An Investigation of Perceived Benefits and Perceived Barriers of E-businesses among Bruneian SMEs

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***Abstract*—This study initiates to identify expected and experienced benefits and barriers in adopting of e-business technologies among Bruneian SMEs in the supplier side. The overall findings indicate that adoption of e-business technologies was seen in a positive light by participating SMEs. These findings identified several key expected/experienced benefits. Among the top five experienced benefits are increased sale, managers' access to methods and models in making functioning area decision, increased flexibility in communicating with business partners, improved customer services, increased ability to compete, and providing managers better access to information. Despite of these benefits, there are encountered expected/experienced barriers to e-business technologies adoption by SMEs. The top five experienced barriers include: lack of technical competence, lack of financial resources, lack of compatibility, high implementation cost associated with e-business technologies, and, the high level of complexity associated with e-business implementation. The theoretical and practical implications of this research are discussed and some conclusions are drawn and recommendations are made.**

Index Terms*—*e-business, perceived benefits, perceived barriers, SMEs and Brunei Darussalam.

I. Introduction

The last decade of the century has radically improved the functioning of the business enterprises across the globe with the innovation in ICTs. The change in business processes have provided a new venue for small and medium enterprises (SMEs) who are always targeted as resources deficient [1] and [2]. The SMEs started enjoying the lure of the new business applications like e-businesses.E-business is the integration of the Internet and related ICTs into the business organizations and defined as a business model which enables buyers and sellers to exchange information and services using a range of electronic technologies [3]. It allows businesses to adjust to novel markets and trade opportunities by increasing their sales, reducing their cost of transactions [4] and increasing flexibility in communicating with business partners [5].Nevertheless, significant difficulties exist for adoption of e-business technologies such as the lack of compatibility between current technical infrastructure and e-business technologies [6].

There exists a rich body of literature on e-business within the context of the SMEs [7]-[9]. However, studies on e-business have focused on the benefits and barriers among SME and not differentiating between buyers and suppliers. Current e-business literature does not report much about the e-business adoption concerns from SMEs from buyers or suppliers' viewpoint. Furthermore, little has been reported about a comparison of expected and realized benefits and barriers from SMEs viewpoint. This pioneering study is thus initiated to better understand the perceptions of SMEs about e-business technology adoption benefits and barriers by using a survey approach among Bruneian SMEs from (supplier side). The study is unique in a way as it explicitly focuses on the various e-business applications as we believe that understanding the SMEs viewpoint especially about the benefits and barriers will help formalize a national policy by the relevant government authorities. Understanding their views is important because participation of SMEs is essential if full potential of e-business technologies need to be harnessed [4].

The overall findings designate that the benefits and barriers of e-business technologies adoption is seen in appositive light by participating SME suppliers. The findings identified several key expected/experienced benefits such as improved customer services, increased ability to compete, and increased sales. 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. Findings make important theoretical and practical contributions. On the theoretical 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

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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.

A. SMEs in Brunei Darussalam

SMEs have grown in importance in the global economy and in Brunei as well. Likewise, SMEs in Brunei has a great contribution to the economy. In 1994, SMEs contributed to the economy around 66.2% to the nation's GDP. This was grown to 90% employment in the private sector in 2000. In the service and manufacturing sectors, the contribution of SMEs is estimated at 38-42% (www.goldpages.com.bn/).

The Government of His Majesty has recognized the significant role that SMEs play in the economic development of the nation and set up a Resource Center of the Ministry of Industry and Primary Resources in 1996 to provide facilities and expertise for facilitating the growth and development with the further scope of providing technical and entrepreneurial assistance such as training and technology transfer services, incubation program, technical and entrepreneurial advisory services and providing relevant information to SMEs. The Brunei SME homepage, which is a collaborative work between the Resource Center, Brunei Shell Petroleum Company and Brunei Liquid Natural Gas (LNG) Company, is one of its programs (ibid).

Although H.M Government is committed to promote SMEs as an engine of growth, however, the intake of technology adoption is still at infancy stage. The potential of e-business strategy is still underexploited by SMEs. Besides the fact that e-business offer many benefits as well as problems that SMEs need to be aware of and to deal with them in a proactive and efficient ways. In this regards we must understand that Bruneian SMEs are lacking in technological as well as financial resources and in addition risk of transform from traditional business operation to e-business is rather high. Most of the failure in this transformation is due to lack of top-management knowledge and skill, people resistance is one of the several bottlenecks hindering the e-business technology implementation.

In Brunei, the adoption of this new technology is comparatively slower compared to other countries [10] and [11]. There research among Bruneian businesses on e-commerce and EDI confirms that this slowness is because of Bruneian tending to be more cautions and conservative in its adoption of new technology especially within the business community.

On this background this pioneering study was conducted in December 2011 with the following objectives:

- To identify the key process of the businesses and to study on how Bruneian SMEs respond to the expected and experienced benefits and barriers associated with e-business technology.
- To highlight top five ranking expected and experienced benefits and barriers and to recommend for relevant governmental agencies such as Ministry of Industry and Primary Resources to promote the e-businesses among SMEs.

The paper continues with a literature review of e-business technologies adoption benefits and barriers by SMEs cited in theory, followed by themain findings of the research carried out on the e-business technologies adoption. A discussion about the main findings follows. Finally, the paper finishes by conclusion, limitations and, future research dimensions.

II. Literature Review

A. 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 discusses benefits without clearly expressing any specific assumptions about business size. In general, the following major benefits were reported in the literature: increased sale [12], improved distribution channels [13] andimproved customer services [14]. These benefits are however likely to be influenced by the capability of businesses to adopt these new technologies. From the resource based view [15]; it can be argued that the organizational capability is strongly associated with business size. Recognizing this, some researchers have examined benefits of e-business technologies adoption by SMEs [16] and [17]. A review of their studies confirms that many of the widely cited e-business benefits advocated by gurus are indeed experienced by SMEs to some extent. However, their also exists a lack of broad agreement about the attainment of some benefits. For example, Daniel and Grimshaw [17] found increased cost reduction butDrew [13] presented evidence to the contrary. It is interesting to note that studies on SME e-business acknowledge the need to undertake further studies to compare benefits of SMEs buyers and suppliers. For instance, Grover and Ramanlal [18] highlighted that the adoption benefits between buyers and suppliers have not yet been unravelled.

Recently, Abid *et al*., [19] conducted a study of 47 Victorian (Melbourne, Australia) SMEs particularly focusing on the supplier side of the business and conducted comparison of expected and experienced benefits with the expected and experience barriers of conducting e-business. They found that improved customer service is ranked as No 1 benefit in the list of expected benefits of e-business technology adoption by SMEs; while it is ranked No 2 in the experienced benefits. Similarly, increased ability to compete is ranked (2) in the expected benefits and ranked (1) in the experienced benefits. The increased sales is ranked (3) in expected benefits and ranked (1) in experienced benefits. In addition, greater access to join a wider range of marketing is ranked (3), improved distribution channel (4), and increased flexibility in communicating with business partner ranked (5) have the same ranking among

both expected and experienced benefits of e-business technology adoption by the suppliers' SMEs.

B. Barriers to Adoption of E-Business Technologies by SMEs

Existing literature has identified 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 were identified: a lack of time to implement e-business [20], the high level of complexity associated with e-business implementation [16] and high implementation cost associated with e-business technologies [21]. It is argued that many of these barriers can be addressed successfully by large organization due to their resource and expertise availability. As SMEs suffer from acute resource scarcity [21], the perceived barriers of e-business technologies adoption by SMEs may differ considerably than those of large organizations. Recognizing this, a few researchers Tan, Tyler and Manica, [22]; Tan *et al.*, [23] have examined barriers perceived by SMEs to e-business technologies adoption. These studies indicate that several of broadly e-business barriers citations are certainly practised by SMEs to some extent. However, there is a disagreement about identifying some barriers. Such as Chong and Parvan [24] found a lack of management willingness to engage in e-business but Tan, Tyler and Manica [22] reported opposite evidence. It is important to recognize that researches on barriers to e-business technologies adoption by SMEs need to carry out further investigations to make a comparison between barriers of SME buyers and suppliers. As Grover an7 Ramanlal [18] reported that the barriers to adoption of e-business technologies between buyers and suppliers have not yet been untangled.

As mentioned previously, Abid *et al*., [19] in his study also identified the expected and experienced barriers of conducting e-business. They found that lack of time to implement e-business is ranked as No 1 barrier in the list of expected barriers in e-business technology adoption by SMEs; while it is not ranked in the experienced benefits. Similarly, the high level of complexity associated with e-business implementation is ranked (2) in the expected barrier and ranked (5) in the experienced barrier. The high implementation cost associated with e-business technology is ranked (3) in expected barrier and ranked (4) in experienced barrier. In addition, lack of technical expertise and resistance of changing work practice is ranked (4), lack of compatibility between current technical infrastructures is ranked as (5), among expected barriers. However, Australian SMEs experienced an additional barrier such as lack of financial resources that was not among the expected barriers of e-business technology adoption by the suppliers' SMEs.

III. Research Methodology

The study uses a survey approach to gain an understanding of SME suppliers' perceptions of benefits and barriers associated with e-business technologies adoption. This study was conducted in the spirit of the positivist research tradition and followed the following five stages: literature analysis to develop the theoretical concepts, survey instrument development, instrument evaluation by domain experts, administration of survey and empirical data analysis.

Population and Sample: The target survey participants are 2000 companies that are registered with the registrar of the firms in Brunei Darussalam. Out of these 90% are considered as SMEs between 1-100 employees (www.bizbeginners.biz/brunei.html). Out of these 1800 SMEs, 60% are in fact falls under the category of micro business with less than ten employees and are classified as small tailoring, dress-making, hair-dressing and saloons, health SPAs, small groceries shops and small travel companies are all excluded from the study. 45% or 324 are in the trading/wholesale/retail and in manufacturing sector are the target populations for this study(www.bruneidirectthys.net/about_brunei/small_medium.html). Out of these we selected 150 SMEs that are in fact dealing with the supplies side and from the Brunei yellow page we randomly selected those organizations that are located in the capital city of Bandar Seri Begawan. Out of these 150 organizations responses from 75 organizations were retained for the purpose of the study, thus making the response rate of 22% which is not an ideal figure however several Australian IT scholars have reported a low response rate in Australia as well. For instance, Lin and Pervan, [25] reported a 7% survey response rate while investigating IS/IT benefits among Australian largest 500 companies. Similarly, in another Australian study, Abid *et al.*, [19] reported small sample size of 47 SMEs.

The instrument: The questionnaire that was divided into five parts: profile of responding managers, characteristic of participating business, nature of IT functions, use of e-business technologies in an organization, expected/experienced benefits of e-business technologies adoption, and expected/experiencedbarriers to adoption of e-business.The instrument is adapted after Abid, [25] who used for his study of 47 Australian SMEs (supplier side) in Victoria, Australia. The expected and experienced benefits and barriers are measured on five-point Likert scale with 1 representing "strongly agree" to 5 for "strongly disagree".

Reliability and Validity: In order to ascertain the reliability, the Cronbach's coefficient (α) [26] was calculated by using SPSS and found 90% for expected benefits and 94% for experienced benefits. Similarly, it remained 92% for both expected and experienced barriers. To ascertain the face validity 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 8 suggestions which were incorporated into the edited version of the questionnaire.

IV. Results

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

Participants' profile indicates that 34% of the respondents are owner managers/CEOs. A good portion of the respondents (33 %) are IT managers. data was also obtained for their working experience with the businesses type. The distribution of the participating mangers in terms of their working experience with their businesses is well represented for all groups.

A majority of surveyed suppliers (77 %) have an employee dedicated to the IT function. Most suppliers have access to the Internet and have a presence on the Internet. All suppliers update their websites on a regular basis.

A. Expected and Experienced Benefits

Comparison was drawn 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, *increased sales* is ranked (9) in expected benefits, while it is ranked (1) in experienced benefits. Similarly, 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 (3) in the experienced benefits. The opposite is observed with increased ability to compet*e*, which is also ranked (3) in expected benefits, whereas it is ranked (4) in experienced benefits. In-addition, provide managers' access to methods and model in making functioning area decisions, (rank 2), increased flexibility in communicating with business partners (rank 3) and provide managers better access to information (rank 5) have the same ranks in both expected and experienced benefits of e-business technology adoption by the suppliers.

B. Expected and Experienced Barriers

We compared the mean scores (by using t-tests) 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. Based on data it is obvious 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. *alack 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*).

V. Discussion

One of the most important benefits that received the top five ranking in experienced benefits is *"increased sales*" that lead to the following observations: firstly, increased sales through e-business technology seems to be the most 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.* [27] 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. Whereas, industry characteristics include competitiveness, technological change, and other factors that shape the way in which IT is applied. It also include 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 [28] that SME suppliers are generally more concerned with obtaining immediate short term benefits from innovative technology such as e-business technology but are in line with Abid *et. al*., [20].

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 customer services and increased flexibility in communication with business partners). This observation is consistent with the views expressed by such scholars as Quayle [16], Fillis *et al.* [28] and Riquelme [29]. Interestingly, the participating SME suppliers seemed to have given higher priority to increasing sales rather than enhancing their internal productivity and decision making capabilities using e-business technologies.

Data analysis through SPSS further indicates that out of fifteen benefits, the difference in ranks of eight benefits (i.e. *improved customer services, increased ability to compete, greater access to a wider range of market, improved distribution channel, improved relationship with business partners, improved productivity of managers, increased cost reduction and support for strategic decision making by the managers)* are statistically significant. A closer look at these eight benefits indicate that the SME suppliers not only to expect to gain an improvement in the decision making capabilities of their functional and strategic management as a result of introducing e-business technologies but also

compete as well. However, in real life, the three benefits i.e., *increased ability to compete* and *provide managers better access to information* was significantly experienced along with the *increased sales*. This observation is in line with research on the business value of IT (e.g. Melville *et al.,* [27]. The use of IT to change organizational processes can have a ripple effect onto other non-related processes. Scheepers and Scheepers [21] 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 [21].

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 that is 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 develop those complex applications. They also underestimated the financial commitment required for introducing e-business technologies.

From the data, it appears that out of fifteen barriers, the difference in the ranks of six particular barriers (i.e. *high implementation cost associated with e-business technologies, resistance to changing work practice due to e-business, lack of interest in your industry sector, lack of sufficient planning foresight and strategy for e-business, lack of industry trust and lack of management willingness to engage in e-business)* are statistically significant. This is 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.

VI. Conclusion

The study has fulfilled both of its objectives. It highlights on the detailed account of perceived expected and experienced benefits and barriers among the 75 surveyed Bruneian SMEs. The study has also identified the top five ranking benefits and barriers that are experienced by these SMEs. In this concern we believe that 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 support on perceived benefits and barriers among SMEs, past studies did not differentiate between buyers and suppliers. In particular, little has been investigated from the perspective of SME suppliers. It is argued that as the fulfillment processes of suppliers are different from the ordering processes of buyers, it is reasonable to expect that the business concerns of suppliers regarding e-business benefits and barriers would be different from those of buyers. 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 innovated in e-business difficulties adoption and prepare themselves accordingly.

Limitations: Although several interesting findings have emerged from the study however, our interpretation of the findings should be treated with caution due to the selection of a convenient and small sample.

Recommendation: Most of the experience barriers are inter-organizational so any intervention from the governmental bodies such as Resource Center of MIPR, and also under the functionality of incubation or i-center can further provide technical help or expertise to the management of SMEs in reducing the barriers such as helping them reducing the implementation cost and to address the issues of lack of financial as well as lack of technical expertise and meeting the acute problem of addressing developing a technical infrastructure. In order to gear up the task of e-business technology adoption, the relevant authorities should provide training to the top management of these SMEs and to educate them on the strategic issues of the technology adoption. They should conduct more road shows, trade shows and product exhibitions to let these SMEs know about the latest hardware and software available and to get familiarized with the latest technology. Once these barriers are overcome the task of e-business technology will increase manifold and Bruneian SMEs will definitely be benefitted from the lure of technology adoption.

Practical implications: Despite of the current limitation, we believe that our findings are useful to both practice and theory in the following manner. For practice, little is known (if any at all) about the benefits and barriers experienced by SME suppliers functioning in the Brunei Darussalam. Hence, these findings provide a rich insight into the extent to which Bruneian SMEs suppliers gained benefits and faced problems in relation to adopting e-business technologies. With regard to 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.

For the practitioners: The manager of the participating organizations should in fact be aware of that most important form of the e-business includes business-to-business (B2B) and most common application for B2B is e-procurement. The managers should be aware of and familiarized with e-Procurement software in creating an electronic catalogue with search capability. Most of the e-Procurement software can generate automate key functions of the purchasing process including creating, reviewing and approving purchase orders and transmitting these purchase orders electronically to the supplier. The top management should negotiate with the vendor or supplier of the software for complete package deal that include training of the staff at every level of the organization so that these SMEs can enjoy the full benefits of the e-business applications.

Future directions of the research: There are several ways to extend our work. There is a clear need to increase sample size and to include qualitative multiple 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 Brunei have a long term view of utilizing e-business technologies. By conducting more cross-cultural and cross-regional studies especially among the ASEAN region will add new dimensions to the current body of knowledge.

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