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# Determinants of Satisfaction of Electronic Commerce Implementation: Some Evidence from the Small and Medium Sized Enteprizes

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# DETERMINANTS OF SATISFACTION OF ELECTRONIC COMMERCE IMPLEMENTATION: SOME EVIDENCE FROM THE SMALL- AND MEDIUM-SIZED ENTERPRISES

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## Abstract

*This study surveys the perceptions and experiences of small- and medium-sized enterprises (SMEs) in the implementation of Internet-based Electronic Commerce (EC). This paper proposes a framework of EC implementation success for SMEs. Results of preliminary interviews of small businesses in Australia and Singapore show that respondents' perceptions of Internet-based EC are pre-dominantly positive. However, a further analysis was carried out regressing overall satisfaction on the 19 influencing factors of EC. It was found that 5 factors – observability, communication channel, customer pressure, supplier pressure, and perceived governmental support make a significant contribution to the adoption of Internet-based EC in Australia; and only 3 factors – firm size, perceived readiness, observability in Singapore.*

*Keywords: Business-to-Business Electronic Commerce, Implementation Success, Internet, Small- and Medium-sized Enterprises.*

# 1       INTRODUCTION

Electronic Commerce (EC) has changed and is still changing the way business is conducted around the world. The commercialization of the Internet and World Wide Web (WWW) has driven Electronic Commerce (EC) to become one of the most promising channels for inter-organizational business processes. Despite the economic downturn and the burst of the "dot-com" bubble, EC is expected to continue its significant growth. EC has emerged as a whole of business strategy that enables organisations to improve business processes and communication, both within the organisation and with trading partners. According to the World Information Technology and Services Alliances (WITSA), globally combined B2B and B2C EC reached US$633 billion in 2001 (WITSA, 2004). It is estimated that by the year 2004, the value of worldwide EC may reach US$2.7 trillion (eMarketer, 2003), which is a massive increase of 1000 percent within 3 years. In Asia Pacific region, it was reported that EC revenue would reach US$2.4 trillion by year 2005 (Gartner Group, 2001).

## 1.1       Significance of the Study

It has been observed and verified in many studies that SMEs have been actively looking for suitable solution and methods of adopting and integrating EC into their business process (Benbasat, Bergeron and Dexter, 1993; Cragg and King, 1993; Dos Santos and Peffers, 1998; Massey, 1986; Purao and Campbell, 1998). Although there is a growing body of literature dedicated to the analysis of the technical and operational aspects of EC, there is little empirical research on topics relating to the factors that would lead to the successful adoption of this emerging technological innovation and business practice. Moreover, there is little empirical research to date that examines the success of EC deployments in organisations once the technology has been adopted. If the EC implementation is successful, potential benefits to small businesses can include increased sales, improved profitability, increased productivity, reduced costs associated with inventories, procurement and distribution, improved quality of service, and secured competitive positions (see Campbell, 1998; Smith, 1998, Whiteley, 2000). On the other hand, if EC implementation is unsuccessful, it will have severe repercussions on small businesses with their limited resources. This paper aims to identify which factors are important in the successful implementation of EC for SMEs.

## 1.2       Research Objectives

The purpose of this paper is to identify a comprehensive set of potential determinants influencing the implementation success of EC. The specific objective of the research is to construct a comprehensive model of EC adoption and deployment for SMEs.

The above objectives can be translated into the following research questions:

1. What factors influence the extent to which EC is adopted by SMEs?
2. What factors influence the implementation success of EC in SMEs?

This paper is focused on answering the second question. It is part of a larger study which aims at investigating both questions in depth. Apart from identifying which factors influence SMEs' perceived overall satisfaction, this paper also seeks to quantify the relative importance of these factors.

## 1.3       Theoretical Perspective of this Study

It should be noted that the background theory of this study encompasses a substantial variety of previous research on adoption, implementation, and innovation diffusion theories applied to technology in general, IS, IT, EDI, IOS, and MIS. Clearly, EC is not identical with any of them. It

necessarily involves IT which it shares with IS and MIS and at more sophisticated levels is likely to enable EDI. It is also undeniably 'Inteorganisational'. It may therefore be argued that any factor that has been shown to influence the adoption of technology in general and any of these applications was worthy of consideration as a potential explanatory variable with respect to EC. The reader is reminded that in this regard, due to the lack of previous EC specific research in this area, this study was essentially exploratory. Thus, keeping an open mind regarding which variables (if any) will be related to a particular factor. To ensure thoroughness, wherever previous research or reasoning suggested a relationship between a factor and one of the variables, its possible influence on the focal variables will also be hypothesised. Innovation diffusion theories have been particularly useful for understanding the facilitators and inhibitors of EC, because this theory provides insight into the factors that influence the adoption of innovation. After a critical analysis of existing models, their influencing factors, stages, and process, the theoretical framework is extended to incorporate important organisational and contextual aspects of adoption in the development of a research model.

### 1.3.1    *The Measure of EC Adoption and Implementation*

As defined in Rogers innovation diffusion theory (1995), **adoption** is a decision to make full use of an innovation as the best course of action. In this study, we are only looking at the factors that influence the **extent** of adoption and not the adoption **process**. It is argued that EC adoption is essentially a continuum involving a range of progressive developments and a broadening variety of applications. For several reasons, there is rarely any clear separation between adoption and implementation in EC. In other words, EC is not "one simple or single innovation" that a firm either does or does not adopt, but should be considered as consisting of a number of combinations of innovations of varying complexity and sophistication on a continuum requiring lesser to greater levels of commitment. While conceptually distinct, there is no temporal dividing line between all the dependent variables in this study for they merge into one another (i.e. *State of Adoption*, *Extent of Deployment*, *Level of Usage*, and *Overall Satisfaction*). Rather their hierarchy is logical in that each is a necessary condition for the next: while one feature is becoming more utilised, another is being explored and a third is being considered or enabled.

*Implementation Success* of EC has technical components, similar to other IT innovations, but EC also has interorganisational elements which distinguish it from other types of innovations. Perhaps the most obvious, intellectually appealing, and arguably the most commercially appropriate, measure of success for any given state of EC adoption would be the change in profitability that is attributable to EC. In the turbulent rapidly changing business world to arrive at a valid measurement of this is almost impossible for it would be extremely difficult to separate the profit attributable to EC from the myriad of other powerful influences. It is rarely practical to conduct controlled experiments in the commercial world. Clearly, other more easily observable measures of success must be used. This study employs three conceptually distinct but naturally related measures: *Extent of Deployment*, *Level of Usage*, and *Overall Satisfaction*. The first two are observable outcomes of adoption and as such are specified by the researcher. Neither of these, however, will necessarily cover the issues most important to the individual firm, therefore the need exists also for a criterion that as far as possible incorporates the values held by the individual firms, heterogeneous as they may be. A measure of success that reflects this range of values is *Overall Satisfaction*. No attempt will be made to combine these three into a single measure as each provides a useful perspective in its own right and taken separately show a richer and more complete picture of some of the dimensions of success.

The following section will focus on discussing the significance of the *Overall Satisfaction* as a measure of implementation success. The other three dependent variables are beyond the scope of this paper.

*<u>Overall Satisfaction</u>*

From the many variables that might be considered as one of the indicators for success of an Internet-based EC, *Overall Satisfaction* has been chosen in this study. Perceived satisfaction naturally has an element of volatility due to the influence of respondent's personality and personal opinion. Even with no substantial change from week to week, small irregular frustration is likely to influence the level of the *Overall Satisfaction*. However, there is an implicit assumption that a person who rates themselves higher than another person is more satisfied.

User satisfaction or user information satisfaction is probably the most widely used single measure of IS success. In small business research, satisfaction has often been used as the dependent variable (Lees, 1987; Montazemi, 1988; Raymond, 1990; DeLone and McLean, 1992). The reasons for this are at least threefold. First, "satisfaction" has a high degree of face validity. It is hard to deny the success of a system where users say that they like it. Second, the development of the Bailey and Pearson (1983) instrument and its derivatives has provided a reliable tool for measuring satisfaction and for making comparisons among studies. The third reason for the appeal of satisfaction as a success measure is that most of the other measures are so poor; they are either conceptually weak or empirically difficult to obtain (DeLone and McLean, 1992).

Despite being a subjective measure, "satisfaction" is used as a construct of EC implementation success in this study because no better objective measure of satisfaction has yet been devised and other alternative measures of success were either inappropriate or unmeasurable. When the use of EC is required, the successful interaction by management with the EC system can be measured in terms of *Overall Satisfaction*. The key issue is whose satisfaction should be measured. In attempting to determine the success of the overall EC effort, this study measures satisfaction of the owner or top management of SMEs.

## 1.4 Focus of this Paper

A more comprehensive set of potential determinants that are important in both the adoption and subsequent implementation of EC are reviewed in Chong (2000). At this present, it is the purpose of the paper to direct its discussion towards the identification of factors that exert influence on **implementation success** of EC using the findings of the survey. This paper is structured as follows: a model of EC implementation success and the outline of the influencing factors will be presented. Then, a brief description of the data collection, measurement of the variables, and instrument validation will be reported. Finally, the findings of the study will be discussed with implications to help SMEs and public policy makers achieve better understanding of EC adoption and implementation.

## 2 RESEARCH MODEL

In this study, it is proposed that several factors influence different levels of EC adoption for the organisation. In the absence of empirical studies to assist in the selection of the most significant variables for EC adoption, a number of possible relevant factors have been identified and grouped into broad categories of *internal* and *external environmental factors*. The distinction between internal and external environmental factors is made to distinguish between organisation-specific (and organisation-determined) factors and factors that are imposed (and determined) from outside the organisation. Figure 1 presents the research model and the relationship between the influencing factors and the *Overall Satisfaction* was examined.
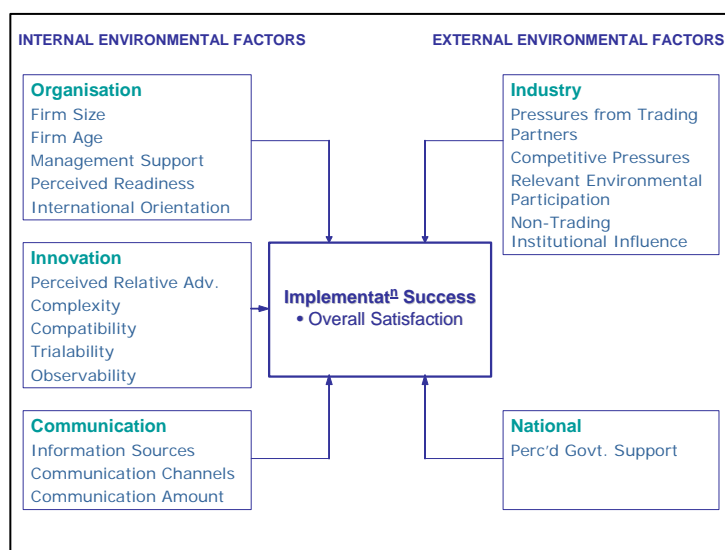
*Fiigure 1.*      *Conceptual Model of Factors that Influence Implementation Success of EC*

The background of the conceptual model has been covered and reported in Chong (2004).

## 3      RESEARCH METHODOLOGY

A positivist approach was undertaken to develop the research model rather than confirm an existing one. The research model is operationalised based on correlational hypothesis testing, rather than the determination of a definitive case and effect relationship. The desired result in testing the model is the determination of variables **associated** with the *Overall Satisfaction* of EC adoption. Due to the exploratory nature of this study, a cross sectional approach was undertaken to measure firms' responses regarding the adoption of EC.

### 3.1      Data Collection

The study was conducted in three phases: preliminary investigation, pilot study and questionnaire survey. Preliminary interviews with five Australian and Singaporean SMEs[1] were conducted. This provided direction to what adoption factors are imperative to SMEs and was supported by an extensive literature review, this contributed to the design of the proposed research model (see Chong, 2000). A survey instrument with questions and multiple-item scales was developed and pilot-tested to capture the information reflecting the perceptions and practice of those adopting EC, specifically what internal or external environmental factors affect the adoption of EC and the degree of influence. In order to focus on SMEs, assistance was sought from governmental and research institutions in both countries to develop a database of SMEs and contact details of target respondents. As the survey was intended to apply over a wide geographical area, the chosen method of delivery was a combination of email, web and mail survey. 780 survey questionnaires were personally disseminated and addressed to the director or owner of the firms. In order to improve response rate, reminders were sent out to target respondents two weeks after the commencement of first and second-wave of mail-out. A total of 115 usable responses were collected in Australia and 42 in Singapore.

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[1]      Definition of Small- and Medium-sized Enterprises (SMEs) differ between Australia and Singapore. According to the Australian Bureau Statistics (ABS), small business is any business employing less than 20 people; and 20 or more but less than 200 people for medium business. As for Singapore, the Productivity Board of Singapore (PSB) defines a SME as a company employing less than 200 people with an annual turnover not exceeding $15 million. (For further definitions of SMEs, please refer to http://sbdc.gov.au and http://psb.gov.sg).

## 3.2    Measurement of Variables

Some of the indicators were developed by the researcher, while some were adopted or modified from previous scholars. In cases where a previous measure is good, the researcher adopts or adapts the items and due credit was properly given. In other cases, new indicators were added and compared with the previous measures according to the suggestions made by Neuman (1997) in coming up with a new measure. Table 1 below shows a comprehensive list of the variables used in this study. These variables were presented with the corresponding indicators, the types of scales used, and an indication of whether they were researcher-defined or the sources from which they were adopted or adapted.

| DEPENDENT VARIABLES | | | |
|---|---|---|---|
| **Variables** | **Indicators** | **Measurement** | **Adopted /Adapted Sources** |
| *Implementation Success* | | | |
| Overall Satisfaction | Perceived overall satisfaction of the EC adoption and implementation | Likert Scale | DeLone & McLean, 1992; Raymond, 1985 |
| **INDEPENDENT VARIABLES** | | | |
| **Variables** | **Indicators** | **Measurement** | **Adopted /Adapted Sources** |
| *Organisational Factors* | | | |
| Management Support | Composite of perceived mgmt support items | Likert Scale | Iacouvou, Benbasat, and Dexter, 1995 |
| Perceived Readiness | Overall perceived preparedness | Likert Scale | Iacouvou, et al., 1995 |
| Firm Size | Number of full-time equivalent employees | Ordinal Scale | Gatignon and Robertson, 1989; Damanpour, 1991 |
| Firm Age | Number of years the firm has been established | Ordinal Scale | Researcher Defined |
| International Orientation | Proportion of turnover derived from international trade | Ratio Scale | Lal, 2002 |
| *Innovation Factors* | | | |
| Perceived Relative Advantage | Composite of perceived relative advantage items | Likert Scale | Rogers, 1995; Soh, Mah, Gan, Chew and Reid, 1997 |
| Compatibility | Composite of perceived compatibility items | Likert Scale | Rogers, 1995; Soh, et al., 1997 |
| Complexity | Composite of perceived complexity items | Likert Scale | Rogers, 1995; Soh, et al., 1997 |
| Trialability | Composite of perceived trialability items | Likert Scale | Rogers, 1995; Soh, et al., 1997 |
| Observability | Composite of perceived observability items | Likert Scale | Rogers, 1995; Soh, et al., 1997 |
| *Communication Factors* | | | |
| Information Sources | Variety of material & organisation sources that firms used to attain information about EC | Ratio Scale | Researcher Defined |
| Communication Channels | Variety of channels firms used to delivery information about EC | Ratio Scale | Researcher Defined |
| Communication Amount | Frequency of communication between the firm & its trading partners | Ordinal Scale | Mohr, Fisher & Nevin, 1996; Cannon & Homburg, 2001 |
| *Industry Factors* | | | |
| Customer Pressure | Level of perceived pressure exerted from customers to adopt EC | Likert Scale | Iacouvou, et al., 1995; Premkumar and Roberts, 1998 |
| Supplier Pressure | Level of perceived pressure exerted from suppliers to adopt EC | Likert Scale | Iacouvou, et al., 1995; Premkumar and Roberts, 1998 |
| Competitive Pressure | Perceived competitor influence on the adoption of EC | Likert Scale | Iacouvou, et al., 1995; Gatignon & Robertson, 1989 |
| Relevant Environmental Participation | Composite of participation of specified related organisations in the business environment which the firm operates in | Ordinal Scale | Researcher Defined |
| Non-Trading Institutional Influence | Composite of perceived influence of specified non-trading institutions | Ordinal Scale | Researcher Defined |
| *National Factors* | | | |
| Level of Governmental Support | Perceived level of support provided by the government to adopt EC | Likert Scale | Researcher Defined |

*Table 1        Original Construct Measurement*

The issue of instrument validation was addressed in detail in the course of the study but a discussion of this area is beyond the scope of this paper.

## 4        RESULTS

Table 2 represents the Australian results of the stepwise-backward elimination, whereby those factors that are statistically significant in the model for the **Overall Satisfaction**, are retained. The result shows an expected moderate reduction in R-squared and an increase in adjusted R-squared value of 0.397 to 0.407. There is also an improvement in the overall significance of F-value from 0.001 to 0.000.

| Influencing Factors | Standardised Coefficient (beta) | t-value | Significance |
|---|---|---|---|
| (Constant) | | 1.600 | 0.115 |
| OBSERVA | 0.478 | 4.391 | 0.000 |
| COMM.CHAN | 0.315 | 2.865 | 0.006 |
| CUST.PRES | -0.312 | -2.228 | 0.030 |
| SUPP.PRES | 0.263 | 1.915 | 0.061 |
| PCD.GOV.SUP | -0.216 | 2.132 | 0.038 |
| $R^2 = 0.457$        Adjusted $R^2 = 0.407$ | F-significance = 0.000 | | Observations = 115 |

*Table 2.        Final Model Estimation for the Overall Satisfaction (Australian Data)*

Since the F-value is significant at the 1 percent level, this shows that there is strong evidence to support that the overall model is significant and the independent variables retained are related to the *Overall Satisfaction*. As shown in Table 2, the adjusted R-squared value indicates that 45.7 percent of the variation in State of Adoption by Australian SMEs is explained by the variation of  ***Observability, Variety of Communication Channels, Customer Pressure, Supplier Pressure,*** and ***Perceived Governmental Support***. All variables are significant at the 0.05 level or better.

| Influencing Factors | Standardised Coefficient (beta) | t-value | Significance |
|---|---|---|---|
| (Constant) | | -1.146 | 0.260 |
| SIZE. FIRM | 0.190 | 1.814 | 0.078 |
| PCD.RDNS | 0.537 | 4.988 | 0.000 |
| OBSERV | 0.387 | 3.684 | 0.001 |
| $R^2 = 0.637$        Adjusted $R^2 = 0.606$ | F-significance = 0.000 | | Observations = 42 |

*Table 3.        Final Model Estimation for the Overall Satisfaction (Singaporean Data)*

As for the Singaporean data, the regression model explained 60.6 percent of *Overall Satisfaction*. Of the all the three factors, ***Observability*** was the only significant variable at the 0.01 level of significance for the Singaporean SMEs, indicating a strong contribution to explaining *Overall Satisfaction* of EC implementation success. This result is consistent with the Australian findings. Both organisational factors, ***Size of the Firm*** and ***Perceived Readiness***, achieve significance on the Singaporean data but not on the Australian data. This may imply that firm size and perceived readiness are more of an issue in the implementation of EC with Singaporean firms than those in Australia.

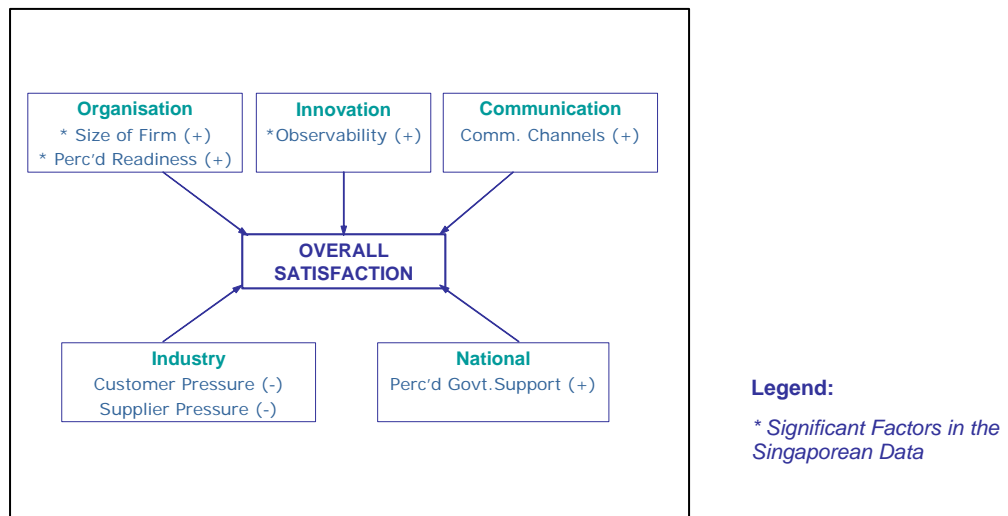The figure below shows factors that are supported by significant evidence in both countries.

*Figure 2.*  *Factors related to the Overall Satisfactio*

## 5    RESULTS

**Size of Firm**: For Singaporean SMEs, *Size of Firm* was found to have a probable relationship to the Overall Satisfaction, indicating that the perceived level of satisfaction with EC implementation was more likely to be higher when respondents are operating from a bigger size of firm. The emergence of *Size of Firm* as a significant variable in influencing adoption success is in line with existing literature. It was found that firms that have a large size of operation are comparatively better off than other firms where investment in new technologies is concerned (Pavitt, Robson, and Townsend, 1987; Siddharthan, 1992). Moreover, large firms are in a better position to appropriate the benefits of new innovation. Sound financial position and appropriate conditions have strong bearings on the adoption of latest technologies and in the investment on innovative activities. Larger firms have the other advantage of employing a more skilled workforce, which may be necessary for using new technologies more effectively and efficiently, thus leading to higher satisfaction in its adoption and implementation.

**Perceived Readiness:** *Perceived Readiness* is found to be the most significant factor relating to the Overall Satisfaction of EC adoption in the SMEs in Singapore. This finding supported the notion of how organisational resources increases the likelihood of IS implementation success for small businesses (Thong, 2001). As small businesses often lack financial and technological resources, insufficient funds may be allocated for the implementation of EC. Insufficient resources may place constraints on the implementation effort and often lead to partial ineffectiveness and thus dissatisfaction with EC. On the other hand, firms with adequate resources can contribute more effectively to the EC implementation through their involvement during the requirements and design phases. This involvement may also encourage more realistic expectations from EC and more comfortable participating in the implementation process which leads to a more satisfying experience for the adopting firms.

**Observability:** *Observability* appears to be a significant factor related to the Overall Satisfaction with EC adoption in both Australian and Singaporean data. The degree to which the results of EC are more visible to SMEs leads to higher satisfaction in its implementation. In the ability to observe the benefits of EC, SMEs may have already observed success in the initiatives taken by other companies, be it trading partners or competitors. With the constant media exposure about EC, SMEs would have now believed EC to be highly valued and that most firms would adopt EC in the near future. With such confidence and belief, it is very likely that this would naturally be transformed into satisfaction with

what the firm is pursuing in the adoption of EC. In the case of doing business online, effects such as quicker access and dissemination of information, and savings in costs (e.g. printing, advertising, communication and overhead costs) are more immediate and easier to acknowledge from trading partners or associates. These easily demonstrated benefits (short-term, but visible effects) might help promote continued adoption of the long-term goals of EC, which inevitably lead to higher level of success of implementation for the adopting firms. .

Despite its significance, the validity of the *Observability* items when transferred into the context of Overall Satisfaction of EC implementation may be questionable. The components of the *Observability* variable are in fact a combination of confidence, optimism, observed outside success and inevitability (i.e. the inevitable progress of EC in the future). The explanation for the existence of this relationship therefore requires a psychological approach. For future reference, this variable has to be treated with slight caution, as the benefits of EC or any kind of technological adoption have to be observable to be satisfying.

**Variety of Communication Channels:** In Australia, Overall Satisfaction was found positively related to the *Variety of Communication Channels* used by firms to disseminate EC-related information or strategy. The use of a greater variety of communication channels to communicate EC information may help to encourage the firms' trading partners to adopt EC, thus increasing the business links, and leading to higher levels of satisfaction with adoption. Expanding the variety of communication channels to increase the awareness and knowledge about EC also helps in improving the level of confidence in users, which increase the level of adoption, and eventually improves the level of use and satisfaction with EC. Thus, SMEs should consider adopting multiple channels as part of the influence strategy to encourage their employees and trading partners to adopt EC.

The descriptive findings of this study suggested that EC initiators (e.g. early adopters, vendors, consultants) could actively communicate the benefits of EC through promotional seminars, presentations, and on-site visits or demonstrations. Internally, on-the-job-training is the most popular communication channels utilised by firms to disseminate EC-related information within the company as hands-on experience is considered to be more effective than mass training. In terms of interorganisational communication channel, it has been found that the most effective means of influencing trading partners is to set the example by using electronic means themselves to communicate with their partners.

**Customer Pressure:** *Customer Pressure* was negatively related to Overall Satisfaction for Australian SMEs, suggesting that the more pressure the customers placed on the firm, the less satisfied they might be with the current adoption. On the other hand, it can be interpreted as once the firms attained the desired outcome of adoption and are satisfied with the performance, they may perceive lower pressure from their customers. This perhaps implies that firms that adopt and use EC on their own initiative tend to be less affected by their customers.

If firms feel easily pressured by their customers, then it is possible that their EC system is not working well enough. A firm will tend to feel pressure from a source whenever it is vulnerable and its performance in relation to that source is less than adequate. In relation to customers, the firm must necessarily be sensitive to clients' needs and demands. If the potential client controls the relationship, then the fate of the firm is in the client's hands. When the customer is satisfied (exerting little pressure), the firm is likely to see its own systems (including its EC status) as being satisfactory. Hence the inverse relationship between perceived *Customer Pressure* and Overall Satisfaction.

**Supplier Pressure:** For Australian SMEs, *Supplier Pressure* was found to have a probable relationship to the Overall Satisfaction, indicating that the perceived level of satisfaction with EC adoption was more likely to be higher when respondents perceived the pressure imposed by their suppliers to be high. The relationship with suppliers is different in one important respect: the firm is now much less vulnerable as it controls the relationship. The supplier is unlikely to try to exert pressure on an unimportant client to modify his business practice (i.e. adopt EC) unless there are substantial benefits to the supplier (due to lower costs and increased efficiency). When they do so, this increases with the volume of business transacted. However, the greater the volume ordered from the supplier, the more thriving the business of the client firm is likely to be, and the greater the overall satisfaction the client would have with his current state of business practice (of which EC is a part). This results in a direct positive relationship between *Suppliers Pressure* and Overall Satisfaction.

Being a customer, the positive link between *Supplier Pressure* and Overall Satisfaction shows that supplier pressure ought not to be resisted. Needless to say, suppliers would have to provide their customers with the necessary educational support and incentive in order to achieve mutually beneficial gains through the implementation of EC. This support may be critical especially for customers that do not have the expertise to implement EC. It is imperative that firms and their trading partners work together to build trust and a supportive operational relation or environment and share the potential benefits waiting to be unleashed from EC.

**Perceived Level of Governmental Support:** The *Perceived Level of Governmental Support* was related to the Overall Satisfaction of EC implementation for Australian SMEs. Although many responding firms consider the level of governmental support to be disappointing (Chong, 2004), those firms that think favourably of the assistance tend to be satisfied with the EC experience. In this case, it is reasonable to suggest that when the government improve the support, adopters are likely to experience higher level of satisfaction. Another assumption may also be true that when a firm is satisfied with the adoption, it naturally holds higher regard to the governmental support that was given to the firm at that point of time.

In any case, increasing governmental support would not be futile and it could lead to a greater satisfaction in adoption and implementation for SMEs. As revealed in the descriptive findings, even though educational support was found to be the most used form of support at the time of the survey, SMEs have high expectations that governmental assistance would come in the form of advisory support. In other words, governmental support is expected to be more advisory-oriented than anything else. Success in this area would tend to be seen as success in governmental support.

# 6 CONCLUSION, LIMITATION & FURTHER RESEARCH

This paper has developed and tested a proposed model of EC implementation success for SMEs by conceptualising the theoretical framework from established IS research on adoption, innovation, implementation and diffusion. The study focuses on theory development rather than theory confirmation. This, with the cross sectional nature of data also limits the ability of this study to draw causal implications in the findings. In making generalisation from the research sample, one has to take into consideration the context of Australia and Singapore. The findings may not be universally true, but they are likely to be applicable in similar cultural contexts.

In this paper*, Overall Satisfaction* is the more subjective measure of success that complements the other components of implementation success in the broader study (i.e. *Extent of Deployment* and the *Level of Usage*). According to the results of this study, firms in Singapore that are *larger*, possess higher sense of *readiness*, have higher confidence and *observability* in the value and benefits that EC would bring them, tend to be more satisfied with the implementation of EC. In Australia, apart from possessing positive attitude towards future gains of EC, those that use a greater variety of *communication channels* to disseminate EC-related information tend to have greater overall satisfaction with the adoption. *Supplier pressure* should not be resisted by SMEs and it should be

viewed as an opportunity to seek support from supplying firms to improve its EC capability. In contrast, when higher *customer pressure* is experienced, the overall satisfaction tends to be lower for the adopters. Interestingly, the factors that were found to be unique to the SMEs in Singapore are Internal Environment-related (*size of firm*, *perceived readiness*), while factors that are exclusive to the Australian experience are External Environment-related (*supplier pressure*, *customer pressure*, and *perceived governmental support*). This further confirms the view that SMEs in both countries adopt a different attitude towards adoption and implementation of EC. In Singapore, SMEs adopts an *inward-*looking attitude towards adoption and implementation when the knowledge of sufficient resources seemed to improve the *Overall Satisfaction*. On the other hand, firms in Australia are more *outwardly-*oriented when the *Overall Satisfaction* of the adoption involves adequately managing or controlling the pressure that was exerted by their trading partners, and attaining assistance from the government. Then again, the *perceived readiness* amongst Singaporean SMEs may also be due to the extensive effort put in by the Singapore government in establishing electronic-infrastructure services and setting (Garelli, 2001)[2].

The exploratory nature of the research has helped identify associations between variables from which more confirmatory or causally directional hypotheses can be generated in the future. Progress towards the formulation of a more comprehensive causal model may be achieved in future research. Here the technique of Structural Equation Modelling may be usefully applied. It would also be insightful to conduct longitudinal studies to confirm the direction and to help clarify causality and test for feedback effects of adoption decisions. In this study, no attempt was made to control for industry type. The models may be tested more intensively in a chosen or a specific industry. Comparison of the research model can also be conducted over several countries, particularly from different geographic regions. The contrasting contexts may provide some interesting results. Lastly, having established the soundness of the theoretical framework of implementation success for SMEs, other researchers may investigate its applicability to a wider range of business communication technologies and further innovations in the future.

# References

Bailey, J.E. and Pearson, S.W. (1983) Development of a tool for measuring and analysing *computer* user satisfaction, *Management Science*, 29(5), pp.530 – 545.

Benbasat, I., Bergeron, M. and Dexter, A. (1993) Development and Adoption of Electronic Data Interchange Systems: A Case Study of the Liquor Distribution Branch of British Columbia, *Proceedings of Administrative Science Association of Canada Twenty First Annual Conference*, Lake Louise, Alberta, Canada, May, pp.153-163.

Boston Consulting Group (1999) *E-tail of the Tiger: Retail E-Commerce in the Asia Pacific*, Boston, MA: Boston Consulting Group.

Campbell, A.J. (1998) Embracing electronic data interchange now will keep you company in step with the competition, *Business America*, 119(6), pp. 28 Retrieved: 5th February, 1999, URL: http://gw3.global.ebscohost.com/

Chong, S. (2000). Electronic Commerce adoption by SMEs in Australia and Singapore. *Workshop on Information Systems Research (WAWISR)*, Edith Cowan University, November, Western Australia, Perth.

Chong, S. (2004) Electronic Commerce adoption by Small- and Medium-sized Enterprises in Australia: An Empirical Study of Influencing Factors, *Proceedings for the European Conference of Information Systems (ECIS)*, June 14 – 16, Turku, Finland

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[2] Global research has shown that Singapore has done reasonably well in their transformation efforts. Singapore was rated 1st in Asia and 5th worldwide for its EC infrastructure in the World Competitiveness Yearbook 2001(Garelli, 2001). The Boston Consulting Group (1999) places Singapore as one of the top 10 companies in the Asia Pacific for online consumer spending and the Economic Intelligence Unit (2001) ranks Singapore as the 1st in Asia and 7th internationally for E-Business readiness.

Cragg, P. and King, M. (1993). Small-firm computing: motivators and inhibitors. *MIS Quarterly*, 17(1), pp.47-60.

Damanpour, F. (1991) Organizational innovation: A meta-analysis of effects of determinants and moderators, *Academy of Management Journal*, 34(3), September, pp.555 - 590.

Delone W.H. and McLean, E.R. (1992) Information Systems success: The quest for the dependent variable, *Information Systems Research*, 3(1), pp.60-95.

Dos Santos, B. and Peffers, K. (1998). Competitor and vendor influence on the adoption of innovative applications of electronic commerce. *Information & Management*, 34, pp. 175 - 184.

eMarketer (2003). *Worldwide B2B Revenues to Pass One Trillion*, 1st April. Retrieved: 18th March, 2003, URL: http://www.nua.com/surveys/?f=VS&art_id=905358753&rel=true.

Garelli, S. (2001). *The World Competitiveness Yearbook 2001*, IMD, International Institute for Management Development, June.

Gartner Group (2001) Gartner says Asia Pacific and Europe to account for nearly half of worldwide B2B Internet Commerce transactions by 2005: Analysts to discuss worldwide B2B Internet Commerce trends at iEB Conference, *Gartner Research*, Press Release, San Jose, California, Retrieved 2nd April. URL: http://www4.gartner.com/5_about/press_room/pr20010402a.html

Gatignon, H. and Robertson, T. (1989). "Technology Diffusion: An Empirical Test of Competitive Effects", *Journal of Marketing*, 53(1), pp.35 – 49.

Iacovou, C., Benbasat, I. and Dexter, A. (1995) Electronic Data Interchange and small organisations: Adoption and impact of technology. *MIS Quarterly*, 19(4), pp.465 - 485.

Lal, K. (2002) E-business and manufacturing sector: A study of small and medium-sized enterprises in India. *Research Policy*, 31, pp.1199 – 1211.

Lees, J.D. (1987) Successful development of small business information systems, *Journal of Systems Management*, 25(3), pp.32-39.

Massey, T. (1986) Computers in Small Business: A Case of Under-Utilisation, *American Journal of Small Business*, 11(2), Fall, pp.51-60.

Mohr, J., Fisher, R. and Nevin, J. (1996) Collaborative communication in interfirm relationships: Moderating effects of integration and control. *Journal of Marketing*, 60, July, pp.349 – 370.

Montazemi, A.R. (1988) Factors affecting information satisfaction in the context of the small business environment, *MIS Quarterly*, 12(2), pp.239-256.

Neuman, L.W. (1999). *Social research methods: Qualitative and Quantitative Approaches*. 4th Edition, Allyn & Bacon, U.S.A.

Pavitt, K., Robson, M. and Townsend, J., (1987) The size of distribution of innovating firms in the UK: 1945-1983, *Journal of Industrial Economics*, 35, pp.297 – 316.

Premkumar, G. and Roberts, M. (1998). Adoption of new Information Technologies in rural small businesses. *The International Journal of Management Science*, 27, pp.467-484.

Purao, S. and Campbell, S. (1998) Critical concerns for small business electronic commerce: some reflections based on interviews of small business owners. *AIS Conference Proceedings*, Baltimore, Maryland.

Raymond, L. (1990) End-User computing in the small business context - Foundations and directions for research, *Data Base*, 20(4), pp.20 – 26.

Rogers, E.M. (1995). *Diffusion of Innovations*. 4th Ed. The Free Press, New York, NY.

Siddharthan, N. (1992) Transaction costs, technological transfer and in-house R&D: A study of the Indian private corporate sector, *Journal of Economic Behaviour and Organisations*, 18, pp.265 – 271.

Smith, A. (1998) New frontiers, *Intelligence*, June.

Soh, C., Mah, Q.Y., Gan, F.Y., Chew, D. and Reid, E. (1997). The use of the Internet for business: The experience of early adopters in Singapore. *Internet Research*, (7)3, pp. 217-228.

Thong, J. (2001) Resource constraints and information systems implementation in Singaporean small businesses, *OMEGA International Journal of Management Science*, 29, pp.143-156.

Whiteley, D., (2000) *E-Commerce - Strategy, Technologies and Applications*, McGraw-Hill Publishing Company; Berkshire, England.

WITSA (2004) *Digital Planet*. Retrieved: 20th October, 2004, URL: http://www.witsa.org.papers