

Association for Information Systems AIS Electronic Library (AISeL)

PACIS 2010 Proceedings

Pacific Asia Conference on Information Systems
(PACIS)

2010

A Critical Analysis of E-Market Adoption in Australian Small and Medium Sized Enterprises

Xiaoxia Duan

RMIT University, xiaoxia.duan@rmit.edu.au

Hepu Deng

RMIT University, hepu.deng@rmit.edu.au

Brian Corbitt

RMIT University, brian.corbitt@rmit.edu.au

Follow this and additional works at: <http://aisel.aisnet.org/pacis2010>

Recommended Citation

Duan, Xiaoxia; Deng, Hepu; and Corbitt, Brian, "A Critical Analysis of E-Market Adoption in Australian Small and Medium Sized Enterprises" (2010). *PACIS 2010 Proceedings*. 169.

<http://aisel.aisnet.org/pacis2010/169>

This material is brought to you by the Pacific Asia Conference on Information Systems (PACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in PACIS 2010 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

A CRITICAL ANALYSIS OF E-MARKET ADOPTION IN AUSTRALIAN SMALL AND MEDIUM SIZED ENTERPRISES

Xiaoxia Duan, Hepu Deng, Brian Corbitt, School of Business Information Technology and Logistics, RMIT University, GPO Box 2476V, Victoria 3000, Australia, {xiaoxia.duan; hepu.deng; brian.corbitt}@rmit.edu.au

Abstract

This paper presents a critical analysis of the adoption of e-market in Australian Small and Medium Sized Enterprises (SMEs) within the technology-organization-environment framework. Through surveying nine hundreds SMEs in Australia and the consequent analysis of the survey data, the paper shows that the level of adoption of e-market in Australian SMEs is still low with the dominant trend of adoption focusing on building their own e-markets. It reveals that there is a positive relationship between top management support, organization readiness, external pressure and perceived indirect benefits and adoption of e-market in SMEs. The study further finds out that top management support, trading partner trust and organization readiness are the critical factors for SMEs who are ready to adopt e-market for their e-business.

Keywords: E-market, Small and Medium Sized Enterprises, Technology Adoption

1 INTRODUCTION

Small and medium sized enterprises (SMEs) are important contributors to the global economy accounting for approximately 50% of all national Gross Domestic Product (GDP) and 30% of export. In Australia, SMEs are essential to the Australian economy as 94% to 96% of businesses are categorized as SMEs, employing approximately 3.5 million people and contributing to an estimated 30% of national GDP (OECD, 2007).

Electronic market (e-market) is a virtual marketplace in which buyers and sellers are brought together in one central market for exchanging goods, services or information (Grieger, 2003). It has become increasingly popular due to its potential benefits to business, especially to SMEs, including strengthened customer relationships, ease of reaching targeted markets, improved efficiency, reduced costs, and greater competitive advantage (Daniel et al., 2004; Standing et al., 2008).

The potential of e-market for SMEs, however, has not been fully utilised. A majority of SMEs has not made use of e-market. Those who have adopted e-market one way or another have not moved beyond the entry-level adoption (Molla and Licker, 2005). There are several studies that attempt to understand the critical factors for the adoption of e-market. No general agreement, however, is reached on how the potential of e-market can be fully explored. Furthermore, existing e-market research in Australia usually adopts qualitative methods such as interview or case study (Standing et al., 2010). There is a dearth of quantitative study on the adoption of e-market in SMEs in Australia.

This paper presents a critical analysis of the adoption of e-market in Australian SMEs within the technology-organization-environment (TOE) framework. Through surveying nine hundreds SMEs in Australia and the consequent analysis of the survey data, the paper shows that the level of e-market adoption in Australian SMEs is still low with the dominant trend of e-market adoption on building their own e-markets. It reveals that there is a positive relationship between top management support, organization readiness, external pressure and perceived indirect benefits and adoption of e-market in SMEs. The paper further finds out that top management support, trading partner trust and organization readiness are the critical factors for SMEs who are ready to adopt e-market for their e-business.

The remainder of the paper is organized as follows. A review of the related literature on the TOE framework, followed by the research model and the hypotheses are presented in Section 2. The research method and data analysis results are presented in Section 3. Section 4 concludes the study with some general observations.

2 RESEARCH MODEL AND HYPOTHESIS

The TOE framework is a popular means for understanding the adoption of technology in SMEs. Iacovou et al. (1995), for example, apply the TOE framework for exploring the adoption of electronic data exchange (EDI) in small businesses, leading to the identification of the perceived benefit, organizational readiness, and external pressure as the critical factors in the adoption of this technology. Kuan and Chau (2001) validate the suitability of the perception-based TOE framework in exploring the EDI adoption driving forces in small businesses. Zhu et al. (2003) state that the TOE framework is an appropriate theory for investigating the adoption of technology in SMEs.

TOE is suitable in exploring the critical factors for the adoption of e-market. Swanson (1994) examines the adoption of technology innovation along the line of the TOE framework based on the three types of technology innovations. The result shows that the TOE framework is able to fully depict and explain the type of innovation embedded in the core of the business. E-market falls into this type of innovation, in the sense that e-market strengthen organizational competitiveness and can streamline the integration the business with suppliers and customers. It is therefore believed that the TOE framework is well suited for e-market adoption study.

The solid theoretical basis and consistent empirical support discussed above promise that the TOE framework can be extended for investigating the critical factors of e-market adoption in Australian SMEs. Through a comprehensive review of related literature on the adoption of e-market in the TOE

framework, this section presents a conceptual model for facilitating the investigation of the adoption of e-market in Australian SMEs. Figure 1 presents this conceptual model with four dimensions including technology, organization, environment and trust, discussed in the following.

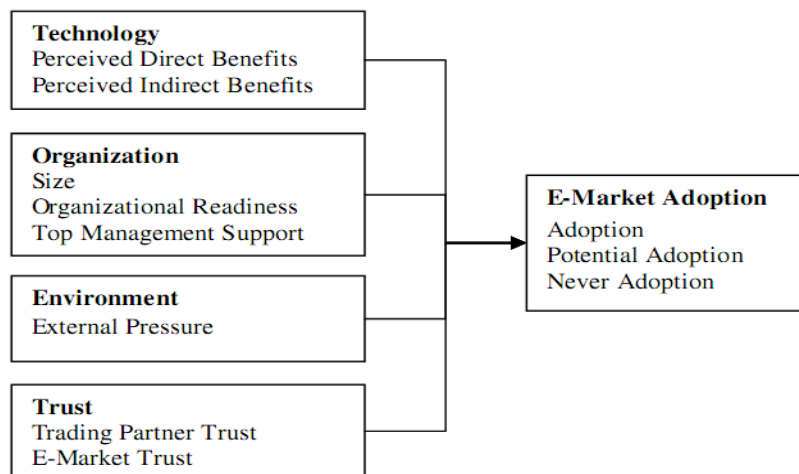


Figure 1. An e-market adoption framework

The technology dimension considers the perceived benefit of adopting e-market in an organization. The perceived benefit positively affects the adoption of technology (Rogers, 2003). Organizations adopt technology when there is a perceived need for using the technology to overcome a perceived performance gap or exploit a business opportunity. The greater the perceived benefit is, the more probable an organization will adopt the technology. In e-market adoption, the perceived benefit is classified into the direct benefit and the indirect benefit (Joo and Kim, 2004). The direct benefit is related to the reduction of operational savings and tangible benefits in the organization such as the access to a larger number of suppliers or customers, increased price transparency, and saved operation costs (Kuan and Chau 2001; Joo and Kim 2004). The indirect benefit is associated with the impact of adopting e-market for management of business process and relationships. It refers to improving the company's image, increasing operational efficiency, and improving trading partner relationships (Daniel et al., 2004; Standing et al., 2008). The above argument leads to the following hypothesis:

H1: Perceived direct benefits positively influence e-market adoption

H2: Perceived indirect benefits positively influence e-market adoption

The size of an organization directly affects the adoption of technologies (Rogers, 2003). Large organizations usually have greater ability to adopt innovations. One possible explanation is that larger organizations have more financial and technical resources for taking risks with new technology than smaller organizations. Bakos (1991) indicates that the cost and expertise required to build or adopt an e-market might favour big organizations. Even within the small business category, a relatively larger firm is in a better position to engage in an e-market. It then leads to the following hypothesis:

H3: Organization size is positively related to e-market adoption

Organization readiness is determined by the financial readiness and technological readiness. Financial readiness refers to the financial resources available for e-market installation costs and for ongoing expenses. Technological readiness is related to the level of sophistication of IT usage and IT management in an organization. The extent by which an organization utilizes IT such as electronic funds transfer, EDI and Internet has a positive impact on the system integration with e-market (Barry and Milner, 2002). Based on the above argument, the following hypothesis is proposed:

H4: Organization readiness is positively related to e-market adoption

Top management support is critical in SMEs in creating a supportive climate and providing adequate resources for adopting the technology. It ensures the limited resources and technical expertise to be allocated for supporting the essential needs of new technology (Delone, 1988). It helps overcome barriers and resistance to change in the organization. An SME that is likely to adopt e-market will

most often have the top management who have positive attitude towards the adoption, who are innovative and who are knowledgeable about IT. It leads to the following hypothesis:

H5: Top management support positively influence e-market adoption

External pressure refers to the influences from the environment in which an organization conducts its business. It includes the pressure from competitor, business partners and the government. The presence of pressure from competitor often forces individual organization to adopt technology for being competitive in a dynamic environment. In the adoption of e-market, organizations are more prone to adopt e-market as competitors become more e-market capable.. Pressure from business partners or government is another critical factor for e-market adoption in SMEs. SMEs are more vulnerable to business partner pressure since they are more likely to be economically dependent on their business partners for survival. On the other hand, organizations also create electronic links with their suppliers to reduce their operations costs and thereby be more competitive in the market place. To conclude, the following hypothesis is proposed:

H6: External pressure is positively related to e-market adoption

Trust is included due to the nature of e-market in the sense that the main communication method for all parties is online. A lack of trust in the online transactions and business partners is one of the major obstacles in the adoption of e-business in many studies (Kimery and McCord, 2002). The lack of trust in online transaction derives from the possibility of leakage of sensitive business information to other parties. Lack of trust in business partners is another issue. It would be difficult for buyers to ensure that suppliers meet or exceed recognizable industry-enforced standards in terms of supplier quality, service and delivery capabilities (Goldsby and Eckert, 2003). Suppliers on the other hand, may also lack trust in the buyer to pay on time. The above argument therefore leads to the following hypothesis:

H7: Trust in trading partners is positively related to e-market adoption

H8: Trust in e-market is positively related to e-market adoption

To investigate the critical factors for the adoption of e-market in SMEs, SMEs are classified into three groups including the “Adoption”, “Potential Adoption” and “Never Adoption”. The “Adoption” group is organizations that have already adopted e-market for their e-business. They are creative and innovative in applying the leading edge technologies, compared with their peers. The “Potential Adoption” group represents those that have not yet adopted e-market, but with plans in the near future. They tend to avoid the immediate application of leading-edge technologies. After some time, they are readily to adopt innovations that have been proven to be effective. The last group is the “Never Adoption” group, organizations in this group have not yet adopted e-market, nor have any plan to adopt in the near future. It is believed that factors place different importance in influencing SMEs’ e-market adoption decision in different stages.

3 RESEARCH METHODOLOGY

3.1 Sample and data collection

The survey technique is appropriate for studying the cause of phenomenon providing with empirical evidence (Creswell, 2003). A survey of top management in SMEs is used to collect data regarding the e-market adoption in Australian SMEs. The process was carried out in three steps. First, a sample of 900 SMEs was selected that target all Australian industries. The targeted contact person information was derived. An initial e-mail was sent out to explain the purpose of study and invitation to participate. 197 of these e-mails were undeliverable. Approximately two weeks after the initial e-mail, mails were sent out to follow up the rest of the potential respondents. 71 were declined due to incorrect address or organization no longer in business. A total of 119 responses were received in both rounds. 14 were unusable hence removed from the analysis, leaving 105 usable responses with a 16.6% response rate. This response rate is comparable with response rates of other information system adoption studies that target senior management (Fink and Neuman, 2007).

3.2 Data analysis

General profile and summary statistics

Most respondents are from Manufacturing (29.5%), Construction (17.1%) and Trading (13.3%), as shown in Figure 2. 89% of the responding SMEs have been in business for more than ten years. Many (86.7%) SMEs own their websites. The main functions of the website are for company information demonstration and products listing. Taking / placing orders and online transaction are less prevalent in those websites. In terms of the way that SMEs conduct selling or buying activities, only 37.1% of the responding SMEs have adopted one or more e-market, 93.3% of the SMEs are still using the traditional face to face method. Among those SMEs that adopt e-market, the preferred type of e-market is the seller dominated e-market (79.5%). The third party dominated e-market which is believed to be suitable for SMEs attract only 12.8% of the respondents. In SMEs that have not yet adopted e-market, 12.1% show their interests in adopting one in the near future, and for the rest (87.9%), e-market seems not to be an attractive choice for them. 68.6% respondents are Managing Director or CEO in the organization, among which 45.7% only have high school or equivalent degree, 25.7% are postgraduates. Male (91.4%) dominate in the high position in SMEs.

The dominant pattern in Australian SMEs for conducting business is still via the face-to-face interaction as shown above. Although most SMEs have long history in business with their company websites, they rarely use websites to deal with online transactions. Among those SMEs that have not yet adopted e-market, only a small portion have the adoption plan in the near future, the rest are not interested in e-market. The high percentage in managing directors or CEOs holding only the high school education might indicate that the top management in these SMEs have a limited understanding of the new technology, which to some extent inhibits the decision in adopting e-market.

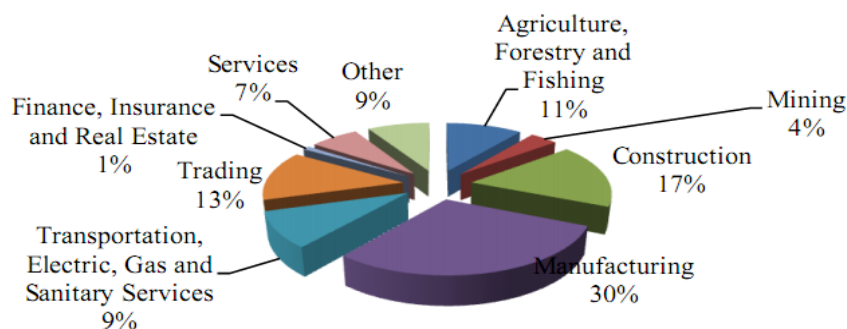


Figure 2. Distribution of respondents according to the industry sector

Measurement reliability and validity

The reliability, convergent validity and discriminant validity of the findings are assessed. Reliability is the assessment of the degree of consistency between multiple measurements of a variable. Construct reliability is assessed by computing Cronbach's alpha, which is derived from the question items for the same construct. The reliability results of the constructs demonstrate the alpha values ranged from 0.761 to 0.976, greater than the research threshold value 0.700. Construct reliabilities are therefore deemed to be sufficient for all factors. The relatively low Cronbach's alpha 0.761 for construct e-market trust can be partly explained by the small number of items (only two items used) in the construct, as the calculation of the alpha is affected by the item numbers of the construct.

Convergent validity and discriminant validity are assessed by performing a factor analysis in SPSS. A principal components analysis is conducted in order to extract the maximum variance from 30 items. To minimize the number of items that have high loadings on any other given factor, the solution is rotated using the Varimax criterion. Seven factors that collectively explain 76.1% of the variance in all items are extracted. Hair et al. recommend that to obtain a power level of 80% at a 0.05 significant level, with standard errors assumed to be twice of conventional correlation coefficient, a factor loading of 0.50 or higher should be considered as threshold.

All 30 items measuring seven factors are considered during the first run. Any item that fails to load on a single factor at 0.50 or greater is dropped. As a result, 4 items not loading on the intended factors are dropped from subsequent analysis and the construct is recalculated. In the rotated component matrix, all the items demonstrate loadings greater than 0.50 and load stronger on their associated factors than on any other factors. Convergent validity and discriminant validity are therefore demonstrated.

Hypotheses testing and analysis

Many statistical methods exist for hypotheses testing and analysis. For example, ANOVA analysis, correlation analysis, t-test and regression analysis are widely used in hypotheses examination in social research (Hair et al, 1992). Among the popular statistical methods, t-test is particularly suitable for testing hypotheses and assessing whether the means of two groups are statistically different from each other. It is used in this study to investigate the driving forces of e-market adoption among different groups. The results are shown in Table 1.

The significance of the independent factors in t-test is examined. The factor top management support is found as the most important determinant affecting SMEs' willingness to adopt e-market, followed by organization readiness and external pressure. Perceived indirect benefit is also a factor that influence an organization's adoption decision, but with less importance. The rest of factors are considered not influential to an organization's decision in whether to adopt an e-market or not. Therefore hypotheses 2, 4, 5 and 6 stand, while the rest are rejected.

	Mean		Difference in Mean	t-value	Significance
	Adoption	Non-Adoption			
Technology					
Perceived Direct Benefit	38.49	35.61	2.88	-1.499	0.137
Perceived Indirect Benefit	24.64	21.71	2.93	-2.255	0.026*
Organization					
Size	2.85	3.02	-0.17	0.728	0.468
Organization Readiness	23.10	20.21	2.89	-2.922	0.004**
Top Management Support	14.79	11.08	3.71	-4.119	0.000***
Environment					
External Pressure	20.28	17.41	2.87	-2.830	0.006**
Trust					
Trading Partner Trust	8.59	8.20	0.39	-0.817	0.416
e-market Trust	8.41	7.65	0.76	-1.497	0.137

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 1. Results of hypotheses test in adoption, non-adoption group

The differences in the mean of each adoption factor in the adoption group and non-adoption group show that except for the size factor, all the other factors play more important roles in affecting the e-market adoption decision in the adoption group than the non-adoption group. SMEs adopt e-market mainly believe that they are able to greatly benefit directly or indirectly from e-market, they are technically and financially ready to adopt the e-market, they get support from the top management, and they get higher pressure from their business partners, government and competitors. Whereas those non-adopters less agree with the importance of those factors towards the e-market adoption decision. In terms of trust factors, both adopters and non-adopters hold the similar attitude, with small difference in mean, 0.39 for trading partner trust and 0.76 for e-market trust. Size factor seems to have less impact on the e-market adoption decision in SMEs group.

62% of the respondents have not adopted the e-market yet as discussed above. It is worthwhile to investigate the driving forces of those SMEs for e-market adoption in the future. t-test is conducted for the "Potential Adoption" and "Never Adoption" group in Table 2. In the survey, SMEs yet to adopt e-market are asked if they have plans to adopt e-market in the near future (12 months). Only 12.1% of the respondents intend to adopt e-market. Factors strongly influence the adoption decision in this group are top management support and trading partner trust, followed by organization readiness. Hypotheses 4, 5 and 7 are therefore supported in this group. Others are rejected.

Potential adopters possess higher expectation in direct and indirect benefits e-market can bring than those never adopters. In terms of organization factors, potential adopters believe they are more technically and financially prepared to adopt e-market, in addition, their potential initiatives would be supported by the top management. The difference of perception between potential adopter and never adopter in external pressure is not obvious. Neither considers pressure from business partners, government or competitors as significant.

	Mean		Difference in Mean	t-value	Significance
	Potential Adoption	Never Adoption			
Technology					
Perceived Direct Benefit	39.88	35.02	4.86	1.329	0.189
Perceived Indirect Benefit	24.38	21.34	3.04	1.227	0.224
Organization					
Size	3.50	2.95	0.55	1.318	0.192
Organization Readiness	22.00	19.97	2.03	2.191	0.025*
Top Management Support	15.25	10.50	4.75	2.845	0.005**
Environment					
External Pressure	17.62	17.38	0.24	-0.423	0.674
Trust					
Trading Partner Trust	10.00	7.95	2.05	2.804	0.006**
e-market Trust	7.38	7.69	-0.31	-0.344	0.732

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2. Results of hypotheses test in potential adoption, never adoption group

Surprisingly, Hypothesis 1 does not stand in either stage of the e-market adoption decision. The perceived direct benefit is identified as a critical factor driving organizations' new technology adoption in previous studies (Premkumar et al., 1994; Rogers, 2003). One possible explanation might be the lack of awareness of the direct benefit of e-market adoption in top management among SMEs. Managing directors or CEOs are crucial in SMEs for making the adoption decision. As a result, their perception of the direct benefit towards the technology adoption is of fundamental importance. The identified demographic data show that most managing directors or CEOs in responding SMEs only hold high school education. This to some extent may indicate that they have a limited knowledge in understanding and accepting the leading edge technology in their business.

4 CONCLUSION

This study has explored the current pattern of the adoption of e-market in Australian SMEs and extensively examined the critical factors for the adoption of e-market in Australian SMEs. The result reveals that the current e-market adoption in Australian SMEs is still low. The dominant pattern of e-market adoption appears to focus on SMEs' building their own e-markets. The potential of e-market, as a result, has not been fully utilized. The paper further finds out that top management support, trading partner trust and organization readiness are the critical factors for SMEs who are ready to adopt an e-market for their e-business.

This study is important as it not only extends and validates the current TOE framework in e-market adoption, but also contributes in the understanding of e-market adoption among Australian SMEs by the empirical study which has not been done before by other Australian researches. The results are valuable for both the Australian government in the sense of policy development in promoting e-market adoption to boost the economy, and for the SMEs to use as a guideline in designing organizational strategy for adopting e-market.

References

- Australian Bureau of Statistics (2007). Counts of Australian Businesses, including Entries and Exits, June 2003 to June 2006. www.abs.gov.au.
- Bakos, J.Y. (1991). A strategic analysis of electronic marketplaces. *MIS Quarterly*, 15 (3), 295-310.
- Barry, H. and Milner, B. (2002). SME and electronic commerce: A departure from the traditional prioritisation of training. *Journal of European Industrial Training*, 25, 316-326.
- Creswell, J.W. (2003). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*. 2nd Edition. SAGE, CA.
- Daniel, E.M., Hoxmeier, J., White, A. and Smart, A. (2004). A framework for the sustainability of e-marketplaces. *Business Process Management Journal*, 10, 277-290.
- Delone, W.H. (1988). Determinants of success for computer usage in small business. *MIS Quarterly* 12 (1), 51-61.
- Fink, L., and Neumann, S. (2007). Gaining agility through IT personnel capabilities: The mediating role of IT infrastructure capabilities. *Journal of AIS*, 8 (8), 440-462.
- Hair, J.F., Anderson, R.E. and Tatham, R.L. (1992). *Multivariate data analysis*. Macmillan Publishing, New York.
- Goldsby, T.J. and Eckert, J.A. (2003). Electronic transportation marketplaces: A transaction cost perspective. *Industrial Marketing Management*, 32 (3), pp. 187-198.
- Grieger, M. (2003). Electronic marketplaces: A literature review and a call for supply chain management research. *European Journal of Operational Research*, 144, 280-294.
- Iacovou, C.L., Benbasat, I., and Dexter, A.S. (1995). Electronic data interchange and small organizations: Adoption and impact of technology. *MIS Quarterly*, 19 (4), 465-485.
- Joo, Y.B. and Kim, Y.G. (2004). Determinants of corporate adoption of e-Marketplace: An innovation theory perspective. *Journal of Purchasing and Supply Management* 10, 89-101.
- Kimery, K.M. and McCord, M. (2002). Third-party assurances: mapping the road to trust in e-retailing. *Journal of Information Technology Theory and Application*, 4 (2), 63-81.
- Kuan K.Y, Chau P.K (2001). A perception-based model for EDI adoption in small business using a technology–organization–environment framework. *Information and Management*, 38 (8), 507-512.
- Molla, A. and Licker, P. (2005). Perceived e-readiness factors in e-commerce adoption: An empirical investigation in a developing country. *International Journal of Electronic Commerce*, 10, 83-110.
- OECD (2007). *Enhancing the Role of SMEs in Global Value Chains*.
- Premkumar, G., Ramamurthy, K. and Nilakanta, S. (1994). Implementation of electronic data interchange: An innovation diffusion perspective. *Journal of Management Information Systems*, 11 (2), 157-186.
- Rogers, E.M. (2003). *Diffusion of Innovations* (5th edition). Free Press, New York.
- Standing, S., Standing, C., and Lin, C. (2008). A framework for managing knowledge in strategic alliances in the biotechnology sector. *Systems Research and Behavioral Science*, 25(6), 783-796
- Standing, S., Standing, C., and Love, P.E.D. (2010). A review of research on e-marketplaces 1997-2008. *Decision Support Systems*, 49(1), 41-51.
- Swanson, E.B. (1994). Information systems innovation among organizations, *Management Science*, 40 (9), 1069-1092.
- Teo, T.S.H., Lin, S. and Lai, K.H. (2009). Adopters and non-adopters of e-procurement in Singapore: An empirical study. *Omega*, 37, 972-987.
- Zhu, K., Kraemer, K.L. and Xu, S. (2002). A cross-country study of e-business adoption using the technology-organization-environment framework. In *Proceedings of the International Conference on Information Systems*, p. 337, Barcelona, Spain.