A Research Framework for Intervened Supply Chains by Outsourcings

by

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Abstract

To improve the efficiency and performance, firms grow to outsource part of their operating process of supply chains. However, once firms rely on the outsourcings, their business supply chains tend to lengthen and become complicated so that they may cause hindrances for firms to develop partner relationships and fulfill information sharing between partners, and eventually impair the performance of supply chains. In this study, we discussed in depth the impacts of outsourcings, third-party logistics and IS outsourcing in particular, on the performance of supply chains by emphasizing the intervening role outsourcings play. We reviewed relevant literature to build a framework depicting the relationships among important constructs in an outsourced supply chain. It is found that although firms tend to outsource their logistics and IS operations in order to focus on their core competence, and thus to enhance their operation efficiency, the efforts they have to make to coordinate with their outsourcing partners could corrode the anticipated benefits from the outsourcings. Our findings suggest firms to turn their attention more energetically towards the coordination between partners in a supply chain than individual firms' operation efficiency. Although the findings are not so distinctive from those from other parallel researches, the framework this study built is still an important basis for further systematic verifications on the supply chain performance intervened by outsourcings.

Keywords: Outsourcing, Supply Chain, Partner Relationship, Information Sharing, Third-Party Logistics

1. Introduction

The globalization of manufacturing and business activities has led industries to outsource many business operations and focus more on their core competence which is 'the one thing that a company can do better than its competitors (Chase et al., 2006)'. Some of these outsourced operations are production functions associated with firms' core activities, and others are supportive operations, such as information system and logistics. The former leads to a multi-layer supply chain and lengthen the chain, while the latter to an intervened supply chain system, and complicate the chain.

In their study on outsourcing strategies, Abdel-Malek et al. (2005) examine and model the multi-layer supply chain which consists of a parent company that produces the end product and outsources a portion of its components to several suppliers, and those suppliers in turn may outsource some of the subcomponents to other vendors and so forth creating a multi-layered chain. In the study, they also develop a framework to assist in selecting the proper outsourcing strategies for the company's supply chain; that is competitive bidding among undedicated suppliers, or the traditional long-term partnerships.

The original purpose for firms to adopt outsourcing is to enable themselves to focus on their core competence and then to achieve better performance. From the perspective of the entire supply chain, however, such a complicated supply chain, whichever a multi-layered one or an intervened one, caused by outsourcing, whichever those main production functions or supportive operations, tends to increase the difficulty in communications and information exchange among the members in it. Such a phenomenon analogous to 'bullwhip effect' may impair the operation efficiency of the entire supply chain, and end up depressing the anticipated performance from outsourcing for the individual firms.

Bullwhip is an important measure, being symptomatic of a poorly performing supply chain (Jones and Simons, 2000). Disney et al. (2004) cite two recent examples of empirical evidence of bullwhip: (1)food sector where the supplier orders two tiers further upstream varied 10 times more than the electronic point of sales (EPOS) data, and (2)automotive sector where the ratio of the variance between incoming orders and order to suppliers at just a single echelon in the supply chain was 1:2. Metters(1997) also reports that only eliminating the seasonal bullwhip effect could increase the product profitability by 10-20%.

To reduce such negative effects of outsourcing on operations performance, firms tend to employ information and communications technologies (ICT) to facilitate the functioning of the supply chain. Specifically, the rapid development of e-commerce makes it possible to integrate and improve the competitive advantages of the whole supply chain because the openness, globalization, low-cost and high efficiency of e-commerce extend the internal information network of an enterprise and enable the business to business (B2B) e-business activities among several enterprises (Ying and Dayong, 2005). Stefansson (2002) also points out that development in information and communication technologies has made it possible to integrate the supply chains so that the links between suppliers, producers, customers and third parties have been easier to establish.

The purpose of this study is to examine the potential impacts of outsourcings on supply chain performance. We will place more emphasis on the intervened supply chain, which is defined by this study as a supply chain where the involved firms outsource their supportive operations, such as information system and logistics, rather than their core functions, to some specialized service providers. Past researches on the effect of outsourcings tend to focus on individual firms' performance, and most of them argue that outsourcings will bring about positive effect on firms' performance because it enable them to be concentrated on their core competence. For example, Greaver II (1999) reports 20 examples of reasons to outsource and the accompanying benefits from six aspects: organizational driven, improvement-driven, financially driven, revenue-driven, cost-driven and employee-driven. This study, however, tries to do it from the perspective of the entire supply chain performance, especially that caused by the interactions between the firms involved in the supply chain, such as communications, information sharing, and partner relationships.

This paper is structured as follows. A brief overview of the intervened supply chain is provided first to underline its significance as an important research domain. In the next section, the communications and interactions between firms in a supply chain are elaborated. Thereafter, a

conceptual research framework exploring the effect of outsourcings on supply chain performance is built. The final section concludes our findings.

3. Towards an Intervened Supply Chain by Outsourcings

3.1 Outsourcings

Outsourcing, which has long been an option in make-versus-buy decisions (Platts et al., 2002), is the act of moving some of a firm's internal activities and decision responsibility to outside providers (Chase et al., 2006). According to Quinn (2000), the environmental changes have made outsourcing much more common. The globalization of manufacturing and business activities has even led industries to conduct international outsourcing of services (IOS), which refers to handing over some of service functions (that were done in-house) by firms to providers located in a foreign country where the former does not have ownership, authority or direct control (Stack and Downing, 2005). Kedia and Lahiri (2007) argue that although IOS is commonplace with many firms, the nature of client-provider partnership is not uniform in all cases. They suggest that the three possible types of IOS partnerships: tactical, strategic, and transformational, represent value propositions and nature of involvement with providers in different ways.

Outsourcing is also considered a management strategy by which an organization outsources major, non-core functions to specialized, efficient service providers (Assmann and Punter, 2004). For a traditional manufacturing organization, the development and maintenance of new technologies that do not directly support manufacturing activities become a good candidate for outsourcing (Samaddar and Kadiyala, 2006). Another good candidate for outsourcing is the logistics. To gain a competitive advantage, many organizations are seeking to manage their logistics operations strategically, but realize that they lack the core competencies and are increasingly seeking to outsource their logistics activities (Hum, 2000).

According to Stephan (1998), some companies argue that there are ways to manage such activities more effectively and less expensively than outsourcing, but it may be that their arguments are based on failure to understand the fundamental difference between *outsourcing partners* and *contractors*. He also elaborates that *contractors* provide a service based on a specific scope of work, for a predetermined price, and they report through a very limited channel; on the other hand, *outsourcing partners* provide a broad range of services, for a more fluctuated price, and they report to a variety of customers. By exploring the IT outsourcing relationships between UPS and Motorola, Zviran et al. (2001) find out the gradual development of trust between the two sides; trust leads the two firms from being committed to a contract to becoming strategic partners.

In an traditional supply chain network system, there generally exist four flows, i.e. flow of goods, flow of information, flow of financing and flow of trading. Among these four flows, firms have long been relying on financial institutions to facilitate the flow of financing, which has thus become the pioneering outsourcing activity for firms. Thereafter, to get competitive advantage, firms gradually outsource their supportive operations, such as information system and logistics. This drives firms to rely more on information system providers to facilitate the flows of information, and on third party logistics service providers to facilitate the flows of goods.

Ying and Dayong (2005) argue that Internet-based collaboration used in e-commerce enables the integration of logistics flow, financing flow, information flow, workflow and value-added flow.

For example, with the utilization of e-commerce, the 3PL company can frequently reengineer its logistics business process flow and thus improve the customer responding ability and service quality.

3.2 Third-Party Logistics (3PL or TPL)

There have been various terms used to describe this phenomenon such as logistics alliance, operational alliances in logistics, contract logistics, contract distribution and third party logistics (3PL or TPL), however, 3PL has been the term more widely used in recent times (Sohail and Sohal, 2003). In definition, the third party is a firm acting as a middleman not taking title to the products but to which logistics activities are outsourced, while the first party is the shipper or supplier and the second party is the buyer. 3PL providers connect the suppliers, the manufacturers and the distributors in supply chains and provide the substance movement and logistics information flow (Ying and Dayong, 2005).

According to Hertz and Alfredsson (2003), a 3PL provider is an external provider who manages, controls, and delivers logistics activities on behalf of a shipper. They also report that most studies have taken shipper's perspective on logistics alliances, its development over time, and the type and evaluation of the services offered by 3PL providers. Moreover, since past researches have thoroughly examined vertical cooperation, involving suppliers, manufacturers, distribution centers, customers and 3PL, Cruijssen et al. (2007) then focus on the horizontal cooperation, which is defined by the European Union as concerted practices between companies operating at the same levels in the market, in 3PLs. Chen and Chen (2005) also report that in addition to such a vertical approach over supply channels, horizontal cooperative has emerged as a promising scheme for seamless integration of the chain. Cruijssen et al. (2007) find out that the potential benefits of horizontal cooperation are to increase their profitability or to improve the quality of their services, while the impediments are to find a reliable party to lead the cooperation and constructing a fair allocation mechanism for the benefits.

Ying and Dayong (2005) point out that the popularization of supply chain management provides a good developing environment and a huge required market for 3PL industry. They also state that the core competition ability of a 3PL provider is its ability of integrated services to help shippers to optimize their logistics management strategies, build up and operate their logistics systems and even manage their whole distribution systems.

Stank and Daugherty (1999) emphasize the importance of the formation of cooperative logistics relationships between manufacturers (shippers) and 3PL providers, and suggest 3PL providers develop selling strategies and sales approaches to overcome manufacturers' concerns relating to over-reliance or dependence upon large service vendors and relating to the loss of bargaining power associated with long-term commitments. Ying and Dayong (2005) also point out that only by providing customized logistics services to various customers as an agency, a 3PL provider could establish a long-term union relationships with its customers and enhance it continuously.

3.3 Information Technology (IT)/Information System (IS) Outsourcing

IT outsourcing is broadly defined as a decision taken by an organization to contract-out or sell the organization's IT assets, people and/or activities to a third part supplier, who in exchange provides and manages assets and services for monetary returns over an agreed time period (Kern and Willcocks, 2000). It is widely known that ever since Kodak outsourced its information systems in 1989, IT/IS outsourcing has grown in organization influence. In the wake of the 'Kodak effect', numerous studies have investigated the IS outsourcing phenomenon from various vantage points (Samaddar and Kadiyala, 2006). Some of these studies concentrated on the degree of outsourcing (Ang and Straub, 1998), others measured outsourcing success (Lacity and Willcocks, 1998), and still others studied the

pre-event firm characteristics (Smith et al., 1998) or antecedents of outsourcing (Grover et al., 1996; Lee and Kim, 1999).

Assmann and Punter (2004) divide the IS outsourcing into three types. Originally, contributions on IS outsourcing focused on the data center, mainly considering the maintenance of existing legacy systems. After that, the focus was on networks and telecommunications infrastructure, followed by help desks and workstation support; e.g., the Application Service Providing (ASP). A third type focuses on application development and support, which concerns often complex applications that consist of many different hardware as well as software components.

Lacity et al. (1995) prescribe a set of nine factors, including have a measurable partnership between the supplier and the company so that they have shared or complementary goals, that ensure that the client organization maximizes flexibility and control over IS outsourcing. Grover et al. (1996) also note that outsourcing has evolved over the years to a partnership relation rather than a customer-vendor relation. Indeed, the fact that partner relationships are a key factor to IS outsourcing success is extensively recommended, e.g., Lee (2001) and Assmann and Punter (2004), but has not yet thoroughly validated in practice. As Kern and Willcocks (2000) point out, the area in IT outsourcing that has received the least research attention so far is the outsourcing relationships.

3.4 An Intervened Supply Chain

As mentioned earlier, outsourcings tend to complicate the supply chain network system, which then turns into a highly intervened one. The capability of integration across these four flows, i.e. flow of goods, flow of information, flow of financing and flow of trading, becomes dominating. As Ying and Dayong (2005) point out, the integration of four flows is one of the characteristics of e-commerce supply chain even though they are running in different velocities.

Figure 1 depicts such an intervened supply chain based on the four flows, where each of the financial institution, 3PL and IS service providers connect the suppliers, the manufacturers, the distributors and the consumers in supply chains in an intervening way. All the flows are depicted in double-directed arrows to emphasize the interactions between all parties. This is slightly different from the logistics flow scheme described by Stefansson (2002), who suggests that the flow of goods be connected only between shippers and 3PL providers and between receivers and 3PL providers, but not between shippers and receivers, and thus be single-directed because goods can only be transported from shippers to receivers, but not vice versa.

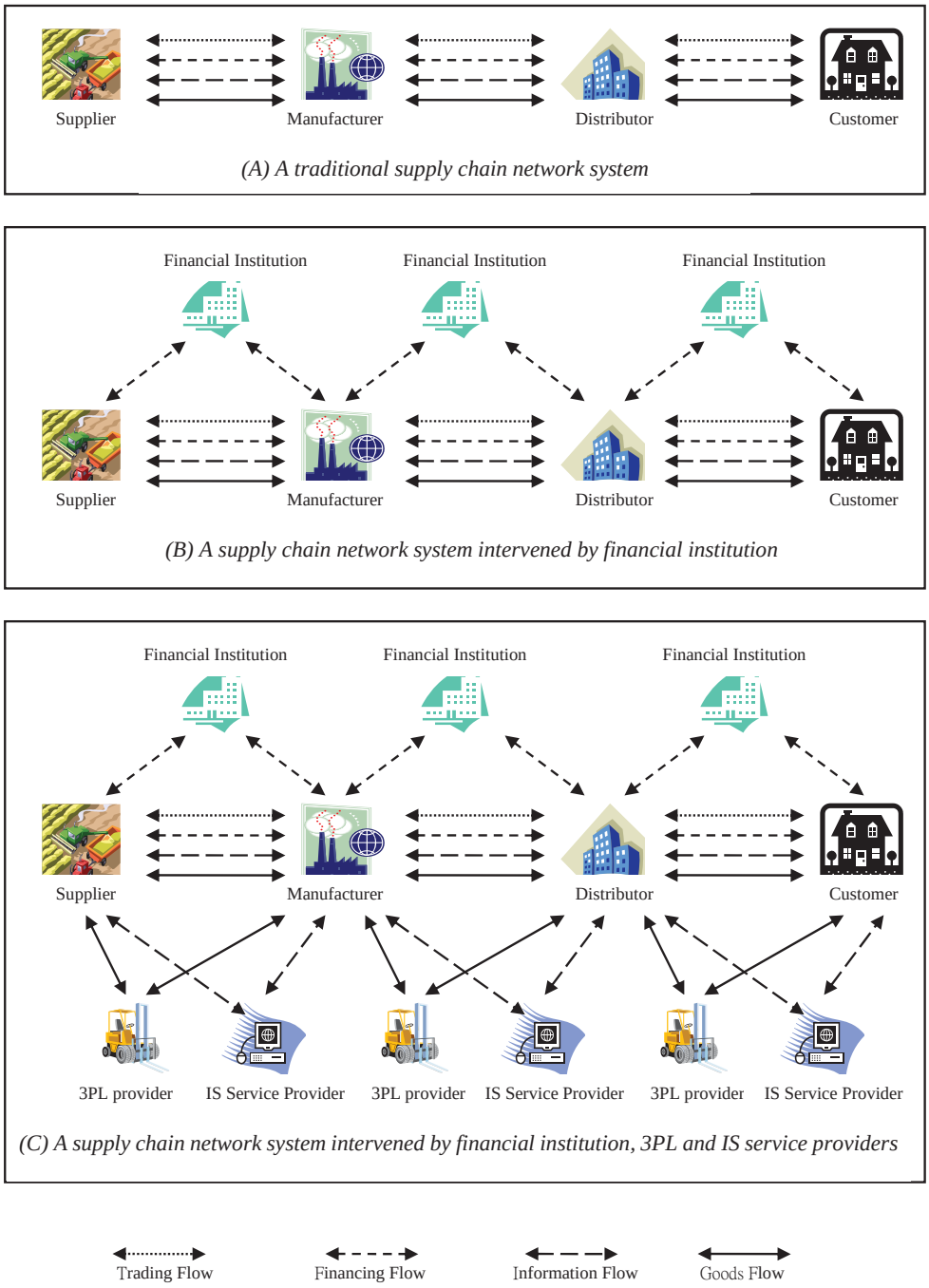

Figure 1 Intervened Supply Chain Network Systems

However, this study argues that firms don't necessarily consign all their logistics to 3PL providers; i.e., 'total' logistics outsourcing may be rarely found, therefore the connection between shippers and receivers should be kept. Furthermore, some returned merchandises may be delivered directly from receivers to shippers without consigning them to 3PL providers. Under this circumstance,

the reverse arrow from receivers to shippers comes to existence, making double-directed flows of goods possible.

4. Communications and Interactions between Firms in a Supply Chain

4.1 Communications and Trust

For the members in a specific supply chain, effective communications and good interactions between firms are crucial. Communications are the process of exchanging messages and knowledge, or sharing information between senders and receivers (Simon, 1976; Katz and Kahn, 1978). Mohr and Spekman (1994) report that the communications behavior generally falls into one of three groups: (1)communication quality; (2) information sharing; (3)participation.

Anderson and Narus (1984) argue that the essence of communication between partners is attaining the established goal. In other words, to reach benefits from cooperation, it is essential to communicate effectively with partners. Anderson and Weitz (1989) also note that highly concentrated communications can promote confidence and willingness for cooperation, and through communications, they can exchange knowledge, share value and goal with each other. All these are considered key factors to partner relationships success.

Anderson and Narus (1990) define the communications as a constant process for developing and maintaining coordination, and as a determinant for developing mutual trust with partners. In other words, communications can promote trust, and reduce arguments over controversial issue (Etgar, 1979). For example, Anderson et al. (1987) verifies that good communications bring about trust to each other, and have positive effect on business development.

Assmann and Punter (2004) believe that trust between contractors and subcontractors is important for exchanging development knowledge between the outsourcing partners. Also, in a partnership model built by Kedia and Lahiri (2007), 'trustworthiness' is considered having moderating effect in the relationships between drivers of international outsourcing of services and partner type. They stress that trust and commitment are essential features for ensuring quality and success of interfirm relationships, collaborative ventures or alliances between overseas partners.

4.2 Information Sharing and Partner Relationships

Information sharing and partner relationships rely on communications. Mohr and Spekman (1994) and Lee and Kim (1999) point out that communications produce the effect of information exchange and are an important indicator for cooperation relationships. Essig and Batran (2005) also argue that long-term partnerships with suppliers can build 'social capital', which is mainly developed by trust and commitment and may reduce transaction cost and enhance linkages between public, private and not-for-profit sectors. In the study on exploring the IT outsourcing relationships between UPS and Motorola, Zviran et al. (2001) find out the gradual development of trust between the two sides, which leads the two firms from being committed to a contract to becoming strategic partners.

According to Gentry (1996), information sharing is a kind of information exchange and open communication between firms. Senge (1997) indicates that information sharing is a process in which a person can acquire information in the same way as that he/she acquires other assets. Lee and Whang (2000) stress that by new information technology, firms will be able to enhance their communication with others and attain effective information sharing. For the logistics outsourcing, Lewis and

Talalayevsky (2000) point out that many companies are increasingly outsourcing their logistical activities to third parties, which in turn heighten the demand for effective data sharing. The data sharing between parties in the supply chain is of fundamental interest, and that the flow of information is essential for carrying out an effective and efficient movement of consignments (Stefansson, 2002).

In their study on the effect of partnership quality on IS outsourcing in the context of Korean organizations, Lee and Kim (1999) find out that partnership quality is a good predictor of outsourcing success and participation, communication, information sharing, and top management have positive effects on partnership quality. Assmann and Punter (2004) also argue that software subcontracting should focus on partnership relationships, aiming at long term, appropriate and equal relationships between contractors and subcontractors. Both evidence the important roles information sharing and partner relationships play in the outsourcing context.

In the reviews on multiple-supplier chains, Minner (2003) reports that the low cost of information sharing via the Internet is an asset in managing supply chain through the emerging E-procurement practices. Chen and Chen (2005) report that to achieve effective supply chain integration, common wisdom suggests the use of collaboration and coordination among channel partners that share business information, in order to simplify core processes, streamline cross company operations and reduce consequent channel-wide costs.

All the Srinagesh et al. (1999), Chen et al. (2000) and Kalchschmidt et al. (2003) argue that one of the methods to reduce the bullwhip effect and improve the supply chain performance is information sharing. As stated earlier, an intervened supply chain tends to complicate the network system, and may produce negative effect analogous to bullwhip one. This as a result may increase the difficulty in effective communications between firms, obstruct information sharing and partnership formation, and finally cause hindrances to supply chain performance improvement.

5. Impacts of Outsourcings on Supply Chain Performance

5.1 Supply Chain Performance

The term ‘supply chain’ comes from a picture of how organizations are linked together as viewed from a particular company (Chase et al., 2006). In most cases, the supply chain performance is examined from the perspective of manufacturers. Otto and Kotzab (2003) examine six perspectives, ranging from system dynamics, operations research, and logistics to marketing, organization, and strategy perspectives, for evaluating supply chains. In most of these perspectives, stock-outs, service level, lead-times, and customer satisfaction have been identified as leading performance indicators of successful supply chains.

On the other hand, Chase et al. (2006) report that there are two common measures to evaluate supply chain efficiency: inventory turnover and weeks of supply, which are essentially the same and are mathematically the inverse of one another. Moreover, in the study on comparing strategies in multi-layered supply chains, Abdel-Malek et al. (2005) use only ‘safety stocks’ to evaluate supply chain performance, because it’s considered a key indicator of customer satisfaction, as well as other involved costs when deciding on the outsourcing strategies.

Overall, how to evaluate the performance of a supply chain has been widely discussed in the literatures. Most of the researches published have used quantitative measurements, such as safety stocks, inventory turnover, and delivery time, in spite of the fact that some still would rather use

qualitative measurement, such as customers' satisfaction, to evaluate supply chain performance. The primary concern of this study is how supply chain performance can be improved by intensifying communications, trust, information sharing and partner relationships on the strength of outsourcings.

5.2 A Research Framework for Development

This study argues that once firms rely on outsourcings, their supply chains tend to lengthen and become complicated. Such complicated supply chains may cause hindrances for firms to develop partner relationships and fulfill information sharing between partners. Such hindrances then influence the outsourcing success, and eventually impair the of supply chain performance.

The original goal for a firm to adopt outsourcing is to gain its core competence. In other words, the outsourcing firm expects to benefit by improving its core competence from such an outsourcing. The third party who contracts to take the outsourcing job also expects to benefit by achieving better efficiency resulting from economy of scale and/or horizontal cooperation. The party who receives the outsourcing service also expects to benefit by achieving higher satisfaction from the third parties' specialized service. All these benefits turn into important elements in promoting outsourcing success, which can be viewed as the level of fitness between the customer's requirements and the outsourcing outcome (Lee, 2001).

Such outsourcing success, however, should depend highly on good interactions; e.g., communications, trust, information sharing and partner relationships, among all parties in a supply chain. In the case that any party focuses only on their core businesses without making efforts to promote positive interactions between parties, then the outsourcing success cannot be secured.

The case study of Zviran et al. (2001) on the IT outsourcing relationships between UPS (United Parcel Service) and Motorola (Israel) may be a good example in supporting such a positive role interactions play in the outsourcing relationships. Zviran et al. found that the IT services provided by Motorola really gave UPS an opportunity to become familiar with the decisions and actions taken to assure UPS's competitive advantage in the turbulent courier service industry.

Furthermore, such an outsourcing success should then be integrated with each party's core competence, and facilitates the supply chains to work and achieves better overall performance. Our primary concern is that in case that the outsourcing is harmed by poor interactions caused by intervened supply chains, then such an outsourcing failure would turn out to moderate its effect on supply chain performance. This drives us to consider outsourcing success playing a moderator role in the relationships between the individual firm's competence and the entire supply chain performance.

Accordingly, this study builds a research framework, as depicted in Figure 2, to express our concerns about firms' relationships in a supply chain. In Figure 2, there are two blocks representing two submodels in the framework, where submodel 1 depicts the interactions among the three parties; i.e., outsourcing party, receiving party and the third party, and submodel 2 the moderator role of outsourcing played in the relationships between individual party's competence and the entire supply chain performance.

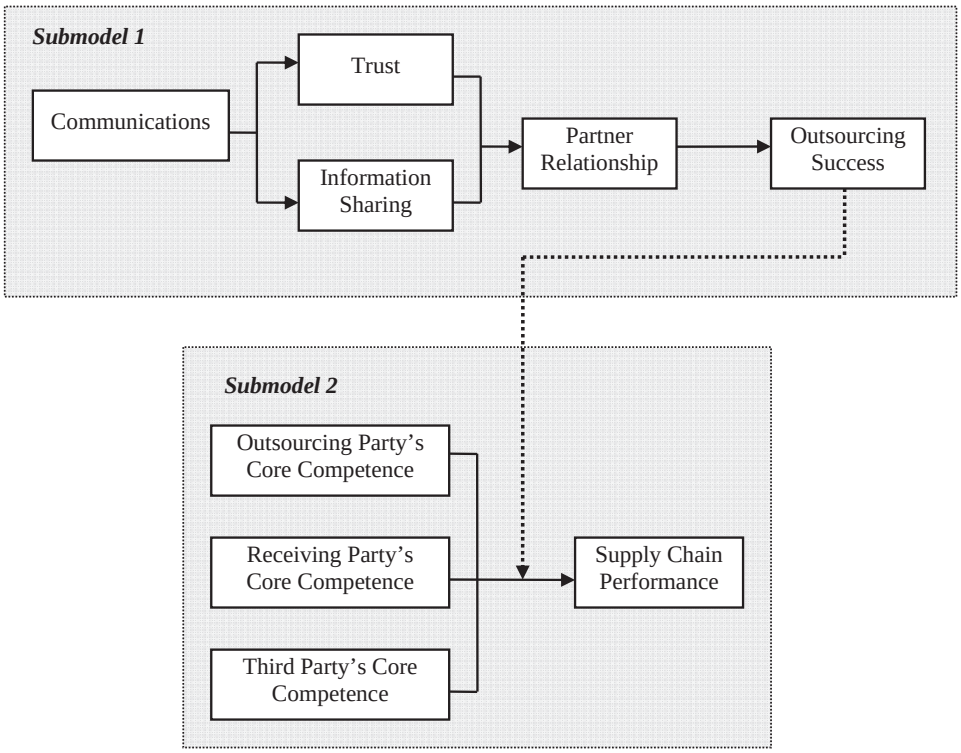

Figure 2 A Research Framework for Development

Submodel 1 indicates that better communications among the three parties tend to lead to better trust and more effective information sharing; both then result in effective partner relationships and higher outsourcing success. Such a notion actually holds similarities to that of Yen and Hsiao (2007) who apply Social Exchange Theory to connect these constructs on interactions among parties, and to that of Lee (2001) who considers partnership quality a construct mediating the relationships between knowledge sharing and outsourcing success.

On the other hand, submodel 2 indicates that outsourcing success plays a moderator role in the relationships between individual firm's competence and the entire supply chain performance. This implies that better competence of individual party should be accompanied with outsourcing success to ensure a better supply chain performance. Once the outsourcing is obstructed by poor partner relationships resulting from an intervened supply chain, then it will moderate the anticipated supply chain performance. Such moderation could in turn impair the individual firms' competence and performance, and the supply chain performance further.

6. Concluding Remarks

To build core competence, many firms have outsourced their business operations to specialized contractors. Some of these outsourced operations are production functions associated with firms' core activities, and others are the supportive operations, such as information system and logistics. The former leads to a multi-layer supply chain and the latter to an intervened one. In other words, both outsourcing strategies tend to complicate the existing supply chain system.

The original purpose for firms to adopt outsourcing is to enable themselves to focus on their core competence and then to achieve better performance. From the perspective of the entire supply chain, however, such a complicated supply chain will increase the difficulty in communications and information exchange among the members in the supply chain, and may impair the operation efficiency of the entire supply chain, ending up depressing the anticipated performance for individual firms.

Past researches on the effect of outsourcing tend to focus on examining its effect on individual firms' performance, and most of them argue that outsourcing will bring about positive effect on firms' performance because it enable them to be concentrated on their core competence. With that stereotyping in mind, they tend to neglect the negative effect of the intervened supply chain caused by outsourcing.

This study has tried to build a research framework where the moderator role of outsourcing success is emphasized in the relationships between individual firms' core competence and the entire supply chain performance. In other words, this study believes that the individual firms' core competence should be integrated with outsourcing success to facilitate the supply chains to work, and eventually achieve a better overall performance. Such a moderator role of outsourcing this study emphasizes, however, is quite different from that of Abdel-Malek et al. (2005) in that they develop a framework to assess the performance of the multi-layered supply chains when coupling the outsourcing strategies.

On the other hand, this study also maintains that outsourcing success depends highly on good interactions; e.g., communications, trust, information sharing and partner relationships, among all parties in a supply chain. Such a mediating role interactions play in achieving outsourcing success holds similarities to that of Lee (2001) in that he considers partnership quality a construct mediating the relationships between knowledge sharing and outsourcing success. All these similarities and dissimilarities remain to be tested and verified in further studies.

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