I).

**Table I:** Hypotheses.

| Name | Hypothesis  | Construct                  |
|------|---|----------------------------|
| H1.  | Relative advantage will be positively related to the intention to the ICT in SMEs   | Relative Advantage (RA)    |
| H2.  | Compatibility will be positively related to the intention to the ICT in SMEs        | Compatibility (Compat)     |
| H3.  | Perceive ease of use will be positively related to the intention to the ICT in SMEs | Perceive Ease of Use (PEU) |
| H4.  | Image will be positively related to the intention to the ICT in SMEs                | Image (Ima)                |
| H5.  | Security will be negatively related to the intention to the ICT in SMEs             | Security (Sec)             |

## 6. Research Methods:

### 6.1 Sample and Data Collection:

The population of this study comprises of all SMEs from manufacturing sectors in Melaka and Johor Bahru states in Malaysia that are registered under Small and Medium Industries Development Corporation (SMIDEC). The target groups were SMEs considered based on the number of employees in the industry is most commonly used in management research (Ghobandian and Gallea, 1996; Haksever, 1996; Terziovski *et. al.*, 1997). The SMEs are classified as those industries with total workforce of less than 150 employees (SMIDEC, 2002). Data were gathered based on mail and personal administered questionnaire. A packet of 500 survey instruments, enclosing a return envelop were sent to randomly selected from insurance, banking and finance, health and medical, education, tourism, logistics, professional management, IT related service and advertising sector. The respondents for this study were targeted to be the owner or manager of the organizations because they always had the chance to deal with ICT in their working position.

To maximize the return rate, three subsequent reminders were sent over telephone and the mail lists maintained by SMIDEC after the initial surveys were mailed. Telephone inquiries were conducted only three weeks later as a last resort for those SMEs that had not responded. The response rate for the survey was 47.2 per cent (236 responses). Due to missing values for at least two sections of the responses 22 samples were discarded from this research and finally 214 samples were then processed and analyzed.

Out of the 214 surveyed, 86.45% were local companies. The remaining 13.55% were foreign companies, therefore indicating that Malaysian SMEs in southern regions are predominantly local companies.

**Table II:** Company's' Profile.

| No | Demographic Variables             | No. of Respondents | %     |
|----|-----------------------------------|--------------------|-------|
| 1. | No of employees                   |                    |       |
|    | <50 employees                     | 120                | 56.1  |
|    | 50-100 employees                  | 90                 | 42.1  |
|    | 100-150 employees                 | 04                 | 1.8   |
| 2. | Years of Internet Experience      |                    |       |
|    | Less than 5 year                  | 189                | 88.32 |
|    | 5 years and above                 | 25                 | 11.68 |
| 3. | Years of Manufacturing Experience |                    |       |
|    | Less than 10 years                | 172                | 80.37 |
|    | 10 years and above                | 42                 | 19.63 |

Respondents of the survey also can be grouped into according to their employees. Results show that most of the SMEs have less than 50 employees. Table II presents a breakdown of companies according to the manufacturing experiences. A high percentage of those surveyed (80.37%) have been involved in manufacturing business less than 10 years, while relatively few (19.63%) for more than 10 years.

### 6.2. Data Analysis Technique:

Bivariate frequency distribution of the respondents, according to types of companies, years manufacturing experience, size of the companies, and years of Internet experience was presented.

To study the factors, which significantly affect ICT adoption, multiple regression analysis is used. The analysis enabled us to examine the individual impact of the independent variables on intent to use ICT into their business. Thus, Moore and Benbasat innovation characteristics and another additional factor security were investigated.

### 6.3. Instrument Development:

The items used in this survey were adapted from previous studies. The measures of relative advantage, compatibility and security were adapted from Alam *et al.* (2007, 2011). Ease of use was measured using items adapted from Davis' TAM model (Davis, 1989). The items image and used intentions were modified from Carter & Belanger, (2007) study. Each item is rated on a scale of 1 to 6 (strongly disagree to strongly agree).

Table III shows the number of items comprising each scale: the reliability reported by Moore and Benbasat (1991) for the scale and Cronbach’s alpha for scale reliability obtained for our sample. Reliability from our sample showed a reasonable level of reliability ( $\alpha > 0.60$ ).

**Table III:** Reliability Analysis.

| Variables          | Coefficient Alpha |
|--------------------|-------------------|
| Relative advantage | .825              |
| Compatibility      | .872              |
| Ease of use        | .724              |
| Image              | .793              |
| Security           | .811              |

**6.4 Test for Construct Validity: Factor Analysis:**

A factor analysis was conducted in order to develop factors that help in explaining the role of experience and reference group in online brand trust. As suggested by Hair *et al.*, (1995), four factors were identified for the factor analysis using the eigen value criteria that suggest extracting factors with an eigenvalue of greater than 1.0. In conducting the factor analysis we followed Hair *et al* (1995) and Alfansi and Sargeant (2000). The rotated factor matrix is displayed in Table IV. The four factors identified explain 66.08 percent of the total variance. The extraction method used was principal axis factoring with Varimax rotation. This method has been widely accepted as a reliable method of factor analysis (see, Alexander and Colgate, 2000). In our survey, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy score (0.92) was well above the recommended 0.5 level (Malhotra, 1999) suggested that the data may be factorable. Moreover, the Bartlett’s test of sphericity indicated that there was adequate correlation among the chosen variables ( $X^2_{(171)} = 2214.38, p < 0.01$ ).

Compatibility and perceived ease of use items also loaded together in other e-government and IT adoption research (Carter and Belanger, 2003; Karahanna *et al.* 1999; Moore & Benbasat’s, 1991) study. Carter and Belanger concluded that “it is unlikely that respondents would perceive the various advantages of using [state e-Government services], if its use were in fact not compatible with the respondents’ experience or life style.

**Table IV:** Factor Analysis (Varimax) Showing the Combined Impacts on ICT adoption.

| Conditions         | Factors/variables | Factors |      |      |      |
|--------------------|-------------------|---------|------|------|------|
|                    |                   | 1       | 2    | 3    | 4    |
| Relative advantage | RA 1              |         |      | .577 |      |
|                    | RA 2              |         |      | .820 |      |
|                    | RA 3              |         |      | .801 |      |
|                    | RA 4              |         |      | .657 |      |
|                    | RA 5              |         |      | .451 |      |
| Compatibility      | Com               | 1.792   |      |      |      |
|                    | Com 2             | .787    |      |      |      |
|                    | Com 3             | .702    |      |      |      |
|                    | Com 4             | .656    |      |      |      |
|                    | Com 5             | .628    |      |      |      |
| Ease of use        | EOU 1             | .733    |      |      |      |
|                    | EOU 2             | .582    |      |      |      |
| Image              | IM 1              |         |      |      | .731 |
|                    | IM 2              |         |      |      | .820 |
|                    | IM 3              |         |      |      | .703 |
| Security           | Sec 1             |         | .651 |      |      |
|                    | Sec 2             |         | .781 |      |      |
|                    | Sec 3             |         | .687 |      |      |
|                    | Sec 4             |         | .695 |      |      |

Extraction Method: Principal Axis Factoring. Rotation Method: Varimax with Kaiser Normalization.

**6.5. Normality of Data and Multi-collinearity:**

This study involves a relatively large sample (214 respondents) and therefore, the Central Limit Theorem could be applied and hence there is no question on normality of the data. Two major methods were utilized in order to determine the presence of multicollinearity among independent variables in this study. These methodologies involved calculation of both a Tolerance test and Variance Inflation Factor (VIF) (Kleinbaum *et al.*, 1988). The results of these analyzes are presented in Table V. As can be seen from this data, i) none of the Tolerance levels is  $\leq$  or equal to .01; and ii) all VIF values are well below 10. Thus, the measures selected for assessing independent variables in this study do not reach levels indicate of multicollinearity. The acceptable Durbin – Watson range is between 1.5 and 2.5. In this analysis Durbin – Watson value of 2.068, which is between the acceptable ranges, show that there were no auto correlation problems in the data used in this research. Thus, the measures selected for assessing independent variables in this study do not reach levels indicate of multicollinearity

**Table V:** Test of Collinearity.

| Variable             | Tolerance | VIF   |
|----------------------|-----------|-------|
| Relative Advantage   | .554      | 1.806 |
| Compatibility        | .358      | 2.791 |
| Perceive Ease of Use | .370      | 2.706 |
| Image                | .584      | 1.711 |
| Security             | .517      | 1.936 |

**6.6. Hypotheses Testing:**

Table VI presents results of a multiple regression analysis used to evaluate the strength of the proposed relationship. Five hypotheses were formulated and all the variables retain after filtering with factor analysis. The individual hypothesis was tested using a multiple regression prediction model following the guidelines established by Hair *et al.*, (1998) with ICT adoption intention as the dependent variable. The results obtained, as shown in Table VI, revealed that H2, H3, H4 and H5 were found to be significant in the prediction model. Effects of relative advantage were tested by H1, which was rejected by this test. This result indicates that relative advantage would not affect ICT adoption intention. The results provide support for hypotheses H2, H3, H4 and H5 that is, the relationship between compatibility ( $\beta=.219$ ;  $p<0.01$ ), perceive ease of use ( $\beta=.171$ ;  $p<0.05$ ), image on ICT adoption intention ( $\beta=.184$ ;  $p<0.01$ ), and security ( $\beta=.234$ ;  $p<0.01$ ) with ICT adoption intention.

Table VI presents results of a multiple regression analysis used to evaluate the strength of the proposed relationship. Five hypotheses were formulated and all the variables retain after filtering with factor analysis. In order to test the 5 hypotheses, linear regression was used, regressing each of the independent variables towards the intention to adopt as the dependent variable.

**Table VI:** Multiple Regression Test between ICT adoption and Innovation Characteristics.

| Variable             | Estimate | Standard Error | P-value |
|----------------------|----------|----------------|---------|
| Constant             | .249     | .284           | .381    |
| Relative Advantage   | .142     | .077           | .066    |
| Compatibility        | .219     | .078           | .005**  |
| Perceive Ease of Use | .171     | .072           | .020*   |
| Image                | .184     | .067           | .007**  |
| Security             | .234     | .068           | .001**  |

R-squared = 0.547, Adjusted R-squared = 0.536, (\*) $p<0.05$ , (\*\*)  $p < .001$

**Discussion:**

The overall results on the ICT adoption intention section confirm Moore and Benbasat (1991) theory regarding the influence of innovation characteristics on ICT adoption.

From the result of this study, relative advantage has no direct and significant effect on ICT adoption intention. However, the positive sign on the figure shows that if there is a relationship it will be a positive one. This means that the higher the advantage the higher the level of ICT adoption intention the SMEs will have. This result is in contradiction on the previous studies done by other researchers (Hoppe *et al.*, 2001; Alam *et al.*, 2007). However, the contradicting results here might be due to the fact that not many of the respondents actually use ICT into their business. They do not see it as a factor that will affect ICT adoption intention because they do not have the experience. When the respondents do not have actual experience in adopting ICT into their business, their perception will tend to be different from those who actually have experiences before.

Studies like those carried out by Alam *et al.* (2007), Tan and Teo, (2000); Hoppe *et al.* (2001); Cooper and Zmud (1990); Tornatzky and Klein (1982) have generally shown that perceived compatibility of an innovation has a positive influence on the adoption of the innovation. This research therefore further proves the earlier findings that showed, SMEs who feel that using ICT is compatible with their working are more inclined to adopt such services.

The acceptance of both H3 (perceive ease of use) and H4 (image) is in agreement with a wide range of previous findings (Lederer *et al.*, 2000; van der Heijden, 2003; Yang, 2005; Horton *et al.*, 2001; Slyke *et al.*, 2005; Lee *et al.*, 2001; Olson and Boyer, 2003). The study result indicating that perceive ease of use and image have a positive effect upon level of ICT adoption intention. All of the previous studies suggest that the ease of information a ICT provides, the higher the level of ICT adoption intention the SMEs have. Similarly the results also show a positive relationship between image and SMEs ICT adoption intention, which means those who regard the use of ICT service as prestigious for the company will have higher intention to use ICT than who do not.

For example, SMEs who view the adoption of ICT service as a way to appear technically say and/or politically progressive will demonstrate a higher intention to use ICT services into the SMEs.

The study also confirmed that security has a significant effect on ICT adoption intention. The relationship is a negative relationship which means that when owner or manager of SMEs is fear about security the degree of ICT adoption is lower. The fear of losing trade secrets will create reluctance for SMEs to consider entering the E-commerce business arena (Killikanya, 2000). All of the previous studies suggest that perceived security was also found to be negatively associated with the adoption since it is a major impediment to the adoption of ICT.

## **8. Implications:**

### **8.1. Implications for Research:**

This study presents an introductory research that explains 55 per cent of the variance in SMEs adoption of ICT. This research can serve as a starting point for other ICT adoption research, while encouraging further exploration and integration addition adoption constructs. Future research needs to focus on a larger cross section and more diversified random samples to verify the findings of the current study. Moreover, to further clarity of the factor influence on ICT adoption in the businesses, Technology Acceptance Model (TAM) and or other model could be used. Future inquiries could also examine the causal relationships between factors and SMEs' perceive overall ICT adoption by employing a structural equation modeling technique. In addition, future research needs to examine ICT adoption in the context of cross-national differences.

### **8.2. Implications for Practice:**

The study reveals five significant indicators of SMEs' intention to adopt ICT in their business. Government agencies like MCMC, MDeC, SMIDEC, and other government agencies should create better awareness of the benefits of EC to encourage higher rate of adoption. It can be done by having seminars or induction sessions to allow SMEs to evaluate their new inventions. In order to receive greater responses towards ICT adoption, it is recommended that authority should give certificate as a token and financial support to attend the seminar. They could establish a close link with all SMEs and get continuous feedback from them in order to identify the problem areas and take necessary actions to rectify them. Another way to enhance the possibility to use ICT in the SMEs sectors, government should enforce standardized, consistent and uniform policies in all SMEs sectors, agencies or subsidiaries in implementing ICT system. As it is found in this study, respondents mentioned ICT is a complex system, the system should be made as user-friendly as possible as not all users are familiar with computers and the Internet, especially the old SMEs. Providing online help and giving end users the choice of their preferred language will ease of their usage. Management of SMEs should provide adequate pre-training to their employees on how to use ICT systems in business at all levels must be ensured so that the employees should get comfortable with its use. Security of information must be ensured with the help of the restricted access level of passwords.

## **9. Limitations and Future Directions:**

Like other empirical studies, this study is not without its limitations. Our sample consisted of SMEs in Melaka and Johor Bahru states in Malaysia may limit the generalizability of the results. Although several technology adoption studies focused on the zone basis (Van Beveren and Thomson, 2002; Cloete *et al.*, 2002), state based respondents, such as experience using technology, differ from state to state from overall population of SMEs. The sample size itself is relatively small. The study can be strengthened by increasing the sample size and including participants in other geographical areas. With an increased sample size, a more detailed empirical analysis among the independent variables and the variables that have multiple categories can be performed. Potential correlations between some of the independent variables (e.g. gender, race, education level of the manager) need to be reported in a future study. Longitudinal studies that use both quantitative and qualitative techniques are required to understand the changes on prior and post ICT adoption in the SMEs. Such studies could result in explanatory variables that have not been considered in this study. Finally, ICT has been used in the business in so many ways, and different companies use it in different ways. Investigations could be conducted by asking people to list the priorities of ICT usages in SMES, and further qualitative statements regarding satisfactions of ICT adoption could be obtained.

## **Conclusion:**

The purpose of this study is to investigate factors affecting intention to adopt ICT in the Malaysian SMEs context. This study also contributes to and extends our understanding of the Internet as a medium for commercial use in the manufacturing arena, identifying the rationales for adopting or rejecting the ICT by the SMEs. From a managerial viewpoint, the findings provide support for investment decisions, and for decisions relating to the development Internet services that address and take the concerns and needs of SMEs into consideration.

The research was done under Moore and Benbasat (1991) perceived characteristics of innovating framework, with security introduced as an additional variable. The multiple regression analysis shows that Moore and Benbasat's perceived characteristics of innovating –compatibility, perceive ease of use and image were useful predictors. Compatibility and perceive ease of use are the factors that primarily influence adoption of ICT. Relative advantage was not useful predictors of ICT adoption by SMEs in the southern region in Malaysia. Additional characteristics security was turned out to be a significant predictor of adoption. All non-adopters, light adopters and heavy adopters appeared to be aware of this issue.

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