

Enacted Capabilities on Adoption of Information Systems: A Study of Small- and Medium-Sized Enterprises

Noor Akma Mohd Salleh

UO Business School, The University of Queensland, Australia
Telephone: +617 33469324 Fax: +617 33656788 e-mail address: m.salleh@business.uq.edu.au

Fiona Rohde

UQ Business School, The University of Queensland, Australia
Telephone: +617 33656530 Fax: +617 33656788 e-mail address: f.rohde@business.uq.edu.au

ABSTRACT

An increasing number of studies into the adoption behaviour of Information systems (IS) have focused on small- and medium-sized enterprises (SMEs). These past studies provide an understanding of the contextual factors offering a simple dichotomous measure such as adopters and non-adopters rather than the manner of usage (from adoption to utilisation). This study introduces the construct of enacted capabilities and examines the enacted capabilities that activate and stimulate SMEs to use an IS to its fullest potential. The construct is derived from the resource-based view of the firm and allows the integration of the technology acceptance model with diffusion of innovation theory. A model of how enacted capabilities affect IS adoption behaviour through perceived net benefits is developed. Results indicate that enacted capabilities possessed by SMEs play a prominent role in determining the adoption behaviour by these enterprises (i.e. active adopters and non-active adopters).

Key words: Information systems; Adoption behaviour; Enacted capabilities; Small- and medium-sized enterprises.

INTRODUCTION

Studies on adoption behaviour of innovative information systems (IS)¹ are devoting increasing attention to small- and medium-sized enterprises (SMEs). Most prior studies, however, have still relied on models developed from studies of large firms (e.g., Ang and Koh, 1997; Thong and Yap, 1995; Iacovou et. al., 1995). The applicability to SMEs of results and models developed from large firm studies is not without question.

SMEs are not miniature versions of large firms. As DeLone (1981) observed SMEs faced different computer related challenges and opportunities than did large firms. In fact SMEs may want to use IS, but may be prevented by lack of skills, knowledge, expertise and finances (e.g., Lee, 2004; Scupola, 2003; Chau and Jim, 2002; Thong, 2001). Past studies show that external expertise is more important than other key factors in IS adoption by SMEs (e.g., Chau and Hui, 2001; Thong, 2001; Iacovou et. al., 1995). Furthermore, these enterprises do not have the internal resources and face difficulties in recruiting and retaining IS professionals (Caldeira and Ward, 2003; Kuan and Chau, 2001).

Due to their differences from large firms, there is a need to examine SMEs separately. Consequently, the aim of this study is to make a contribution by empirically examining issues on the adoption of IS by SMEs. In line with this objective, the following research question will be examined: what are the critical activators that allow SMEs to overcome inhibiting factors and adopt and actively utilise IS?

PRIOR STUDIES

The technology acceptance model (TAM) presented by Davis (1989) has commonly been used as groundwork for IS research at the individual level (Prescott, 1995; Davis et. al., 1989). TAM assumes that individuals adopt and accept IS based on perceptions and attitudes (Venkatesh and Davis, 2000). Specifically, the model identifies the causal linkages between an individual user's attitudes and perceptions toward IS and the actual adoption (e.g., Van Akkeren and Cavage 1999; Davis, 1989). TAM postulates that (1) perceived usefulness and (2) perceived ease of

¹ Innovative information systems refer to all types of information systems such as information technology, Internet-based information systems, on-line businesses and electronic businesses.

use are of primary relevance for information technology acceptance behaviours (Davis et. al., 1989). Moreover, perceived usefulness is also influenced by perceived ease of use (Ventakesh and Davis, 2000). One of the limitations of TAM is its assumption that usage is voluntary. External pressure to adopt IS by SMEs, and thus the removal of the “truly voluntary nature of adoption” implies that TAM may not provide a complete prediction and explanation of adoption behaviour by these enterprises.

Rogers’ (1995) diffusion of innovation theory (DOI) describes innovations as having certain characteristics, such as relative advantage, complexity, compatibility, trialability, and observability. These characteristics are perceived differently by different adopters, and thus affect the rate of adoption for the innovation (e.g., Teo and Pian, 2003; Levy and Powell, 2003; Wang and Tsai, 2002). IS researchers, however, have determined that these characteristics are not a complete set of factors in explaining the adoption of IS (Lee, 2004; Fichman, 1993; Brancheau and Wetherbe, 1990). Tornatzky and Fleischer (1990) propose a framework consisting of technological factors (e.g., perceived net benefit; trust in technology), organisational factors (e.g., technical competence; level of skills and knowledge; owners’ attitude) and environmental factors (e.g., vendor and trading partner influence) that influence IS adoption behaviour by SMEs. Past studies also reveal that perceived benefits are an important factor affecting SMEs willingness to adopt IS (e.g., Lee, 2004; Levy and Powell, 2003; Wang and Tsai, 2002, Chau and Jim, 2002). With continual advances in IS innovation, Tornatzky and Fleischer (1990) framework and DOI theory still provide an excellent theoretical foundations for exploring IS adoption behaviour within SMEs (e.g., Lee, 2004; Levy and Powell, 2003; Wang and Tsai, 2002).

The importance of the availability of financial and technological resources and the availability of external expertise to information systems success has been well documented (e.g., Lee, 2004; Caldeira and Ward, 2003). More recently, a firms’ technological opportunism has been introduced as an important determinant of IS adoption (Srinivasan et. al., 2002). Within this context, managers possess the capability to respond to new opportunities by acquiring knowledge and understanding them. The more knowledge and understanding they acquire in relation to a particular system the more likely they are to adopt and utilise that system (Srinivasan, et. al., 2002; Mata et. al., 1995). SMEs also require organisational capabilities in what may be labelled enacted capabilities. These enacted capabilities include skills and knowledge of the enterprises’ members, trust in technology and trading partners, external support, and organisational culture (Caldiera and Ward, 2003; Bharadwaj, 2000; Mata et. al., 1995, Barney, 1991).

This study investigates the relationship between perceived net benefits and enacted capabilities in predicting adoption behaviour. Many SMEs are small organisations where decisions are made by an individual (e.g., the owner). Hence organisational decisions are intertwined with individual perceptions (Lee and Runge, 2003; Van Akkeren and Cavage, 1999). Combining these characteristics (i.e. perceived benefits and enacted capabilities) enables a coherent and consistent explanation for predicting the IS adoption behaviour by SMEs that possess both organisational and individual perceptions.

THEORETICAL FOUNDATION AND HYPOTHESIS DEVELOPMENT

Based on the aforementioned arguments, the adoption and utilisation of IS across heterogeneous culture, locales and markets is a critical and ongoing challenge. Dealing effectively with such a challenge requires more than just good ideas and extensive resources. It also requires organisational capabilities in what may be labelled “enacted capabilities”. These enacted capabilities are informed by the resource-based view of the firm where resources that require an extended learning process, or are a result of a particular organisational culture are more likely to be unique to the enterprise and more difficult to imitate (Bharadwaj, 2000; Andreu and Ciborra, 1998; Barney, 1991). Enacted capabilities are controlled by the firms and enable the firms to conceive and implement strategies that improve their efficiency and effectiveness (Grant, 1991, Barney, 1991).

For a firm to be successful in the adoption and utilisation of IS, the firm’s capabilities of employing the innovation are a distinguishing factor between firms (Conner, 1991). A firm is not successful in adopting and utilising IS because of the particular leading edge technological application. A firm is successful in adopting and utilising IS because the firm develops a capability for applying the IS to ever-changing business opportunities (Ross et. al., 1996; Grant, 1991). This study considers enacted capabilities as organisational attributes resulting from processes that bring together the culture, trust in the technology, trust in trading partners, external experts support, and skills and knowledge of top management of the firms (Caldeira and Ward, 2003; Srinivasan et. al., 2002; Dasgupta et. al., 1999). These enacted capabilities influence the firm ability to be enabled for use of IS.

Investigating the enacted capabilities of SMEs is the key to understanding perceived net benefits to embracing IS.

The understanding of the perceived net benefits by CEO/owner of SMEs helps to explain how the SMEs will behave related to their IS development strategy (Lee, 2004; Fillis et. al., 2003; Kowtha and Choon, 2001). Subsequently, SMEs will have the confidence to enter into new IS environment.

THE RESEARCH MODEL

The proposed research model is based on the extension of TAM and a combination of both the resource-based view of the firm and DOI theory (Figure 1).

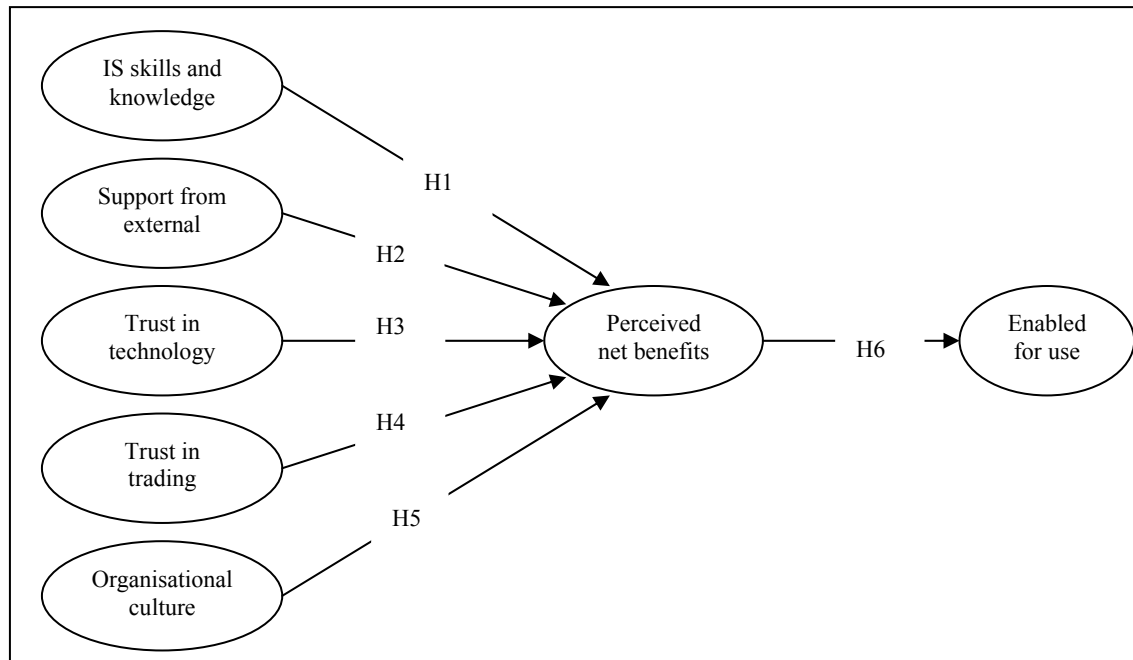


Figure 1: TAM and DOI Theory.

Top Management IS Skills and Knowledge

Lack of IS skills and knowledge by top management creates insufficient awareness of the potential benefits. SMEs are more likely to lack these skills and as such be less likely to perceive the benefits of adopting IS (Chang et. al., 2003; Senn and Gibson, 1981). Prior studies have found that a SME managed by CEOs having IS skills and knowledge have better understanding of the benefits of IS adoption (Thong, 1999; Ettl, 1990; Dewar and Dutton, 1986). This study predicts that a CEO with more knowledge and skills in technological innovation is more likely to perceive higher benefits of IS, and thus, more likely to use that system (Srinivasan, et. al., 2002; Mata et. al., 1995).

H1: Top management IS skills and knowledge will have a significant positive direct affect on the perceived net benefits of IS.

Support from External Experts

Besides the lack of experience with the corresponding technology, SMEs generally face difficulties in recruiting and retaining internal IS experts (Dos Santos and Peffer, 1998). This difficulty implies SMEs may rely significantly on external support (Cragg and King, 1993; Senn and Gibson, 1981). These external experts act as mediators to compensate for the lack of IS knowledge and play a critical role in lowering and evaluating the knowledge barriers toward IS diffusion in SMEs (Attewell, 1992). External expert support will make it easier for SMEs to use IS when lacking in-house expertise.

H2: Support from vendor will has a significant positive direct affect on the perceived net benefits of IS.

Trust in Technology

Trust in technology measures reliance on technical safeguards, protection measures, and control mechanisms that aim to provide reliable transactions with timely, accurate, and complete data transmission (Bahmanziari et. al., 2003; Chan and Lee, 2002). IS are unlikely to be used unless this perception of a security problem is solved or alleviated (Kendall et. al. (2001). This study expects trust in technology is a significant factor that influences the level of perceived net benefits and thus the enabled for use of the systems. This issue is especially obvious in SMEs, as SMEs tend to have lower technology levels.

H3: Trust in IS technology will have a significant positive direct affect on the perceived net benefits of IS.

Trust in Trading Partners

Lack of trust in trading partners during IS activities can sometimes lead to uncertainties. These uncertainties include uncertainty regarding unknown future events, and uncertainty regarding trading partners' responses to future events in IS activities (Ratnasingam, 2003; Chan and Lee, 2002; Deeter-Schmelz, 2001). Lack of previous experience or relationships with Internet-based trading partners may lower perceived net benefits in the businesses' minds (Bahmanziari et. al., 2003; Pavlou, 2002; Bensaou, 1999). This study argues that these uncertainties create a perception of difficulty, thereby inhibiting the tendency of SMEs ability to use IS.

H4: Trust in trading partners will have a significant positive direct affect on the perceived net benefits of IS.

Organisational Culture

Organisational culture is a reflection of shared values that guide the thinking and behaviour of members (Dasgupta et. al, 1999; Cook and Lafferty, 1989). Organisational culture orientations can result in a range of perceived net benefits (Fillis et. al., 2003; Covin, 1991). These perceptual stances can range from the highly positive entrepreneurial stance to a much more conservative, resistance to change stance. This study expects that those enterprises that have an entrepreneurial culture will be more likely to perceive innovativeness favourably.

H5: A high performance (entrepreneurial) organisational culture will have a significant positive direct affect on the perceived net benefits of IS.

Enabled for Use and Perceived Net Benefits

A number of IS studies have examined the effect of perceived net benefits on usage and have found the factor to be an important determinant of IS adoption behaviour (Lee, 2004, Moore and Benbasat, 1996, Adam, et. al., 1992). As argued by Rogers (1995), perceived net benefits is the degree to which an innovation is perceived as being better than the idea it supersedes, and that has a direct impact on the likelihood of adoption (Chan and Lee, 2002; Kendall et. al., 2001; Iacovou et. al., 1995). All these benefits, direct and indirect come at a cost. If the perceived benefits cover the perceived costs, a firm is likely to favour the decision to adopt. Even though quantifying such benefits (specifically, indirect benefits), is generally recognised as difficult, there is a perception of the proposed magnitude of these benefits.

H6: Perceived net benefits will have a significant positive direct affect on enabled for use of IS.

RESEARCH METHOD*Background*

A cross-sectional field study was conducted with CEOs/owners of Malaysian SMEs in December 2004 to January 2005. The IS being introduced to Malaysian SMEs is the government electronic procurement system, better known as ePerolehan. ePerolehan was launched in December 2002. The system streamlines government procurement activities with suppliers. ePerolehan allows suppliers to present their products on the World Wide Web, receive, manage and process purchase orders and receive payment from government agencies via the Internet. The supplier is able to submit quotations, obtain tender document and submit tender bid through ePerolehan. At the time of the

study, out of 61,000 SMEs that registered for the ePerolehan about 7,736 SMEs are ePerolehan enabled. Approximately half of those that have been enabled for use are active users (Commerce Dot Com Database, 2005).

Measurement Scales

The seven constructs, identified in the research model (see Figure 1), were measured within the study². The construct “enabled for use” refers to the extent to which the enterprise has the ability to successfully implement electronic procurement upon receiving orders of goods and services from government agencies. This implies that during the adoption stage SMEs have the ability to implement and proactively use ePerolehan when they made the decision to adopt the system (Thong, 1999). Hence, four items that are deemed applicable to SMEs in the context of ePerolehan using seven-point Likert scale were developed.

The second construct “perceived net benefits” was measured using twelve item seven-point Likert scale that examined the enterprise perception of the net benefits of adopting and utilising ePerolehan. Four constructs: top management IS skills and knowledge; support from external experts; trust in technology and trust in trading partners were measured using pre-validated scales adapted from prior IS studies, with six-item 7-point Likert scales. All these constructs, except for enabled for use were measured using pre-validated scales adapted from prior studies of IS adoption behaviour.

“Organisational culture” refers to the type of culture that exists in the business. The original measures were used by Wallach’s (1983) to assess culture in organisation. Wallach identified and defined three separate organisational cultures, innovative, supportive and bureaucratic culture, covering almost all the parameters identified by other research³. The measures of these three categories consisting ten items are constructed to elicit responses concerning cultural of varying degree. Instead of ranking these items, respondents had to choose which statements best describe the culture of their organisation. Seven-point Likert scale was used with “1” being “Strongly disagree” to “7” being “Strongly agree” to describe their organisations (Kanungo, et. al., 2001; Weber and Pliskin, 1996).

Validation of Research Instrument

The instrument was pre-validated by a panel of academics. The instrument was then put through a two way language translation process to ensure that the translation to Malay was valid (language in which survey was ultimately administered). The instrument was also validated for ease of answerability by ten Malaysian SMEs and pilot tested using thirty five SMEs randomly selected from the population of government suppliers.

Data Collection, Samples and Non-Response Bias

The questionnaire was mailed to 1,000 SMEs who have registered for the ePerolehan. The final samples for the study were 206 with a response rate of 21.5 percent⁴. Demographic data about the respondents in the final samples are presented in Table 1. Tests were conducted to ensure that there was no late response bias and also limited non-response bias.

DATA ANALYSIS

Partial Least Square Approach

This study uses Partial Least Squares (PLS) to examine the measures and research model. An initial factor analysis was performed. All constructs appeared valid except organisational culture. Organisational culture was eventually determined to contain two components. We define Component 1 to be “performance oriented” and Component 2 to be “stability oriented” cultural values as suggested by Dasgupta et. al. (1999). Scale reliability was assessed via Confirmatory Factor Analysis (CFA), performed by using the PLS approach. All forty six measurement items of constructs included in this study are loaded within the range of 0.61 or more and thus appear reliable. All scale items

² Due to space limitations the survey instrument is not included, however can be obtained by contacting the researchers.

³ O’Reilly et. al. (1991) and Glaser et. al. (1987) argued that Wallach (1983) provides a validated instrument for empirically assessing organisational culture into entrepreneurial organisation culture.

⁴ Although the response rate is not high, it is comparable to many empirical studies in SMEs and innovative information systems research (e.g. Lee, 2004; Bhattacharjee and Premkumar, 2004; Chau and Jim, 2002; Karahanna et. al. 1999). Furthermore, data was being gathered at the time of the Tsunami disaster in the region.

were tested for convergent and discriminant validity again results provide confidence in the adequacy of the measurement scales.

RESULTS

Analysis of the results proceeded in two stages. First, the hypothesized associations in the research model were analysed using PLS. This process allowed the strength of the hypothesized paths of the research model (path analysis) to be examined. The structural relationships among the constructs were also examined. A post hoc analysis was performed to further highlight differences in the active users and the non-active users. The same procedure at the first PLS analysis are applied to the post hoc analysis stage.

Path analysis

As PLS makes no distributional assumptions, bootstrapping (100 samples with replacement) is used to test the statistical significance of each path coefficient (Chin, 1998). Results of the analysis for the overall model, including path coefficients, path significances for all independent variables and variance explained (R^2 values) for each dependent variable are shown in Figure 2-a.

	Demographic variables	Frequency	Percent
Owner of the company	OWNER	84	40.8
	CEO	122	59.2
Level in the organisation hierarchy	Middle management	102	49.5
	Strategic management	104	50.5
Actively involved with the decision	Yes	201	97.6
	No	5	2.4
No of employee	Less than 10	82	39.8
	11 to 30	63	30.6
	31 to 45	8	3.9
	46 to 75	15	7.3
	76 to 120	3	1.5
	More than 120	35	17.0
No of year established	1 to 2 years	12	5.8
	3 to 5 years	58	28.2
	6 to 10 years	48	23.3
	11 to 15 years	33	16.0
	More than 16 years	55	26.7
Type of industry	Servicing	99	48.1
	Manufacturing	21	10.2
	Others	86	41.7
Type of business	Sole proprietor	40	19.4
	Partnership-based	19	9.2
	Small corporation	147	71.4
Estimated total annual revenue	Less than RM50,000	12	5.8
	More than RM50,000 to RM100,000	14	6.8
	More than RM100,000 to RM150,000	18	8.7
	More than RM150,000 to RM250,000	23	11.2
	More than RM250,000 to RM500,000	38	18.4
	More than RM500,000 to RM1.5 million	33	16.0
	More than RM1.5 million to RM5 million	29	14.1
	More than RM5 million	39	18.9

Uses of information systems	Co-ordination	43	20.9
	Efficiency	23	11.2
	Innovation	107	51.9
	Collaboration	33	16.0
No of years the company has registered for the ePerolehan system	1 to 4 months	40	19.4
	5 to 8 months	16	7.8
	9 to 11 months	28	13.6
	12 to 24 months	74	35.9
	More than 24 months	48	23.3

Table 1: Demographic summary of survey respondents (n=206).

Two of the hypothesised paths (1) top management IS skills and knowledge ($\beta = 0.338$) to perceived net benefits and (2) trust in trading partners ($\beta = 0.308$) to perceived net benefits were significant at $p < 0.10$. All remaining hypothesized paths were not significant. Top management IS skills and knowledge and trust in trading partners jointly explained 44.8 percent of the variance in perceived net benefits, with both constructs contributing equally to the explanation. The results suggest that top management IS skills and knowledge and trust in trading partners are more critical in the formation of perceived net benefits than any other enacted capabilities. The results also reflected the impact of top management IS skills and knowledge and trust in trading partners as suggested by prior studies.

For perceived net benefits to enablement for use, the hypothesized path ($\beta = 0.336$) was significant at $p < 0.05$ indicating that perceived net benefits are critical in the SMEs decision to be enabled for use. The strong direct effect of perceived net benefits is consistent with prior studies, which have identified net perceived benefits to be the dominant factor that activate the adoption of IS. About 11.3 percent of the variance enabled for use was explained by perceived net benefits. Thus, the results support hypotheses 1, 4 and 6.

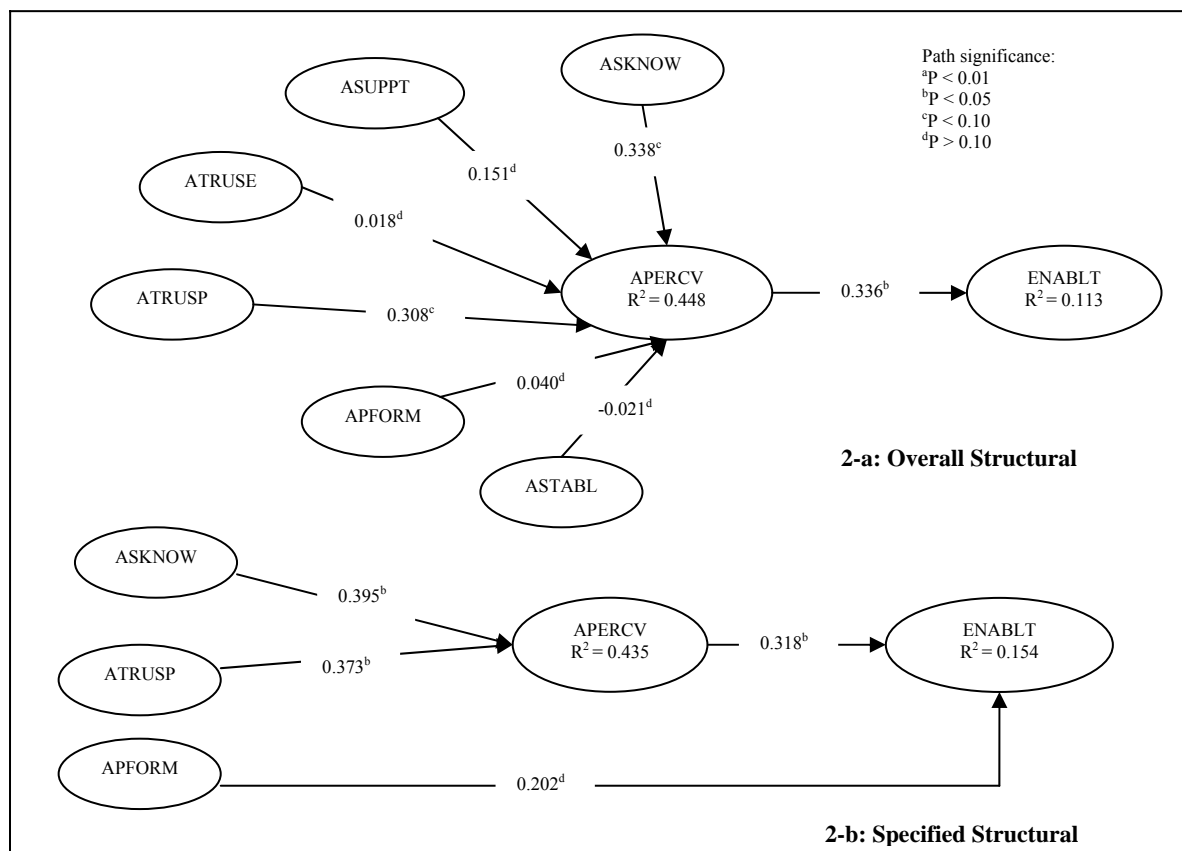


Figure 2: PLS Analysis of Enabled for Use.

PLS analysis was again performed on the research model to obtain determinate values of the latent construct for predictive purposes. The analysis is done by including/excluding each of the enacted capabilities constructs to the dependent latent constructs (i.e. perceived net benefits and enabled for use). Any path estimates (β) that are not significant ($p > 0.10$) are omitted from the model. This procedure resulted in a more refined and specified model. The changes in R^2 (i.e. effect size f^2)⁵ on the initial model and the specified model are then examined to see whether the impact of particular enacted capabilities on perceived net benefits and enabled for use is substantial (Chin, 1998). The effect size f^2 is assessed based on Cohen (1988) where 0.02, 0.15 and 0.35 as small, moderate and large effects respectively.

Figure 2-b shows the new resulting estimates (β) of the hypothesized path associations of the research model that are significant ($p < 0.10$). In the specified model, top management IS skills and knowledge ($\beta = 0.395$) and trust in trading partners ($\beta = 0.373$) have become more meaningful and significant ($p < 0.05$) in the formation of perceived net benefits. All other constructs (i.e., support from external experts, trust in technology and organisational culture) were non-significant and thus deleted. The results suggested that both top management IS skills and knowledge and trust in trading partners have significant influence on SMEs perception of the net benefits that may be realised from enabled for use of IS. Even though the R^2 is slightly lower in the specified model (i.e., $R^2 = 43.2$ per cent) in explaining the net perceived benefits by both of these constructs, the hypothesised path have become more meaningful ($p < 0.05$). 15.4 percent of enabled for use was explained by perceived net benefits with meaningful path estimates ($\beta = 0.318$) and were significant at $p < 0.05$.

The specified model resulted in slightly higher standardised beta (β) for performance oriented organisational culture (from $\beta = 0.040$ to $\beta = 0.202$), even though it was not significant ($p > 0.10$), and a larger R^2 of 15.4 percent for enabled for use. The specified model has an effect size f^2 of 0.02 for perceived net benefits and -0.05 for enabled for use, which indicated small to medium effect. Even though the effect size f^2 is small to medium, the effect is very important as the resulting beta changes (β) for all hypothesized paths are meaningful ($p < 0.05$). Collectively, these effects attest the importance of enacted capabilities in shaping perceived net benefits that activate SMEs to be enabled for use.

POST HOC ANALYSIS

The initial results demonstrated the adoption behaviour of SMEs without considering whether they are actively using the system. To understand whether there are differences among these groups this study drilled down on the dataset using two dimensions: (1) have the ability to use and actively using the system (i.e. frequency of using the system: half of the time, often, very often and all the time) and (2) have the ability to use but not actively using the system (i.e. frequency of using the system: none at all, seldom, sometimes). In the post hoc stage, data are analysed using the same procedure as for the whole dataset. Both models for active and non-active adopters were evaluated by examining the strength and significance of the hypothesized paths. The models were also evaluated by comparing the relative effect size f^2 for common dependent variables.

Active Adopters

For the overall model for active adopters (Figure 3-a), the hypothesized paths trust in trading partners ($\beta = 0.478$, $p < 0.01$) and top management IS skills and knowledge ($\beta = 0.261$, $p < 0.10$) are significant. All other hypothesized paths were non-significant. Both of these constructs combined explained 67.8 percent of the variance in perceived net benefits, with trust in trading partners contributing 47.8 per cent to most of the explanation for the formation of perceived net benefits. The result suggests that for active adopter, the enabled for use is less dependent on perceived net benefits and their decision relied more on the enacted capabilities that they possess.

⁵ $f^2 = \frac{R^2_{\text{initial model}} - R^2_{\text{specified model}}}{1 - R^2_{\text{initial model}}}$

$1 - R^2_{\text{initial model}}$

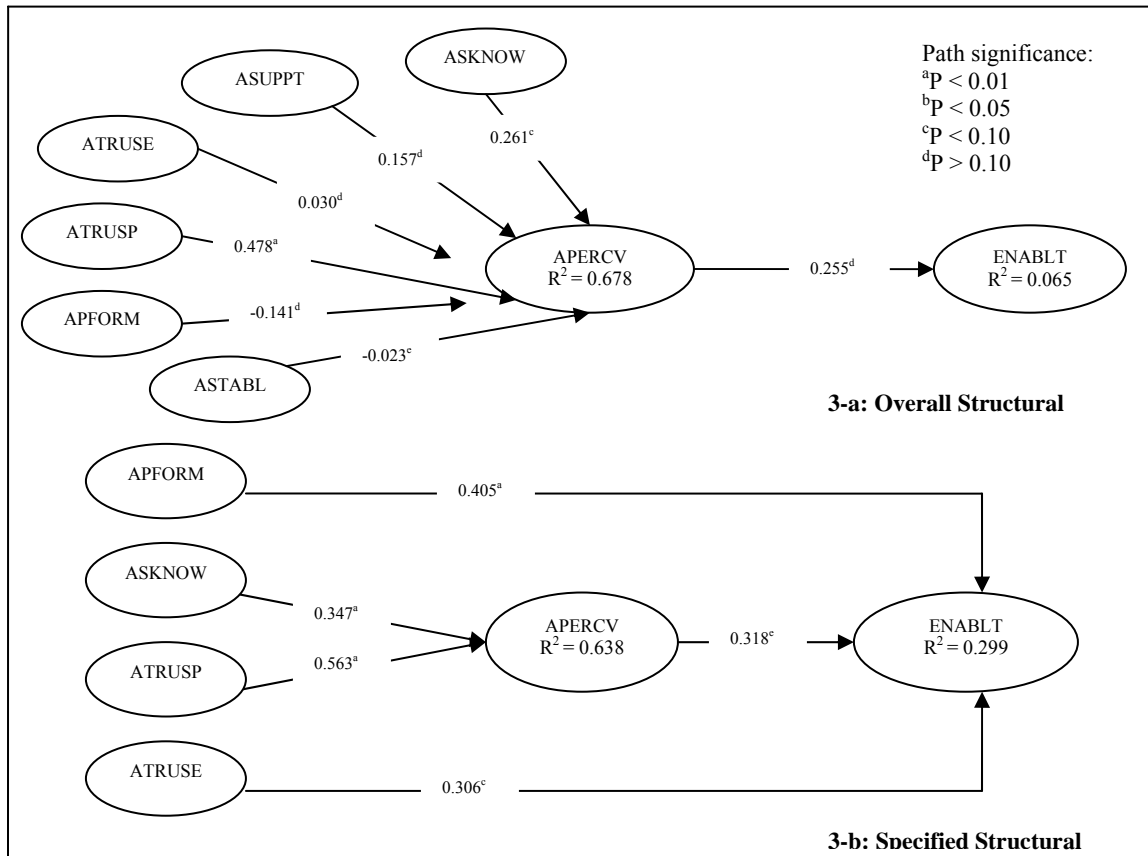


Figure 3: PLS Analysis of Enabled for Use (Active Adopter).

The specified model in Figure 3-b indicates two significant hypothesized paths affecting net perceived benefits: top management IS skills and knowledge ($\beta = 0.347$); trust in trading partners ($\beta = 0.563$). Top management IS skills and knowledge together with trust in trading partners are still the dominant factors in explaining the variance in perceived net benefits (combined R^2 of 63.8 percent). Perceived net benefits still has a marginally significant direct effect on enabled for use ($\beta = 0.318$, $p = 0.10$).

The performance orientation culture that SMEs possess, however, has emerged as significant in determining the adoption behaviours by these enterprises ($\beta = 0.405$ at $p < 0.01$). Trust in technology also has a marginally significant direct effect on stimulating active utilisation of IS ($\beta = 0.306$, $p = 0.10$). Both performance oriented culture and trust in technology explained 29.9 per cent of the variance in the enabled for use for active adopter, with performance oriented culture contributes more to the explanation.

The specified model has a moderate to large effect size f^2 of 0.12 for perceived net benefits and 0.33 for enabled for use. The weak perceived net benefits, coupled with strong presence of performance oriented culture and trust in electronic procurement technology, suggests that enabled for use is determined more by enacted capabilities than the perceived benefits of adopting IS. The results from the specified model support and strengthen the premise of the study, i.e., the importance of the enacted capabilities possessed by SMEs in relation to adoption decisions.

Non-Active Adopters

For the overall model of non-active adopters (see Figure 4-a), only top management IS skills and knowledge influence the formation of perceived net benefits ($\beta = 0.370$, $p < 0.05$). This enacted capability explained 40.4 percent of the variance in perceived net benefits. All other hypothesised paths were non-significant at $p > 0.10$. The result suggests that for the non-active adopters, perceived net benefits is very much affected by IS skills and knowledge possess by SMEs top management, and depend less on other enacted capabilities of the enterprises. 13 percent of variance in enabled for use was explained by perceived net benefits ($\beta = 0.336$, $p < 0.01$). These findings demonstrated the salience of top management IS skills and knowledge in shaping perceived net benefits, and the subsequent belief or perception of the net benefits they may received greatly impact enabled for use.

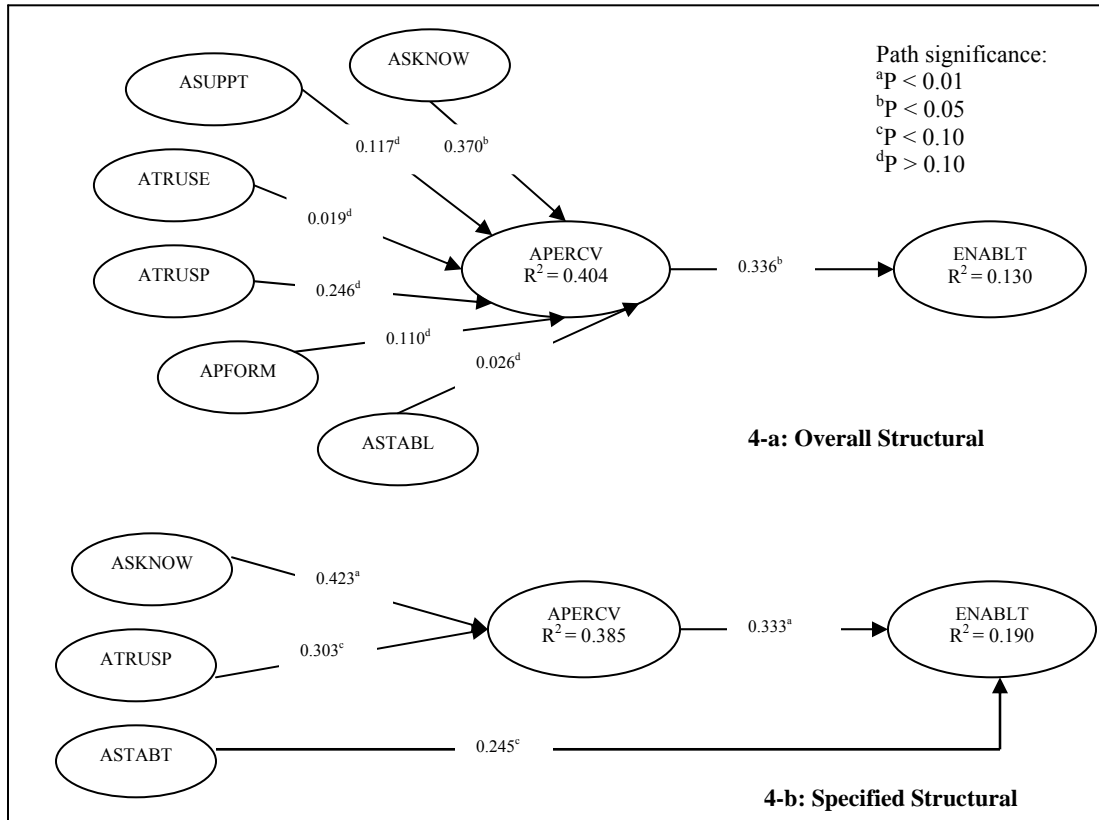


Figure 4: PLS Analysis of Enabled for Use (non-active adopter).

The specified model Figure 4-b indicates two significant hypothesized paths affecting net perceived benefits: top management IS skills and knowledge ($\beta = 0.423, p < 0.01$); trust in trading partners ($\beta = 0.303, p < 0.10$). Both of these constructs explained 38.5 percent of the variance in perceived net benefits, with top management IS skills and knowledge being the dominant factor. Thus, the result mirrors a similar pattern to those of the active adopters. Perceived net benefits has a significant direct effect on enabled for use ($\beta = 0.333, p < 0.01$) suggesting that for the non-active adopters perceived net benefits are more critical in stimulating enabled for use.

The stability orientation culture that SMEs possess, however, has emerged as a marginally significant in determining the adoption behaviours by these enterprises ($\beta = 0.245$ at $p < 0.10$). This construct, in combination with net perceived benefits, explained 19 percent of the variance in enabled for use.

The specified model has a small to moderate effect size f^2 of -0.07 for enabled for use and 0.03 for perceived net benefits. The effect size f^2 of -0.07 for enabled for use informs of the strong and substantive impact of stability oriented culture on enabled for use.

DISCUSSION

The results of the data analysis above provide preliminary evidence of important between active adopters and non-active adopters. The enacted capabilities that allow SMEs to overcome inhibiting factors for active adopters and non-active adopters are top management IS skills and knowledge and trust in trading partners. The finding demonstrates that top management with more knowledge of IS innovation are significantly more likely to implement aggressive technology adoption policy. However, having the skills and knowledge does not play an integral role in motivating SMEs to proactively use IS. Likewise, without trust in trading partners, SMEs might not be confidence to use IS to deal business with their trading partners. As evidenced in the current study, both of these enacted capabilities become important in sustaining and institutionalising usage of IS. This result support evidence in the literature (e.g., Chan and Lee, 2002). However, the current study takes a step further by investigating these constructs and their relationship to perceived net benefits. The finding suggests that trust in trading partners may be an effective mechanism to overcome non-active adopters' initial inertia in utilising IS.

Another important finding of the study is that active adopters and non-active adopters differ in the set of enacted capabilities underlying enabled for use. Whereas non-adopters enabled for use is affected by perceived net benefits, active adopters perceived net benefits do not affect these adopters to be enabled for use. The richer sets of predicting enabled for use for active adopters are trust in technology and performance oriented culture. The findings also indicated that stability oriented culture possessed by non-active adopter might impact enabled for use. Trust in technology was found not to be the determinant for enabled for use to non-active adopters. This may be cause by the organisational culture orientation of the non-active adopters. Stability oriented culture displays procedural, regulated and systematic culture and trust in technology is greatly affected by perceived risk of using IS (Ratnasingam, 2003; Chan and Lee, 2002). These non-active adopters might be sceptical about using IS because it is perceived as being very risky. The lack of trust in technology and the stability oriented culture that they possess, may inhibit these adopters, thus hindering them to proceed towards the full potential of IS usage. The finding demonstrates that SMEs that gear towards stability oriented culture probably needs to adopt a minimal amount of IS to survive in current environment. However, taking a step further into the adoption of IS warrants for extended learning process. This finding support Boynton and Zmud's (1987) recommendation emphasising the important of organisational culture in determining IS adoption behaviour.

CONCLUSIONS, IMPLICATIONS AND LIMITATIONS

This study found that organisations' enacted capabilities display important roles in the adoption behaviour of IS. Apart from requiring good ideas and financial resources, SMEs also require an extended learning process that is unique to them helping them to efficiently and effectively adopt and utilise IS. Although, this study deals with adoption in only one country, Malaysia, the study found that existing models for IS adoption developed within other countries are supported to some extent. A firm adopts and utilises an IS because the firm develops capabilities (such as trust in trading partners; top management IS skill and knowledge, trust in technology and organisational culture orientation) that enable them to deploy and mobilise IS. Second, this study found that trust in technology and organisational cultural orientations are important stimulators of IS usage. The result demonstrates that SMEs that have these capabilities are able to sense and response to challenges of IS utilisation in everyday practice.

The current study provides preliminary evidence suggesting perceived net benefit and enabled for use of IS are determined by the enacted capabilities. Both trust in trading partners and top management IS skills and knowledge influence perceived net benefits, and are significant to active adopters. On the contrary, perceived net benefits were found to be not significant in stimulating enabled for use. In the current study, the results may suggest the existence of an interaction effect between organisational culture, trust in technology and support from external experts.

The findings also have important practical implications for IS adoption and utilisation. The study provided preliminary evidence concerning the criteria that active adopters and non-active adopters' consider in relation to adoption of IS. Actively using the innovation requires identifying and understanding the enacted capabilities that are unique to SMEs. Such an understanding can assist system developers in the planning of intervention mechanisms, through training. During the training sessions the systems developers could educate SMEs about the technology by explaining the structural and technological safeguards that may be used to promote trust in technology. A better understanding of the technological safeguards will increase the level of trust in the technology. Furthermore, the system developers need to focus on building SMEs trust in trading partners. The building of trust in trading partners is of particular importance as the findings indicate active adopters have stronger beliefs about the reliability, competence and integrity of their trading partners compared with non-active adopters. Thus, systems developers may need to join forces with trade associations to enhance SMEs perceptions of the competency, integrity and reliability of the trading partners.

It is important to evaluate the study's results and contributions in light of its limitations. First, the use of government suppliers and one product may limit the generalisability of our findings. Second, the general caveats associated with the use of questionnaires apply. Third, perceived net benefits and IS innovation are dynamic, thus the use of cross sectional research may not fully capture the complexity or periodicity of the adoption and utilisation process.

There are a number of opportunities for future research with two mentioned here. First, a longitudinal case study would provide more conclusive evidence as to process through which enacted capabilities affect everyday business practices. Second, the interplay between enacted capabilities should be explored.

REFERENCES

- Andreu, R., and Ciborra, C. (1998). Organisational Learning and Core Capabilities Development: The Role of IT. in: Information Technology and Organisational Transformation - Innovation for the 21st Century Organisation. R. Galliers and W. Baets (eds.), John Wiley & Sons, Chichester, 87-106.
- Ang, J., and Koh, S. (1997). Exploring the Relationships between User Information Satisfaction. *International Journal of Information Management* (17:3), 169-177.
- Attewell, P. (1992). Technology Diffusion and Organisational Learning: The case of business computing. *Organisation Science* (3:1), 1-19.
- Bahmanziari, T., Pearson, J.M., and Crosby, L. (2003). IS Trust Important in Technology Adoption? A Policy Capturing Approach. *Journal of Computer Information Systems* (43:4), 46-54.
- Barney, J. (1991). Firm Resources and Sustainable Competitive Advantage. *Journal of Management* (17:1), 99-120.
- Bensaou, M. (1999). Portfolios of Buyer-Supplier Relationships," *Sloan Management Science* (40:4), 35-44.
- Bharadwaj, A.S. (2000). A Resource-based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation. *MIS Quarterly* (24:1), 169-196.
- Blili, S., and Raymond, L. (1993). IT: Threats and Opportunities for Small and Medium-Sized Enterprises. *International Journal of Information Management* (13:6), 439-448.
- Boynton, A.C., Zmud, R.W., and Jacobs, G.C. (1994). The Influence of IT Management Practice on IT Use in Large Organisations. *MIS Quarterly*, 299-318.
- Brancheau, J.C., and Wetherbe, J.C. (1990). The Adoption of Spreadsheet Software: Testing Innovation Diffusion Theory in context of End-user Computing. *Information Systems Research*, 115-143.
- Caldeira, M.M., and Ward, J.M. (2003). Using Resource-based Theory to Interpret the Successful Adoption and Use of Information Systems and Technology in Manufacturing Small and Medium Sized Enterprises. *European Journal of Information Systems* (12), 127-141.
- Chan, J.K.Y., and Lee, M.K.O. (2002). SME E-procurement Adoption in Hong Kong: The Roles of Power, Trust and Value. *Proceeding of the 36th Hawaii International Conference on System Sciences*, IEEE Computer Society, Hawaii,
- Chau, P.Y.K., and Hui, K.L. (2001). Determinants of Small Business EDI Adoption: An Empirical Investigation. *Journal of Organisational Computing and Electronic Commerce* (11:4), 229-252.
- Chau, P.Y.K., and Jim, C.C.F. (2002). Adoption of Electronic Data Interchange in Small and Medium sized Enterprises. *Journal of Global Information Technology Management* (10:4), 61-85.
- Chen, J.C., and Williams, B.C. (1998). The Impact of Electronic Data Interchange (EDI) on SMEs: Summary of eight British Case Studies. *Journal of Small Business Management*, 68-72.
- Chin, W.W. (1998). The Partial Least Squares Approach to Structural Equation Modelling. In *Modern Methods for Business Research* (eds), George A. Marcoulides, Mahwah, New Jersey, 295-336.
- Conner, K. (1991). A Historical comparison of Resource-based Theory and Five Schools of Thought within Industrial Organisation eEconomics: Do we have a New Theory of the Firm?. *Journal of Management* (17:1), 121-154.
- Covin, J.G. (1991). Entrepreneurial versus Conservative firms: A comparison of Strategies and Performance. *Journal of Management Studies* (28:5), 439-461.
- Cragg, P., and King, M. (1993). Small-firm Computing: Motivators and Inhibitors. *MIS Quarterly* (17:1), 47-60.

- Dandridge, T.C. (1979). Children are not little grown ups: Small business needs its own organisation theory. *Journal of Small Business Management*, 53-57.
- Dasgupta, S., Agarwal, D., Ioannidis, A., and Gopalakrishnan, S. (1999). Determinants of Information Technology Adoption: An Extension of Existing Models to firms in a developing country. *Journal of Global Information Management*, 30-40.
- Davis, F.D. (1989). Perceived Usefulness, Perceived ease of use, and User acceptance of information technology. *MIS Quarterly*, 319-339.
- Davis, F.D., Bagozzi, R., and Warshaw, P. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science* (35:8), 982-1003.
- Deeter-Schmelz, D.R., Bizzari, A., Graham, R., and Howdysshell, C. (2001). Business-to-business Online Purchasing: Suppliers' Impact on Buyers' Adoption and Usage intent. *The Journal of Supply Chain Management*, 4-10.
- DeLone, W.H. (1981). Firm Size and Characteristics of Computer Use. *MIS Quarterly* (5:4), 65-77.
- Dewar, R.D., and Dutton, J.E. (1986). The Adoption of Radical and Incremental Innovations: An Experimental Analysis. *Management Science* (32), 1422-1433.
- Dos Santos, B.L., and Peffers, K. (1998). Competitor and Vendor Influence on the Adoption of Innovative Applications in Electronic Commerce. *Information and Management* (34), 175-184.
- Ettlie, J.E. (1990). What makes a manufacturing firm innovative?. *Academy Management Executive* (4:4), 7-20.
- Fichman, R.G. (1992). Information Technology Diffusion: A review of empirical research. *Proceeding of 13th International Conference on Information Systems*, 195-206.
- Fillis, I., Johansson, U., and Wagner, B. (2003). A conceptualisation of opportunities and barriers to e-business development in smaller firm. *Journal of Small Business and Enterprises Development* (10:3), 336-344.
- Grant, R.M. (1991). The resource-based theory of competitive advantage: Implications for strategy formulation. *California Management Review* (33:3), 114-135.
- Iacovou, C.L., Benbasat, I., and Dexter, A.S. (1995). Electronic data interchange and small organisations: Adoption and impact of technology. *MIS Quarterly* (19:4), 465-485.
- Kanungo, S., Sadavarti, S., and Srinivas, Y. (2001). Relating IT strategy and organisational culture: An empirical study of public sector units in India. *Journal of Strategic Information Systems* (10), 29-57.
- Kendall, J.D., Tung, L.L., Chua, K.H., Ng, D.C.H., and Tan, S.M. (2001). Receptivity of Singapore's SMEs to electronic commerce adoption," *Journal of Strategic Information Systems* (10), 223-243.
- Kowtha, N.R., and Choon, W.I. (2001). Determinants website development: A study of electronic commerce in Singapore. *Information and Management* (39), 227-242.
- Kuan, K.K.Y., and Chau, P.Y.K. (2001). A perception-based model for EDI adoption in small businesses using a technology-organisation-environment framework. *Information and Management* (38), 507-521.
- Kwon, T.H. , and Zmud, R.W. (1987). Unifying the fragmented models of information systems implementation. in *Critical Issues in Information Systems Research*, R.J. Boland and R.A. Hirschheim (eds), John Wiley and Son Ltd., Chichester, England, 227-251.
- Lee, J. (2004). Discriminant Analysis of Technology Adoption Behaviour: A case of Internet Technology in Small Businesses. *Journal of Computer Information Systems*, 57-66.
- Lee, J., and Runge, J. (2001). Adoption of information technology in small business: Testing drivers of adoption for entrepreneurs. *The Journal of Computer Information Systems* (42:1), 44-57.

- Levy, M., and Powell, P. (2003). Exploring SME Internet adoption: Towards a contingent model. *Electronic Markets* (13:2), 173-181.
- Lin, C.Y.Y. (1998). Success factors of small- and medium-sized enterprises in Taiwan: An analysis of cases. *Journal of Small Business Management*, 43-56.
- Mata, F., Fuerst, W., and Barney, J. (1995). Information technology and sustained competitive advantage: A resource-based analysis. *MIS Quarterly* (19:4), 487-505.
- Moore, G.C., and Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research* (2:3), 192-222.
- Moore, G.C., and Benbasat, I. "Integrating diffusion of innovations and theory of reasoned action models to predict utilisation of information technology by end-users," in *Diffusion and Adoption of Information technology*, K.Kautz and J. Pries-Heje (eds), Chapman and Hall, London, 1996, pp 132-146.
- Pavlou, P.A. (2002). Institution-based Trust in Inter-organisational Exchange Relationships: The role of online B2B Markets Places on Trust Formation. *Journal of Strategic Information Systems* (11), 215-243.
- Ratnasingam, P. (2003). Inter-organisational trust in business-to-business electronic commerce: A case study in Customs Clearance. *Journal of Global Information Management* (11:1), 1-19.
- Ratnasingam, P., and Phan, D.D. (2003). Trading partner trust in B2B e-commerce: A case study. *Information Systems Management*, 39-50.
- Raymond, L., and Bergeron, F. (1996). EDI success in small and medium sized enterprises: A field study. *Journal of Organisational Computing and Electronic Commerce* (6:2), 161-172.
- Rogers, E.M. (1995) *The Diffusion of Innovation*, (4th ed.) Free Press, New York.
- Ross, J.W., Beath, C.M., and Goodhue, D.L. (1996). Develop long-term competitiveness through it assets. *Sloan Management Review* (38), 31-45.
- Scupola, A. (2003). The adoption of Internet commerce by SMEs in the South Italy: An environmental, technological and organisational perspective. *Journal of Global Information Technology Management* (6:1), 52-71.
- Senn, J.A., and Gibson, V.R. (1981). Risks of investment in microcomputers for small business management. *Journal of Small Business Management*, (19:3), 24-32.
- Srinivasan, R., Lilien, G.L., and Rangaswamy, A. (2002). Technological opportunism and radical technological adoption: An application to e-business. *Journal of Marketing* (66:3), 47-60.
- Subramanian, G.H. (1994). A replication of perceived usefulness and perceived ease of use measurement. *Decision Sciences* (25:5/6), 863-874.
- Teo, T.S.H., and Pian, Y. (2003). A contingency perspective on Internet adoption and competitive advantage. *European Journal of Information Systems* (12), 78-92.
- Thong, J. (2001). Resource constrains and information systems effectiveness: Associations and implications. *Omega International Journal of Management Science* (29:2), 143-156.
- Thong, J.Y.L. (1999). An integrated model of information systems adoption in small businesses. *Journal of Management Information Systems* (15:4), 187-214.
- Thong, J.Y.L., Yap, C.S., and Raman, K.S. (1996). Top management support, external expertise and information systems implementation in small businesses. *Information Systems Research* (7:2), 248-267.
- Tornatzky, L.G., and Fleischer, M. (1990). *The processes of technological innovation* Lexington Books, Lexington MA.

- Tornatzky, L.G., and Klein, K.J.(1982). Innovative characteristics and innovation adoption-implementation: A meta analysis of findings. *IEEE Transactions on Engineering Management* (29:11), 28-45.
- Van Akkeren, J.K., and Cavage, A.L.M. (1999). Confusion with diffusion? Unravelling IS diffusion and innovation literature with a focus on SMEs. *Australian Journal of Information Systems* (7:1), 60- 67.
- Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation and emotion into the technology acceptance model," *Information Systems Research* (11:4), 342-365.
- Ventakesh, V., and Davis, F.D. (2004). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science* (46:2), 186-204.
- Wang, J.C., and Tsai, K.H. (2002). Factors in Taiwanese firms' decision to adopt electronic commerce: An empirical study. 1145-1167.

