

INTER-FIRM DEPENDENCY AND THE ADOPTION OF E-PROCUREMENT SYSTEM: CASE STUDY OF MALAYSIAN MANUFACTURERS

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ABSTRACT

E-procurement is an automated purchasing system that may help improve the coordination and efficiency of procurement activities between component or materials suppliers and manufacturer. There has been much research conducted to identify factors that encourage the adoption and diffusion of e-procurement technology but there is no evidence of study that looks from the resource dependency theory perspective. Therefore, the objective of this study is to investigate the impact of dependency among supply chain members on the diffusion of an e-procurement adoption system by using a case-study interview method. This paper will discuss the findings of case study interviews conducted with two manufacturers in Malaysia that supply components and parts to a relatively larger manufacturer in Malaysia. With support from the resource dependency theory, the findings of this paper highlight the extent to which supplier's dependency to their major business partners may lead to the adoption of e-procurement system.

Field of research: E-procurement, Resource dependency theory, Diffusion of innovation, Supply chain relationship

1. Introduction

The use of information technology in business procurement activities is a common practice these days as it is expected to significantly improve materials or components procurement efficiency. The manufacturing industry also could not run away from using e-procurement especially in managing their complex and fragmented business procurement activities with their supply chain partners. A supply chain is a network of retailers, distributors, transporters, storage facilities, and suppliers that participate in the production, delivery, and sale of a product to the consumer. The supply chain is typically made up of multiple companies who coordinate activities to set themselves apart from the competition. It involves the coordination of an organization's internal planning, manufacturing and procurement effort with the company's external partner (McLaren, Head, & Yuan, 2002). The need for better coordination and efficiency in procurement activities might lead to the use of information technology such as an e-procurement system. The relative size and power hold by some supply chain partners might result in the diffusion of the e-procurement system to the other partners within the supply chain by force, because of the dependency that exist between them. Diffusion is defined as the process by which an innovation is adopted and gains acceptance by members of a certain community (Rogers, 1995). Therefore, the objective of this study is to investigate the impact of dependency among supply chain members on the diffusion of an e-procurement adoption system by using a case-study interview method. This paper will discuss the findings of case study interviews

conducted with twocomponent manufacturers and supplier to a larger size manufacturing firms in Malaysia.

2. E-procurement

Procurement has been increasingly recognised as a critical element for manufacturers since procurement processes are costly and complicated as it might involves many suppliers located either locally or abroad. Procurement covers not only purchasing (the actual buying of materials or components), but also associated activities such as transportation, warehousing and inbound receiving. During the 1970s and 1980s, procurement was characterized as a slow manual business procedure and, at the same time, involved problems such as errors in ordering, delivering, costing and invoicing, which were time-consuming and costly to trace (Rudzki, Smock, Katzorke, & Stewart, 2005). After internal company initiatives such as Just in Time (JIT), Total Quality Management (TQM), Kanban and many others reached the maximum level of cost reduction, businesses then shifted their attention to their supply chain networks to determine how to further reduce the cost. They then began to realise that cost, and even time savings, can be achieved by having a link with their major suppliers through private networks such as an electronic data interchange (EDI).

Next came the Internet era and it created more opportunities for companies to reduce their costs further. The Internet enabled global firms to centralize their globally scattered procurement and logistics systems that were previously conducted in every country in which they operated to a single or only a few optimal locations. The e-procurement system was first introduced by large corporations from various industries during the last few years to connect and integrate their order management activities with their partners within one inter-connected system. General Electric, for example, reports that the firm has saved over \$10 billion annually through its e-procurement activities (Hawking, Stein, Wyld, & Foster, 2004), while FedEx also saved millions of dollars by automating its procurement operations (Dalton, Violino, & Mateyaschuk, 1999). Currently, setting up an e-procurement system is even cheaper with the Internet, and even small or medium size companies can take advantage of this technology. E-procurement is not exclusive to giant manufacturers only, as it is widely used by smaller firms too (Bharati & Chaudhury, 2006). E-procurement consists of many different tools and firms may implement all of them or just some applications that are relevant to their business needs. Six type of e-procurement applications are e-sourcing, e-tendering, e-informing, e-reverse auction, e-MRO/Web-based MRP and e-collaboration (De Boer, Harink, & Heijboer, 2002).

3. Resource dependency theory / Power Theory

Many companies form a supply chain relationship and alliances with their supply chain partners with the aim of increasing the supply chain efficiency. A partnership is expected to lead to better service and to provide access to new markets. However, placing too much reliance on specific supply chain partners proves to be very risky (Lankford, 2004). Studies even suggest that today's business supply chains are converging towards a situation where one party assumes disproportionate power over another (Crook & Combs, 2007). This could be manufacturer, supplier or buyer driven power. Most of the time, it is not the primary producer of components or raw materials at the start of the commodity chain, but the large transnational corporation that plays a central role in coordinating production networks with a large market or holders of prestigious brand names that achieve this predominance. The dominance of a particular partner will result in increased dependence on it and will eventually increase the dominant partners' ability to impose specific sets of practices or even to take punitive action on more junior partners (Gereffi, 2001; Wood & Brewster, 2005).

Studies also have proven that dominant partners can obtain control over their partners' decisions by creating a situation where these particular partners will become highly dependent upon them. It can be done by getting the partner to believe that the goods and services they obtain from the suppliers are essential in achieving their goals, or by persuading the partners to perceive that switching to alternative sources of supply would be difficult (Brown, Lusch & Muehling 1983). Increased dependency on members of the supply chain can have disastrous consequences if these supply chain members are unable to handle the functions assigned to them. Other than that, perceived dependency in business relationships between suppliers and their customers may be influenced by various factors such as the degree of outsourcing, the inventory levels, the number of suppliers/customers and the amount of preventive activities (Svensson, 2004). Besides influencing the relationships between supply chain partners, studies also indicate that dependency of one party to another can influence technology adoption decisions (Norm, Shan, & Claire, 2008; Harrison, Mykytyn, & Riemenschneider, 1997; Treadgold, 1990).

Dependency itself roots from the theory of power as Emerson (Emerson, 1962) states that the basis of power is dependency. Power has been defined in various ways, but all definitions essentially contain the idea of the control, influence or direction of one party's behaviour by another (Cartwright 1959). French and Raven (1959) state that source of power over a target is composed of the power bases the source holds over the target. In total, six types of power bases have been identified: reward power; coercive/dependency power; legitimate power; referent power; expert power; and, information power. The terms dependency and coercive power are used interchangeably in studies, but both refer to the same situation where one party in the relationship has the ability to influence another, and can even impose punishment if their requests are not complied with (Leonidou, Talias, & Leonidou, 2008; (Teo, Wei, & Benbasat, 2003; Hart & Saunders, 1997).

In the context of this study, dependency that exists between supply chain partners and its influence on e-procurement adoption, the information technology or knowledge possessed by partners, could become an important factor that determines adoption. As mentioned earlier, e-procurement is about the sharing of information via connected information systems; therefore, the necessity for information sharing will increase dependency levels between one business partner and another. Moreover, the use of e-procurement by supply chain partners is more likely if one partner that contributes much to their sales, or supplies an important material or component, conducts all their purchasing or selling activities through the system.

4. Research Methodology

In order to understand the impact of inter-firm dependency on e-procurement system adoption among supply chain members, a case study methodology was adopted. It serves as an exploratory research to identify the current trends in e-procurement adoption specifically in Malaysia, and also to gain insights on whether dependency factors do result in the diffusion of the e-procurement system among the supply chain members. Furthermore, case studies could further increase the understanding on the details of each case from the viewpoint of the participants by using multiple sources data. Case study evaluation can include the use of document analysis, open and closed-ended interviews, quantitative analysis of archival data and direct field observations. An interview approach was used in this study as it is more focused than the other method (Yin, 1993).

A list of questions was prepared as a guide during the interview process. Managers were chosen based on the methodology of key informants. The key informant interview was conducted with a member of the organization who is in a unique position and sufficiently knowledgeable to report on

the topic of study. They are responsible for all operational and strategic issues and are very important decision-makers within their organisation (Phillips & Bagozzi, 1986). In this case, it is the procurement/purchasing manager or the managing director of the company itself. Semi-structured interviews are more flexible, as they allow new questions to be brought up during the interview as a result of what the interviewee says. During the interview session, the purpose of the interview was briefly explained and the key themes for discussion were highlighted at the very beginning of the interview. Questions were deliberately broad so that the respondents had as much freedom in their answers as possible. Interviews with both companies were recorded and transcribed. A copy of the report was then emailed to the respective interviewees to obtain their verification.

5. Findings

Case study A

Case study A (CsA) is an established manufacturer of cables, wire harnesses and components for the automotive industry, in addition to some electrical modules for the consumer electronics industries. For instance, their major customer comes from the automotive industry. Almost 80% of their products are sold to the two largest local car manufacturers in Malaysia. CsA currently employs more than 500 employees nationwide. Competition, however, is very stiff in this industry and the procurement manager estimated that CsA's local market share for cable and wire harness, which were their main product are between 20 to 25%. CsA uses e-procurement in all selling activities with their major customers. They were directly connected to the customers' e-procurement system, either through a web based portal that is accessible via the Internet or web based ERP system that is developed and installed by their customers. CsA pay a small installation and a monthly fee for the web based ERP system. As an approved supplier, CsA received a username and password to enter the system, where they can check new orders, view current level of inventory kept by the customer, their production plan and payment status. The benefit of such system to CsA includes the fact that it is easy and simple to use, improves accuracy and efficiency of their order management, in addition to improving the communication process between both companies.

At the same time, CsA also have a knowledge sharing and joint research and development activity with these companies. In order to keep on obtaining the benefits, CsA had to fulfil their customers' requirements of using the pre-determined suppliers for some materials or components and also to use the customers' e-procurement systems. Using the system, however, is not a major issue to CsA since it either did not incur any extra cost because it is a web-based portal system, or it involved just a small fee or investment on new hardware or software. However, there is a situation where CsA has to make some adjustment to their practices and even to their products to suit their customers' needs as well. When asked to estimate the percentage of business held electronically, the procurement manager said: *"I think it is around 70% of our selling activities are conducted electronically using this customer's e-procurement system, while in terms of our own purchasing, currently we have none."*

Case study B

Case study B (CsB) is a medium sized local company that manufacture steel based parts or components used especially in the automotive and electronics industries. The company was incorporated in 1996 and now operates at a 12,800 sq. ft factory located in Sungai Petani, at the Northern part of Malaysia, with 60 employees. Their principal activities include metal stamping and spot welding, contract assembly of automotive parts, pipe and tube bending and steel fabrication. Currently, the major products that CsE produce include stands, brake levers, brackets and mufflers,

which are major components of a motorcycle. Their current major customer is the local motorcycle producers, which brings about 90% of business to them.

CsB do not utilise any kind of e-procurement system in their purchasing activities. According to the managing director: *"The number and type of material that we use in our production is small and, therefore, so is our supplier base. The majority of our material purchase is steel, since our product is used mainly in the production of motorcycles. It is followed by machine tools, chemical, industrial gases and of course administrative items. Therefore, we do not feel that there is an urgent need to use such a system at the moment. However, we did not rule out the possibility of using e-procurement in the future as our business grows and becoming more diversified"*. In contrast to purchasing activities, CsB sells its products to their major customer through a web based MRP system that is provided by their customer. It is an e-procurement system that allows CsB to receive orders or any other related information from their customer. This system is installed by their customer and CsB have to pay a small installation and monthly fee to use it. Through this system, CsB may view information such as the customer's production schedule, inventory level, new orders, delivery schedule, send out invoices and even check payment status from their customer. The customer do requires all their suppliers to use the procurement system and therefore, CsB has to agree with the installation and pay the fee.

When asked whether they feel like they were forced to use the system by their customers, the managing director said: *"Yes, we must use the system to get orders from them. But I do not feel that we been forced to do so. It did not cost us too much as they charged a considerably low amount of fee. Furthermore, the business volume and earnings that we get from doing business with our major customer far outweighs the fee that we pay for installing and using the system. I also personally think that IT is a necessity in today's business environment and that is why we are happy to use the system as required by customer"*.

The managing director at CsB also insists that it is important for them to maintain their good relationship with the customer. *"Our company has a long term supply agreement with our major customer. It is not just about buying and selling, but our relationship goes beyond that. We receive not only financial but also other benefits too from our customer such as technical assistance, staff training, consultation and other incentives that brings a huge benefit to the company. The customer's commitment in this relationship shows that they are serious in helping a small company like us and it did instil our trust on them. It is among the reasons why we did agree to install their web based MRP system too even with some fee"*.

6. Discussions and conclusions

The first important finding from this case study is the fact that company's dependency on their customer depends very much on the size of the company itself. Smaller manufacturers like CsB are doing business with larger manufacturers and tend to have a high level of dependency, especially when the majority of their business is with this manufacturer. Majority of CsB's income is generated from sales to one large manufacturer and therefore, CsB had to adhere to all the requirements, regulations or instructions from their customers in order to continue doing business with them. Findings of this case study has further justify the proposition made by previous authors that small firms were found to be more proactive in adopting IT initiatives when making a purchase or when buying (Atkinson, 2007; Kulp et al., 2006). Small and medium size companies that rely heavily on their large partners will tend to adopt the e-procurement system that will link them together, either because they are forced or even suggested by their partners to do so.

Although both the managers at CsA and CsB did not directly acknowledge the fact that their customers force them to use the e-procurement system, it is very clear that the situation does exist, but in an indirect way. By having all orders, information and communication through the system, suppliers such as CsA and CsB must use the system, even if it is against their will, as no purchase will be made if the suppliers do not adopt and install the same system. At the same time, this case study finding has further identified the phenomenon where small and medium size companies such as CsB nowadays not only rely heavily on their customers for business, but are also involved in a vendor development program introduced by their customers that helps them in terms of financial, technical, technology and knowledge sharing, hence increasing the level of dependency. This further supported the notion that knowledge is the source of power (Kelly, 2007). Firms with more critical or non-substitutable knowledge have higher power than firms that are lower on these knowledge attributes (Wong, Ho, & Lee, 2008). Findings indicate that firms such as CsB which are lacking in terms of critical or non-substitutable knowledge will have a higher level of dependency towards their supply chain partners who possess knowledge. As a consequence, the superior firm is deemed as having a higher power over their business partners and capable of using this power for their own benefit.

In practice, findings of this case study could provide the management of a company with a better understanding on e-procurement adoption and how it relates to the issues of dependency with their supply chain partners. Managers hopefully will be in a better position to make a fair decision when adopting an information system as any decisions made by them could also influence the business operations of the other supply chain members who depend on them for business. In other words, when making a decision about any information systems adoption, managers are obliged to ensure that the system will benefit each supply chain member who will have the system linked to them. Small and medium size companies especially might be lacking in terms of IT knowledge, finance and resources that make them rely very much on their partners to move forward. It is important that the management of both companies to understand each other's needs so that they can work with each other effectively and help smaller size partners benefit from information technology adoption. This study also contributes to the literature on e-procurement diffusion adoption factors as it acknowledges the impact of inter-firm dependency on adoption decision, which is not among the focus of previous study.

Finally, there is some limitation of this study that could be an opportunity for improvement by future researchers. First, the generalisability of the findings is limited as this study focuses only on manufacturers in Malaysia. Generalizing these findings to an organization in other country and within another cultural environment must be held with caution. Furthermore, the study only involves two companies and is based on qualitative case study interview findings. Involvement of more companies from diverse industry and sizes might provide far more conclusive evidence on the role of dependency on e-procurement diffusion. This study uses a case study method to gather the data. Yin (1993) however highlights some weaknesses of this case study interview approach, which includes bias due to poor questions, and incomplete recollection and reflexivity, where an interviewee tends to express what the interviewer wants to hear. As a result, more conclusive studies which employ the quantitative method such as mail or self administered survey will be able to further justify the finding of this case study.

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