

Experienced Benefits and Barriers of e-Business Technology Adoption by SME suppliers

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Abstract

E-business technologies present unique opportunities and challenges for businesses, and Small & Medium Enterprises (SMEs) are no exception. However, there is a rich body of the e-business literature concentrates on adoption concerns from SMEs buyers' viewpoint, little research has so far been reported from the viewpoint of SME suppliers. Participation of SME suppliers needs to be ensured in order to use the full potential of e-business technologies. This study was thus initiated to identify the experienced and expected benefits and barriers to adoption of e-business technologies from the viewpoint of group SME suppliers. In general, the findings designate that the SME suppliers have experienced numerous impediments that they need to overcome for the successful implementation of e-business technologies. The suppliers also have a broader view of e-business benefits than just cost saving.

Keywords: SME supplier, Adoption, Benefits, Barriers, experienced, E-business.

Introduction

E-business is defined as a business model which enables buyers and sellers to exchange information and services using a range of electronic technologies (Davies & Garcia-Sierra, 1999). It allows businesses to adjust to novel markets and trade opportunities by increasing their sales, reducing their cost of transactions (Tan et al., 2010) and increasing flexibility in communicating with business partners (Tan et al., 2010; Heung, 2003). Nevertheless, significant difficulties exist for adoption of e-business technologies such as the lack of compatibility between

current technical infrastructure and e-business technologies (NOIE, 2000).

There exists a rich body of literature on e-business for the SME context. However, studies on e-business have not differentiated the benefits and barriers between SME buyers and suppliers. As the business processes associated with fulfillment of suppliers are different from those of ordering and procurement of buyers (Kim, and Shunk, 2004), it is argued that SME suppliers are likely to have different concerns regarding e-business benefits and barriers. Current e-business literature does not report much about the e-business adoption concerns from SME

suppliers' viewpoint. Furthermore, little has been reported about a comparison of expected and realized benefits/barriers from SME viewpoint. This study was thus initiated to better understand the perceptions of SME suppliers about e-business technology adoption benefits and barriers by administering an online survey among a group of SME suppliers which are registered with a large city council located in the estate of Victoria, Australia. Understanding their views is important because participation of SME suppliers is essential if full potential of e-business technologies need to be harnessed.

The overall findings indicate that the impact of e-business technologies adoption is seen in a positive light by the participating suppliers. The SME suppliers have a broader view of e-business benefits than just cost reduction. The findings further confirm that SME suppliers do experience many barriers that they need to overcome for the successful implementation of e-business technologies. However, there is a disagreement in importance between expected and actually encountered barriers. These findings make important theoretical and practical contributions. On the theory side, benefits and barriers of e-business technologies adoption by SME suppliers are identified and comparisons between expected and experienced benefits/barriers are highlighted which has not been specifically addressed in the current e-business literature. The findings thus help in reducing a gap in the literature. The research also identifies a number of key benefits and barriers that owners and managers of SME suppliers should carefully reflect on when considering the adoption of e-business technologies.

The paper continues with a literature review of e-business technologies adoption benefits and barriers by SMEs. This is followed by a research approach description. Next, results are reported and discussed. Finally, the paper concludes by highlighting contribution, limitations and, future research direction.

2. Related background literature

2.1 Benefits of e-business technologies adoption by SMEs

There is a rich body of literature on e-business benefits. A large portion of the literature however discusses benefits without clearly expressing any specific assumptions about business size. In general, the following major benefits are reported in the literature: *increased sale* (Dubelaar et al., 2005; Scupola, 2009), *improved distribution channels* (Scupola, 2009; Tan et al., 2010) and *improved customer services* (Scupola 2009; Osmonbekov, 2010; Tan et al., 2010). These benefits are however likely to be influenced by the capability of businesses to adopt these new technologies. From the resource based view (Grant, 1991); it can be argued that the organizational capability is strongly associated with business size. Recognizing this, benefits of e-business technologies adoption by SMEs are examined by some researchers in recent years (e.g. Quayle, 2002; Drew, 2003; Scupola, 2009; Tan et al., 2010). The following observations can be made by drawing on a review of these studies. First, many of the widely cited e-business benefits advocated by e-business gurus are indeed experienced by SMEs to some extent. Second, there also exists a lack of broad agreement about the attainment of some benefits. For example, Argoneto and Renna, (2010) find *increased cost reduction* but Tan et al., (2010) present evidence to the contrary. Literature analysis further indicates that some studies acknowledge the need to undertake further investigation to compare benefits of SME buyers and suppliers. For instance, Grover and Ramanlal (1999) highlight that the adoption benefits between buyers and suppliers have not yet been unravelled. Third, no empirical investigations are reported on how various factors affect the attainment of benefits for SMEs context.

2.3 Barriers to adoption of e-business technologies by SMEs

Existing literature identifies numerous barriers to e-business technologies adoption. Similar to e-business benefits, literature is also silent about whether barriers differ based on organizational size. In general, the following major barriers are identified: *a lack of time to implement e-business* (Scupola, 2009), *the high level of complexity associated with e-business implementation* (Kaynak et al., 2005) and *high implementation cost associated with e-business technologies* (Gunasekaran and Ngai, 2007; Li and McQueen, 2008; Tan et al., 2010). It is argued that many of these barriers can be successfully addressed by large organizations due to their resource and expertise availability. As SMEs suffer from acute resource scarcity (Riquelme, 2002), the perceived barriers of e-business technologies adoption by SMEs may differ considerably than those of large organizations. As such, some researchers (e.g. Heung, 2003; Tan, Tyler and Manica, 2007; Tan et al., 2009; Tan et al., 2010; Johnson, 2010) examine the barriers perceived by SMEs for introducing e-business technologies. According to these scholars, SMEs encounter several barriers cited in the broader SME literature. However, there is a disagreement about some barriers. For instance, Tan (2007) find a *lack of management willingness to engage in e-business* to be a major barrier for SME context. But Li and McQueen, (2008) provide opposite findings. Some scholars acknowledge that barriers to e-business technologies adoption among SME buyers and suppliers may differ. For example, Grover and Ramanlal (1999) reported that the barriers to adoption of e-business technologies between buyers and suppliers have not yet been untangled. Furthermore, it is unclear whether these barriers have significant influence on e-business technologies adoption decision making or implementation stages. Further research is needed to address this concern.

3. Research approach

This study used an online survey approach to gain an understanding of SME suppliers'

perceptions of benefits and barriers associated with e-business technologies adoption. Online survey was considered appropriate due to: fast access to individuals, increased ability to reach to difficult contact participants, and ease of having automated data collection which reduced researcher time and effort (Wright, 2005). Furthermore, online surveys save researchers money due to the electronic collection of data (Yun and Trumbo, 2000).

The study was conducted in the spirit of the positivist research tradition and followed five stages: literature analysis to develop the theoretical concepts, survey instrument development, instrument evaluation by domain experts, administration of survey and empirical data analysis. From the literature analysis, a set of e-business benefits and barriers were identified. These served as the foundation for developing an initial survey instrument which was divided into four parts: profile of responding managers, characteristic of participating business, expected/experienced benefits of e-business technologies adoption, and expected/experienced barriers to adoption of e-business. The instrument was then given to four domain experts (i.e. three e-business academics and one senior IT manager from a government organization). They offered a total of 28 suggestions out of which 23 were about improving the clarity and readability of the instrument, 4 were about inclusion of new benefits/barriers related items, and one was about removing a redundant item.

The target survey participants are 3000 SME businesses in Melbourne, Australia, which are registered with a particular city council. The city council provides support for the SME businesses through seminars and delivers relevant information through e-mail. Half of these SME businesses are professional businesses (e.g. accounting organizations) that were not considered suppliers. Out of the remaining 1500 SME businesses, 500 are hairdressers and restaurants which too were not considered suppliers. Thus, the survey questionnaires

were sent (via email) to the remaining 1000 SME suppliers, out of which 47 SME suppliers responded to the survey, representing a 4.7 % response rate. This low response rate was not considered to be a surprise, given that survey has often been plagued by low response rates (Church, 1993). Moreover, other Australian IT scholars have also reported a low response rate. For instance, Lin and Pervan (2003) reported a 7% survey response rate while investigating IS/IT benefits among Australian largest 500 companies. Access to the SMEs was obtained by contacting business development manager of the council who was responsible for organizing seminars for SME businesses. Due to privacy concerns, the development manager sent an email to the 1000 SME suppliers requesting their participation in an online survey prepared by authors.

4. Results

The research findings were analyzed using a well known statistical package, SPSS version 16. Descriptive, student t-tests and comparative means analysis were performed to analyze the survey data.

4.1 Participants' profile

Table 1 provides a summary of the key characteristic about participating respondents. A large majority of the respondents (70.2%) are owner managers. A slight dominance of male respondents is observed. The distribution of the participating managers in terms of their working experience with their businesses is well represented for all groups.

4.2 Characteristic of participating businesses

A majority of the surveyed suppliers (55.6%) have an employee dedicated to the IT function. Most suppliers have access to the Internet and have a web presence on the Internet. All suppliers update their websites on a regular basis. Table 2 shows the key characteristics of the participating businesses.

Table 1: Participant Demographic

Managers	Frequency	Percent
Job Role		
• Owner	33	70.2
• CEO	7	14.9
• Senior business manager	5	10.6
• IT manager	2	4.3
Gender		
• Male	25	53.2
• Female	22	46.8
Years with the organization		
• < 1 year	12	25.5
• 1 – 5 years	15	31.9
• 6 – 10 years	7	14.9
• Over 10 years	13	27.7

Table 2: Characteristic of participating businesses

Characteristic	Frequency	Percent
IT people		
• Yes	25	55.6
• No	20	44.4
Website present		
• Yes	34	73.9
• No	12	26.1
Update frequency of websites		
• Once a month	20	58.8
• Twice a month	6	17.6
• Every three months	8	23.5

4.3 Expected and experienced benefits

Table 3 offers a comparison between the mean scores and ranks for both expected and experienced benefits of e-business technology adoption by the participating suppliers. The results indicate the presence of a broad agreement in the top five rankings between expected and experienced benefits. For example, *an improved customer service is* ranked (1) in the list of expected benefits of e-business technology adoption by SME suppliers, while it is ranked (2) in the experienced benefits. The opposite is observed with *increased ability to compete*, which is ranked (2) in expected benefits, whereas it is ranked (1) in experienced benefits. In addition, *increased sales* is ranked (3) in expected benefits, while it is ranked (1) in experienced benefits. *Greater access to join a wider range of markets* is ranked (3) in both expected and experienced benefits, *improved distribution channels* (rank 4) and

increased flexibility in communicating with business partners (rank 5) have the same ranks in both expected and experienced benefits of e-business technology adoption by the suppliers.

4.4 Expected and experienced barriers

Table 4 compares the mean scores and ranks for expected and experienced barriers to e-business adoption by SME suppliers. The first five ranks in both expected and experienced barriers to e-business technology adoption by SME suppliers are categorized as internal barriers, whereas, external barriers attained the lowest ranks. This observation indicates that the external barriers are neither considered important nor they are frequently encountered, while internal barriers are considered to be more important. Another interesting observation is a lack of correspondence between expected and actually experienced barriers.

Table 3: Expected and Experienced Benefits

Benefits	Expected Benefits		Experienced Benefits		Rank Difference	Mean Difference (P-Value)	Remarks
	Mean	Rank	Mean	Rank			
Improved customer services	2.11	1	2.47	2	-1	0.36	Not significant
Increased ability to compete	2.21	2	2.40	1	1	0.19	Not significant
Greater access to a wider range of markets	2.23	3	2.49	3	0	0.26	Not significant
Increased sales	2.23	3	2.40	1	2	0.17	Not significant
Improved distribution channels	2.36	4	2.55	4	0	0.19	Not significant
Increased flexibility in communicating with business partners	2.43	5	2.64	5	0	0.21	Not significant
Provide managers better access to information	2.47	6	2.72	9	-3	0.25	Not significant
Improved relationships with business partners	2.49	7	2.68	7	0	0.19	Not significant
Improved communication within my organization	2.60	8	2.74	10	-2	0.14	Not significant
More effective support role to operations	2.62	9	2.70	8	-1	0.08	Not significant
Improved productivity of the managers	2.64	10	2.89	12	-2	0.39	Not significant
Increased cost reduction	2.66	11	2.66	6	5	0.00	Significant*
Provide managers access to methods and models in making functional area decisions	2.74	12	2.72	9	3	0.02	Significant*
Greater ability to join supply chains of large companies	2.81	13	2.85	11	2	0.04	Significant*
Support for strategic decision making by managers	2.83	14	2.85	11	3	0.02	Significant*

Table 4: Expected and Experienced Barriers

Barriers	Expected Barrier		Experienced Barrier		Rank Difference	Mean Difference (P-Value)	Remarks
	Mean	Rank	Mean	Rank			
Lack of time to implement e-business	2.64	1	2.79	5	-4	0.15	Not significant
The high level of complexity associated with e-business implementation	2.70	2	2.79	5	-3	0.09	Not significant
High implementation cost associated with e-business technologies	2.72	3	2.77	4	-1	0.05	Not significant
Lack of technical expertise to engage in e-business	2.74	4	2.68	1	3	0.06	Not significant
Resistance to changing work practices due to e-business technologies adoption	2.74	4	3.62	11	7	0.88	Not significant
Lack of compatibility between our current technical infrastructure and e-business technologies	2.77	5	2.74	3	2	0.03	Significant*
Management concerns about e-business security	2.81	6	2.89	6	0	0.08	Not significant
Lack of sufficient interest of your major business partners to participate in e-business initiatives	2.83	7	3.06	8	-1	0.23	Not significant
Lack of financial resources to engage in e-business	2.85	8	2.70	2	6	0.15	Not significant
Lack of interest (adoption) in your industry sector (e.g. partner)	2.85	8	3.11	10	-2	0.26	Not significant
Lack of sufficient planning, foresight and strategy for e-business	2.89	9	2.91	7	2	0.02	Significant*
Lack of industry trust	2.91	10	3.11	10	0	0.2	Not significant
Your business model is not suitable to adopting e-business technologies	2.96	11	3.09	9	2	0.13	Not significant
Lack of management willingness to engage in e-business	3.00	12	2.77	4	8	0.23	Not significant
Inadequate competition in your industry	3.04	13	3.09	9	4	0.05	Not significant

Drawing on Table 4, it can be seen that the top five expected barriers (i.e. *a lack of time to implement e-business, the high level of complexity associated with e-business implementation, high implementation cost associated with e-business technologies, lack of technical expertise to engage in e-business and resistance to changing work practices due to e-business technologies adoption*) substantially differ from the top five experienced barriers (i.e. *a lack of technical expertise to engage in e-business, a lack of financial resources to engage in e-business, a lack of compatibility between our current technical infrastructure and e-business technologies, high implementation cost associated with e-business technologies and the high level of complexity associated with e-business implementation*).

5. Discussion

The most important benefits which received the top five ranks in both expected and experienced benefits lead to the following two observations: firstly, providing customers with improved services through e-business technology seems to be the most wanted and achieved benefit; secondly, the remaining four top benefits (both expected and experienced) are internally focused. In a comprehensive review of the benefits businesses gain from investing in IT, Melville et al. (2004) identify three levels of benefits: focal businesses (the organization that invests in and deploys IT resources); level of competitive environment (separated into two components: industry characteristics and trading partners - industry characteristics include competitiveness, technological change, and other factors that shape the way in which IT is applied within the focal firm to generate business value and also include the focal firm's trading partners) and macro environment (specific factors shape IT application for the improvement of organizational performance). All five benefits identified in this study are at the level of the competitive environment. This seems to indicate that the participating SME suppliers have a broader view than just cost savings. This is in contrast to the commonly held view by

scholars (Kaynak et al., 2005) that SME suppliers are generally more concerned with obtaining immediate short term benefits from innovative technology such as e-business technology.

Furthermore, there is evidence of seeking and experiencing both strategic (e.g. increased ability to compete and greater access to a wider range of markets) and efficiency improvement oriented benefits (improved distribution channels and increased flexibility in communication with business partners). This observation is consistent with the views expressed by such scholars as Quayle (2002), Fillis et al. (2004) and Riquelme (2002). Interestingly, the participating SME suppliers seemed to have given higher priority to satisfying the needs of their customers rather than enhancing their internal productivity and decision making capabilities using e-business technologies.

Table 3 further indicates that out of fifteen benefits, the difference in ranks of four benefits (i.e. *increased cost reduction, provide managers access to methods and models in making functional area decisions, greater ability to join supply chains of large companies and support for strategic decision making by managers*) are statistically significant. A close look at these four specific benefits indicates that: the SME suppliers did not expect to gain an improvement in the decision making capabilities of their functional and strategic management as a result of introducing e-business technologies. However, in real life, these two benefits were significantly experienced. This observation is in line with research on the business value of IT (e.g. Melville et al., 2004). The use of IT to change organizational processes can have a ripple effect onto other non related processes. Scheepers and Scheepers (2008) highlight the ripple effect the introduction of e-business technology can have on various processes even though these processes have not been directly changed by technology. It is possible that participating suppliers have experienced such a ripple effect by utilizing e-business technology to enhance their customer service. The technology potentially

increased the efficiency and effectiveness of other processes in the supplier and provides managers with spin-off information assets that can be utilized quite effectively (Scheepers & Scheepers, 2008).

The SME suppliers did not expect a reduction in their operating costs as a result of e-business technology adoption but they have experienced a reduction in costs once the technology was put into operation. This may be attributed to the fact that e-business technologies, through improving customer services, may have reduced the need for additional paper work which was necessary to resolve customer complaints. This could also be due to the lesser need to maintain customer service staff who are often dispatched to the customer's premises for face-to-face discussion.

The findings further suggest that although the SME suppliers recognized the high level of complexity associated with e-business implementation to be a major barrier they assumed that they have the technological sophistication and maturity to manage the introduction and operation those complex applications. They also underestimated the financial commitment required for introducing e-business technologies which is not surprising given that they have limited understanding about the hidden cost associated with e-business technologies adoption.

From Table 4, it appears that out of fifteen barriers, the difference in the ranks of two particular barriers (i.e. *lack of compatibility between our current technical infrastructure and e-business technologies* and *lack of sufficient planning, foresight and strategy for e-business*) are statistically significant. This in fact suggests that the participating SME suppliers were potentially ill-prepared for the introduction of e-business technologies. They have seriously underestimated the importance of adequate upfront planning activities in support of e-business technology adoption.

6. Conclusion

The rapid spread of the Internet as a low cost business medium has improved awareness of electronic business which attracted SMEs to invest in various forms of e-business technologies. However, gaining benefits from the adoption of these technologies is not easy as SMEs need to overcome many barriers associated with their implementation. Although there exists some literature on SMEs' perceptions about benefits and barriers, past studies did not differentiate between buyers and suppliers. In particular, little has been investigated from the perspective of SME suppliers. To address this gap in the literature, this project was initiated to better understand the perceptions of SME suppliers about e-business adoption benefits and barriers. Understanding the views of SME suppliers is important because the full potential of e-business can be realized when both buyers and suppliers appreciate the value of e-business and are aware of the potential difficulties in adopting e-business technologies and prepare themselves accordingly.

Several interesting findings have emerged from our study which was discussed in light of the existing literature. However, our interpretation of the findings should be treated with caution due to the selection of a convenient and small sample from only a particular location (i.e. Victoria) in Australia. However, we do not see any reason for which SMEs located in other parts of Australia would differ significantly from those located in Victoria. This is because the operating and competitive forces which help shape SME industry are likely to be equally applicable to all states of Australia. Therefore, despite acknowledging the limitation associated with small sample size, we may still be able to safely extend our observations about e-business adoption benefits and barriers to broader Australian SME context. However, the findings may not be applicable to other national context without further empirical confirmation. Another weakness of this study is the implicit assumption that participant's experience correlates with their expertise. However, expertise of

participants may differ from their working experience at their respective organizations which may in turn interfere in completing the survey instrument. Despite these limitations, we believe that our findings are useful to both theory and practice. For theory, this research highlights the benefits and barriers from the perspective of SME suppliers which has not been specifically addressed in the existing e-business literature. As the e-business literature is primarily concerned with the benefits and problems faced by buyers, this study helps in reducing a gap in the literature. With regard to practice, the findings would help raise awareness of SME management about the key issues associated with e-business adoption and thus help set realistic expectations from their investment decisions in e-business technology.

There are several ways to extend our work. There is a clear need to increase sample size and conduct qualitative case studies. Together, they would help us improve generalization of the research findings. Further studies are needed to investigate the ripple effect of e-business technology investment on organizational processes. This research indicated that SME suppliers in Victoria, Australia have a long term view of utilizing e-business technologies. Additional studies are required to further explore this phenomenon in contexts other than Australia.

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