International Conference on Accounting Studies 2014, ICAS 2014, 18-19 August 2014, Kuala Lumpur, Malaysia

Extent of e-procurement use in SMEs: A descriptive study

Haslinda Hassan[a]*, Alexei Tretiakov[b], Dick Whiddett[b], Iskandar Adon[a]

[a]*School of Accountancy, Universiti Utara Malaysia 06010 UUM Sintok, Kedah, Malaysia*
[b]*School of Management, Massey University, Palmerston North 4442, New Zealand*

Abstract

Although e-procurement is a complex practice, a number of existing studies, however, simplified the representation of the state of e-procurement in an organization to a binary measure. Although this is helpful to understand adoption decisions, it does not completely capture the reach and richness of the use of information technology (IT) innovations. Hence, this study explores the extent of e-procurement use in New Zealand, focusing specifically on the range of e-procurement functionalities used in the manufacturing SMEs. The e-procurement functionalities are seen from the information and transaction perspectives. A cross-sectional survey is used as a methodology for data collection. The SPSS software is used to analyse the data gathered from the 151 senior managers. Our results demonstrate that all of the functionalities, especially those that rely on commonly available technologies, are in use. Nonetheless, complex e-procurement technologies, such as e-auctions, are not common.

Keywords: E-procurement; SMEs; manufacturing.

1. Introduction

E-procurement is an organizational use of IT in establishing contracts and purchasing goods or services (Robinson, Wale, & Dickson, 2010; Rolstadas, Hetland, Jergeas, & Westney, 2011). E-procurement use ranges from the use of commonly available tools (such as web browsers or e-mails) to the use of sophisticated dedicated e-procurement systems (such as inter-organizational information systems). E-procurement enables organizations to

---

* Corresponding author. Tel.: +604-9287247; fax: +604-9287216.
  E-mail address: lynn@uum.edu.my

reduce business costs, reduce paperwork, streamline purchasing processes (Teo, Lin, & Lai, 2009), and access wider markets (Gunasekaran, McGaughey, Ngai, & Rai, 2009). Though e-procurement is expected to benefit the organization, the extent to which they use e-procurement, however, differs.

This study aims to explore the extent of e-procurement use in the manufacturing SMEs in New Zealand, focusing specifically on the range of e-procurement functionalities used in the organizations. The results of this study may enable SME managers in the manufacturing industry in New Zealand to assess the use of e-procurement functionalities in their industry by comparing the patterns of use within their own organization with the rest of the industry.

The remainder of this paper is organized as follows. Section two presents the literature review of e-procurement. Section three discusses a research methodology by presenting the measures, unit of analysis, and sample of the study. Section four discusses the study's findings. The paper concludes with the study's limitations in the final section.

2. Literature review

E-procurement has been changing the way organizations acquiring goods or services. Although e-procurement is a complex practice, most of the existing researchers, however, simplified the use of e-procurement in an organization using binary measure, such as adopt or not adopt decisions. Soares-Aguiar and Palma-dos-Reis (2008), for instance, asked the respondents to indicate whether their organizations adopted e-procurement or not. Although this provides a useful understanding of adoption decisions, however, it does not completely capture the reach and richness of the use of IT innovations (Zhu, Dong, Xu, & Kraemer, 2006). Binary measure was also criticized as not capturing salient variations in organizational behaviour with respect to IT (Ramamurthy, Premkumar, & Crum, 1999; Tornatzky & Klein, 1982). Our study focuses on the extent of e-procurement use (i.e., post-adoption stages) and, thus, fills this gap.

Although some of the studies (see, for example, Pearcy, Parker, & Giunipero, 2008; Wu, Zsidisin, & Ross, 2007) attempting to explain the use of e-procurement in the organizations beyond the binary measure, however, the functionalities covered in these studies were not comprehensive as in the study by Lefebvre, Lefebvre, Elia, and Boeck (2005). Wu et al. (2007), for instance, included two dimensions of the intensity of e-procurement use: coordination application use (i.e., the use of e-procurement as a strategic tool to facilitate information exchange with suppliers, such as sharing product and inventory planning information with suppliers) and transactional application use (i.e., the use of e-procurement to facilitate transactions, such as placing orders with suppliers electronically). Nonetheless, Wu et al. (2007) did not include any functionalities relating to purchasing via e-catalogue, e-tender, and e-auction. Similarly, Pearcy et al. (2008) did not include any functionalities relating to purchasing via e-tender and e-auction. Based on the literature review, we found that Lefebvre et al. (2005), in their studies of B-to-B e-commerce adoption in manufacturing SMEs in Canada, covered the e-procurement functionalities in more detail. Our study fills this gap by taking into account all of the functionalities covered in Lefebvre et al. (2005).

3. Research methodology

3.1. Measures

The extent of e-procurement use is measured by the range of e-procurement functionalities used within an organization (Lefebvre et al., 2005; Wu et al., 2007). Following Beldona, Morrison, and O'Leary (2005), the e-procurement functionalities are divided into two dimensions: information (buyers rely on IT to gather and exchange information with their suppliers) and transaction (buyers rely on IT to execute transaction). Each of the functionalities was taken from prior literature (see Table 1 for details). A seven-point semantic differential scale ranging from 1 (*not used at all*) to 7 (*used very extensively*) is used for each of the functionalities.

Table 1. Extent of e-procurement use: Measures

Extent of e-procurement use	Source
Information perspective	Lefebvre et al. (2005); Pearcy et al. (2008); Teo et al. (2009)
Transaction perspective	Lefebvre et al. (2005); Teo et al. (2009); Wu et al. (2007)

3.2. Unit of analysis

The unit of analysis is an organization (in particular, SME businesses in the manufacturing industry in New Zealand). Manufacturing companies that depend on both direct and indirect goods benefit more from e-procurement than other industries due to large purchase orders and diverse purchase portfolio (Batenburg, 2007).

SMEs have been highlighted as the engine of economic growth (Gunasekaran et al., 2009). In New Zealand, 90% of the businesses are SMEs (Ministry of Economic Development, 2009). The key informant of this study is the senior manager of the organization, who fills in the survey on behalf of the organization. According to Xu, Zhu, and Gibbs (2004), senior managers at SMEs have an extensive, detailed knowledge of their organizations and are able to provide accurate data.

3.3. Sample

We conducted a cross-sectional survey to determine the extent of e-procurement use in the manufacturing SMEs in New Zealand. Open-ended questions were incorporated at the end of each section of the questionnaire to enable respondents to elaborate on their responses. Respondents' comments are treated as qualitative data.

The list of SME manufacturers in New Zealand was obtained from Kompass database. A random sample of 1,000 SMEs (with employees from 6 to 99) was obtained, covering of 860 and 140 small and medium companies, respectively. The respondents were personally contacted by phone to participate in the survey. A total of 151 usable responses were obtained (with a response rate of 15%). The response rate of 15% is common for studies involving senior managers as respondents (see, for example, Gunasekaran et al., 2009; Wu et al., 2007). Two reminders were issued to increase the response rate. The first reminder letter was sent two weeks after the initial distribution. The second reminder letter, along with a hard copy of the questionnaire, was sent two weeks after the first reminder.

4. Findings and discussion

This study is descriptive in nature. Hence, the frequencies are used to report the data. The data were analysed using the SPSS version 19 software.

4.1. Organization's profile

Table 2 presents the demographic profiles of the organization. This includes legal form of the organization, number of employees, region, years of the organization in the industry, and manufacturing sector.

Most of the organizations were limited liability companies (97%) and small in size (with less than 50 employees) (85%) (see Table 2 for details). Majority of them were established for at least twenty years (51%). The manufacturing sectors relying on metals as raw materials (primary metal and metal product, machinery and equipment, fabricated metal product, and furniture and other manufacturing) were best represented (covering together 58% of the organizations in the data set). Most of the organizations were located in the North Island, with Auckland (41%) was the highest. Canterbury (8%) and Otago (6%) were best represented in the South Island.

Table 2. Organization's profile

	No.	%		No.	%
Legal form			*Year in industry:*		
Limited liability company	146	97	<5 years	19	13
Partnership	3	2	5 – 10 years	24	17
Sole trader	1	1	11 – 20 years	29	21
			21 – 30 years	40	29
Number of employees			31 – 40 years	21	15
6 - 49	116	85	>40 years	7	5
50 - 99	21	15			
			Manufacturing sector[a]		
Region			Food product	9	6
Northland	1	1	Beverage and tobacco product	2	1
Auckland	62	41	Textile, leather, clothing and footwear	9	6
Waikato	13	9	Wood product	11	7
Bay of Plenty	4	3	Pulp, paper and converted paper product	2	1
Hawkes Bay	3	2	Printing	6	4
Taranaki	4	3	Basic chemical and chemical product	9	6
Manawatu-Wanganui	12	8	Polymer product and rubber product	9	6
Wellington	18	12	Non-metallic mineral product	3	2
Canterbury	12	8	Primary metal and metal product	17	12
Otago	10	6	Fabricated metal product	22	15
Southland	2	1	Transport equipment	4	3
Tasman	4	3	Machinery and equipment	21	15
Nelson	4	3	Furniture and other	24	16

[a]Manufacturing industry sectors were defined following the Australian and New Zealand Standard Industrial Classification 2006 (ANZSIC06) (Statistics New Zealand, 2010).

4.2. Extent of e-procurement use

The extent of e-procurement use in the manufacturing SMEs in New Zealand are summarized in Table 3 (from the information perspective) and Table 4 (from the transaction perspective). Overall, all of the functionalities from both information and transaction perspectives were in use.

Table 3. Extent of e-procurement use: Information perspective

Functionality	No.	%
Searching for suppliers of goods electronically	109	72
Searching for suppliers of services electronically	95	63
Checking availability of goods electronically	83	56
Checking availability of services electronically	69	46
Checking prices of goods electronically	89	59
Checking prices of services electronically	65	44
Communicating with suppliers via e-mail	138	91
Communicating with suppliers using technologies other than e-mail	34	23
Internal electronic communications on issues related to procurement via e-mail	107	71
Internal electronic communications on issues related to procurement using technologies other than e-mail	33	22
Exchanging purchasing information with external parties electronically	85	58
Exchanging purchasing information with internal parties electronically	88	59
Negotiating contracts (such as price and volume) with suppliers electronically (such as via e-mail)	111	74

From the information perspective, most of the companies used e-procurement to communicate with their suppliers via e-mail (91%), to negotiate contracts with suppliers electronically (74%), and to communicate internally on issues related to procurement via e-mail (71%). A possible explanation to this finding is that using e-mail is faster, cheaper, and convenience (Kotelnikov, 2007). Some of the respondents asserted that:

"E-mail is serving Company needs at present,"

"Interaction with suppliers is through e-mails," and

"Communication on a daily basis with suppliers is done via e-mail wherever possible."

Other respondents shared similar views by stating: "All correspondence is by e-mail particularly as we deal with overseas companies. It assists with the language barrier. Also, we are able to get fast answers when dealing with International companies" and "E-mail plays a large part in complex negotiations." Another respondent, however,

argued that "We only use this form of communication if we cannot reach our sales reps, or they don't return phone calls, we get a better response via e-mail."

Nonetheless, the use of higher levels of communication technologies, such as instant messaging and video conferencing, were still uncommon. One of the respondents, for instance, mentioned that "Not much use of instant messaging, no use for conference calling in our engineering business." A number of respondents, on the other hand, still preferred to have a direct communication when dealing with their business partners. The respondents remarked that: "The subjects you nominate need personal negotiation," "Would almost always expect to have face-to-face dealings with suppliers before making a purchase," "Most contract negotiations in our company are done face-to-face," and "Our clientele is face-to-face most often." This is because "direct communication is easy and it is clear what you as the customer want."

Almost one-third of the SMEs used e-procurement for searching for suppliers of goods electronically (72%). A plausible explanation is that e-procurement technologies (such as e-auctions) allow firms to search for suppliers that can provide goods and services at lower cost (Mishra, Konana, & Barua, 2007). The respondents asserted that:

"E-procurement is a useful first up tool to find suppliers and services,"

"Most useful in searching for suppliers of obsolete electronic components," and

"We make frequent use of the Internet when looking for suppliers, customers, addresses and phone numbers."

Table 4. Extent of e-procurement use: Transaction perspective

Functionality	No.	%
Purchasing goods using e-catalogues	73	49
Purchasing services using e-catalogues	42	28
Creating purchase requisitions electronically	91	61
Approving purchase requisitions electronically	73	50
Tracking orders electronically	92	61
Purchasing goods at e-auctions	26	18
Purchasing services at e-auctions	7	5
Purchasing goods via e-reverse auctions	5	3
Purchasing services via e-reverse auctions	2	1
Purchasing goods by issuing electronic calls for tenders	14	10
Purchasing services by issuing electronic calls for tenders	8	5
Integrating e-procurement system with other internal systems	57	39
Permitting suppliers to directly access our internal systems	11	7

From the transaction perspective, tracking orders electronically, a relatively sophisticated functionality was used very often by the organizations (see Table 4 for details). The respondents noted that: "If the option is available to place orders electronically, we do use it. We also track items if we have the tracking no. supplied to us by our suppliers" and "We purchase some stationery where the supplier puts up a list which we tick online. Our major Freighting agent does have electronic tracking of pickups and dispatches which we use regularly." Another respondent, however, asserted that "We use a transactions system called 'REES' that allows us to create and track purchase orders, but we do not use the track function."

Nonetheless, the use of complex e-procurement transactions, especially in the context of purchasing goods and services using sophisticated channels (such as e-auctions and e-tenders), were uncommon. This might be due to the lack of electronic integration which is often required for the organizations to move to more complex electronic transactions (Lefebvre et al., 2005). Another possible explanation to this finding is that conducting transactions via e-procurement technologies, such as e-reverse auctions, can potentially harm a buyer's long-term performance by generating distrust among its suppliers (Tassabehji, Taylor, Beach, & Wood, 2006). The respondents claimed that:

"Auction and tenders are not applicable to our business."

"If procuring widgets or commodities, e-procurement could be helpful. The problem with electronic tendering and no face-to-face is that it attracts opportunists and oddball suppliers whose reputation you know nothing about and whose quality can be variable and you know nothing about their sourcing. Also with Good Manufacturing Practice production is becoming much standardized and there are few incentives

to change suppliers because of price. You are committed to very long term relationships. Relationships are more important than price. Quality is also extremely important. So is service."

Consistent with Teo et al. (2009), Gunasekaran et al. (2009), and Gunasekaran and Ngai (2008), we found that the organizations used e-procurement for purchasing goods more than services. For instance, Gunasekaran and Ngai (2008), in a survey of organizations in in multiple industries in Hong Kong, discovered that most of the organizations used e-procurement to purchase raw materials, office products, and maintenance items. Gunasekaran et al. (2009), in a survey of SMEs in multiple industries in Southcoast Massachusetts, found that the organizations tended to purchase more MRO items, office supplies, and raw materials than services. A plausible explanation to this finding is that most of the e-procurement activities in the organizations were commonly centered on the non-production goods (mainly MRO), manufactured goods, and raw materials, than services.

5. Conclusion

The study's findings show that all of the e-procurement functionalities, especially those that rely on commonly available technologies, were in use. The use of complex e-procurement technologies (such as e-auctions and e-tenders) was, however, uncommon. Most of the organizations used e-procurement to purchase goods than services.

This study is descriptive in nature and restricted to the manufacturing SMEs in New Zealand only. Hence, inferences drawn are not explanatory and should not be generalized. In future, personal interview is suggested to be used for data collection purposes as this allows researcher to obtain more in-depth data on the related issues.

References

Batenburg, R. (2007). E-procurement adoption by European firms: A quantitative analysis. *Journal of Purchasing & Supply Management*, *13*, 182-192.

Beldona, S., Morrison, A.M., & O'Leary, J. (2005). Online shopping motivations and pleasure travel products: A correspondence analysis. *Tourism Management*, *26*, 561-570.

Gunasekaran, A., McGaughey, R.E., Ngai, E.W.T., & Rai, B.K. (2009). E-procurement adoption in the Southcoast SMEs. *International Journal of Production Economics*, *122*, 161-175.

Gunasekaran, A., & Ngai, E.W.T. (2008). Adoption of e-procurement in Hong Kong: An empirical research. *International Journal of Production Economics*, *113*, 159-175.

Kotelnikov, V. (2007). *Small and medium enterprises and ICT*. Retrieved from http://www.apdip.net/publications/iespprimers/eprimer-sme.pdf

Lefebvre, L., Lefebvre, E., Elia, E, & Boeck, H. (2005). Exploring B-to-B e-commerce adoption trajectories in manufacturing SMEs. *Technovation*, *25*, 1443-1456.

Ministry of Economic Development. (2009). SMEs in New Zealand: Structure and dynamics 2009. Retrieved from http://www.med.govt.nz/upload/69938/SMEDs_July09.pdf.

Mishra, A.N., Konana, P, & Barua, A. (2007). Antecedents and consequences of internet use in procurement: An empirical investigation of U.S. manufacturing firms. *Information Systems Research*, *18*, 103–120.

Pearcy, D.H., Parker, D.B., & Giunipero, L.C. (2008). Using electronic procurement to facilitate supply chain integration: An exploratory study of US-based firms. *American Journal of Business*, *23*(1), 23-35.

Ramamurthy, K., Premkumar, G., & Crum, M.R. (1999). Organisational and inter organisational determinants of EDI diffusion and organisational performance: A causal model. *Journal of Organizational Computing and Electronic Commerce*, *9*(4), 253-285.

Robinson, P., Wale, D., & Dickson, G. (2010). *Events management*. Cambridge, MA: CABI.

Rolstadas, A., Hetland, P.W., Jergeas, G.F., & Westney, R.E. (2011). *Risk navigation strategies for major capital projects: Beyond the myth of predictability*. London, NY: Springer.

Soares-Aguiar, A., & Palma-dos-Reis, A. (2008). Why do firms adopt e-procurement systems? Using logistic regression to empirically test a conceptual model. *IEEE Transactions on Engineering Management*, *55*, 120-133.

Statistics New Zealand. (2010). *New Zealand business demography statistics: At February 2010*. Retrieved from http://www.stats.govt.nz/browse_for_stats/businesses/business_characteristics/BusinessDemographyStatistics_HOTPFeb10/Tables.aspx

Tassabehji, R., Taylor, W.A., Beach, R., & Wood, A. (2006). Reverse e-auctions and supplier-buyer relationships: An exploratory study. *International Journal of Operations & Production Management*, *26*, 166-184.

Teo, T.S.H., Lin, S., & Lai, K. (2009). Adopters and non-adopters of e-procurement in Singapore: An empirical study. The International *Journal of Management Science*, *37*, 972-987.

Tornatzky, L.G., & Klein, K.J. (1982). Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions on Engineering Management*, *29*(1), 28-43.

Wu, F., Zsidisin, G.A., & Ross, A.D. (2007). Antecedents and outcomes of e-procurement adoption: An integrative model. *IEEE Transactions on Engineering Management*, 54, 576-587.

Xu, S., Zhu, K., & Gibbs, J. (2004). Global technology, local adoption: A cross-country investigation of Internet adoption by companies in the United States and China. *Electronic Markets*, 14(1), 13-24.

Zhu, K., Dong, S., Xu, S.X., & Kraemer, K.L. (2006). Innovation diffusion in global contexts: Determinants of post-adoption digital transformation of European companies. *European Journal of Information Systems*, *15*, 601-616.