

Design and Development of B2B e-Commerce Framework for Malaysian SMEs

W.K. Chong, K.L. Man, C. Chen and H.Y. Lai

Abstract—With internet technologies increasing E-marketing is growing exponentially. The Small and Medium Sized Enterprises (SMEs) should take advantage of the internet and refocus their business strategies to improve their competitiveness. The development and usage of Business-To-Business (B2B) e-Commerce enabling technology has caused profound changes to the e-Business environment. The purpose of this paper is to develop an e-Marketing framework for SMEs in conducting B2B e-Marketing in Malaysia.

Index Terms—B2B e-Marketplace, e-Marketing, SMEs, Malaysia

I. INTRODUCTION

Internet technologies are increasingly recognized as a key resource for most of the firm's business and marketing performances [1]. Explosive growth of the World Wide Web (WWW) and the internet-based trading has greatly facilitated the development of online commercial applications [2]. The development and usage of B2B e-Commerce enabling technology has caused profound changes to the e-Business environment.

The B2B e-Marketplace can significantly improve the way companies deal with their customers and suppliers [3]. Furthermore, the initial proliferation of B2B e-Marketplaces that proved to be sustainable for buyers/sellers and play an important role in B2B e-Commerce [4]. According to [5], the success of B2B e-Marketplaces heavily depend on their participants by established values and corporations based on the performance of B2B e-Marketplaces. Hence, the successful B2B e-Marketplace is determined by the important role of the participants. The majority of participants in the B2B e-Marketplace are SMEs and there is an urgent need to understand the adoption issues confronted by them especially from the e-Marketing standpoint.

The reminder of the paper is organized as follows. Section II shows the B2B e-Marketplace in Malaysia. We describe the research methodology in Section III. Moreover the survey results are presented in Section IV. In Section V, we present the e-Marketing framework B2B e-Commerce in Malaysia. Finally, concluding remarks are made and directions for future research are discussed in Section VI.

II. B2B e-MARKETPLACE FOR MALAYSIAN SMEs

The development of B2B e-Commerce has brought significant changes in recent years in Malaysia. The growth and impact of internet technology and the emergence and penetration of the digital economy are likely to lead the

growth of B2B e-Commerce in the Malaysian marketplace. B2B e-Marketplace in Malaysia plays an important role for B2B trading as it is becoming the first destination for buyers and sellers from SMEs for business exposure, products/services promotion and online transactions in the region.

Malaysian SMEs are playing a significant role in the country's economic development [6; 7; 8]. A total of 600,000 SMEs are registered in Malaysia and their contribution to the manufacturing sector was 29.3 percent of their GDP or RM75.2 billion (US\$22 billion) in December, 2005 [8].

B2B e-Commerce remains a popular online business model for SMEs. While the larger organizations are taking advantages from the vast array of information/products/services, SMEs remain in the concern of how their businesses can take advantages from B2B e-Marketplace. However, similar to many countries, Malaysian SMEs are faced with resource constraints, but in relation to B2B e-Marketplace, they have to respond to specific challenges. Generally, the major barriers for B2B e-Marketplace adoption include:

- Lack of understanding of available technology [9,10],
- Lack of confidence in electronic-based marketing [11],
- Lack of technical and knowledge resources [12],
- Lack of e-Business recognition in some industry sectors [13].

SMEs may fail to overcome these barriers if the essential capabilities are not evident in the B2B firms. Hence, there are concerns that limited efforts have been diverted to the promotion of B2B e-Marketplace. Although SMEs use conventional marketing practices which have increased their online presence, the majority of them are still not being achieved even at the minimal levels of adoption [4].

Specific barriers to B2B e-Marketplace participation sometimes reflect more general barriers to e-Business adoption, what are discussed here specifically in relation to the e-Marketing perspective:

1. Generic SME Constraints - Development cost is one major issue in implementing ICT solutions for Malaysian SMEs [8]. According to [14], an SME needs to be entirely reshaped its current systems because ICT adoption projects are complex in nature. Hence, there are many issues that need to be addressed while implementing e-Marketing projects including hardware, software, Human Resources Management (HRM), training and project management. Consequently, SMEs are uncertain about whether they have sufficient resources, expertise, and experience to operate in B2B e-Marketplace for marketing activities.
2. Lack of Understanding of the 'e' Environment - Most Malaysian SMEs do not understand deeply the nature of 'e' environment [15] and how it interacts with e-Marketing. It is crucial for SMEs to understand

¹W.K. Chong is with the Department of Business, Economics and Management, Xi'an Jiaotong-Liverpool University, Suzhou, China. (phone: +86 512 8816 1717; fax: +86 512 8816 1899; e-mail: woonkian.chong@xjtlu.edu.cn).

K.L. Man is with the Department of Computer Science and Software Engineering, Xi'an Jiaotong-Liverpool University, Suzhou, China. (e-mail: ka.man@xjtlu.edu.cn).

C. Chen is with the Global Institute of Software Technology, Suzhou, China. (e-mail: catherinechenchen@gmail.com)

internet technologies and its complementary tools that can enhance their marketing capability.

3. Lack of Exploitation of e-Marketing Services – Limited exploitation of e-Marketing reflects a myriad of other barriers to the adoption of B2B initiatives and results in the loss of potential revenue streams which would assist in funding the SME to overcome (at least some of) them.

4. Identification of Critical Success Factors (CSFs) - The dynamic nature of the electronic environment hinders the progress of B2B e-Marketplace adoption. The benefits of adoption at the early stages are limited, and SMEs are perhaps, insufficiently motivated to progress with the initiative. Therefore, there has to be some realistic immediate success factor(s) to encourage SMEs to gain the benefits from the B2B e-Marketplace.

5. Absence of a Standard e-Marketing Framework - The lack of standard e-Marketing framework is a concern of SMEs. SMEs need a framework that can create, acquire, organize, distribute, and use information to implement e-Marketing strategies. Therefore, a framework responds to multiple dimensions including contextual factors for adoption, CRM, SCM, IS/IT integration, competitiveness, transparency of information, and critical success factors that is vital for SMEs to aggressively pursue the adaptation.

6. III. RESEARCH METHODOLOGY

This study addresses three main research objectives (ROs) which are to: identify the characteristics of firms that adopt B2B e-Marketplace (RO1); explore the dimensions of e-Marketing services of B2B e-Marketplace for SMEs (RO2), and identify CSFs associated with e-Marketing service performances derived from B2B e-Marketplace (RO3).

An online questionnaire was targeted at, proprietors, managing directors, general managers, IT managers, sales/marketing managers and export managers in selected SMEs that participated in B2B e-Marketplace. Participant details including their name, full address, email, position hold, contact number and transaction volume were drawn from the chosen B2B e-Marketplaces.

Prior to dissemination, the online questionnaire was verified by two academicians and piloted on 20 senior management members of the SMEs selected from the sample population. Minor amendments were made to the flow and phrasing of the questions. The pilot study also confirmed the relevance and clarity of the questions to ensure the findings are consistent and relevant.

The sampling frame of this study contains 200 SMEs randomly selected from the B2B e-Marketplaces, who were active members (based on their transaction volumes). All the SMEs were contacted by email together with the covering letter. A total of 91 questionnaires were returned, 84 were valid (6 were considered invalid due to incomplete nature of the response), providing a response rate of 42%. Compared with other SME survey response rates in Malaysia, (e.g. 20.2% in [7] and 40.6% in [15], the response rate is acceptable for an empirical industry study.

IV. SURVEY RESULTS

The reliability and consistency of the data was then

scrutinized. Internal consistency analysis using Cronbach's alpha value is the standard reliability measurement for quantitative data collection. According to [16], the Cronbach's alpha value should > 0.7 for high reliability standard. Table 1 shows the Cronbach's Alpha Value Test Results > 0.7 , indicates the existence of internal consistency or homogeneity among the variables for this study.

TABLE I
CRONBACH'S ALPHA VALUE TEST RESULTS AND DESCRIPTIVE STATISTICS

Constructs	Cronbach's Alpha Value	Mean
<i>The degree of demands to push a firm to adopt B2B e-Marketplace</i>		
Government Encouragement	0.889	3.211
Senior Management Involvement	0.809	3.649
<i>Dimensions of e-Marketing services</i>		
Customer Relationships Management	0.704	4.068
Supply Chain Management	0.822	3.857
Competitiveness in the global business environment	0.849	3.878
IS/IT Integration	0.884	4.011
Transparency of Information	0.894	3.383
<i>The degree of satisfactory results of certain areas or functions to ensure successful competitiveness for an organization</i>		
Critical Success Factors	0.746	3.962

A. RO1: The characteristics of firms that adopt B2B e-Marketplace

The section presents demographic information and the degree of demands for the adaptation of B2B e-Marketplace.

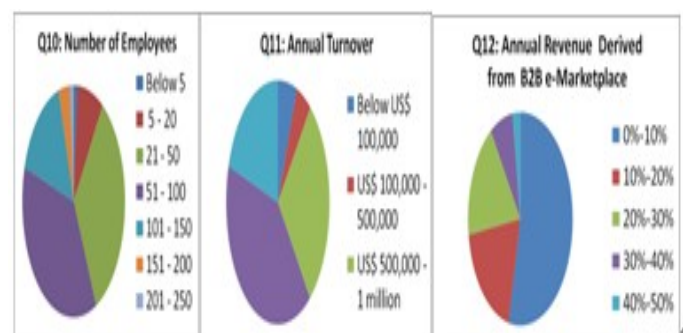


Figure 1. Descriptive Characteristics of Respondents

Referring to Figure 1, the selected sample demonstrates the following characteristics:

- all of them participated in B2B e-Marketplace;
- the majority of the firms (95.2%) employed under 150 people considered as SMEs based on the definition of Malaysian SMEs (SMIDEC, 2009);
- the majority of the firms (91.6%) benefited from an annual turnover of under US\$7 million consistent with SMIDEC (2009) definition of Malaysia and;
- a majority (53.6%) of the firms generated 0 – 10% of their total annual revenue from B2B e-Marketplace.

According to [17], a country's readiness for e-Business fundamentally depends on government encouragement: promotion activities, government grants and the regulation

standards that are crucial for creating an online trading environment. The means of Government Encouragement shown in TABLE I that is more than 3.0 which indicates an agreement with a particular item. Since the means score > 3.5, the respondents are likely to agree upon the importance of senior management involvement in B2B e-Marketplace adoption.

Our findings suggest that, government encouragement and senior management involvement have a significant impact on the adaptation of B2B e-Marketplace. Hence, government and senior management members play an important role to develop suitable strategies to drive SMEs to adopt B2B e-Marketplace services. Although a majority (53.6%) of the participants indicates it only generates 0 – 10% of their total annual revenue from B2B e-Marketplace, SMEs still have high expectations of the government and its senior management members to further explore the opportunities provided by B2B e-Marketplace especially in e-Marketing services.

B. RO2: The dimensions of e-Marketing Services Derived from B2B e-Marketplace

Five variables for dimensions of e-Marketing services are shown in Table 1. Except the mean from “Transparency of Information”, all others have a mean score > 3.5. This suggests that the perceptions of SMEs on the performance of e-Marketing dimensions are optimistic. The arithmetic means showing 2 variables > 4.0, which confirm that the respondents have high expectations from their B2B e-Marketplace in “Customer Relationships Management” and “IS/IT Integration” to improve and satisfy the increasing demand of SMEs.

Our findings imply a strong link between SMEs and the e-Marketing services derived from B2B e-Marketplace. The adoption of B2B e-Marketplace may spur small businesses to focus on long-term marketing planning and business success. The results indicate willingness among SMEs for B2B e-Marketplace adoption to foster their marketing activities. The effectiveness of e-Marketing services are highly determined by several dimensions such as CRM, SCM, competitiveness, IS/IT integration and transparency of information, pointed out earlier.

C. RO3: Critical Success Factors (CSFs) associated with e-Marketing service performances derived from B2B e-Marketplace

The result of “Critical Success factors” indicates the high level of CSFs (mean 3.962) associated with e-Marketing services derived from B2B e-Marketplace. SMEs that have the best chance to compete in the global marketplace are those participating in the B2B e-Marketplace. B2B e-Marketplace provides a large number of buyers trading on their platform and this attract more suppliers. By attracting large numbers of buyers and suppliers around the globe, a marketplace can become very strong and this will provide an opportunity for the participants to compete in the world marketplace. For instance, asiep.com, Malaysia’s leading B2B e-Marketplace service provider has outstanding buying value: over US\$160 billion covering 203 countries since it was established in 1996. The survey recipients also consider CRM as a critical for them especially in the virtual business environment that is getting more saturated and competitive.

According to [18], the marketing model is gradually changing from product to customer centered. Thus, a successful company in the ‘e’ environment will use customer information wisely to develop long-term relationships. The government and senior management members’ involvement are also crucial for SMEs to be encouraged and motivated to ensure successful e-transformation. They need to ensure SMEs which are clear with regard to the conditions of their adoption and the commitments to transform of businesses to the electronic environment. Finally, IS/IT performances, transparency of trading information and supply chain are also vital for SMEs to adopt B2B e-Marketplace successfully.

V. E-MARKETING FRAMEWORK

Our results provide an analysis of B2B e-Marketplace efforts on B2B transactions and collaborations. The impact of the B2B e-Marketplace may cause Malaysian SMEs to radically overhaul their marketing strategy formulation. The empirical results together with the literature search represent an original attempt to develop an e-Marketing framework (see Figure 2) for SMEs who are keen for “e” transformation.

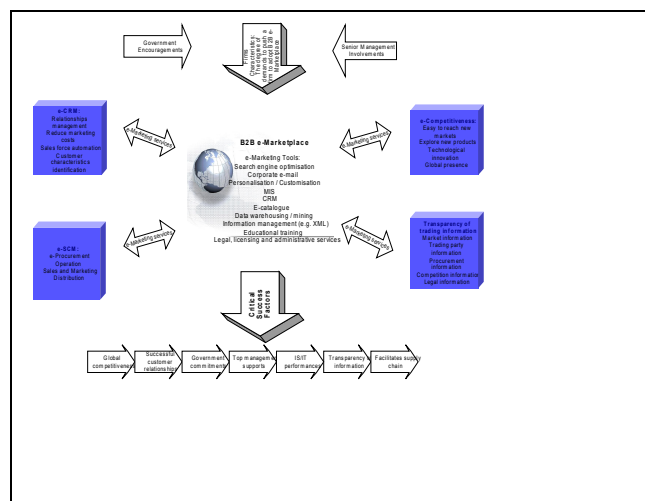


Figure 2. The e-Marketing Framework for B2B e-Commerce

Based on the survey results, the key attributes driving a firm to adopt B2B e-Marketplace are the involvement of and support from the government and senior management within the SMEs. The key factors which are ranked most critical by the respondents are “using e-Marketplace is easier to get government grants” and “senior management allocates the required resources for B2B e-Marketplace every year”. There are four main e-Marketing services from the B2B e-Marketplace identified by the respondents:

- e-CRM – using IS/IT communications technologies such as web-based e-mail, data mining/warehousing to maximise benefits for both sellers/buyers and encourage customers retention.
- e-SCM – the IS/IT services integrated in the B2B e-Marketplace can be upstream SCM activities particularly in e-Procurement. This system can support all procurement activities including purchase, request, ordering, and delivery between sellers and buyers.
- e-Competitiveness – B2B e-Marketplace provides new opportunities for SMEs to compete globally. Based on the survey results, the respondents noted that they can use the e-Marketing services offered by B2B e-

marketplace to retain their customers.

- Transparency and visibility of information – transparency of information in B2B e-Marketplace offers unbiased, complete and accurate market information. The respondents require a well-developed framework that can facilitate a transparent e-Marketplace.

Finally, it is important that SMEs develop a systematic approach to identify prioritizing CSFs in the implementation process and in line with the environment in which the adaptation is located. Therefore, SMEs can establish a comprehensive approach to manipulate each factors based on the findings and interpretation of this study.

VI. CONCLUSION AND FUTURE RESEARCH

This paper addresses the following three research objectives (ROs) by: identified the characteristics of firms that have adopted B2B e-Marketplace; explored the dimensions of e-Marketing services of B2B e-Marketplace for SMEs, and identified the CSFs associated with e-Marketing service performances derived from B2B e-Marketplace. The proposed framework is intended to be used as a guideline for managers and practitioners who wish to adopt a proactive approach in the use of B2B e-Marketplace for competitive advantage, and exploration of the e-Marketing service performances. The proposed framework also provides a balanced perspective of e-Marketing and the contemporary marketing activities for sustaining effective led practice in the global marketplace.

The limitation may be viewed as the sample size of SME participation in the survey. Therefore the future studies may place further emphasis in cross-country perspective with focus on large scale organizations for result comparisons. Nonetheless, this study contributes a major step towards the systematic adoption of e-Marketing on SMEs' business performances, which adding value to this research implementing the model would be another area for future.

REFERENCES

- [1] Aziz, N.A. and Yasin, N.M., (2004), "The Influence of Market Orientation on Marketing Competency and the Effect of Internet-Marketing Integration", *Asia Pacific Journals of Marketing and Logistics*, Vol. 16 No. 2, pp. 3-19.
- [2] Nguyen, T.D. and Barrett, N.J., (2006), "The adoption of the internet by export firms in transitional markets", *Asia Pacific Journal of Marketing and Logistics*, Vol. 18 No. 1, pp. 29-42.
- [3] Derfler, F.J., (2001), *e-Business essentials*, PC Magazine, USA.
- [4] Stockdale, R. and Standing, C. (2004), "Benefits and barriers of electronic marketplace participation: an SME perspective", *The Journal of Enterprise Information Management*, Vol. 17 No. 4, pp: 301-311.
- [5] Büyüközkan, G., (2004), "Multi-criteria decision making for e-marketplace selection", *Internet Research*, Vol. 14 No. 2, pp. 139-154.
- [6] Chong, S., Pervan, G., and Bauer, C. (2001), "Implementation success of internet-based electronic commerce for small-and medium-sized enterprises in Australia", paper presented at the 14th International Bled Electronic Commerce Conference, Bled, June 25-26, 2001.
- [7] Sohail, M.S. and Teo, B.H., (2003), "TQM practices and organizational performances of SMEs in Malaysia", *Benchmarking: an International Journal*, Vol. 10 No. 1, pp.37-53.
- [8] Alam, S.S., (2009), "Adoption of Internet in Malaysian SMEs", *Journal of Small Business and Enterprise Development*, Vo. 16 No. 2, pp. 240-255.
- [9] Chong, W.K. and Shafaghi, M., (2009), "Performances of B2B e-

Marketplace for SMEs: The research methods and survey results", *Communications of IBIMA*, Vol. 9 No. 22 pp. 185-192.

- [10] Chong, W.K., Shafaghi, M., Woollaston, C., and Lui, V., (2010), "B2B e-marketplace: an e-marketing framework for B2B commerce", *Marketing Intelligence and Planning*, Vol. 28 No. 3, pp.310 – 329.
- [11] Lewis, R., and Cockrill, A. (2002), "Going global – remaining local: the impact of e-commerce on small retail firms in Wales", *International Journal of Information Management*, Vol. 22 No., pp. 195-209.
- [12] Mullane, J.V., Peters, M.H., and Bullington, K.E., (2001), "Entrepreneurial firms as suppliers in business-to-business e-commerce", *Management Decision*, Vol. 39 No. 5, pp. 388-393.
- [13] Chaffey, D., (2004), *E-Business and E-Commerce Management*, Financial Times-Prentice Hall, London.
- [14] Rodgers, J.A., Yen, D.C., and Chou, D.C., (2002) "Developing e-business; a strategic approach", *Information Management & Computer Security*, Vol. 10 No. 4, pp. 184-192.
- [15] Tan, K.S., Chong, S.C., Lin, B.S., and Uchenna, C.E. (2009), "Factors influencing the adoption of internet-based ICTs: evidence from Malaysian SMEs", *International Journal of Management and Enterprise Development*, Vol. 109 No. 2, pp. 224-244.
- [16] Nunnally, J. C. (1978). *Psychometrics Methods*, McGraw-Hill, New York.
- [17] Hu, Q., Wu, X., and Wang, C.K., (2004), "Lessons from Alibaba.com: government's role in electronic contracting", *info*, Vo. 6 No. 5, pp. 298-307.
- [18] Xu, Y., Yen, D.C., Linn B., and Chou, D.C., (2002), "Adopting customer relationship management technology", *Industrial Management & Data Systems*, Vol. 102 No. 8, pp. 442-452.