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Abstract

The purpose of this research is to explore logistics innovation at third-party logistics (3PL) firms in China. Case studies of 3PL firms in Taiwan, Hong Kong, and Mainland China (Greater China region) have been conducted. Based on interviews, observation and documentation, a qualitative case-study approach has been followed. Drawing on case-study findings, the driving forces, barriers, and effects of logistics innovation on 3PL firms in China are discussed. Customer requirements, environmental factors, efficiency and effectiveness enhancement, and provision of wider service portfolios and differentiation are strong rationales for 3PL firms to innovate in China. In comparison, cost, time, and employee ability are crucial barriers hindering 3PL firms from innovating in China. Logistics innovation can lead to positive operational performance by increasing efficiency, effectiveness, and service portfolios. Logistics innovation is also positively related to the enhanced relationship with clients, growing sales, reputation and financial performance.

Keywords

Logistics innovation, Third party logistics, Drivers, Barriers, China

Introduction

In recent years, China has emerged as a production center in Far East Asia. Many firms are operating in China to take advantage of low costs and a growing market. Firms tend to use local logistics firms in order to strengthen their supply chain (Jiang 2002). There is a growing trend for firms to outsource their logistics operation in China (Hong, Chin, and Liu 2004). In the meantime, the booming economy of China and its status as a member of the World Trade Organization (WTO) have changed and modernized the traditionally regulated logistics and distribution system (Jiang and Prater 2002). Consequently, the logistics industry in China has been growing. The growth of the logistics market in China has provided opportunities for logistics firms (Lai et al. 2008).

However, most of the logistics firms in China tend to concentrate heavily on transportation and warehousing. They do not have sufficient value-added service provisions and logistics information management, which may negatively affect their sales and subsequent revenue (Hong, Chin, and Liu 2007; Zhou et al. 2008). In order to survive in the market, logistics firms in China have to constantly seek new ways to serve their clients and increase their service quality (Wang et al. 2006).

When firms select logistics service providers in China, they focus on service quality and performance, range of services, geographical coverage, and capability to meet market changes (Lu and Dinwoodie 2002; Qureshi, Kumar, and Kumar 2008). Limited number of service offerings and lack of awareness of the logistics concept have caused customer dissatisfaction (Hong, Chin, and Liu 2004). Logistics firms in China are aware of the challenges and highly value improving customer service and providing quality service (Wang et al. 2008). Many logistics firms attempt to enhance their competitiveness by offering more comprehensive service packages (Hong and Liu 2007). Further, logistics firms try to differentiate themselves in the market through innovation and provision of customized services to their clients (Cui, Su, and Hertz 2009).

Innovation is essential for third-party logistics (3PL) firms in China. Through innovation, 3PL firms can reap first-mover advantage and obtain competitive advantage (Wagner and Franklin 2008). Further, innovation can help 3PL firms to increase customer loyalty (Flint, Larsson, and Gammelgaard 2008). However, according to Wagner (2007), 3PL firms have relatively low capacity to generate innovation. Wagner (2008) points out that there are fewer service and process innovations in the logistics industry than in other industries. Flint et al. (2005) and Wagner (2008)

highlighted the fact that there is scant knowledge of innovation in logistics research. To our knowledge, research on logistics innovation in China is almost nonexistent.

The purpose of this research is to explore logistics innovation at 3PL firms in China. Drawing on the findings from case studies of 3PL firms in Taiwan, Hong Kong, and the Mainland of China, the driving forces, the barriers, and the effects of logistics innovation on 3PL firms are investigated. This research is divided into three parts. The first part highlights the theoretical and methodological issues in studying logistics innovation at 3PL firms. In the second part, empirical findings and analysis of case studies are presented. Finally, research limitations and further research suggestions are discussed.

Literature Review

Definition of Third-Party Logistics Firm

A number of different terms have been introduced to describe generally the concept and practice of professional logistics services in business in recent years. These terms range from third-party logistics (3PL), logistics outsourcing, logistics alliance, contract logistics, to logistics partnership (Selviaridis and Spring 2007; Marasco 2008). A summary of some influential definitions is presented in table 1. These terms carry similar messages and are often used interchangeably. As Berglund (2000) points out, these terms, especially “third-party logistics” or “3PL,” are quite carelessly used. Terms like “logistics alliance” and “partnerships” have been applied with the intention to capture the essence of 3PL without using the elusive term itself (Skjoett-Larsen et al. 2006). These terms actually construe different meanings and are not exactly the same. We support Andersson’s (1995) and Berglund’s (2000) contention that there is hitherto no consensus on the definition of third-party logistics in the literature. Due to the overlapping definitions and meanings, the concept of 3PL service provider is somewhat blurred.

As table 1 presents, these definitions tend to emphasize the fact that a 3PL firm is an external company carrying out logistics activities as service offerings on behalf of the shipper. However, these definitions underestimate the problem-solving ability and customer adaptation of 3PL firms (Hertz and Alfredsson 2003). Further, 3PL firms do not merely replace shippers in providing logistics solutions that are traditionally done in-house. They are customer-oriented and supposed to be innovative. In addition, these definitions do not consider the fact that 3PL firms can play different roles in supply chains. Certain elements of the client’s strategy shape the outsourcing decision

Table 1/Summary of Definitions from Literature

Author (s)	Year	Definition
Lieb	1992	The use of external companies to perform logistics functions that have traditionally been performed within an organization. The functions performed by the third party can encompass the entire logistics process or selected activities within that process.
Virum	1993	The services offered by a middleman in the logistics channel that has specialized in providing, by contract, for a given time period, all or a considerable number of logistics activities for other firms.
Sink et al.	1996	Third-party logistics services are multiple distribution activities provided by an external party, assuming no ownership of inventory, to accomplish related functions that are not desired to be rendered and/or managed by the purchasing organization.
Murphy and Poist	1998	A relationship between a shipper and third party that, compared with basic services, has more customized offerings, encompasses a broader number of service functions, and is characterized by a longer term, more mutually beneficial relationship.
Berglund	2000	A phenomenon that in simple words can be described as the outsourcing or subcontracting of logistics operations to external service suppliers. A provider of 3PL is consequently an organization that provides logistics.
Bask	2001	Relationships between interfaces in the supply chains and third-party logistics providers, where logistics services are offered, from basic to customized ones, in a shorter or longer relationship, with the aim of effectiveness and efficiency.

and requirements, which, in turn, influence the role of 3PL firms within the supply chain (Bolumole 2003). 3PL firms can provide value-added services and virtual logistics in an integrated way, acting as a supply chain logistics coordinator or a logistics process integrator (Bolumole 2001). As a “tool” used by their clients (Fabbe-Costes, Jahre, and Roussat 2009), 3PL firms can also contribute to supply chain integration and performance. In addition, 3PL firms can play a critical role in linking users to their major vendors and customers, thereby facilitating supply chain integration (Lieb and Bentz 2004).

The 3PL firm in this research is defined as an external company that provides basic or value-added logistics services to its customers for a reasonable service fee under a longer-term business relationship. A 3PL firm usually does not own the title of the goods. Activities carried out by the 3PL firms are highly customized and integrated, as opposed to those that stand alone. The cooperation between a 3PL firm and its customers should be an intended continuous and mutually beneficial relationship.

Logistics Innovation and Influential Factors

Logistics innovation has a unique nature since it often arises not because of a formal plan or process, but rather as an ad hoc response to a customer request (Wagner and Franklin 2008). However, there is not a common and

consistent understanding of the meaning of logistics innovation across the organization (Oke 2008). Flint et al. (2005, 114) treat logistics innovation as “any logistics related service from the basic to the complex that is seen as new and helpful to a particular focal audience.” According to Oke (2008), logistics innovation should include technological developments, service, and service product innovations. In contrast, Wagner and Busse (2008, 2) define innovation as “a subjective novelty which is the result of a conscious management process and which aims at economic exploitation.” They claim that logistics innovation should be manageable and serves an exploitation purpose (Wagner and Busse 2008). This article adopts Wagner and Busse’s definition and support the idea that logistics firms need to regard imitation as innovation (Wagner and Busse 2008).

Several researchers have shed light on influential factors on logistics innovation. Chapman, Soosay, and Kandampully (2003) investigate the factors that result in logistics innovation. They propose that knowledge, technology, and relationship networks are keys. Soosay and Hyland (2004) examine and compare factors driving innovation in distribution centers in Australia and Singapore. They find that financial reasons, customer orientation, employee orientation, a leading-edge status in the industry, operational performance, competition, and shareholder orientation are driving forces for innovation (Soosay and Hyland 2004). Soosay and Sloan (2005) find that customer satisfaction and intended continuous improvement are the most important driving forces. Panayides and So (2005) empirically point out that organizational learning mediates the relationship between relationship orientation and logistics innovation. Flint, Larsson, and Gammelgaard (2008) find that direct antecedents to logistics innovation contain the extent of supply chain learning management and innovation management. Wagner (2008) proposes that acquisition of knowledge, and training and education lead to the generation of logistics innovation. In addition, Grawe, Chen, and Patricia (2009) empirically show that customer orientation and competitor orientation positively affect logistics innovation.

Moreover, multiple factors that might impede the management of innovation by logistics firms are stated in literature. Examples are lack of clear definition of innovation, reactive versus proactive innovations, peculiar customers, ineffective transfer of knowledge, inability to protect innovations with patents, technology as a major source of innovation, lack of effective development processes, and difficulty in concept testing (Oke 2004, 2008). Gellman (1986) investigates innovation performance of railroads under deregulation and claims that regulation, labor

Figure 1 Influencing Factors and Outcomes of Logistics Innovation

influence, and lack of channel member innovation are barriers to innovate. In addition, Gammelgaard (2008) reveals four potential pitfalls, including improper cooperation, lack of openness, loss of diversity necessary for innovation due to long-term relationships, and information abusing and resource-consuming due to information sharing.

Researchers have also examined the effects and outcomes of logistics innovation under various contexts. Persson (1991) argues that logistics innovation can lead to competitive advantages. Twede (1992) presents that packaging innovation can lead to differentiation and competitive advantage. Richey, Genchev, and Daugherty (2005) identify the positive relationship between logistics innovation and operational service quality. Panayides and So (2005) find that logistics innovation is positively related to logistics service-provider effectiveness. Further, according to Wallenburg (2009), innovation can help logistics firms to increase customer loyalty.

In sum, in recent years researchers have shed light on driving forces, barriers, and effects of logistics innovation in different contexts. However, there is little research that investigates these three aspects of logistics innovation in a holistic way. Therefore, this research tries to fill this gap by examining the driving forces, barriers, and effects of logistics innovation simultaneously. Figure 1 serves as a framework that guides the data collection and analysis in this study.

Methodology

This research is based on multiple case studies. Empirical data have been collected through semi-structured interviews, observations, and documentation with three 3PL firms in China. Several motivations have spurred our choice of case-study method. First, according to Feagin, Orum, and Sjoberg (1991), case study is an ideal method when a holistic, in-depth investigation is required. Second, the review of existing literature underpins the weak understanding of the nature of innovation in logistics sector, confirming the need for more theoretical development. Case studies can help logistics researchers generate new concepts and theories (Arlbjorn

and Halldorsson 2002). Third, logistics research is usually dealt with practical-oriented problems. The case-study approach allows researchers to gather first-hand information to develop knowledge and gain relevance (Naslund 2002).

This research followed the process suggested by Ellram (1996). Three case companies were chosen using purposeful sampling (Yin 2003). They were selected based on their market reputation in logistics innovation, openness to share their experience, willingness to participate in our research, and the research project budgetary constraints. Initial contacts with key persons at each case company were made to get their support to this study. Through those key persons, interview participants were selected based on snowball effect. These participants are all managers who are familiar with business in the Greater China region.

An interview protocol was first developed and sent to the interviewees prior to the interview in order to facilitate the interview process. The protocol provided interviewees with a clear understanding of research background and purpose. It included key questions and interview guidelines. In order to discover as much information as possible, we kept the questions open and broad, and then delved in depth about logistics innovation. In total twenty interviews were conducted; each took around ninety minutes to complete and was conducted on site at the company facility. A summary of interview participants is shown in table 2. In order to facilitate the interview process, we followed the interviewees' preference and used different languages accordingly. Specifically, twelve interviews were conducted in Mandarin, five in Cantonese, and three in English. All of the interviews were recorded by digital recorders and transcribed afterwards. We also translated all of the interviews into English, the translated transcripts of which were sent back to interviewees for comments and clarifications.

All empirical data, mainly interview transcriptions, were analyzed according to the qualitative coding processes (Miles and Huberman 1994; Ellram 1996). The primary aim of coding is to systematically derive core categories and facilitate cross-case analysis. Open coding was first conducted to break down data in order to analyze, conceptualize, and develop categories. Then, axial coding was done to make connections among categories developed in the open coding. Further, a central category of the analysis relating to other categories was selected (Strauss and Corbin 1990). Last, cross-case analysis was conducted to generate unique categories.

Table 2/List of Interviewees of 3PL Firms in Greater China Region

Company	Title	Location
Dimerco	Corporate Vice President	Head office, Taipei
	General Manager	Head office, Taipei
	Corporate Marketing Manager	Head office, Taipei
	Director, Northern China	Beijing Office, Beijing
	Assistant General Manager, Northern China	Tianjin Office, Tianjin
	MNC Team	Tianjin Office, Tianjin
	Assistant Manager	Beijing Airport, Beijing
	Manager, Import Department	Beijing Airport, Beijing
	Manager	Beijing Airport, Beijing
	Export Manager	Beijing Airport, Beijing
	In-House Representative	Tianjin Airport, Tianjin
Oriental Logistics	Management Accounting Manager	Head Office, Hongkong
	Senior Project Manager	Head Office, Hongkong
	Senior Operation Manager	Head Office, Hongkong
	Assistant General Manager, Marketing Dept.	Head Office, Hongkong
	Senior Operation Manager	Head Office, Hongkong
	General Manager	Head Office, Hongkong
Schenker Logistics	General Manager, Central/ North China	Shanghai Office, Shanghai
	Managing Director	Taipei Office, Taipei
	Director, South China	Hongkong Office, Hongkong

Empirical Findings

Description of Case Companies

Oriental Logistics

Oriental Logistics was founded in Hong Kong during the Asia financial crisis and the return of Hong Kong to Mainland China in 1997. In the beginning, it only provided warehousing services and very limited transportation services. Due to its client-centric partnership model, it has become a 3PL firm and grown dramatically in China together with its clients. Currently, Oriental Logistics has operations in Hong Kong, Guangzhou, Beijing, Shanghai, and Taiwan. Its clients are from both industrial and consumer goods sectors.

Dimerco Express Group

Dimerco Express Group (DEG) started as an air freight forwarder. With the development of the firm, it has turned into a 3PL firm specialized in Asia Pacific and North America and offers integrated logistics services. Many clients of DEG’s are dealing with high-value products and demand express services. In China, DEG has more than twenty offices. DEG is also the first logistics company listed in the Taiwanese stock market.

Schenker Logistics

Schenker Logistics is a 3PL firm in the DB Schenker group. Schenker Logistics in China offers the same services as the other parts of Schenker Logistics, including sea, air, land, contract logistics, and exhibition logistics. It has been providing different kinds of services in China for more than thirty years. There are six industries on which Schenker Logistics focuses in China. The first three are the automotive industry, the electronic industry, and the manufacturing industry. The rest are within the “emerging” industries, including health care, aerospace, and luxury goods. Schenker Logistics has a wide network in China, covering most of the major cities.

Driving Forces

A number of driving forces have been identified from our case studies as summarized in table 3. Among these driving forces, customer requirements constitute a key driving force to innovate at all of the case-study companies. Customers have different businesses and operations in China, and as such they have various demands. Also, with the growth of customers’ supply chains, customers require a wider variety of services and customized solutions.

Table 3/Driving Forces to Logistics Innovation

Driving Forces	Oriental Logistics	Dimerco Express Group	Schenker Logistics
Customer requirement	√	√	√
Environmental factor	√	√	√
Enhance efficiency	√	√	√
Enhance effectiveness	√	√	√
Provide wider service portfolio	√	√	√
Differentiation	√	√	√
Increase geographical coverage	×	√	×
Growth	√	√	×

Note: √ – considered as a driving force; × – not considered as a driving force

All three case companies place great importance on customer requirements and constantly search for better ways to meet them. They train their employees to enhance their logistics and supply chain management knowledge. In order to better understand customers' requirements, they try to look at customers' positions in the entire supply chain and conduct research on customers' product characteristics. Next, they take each customer's situation into consideration and try to develop new solutions and customized services accordingly.

Situational factors comprise another critical driving force. All of the case-study companies are aware of the complexity of Customs procedures and governmental policies. In terms of the logistics service market, Hong Kong and Taiwan have a sufficient supply of shipping and air freight services, whereas Mainland China's experiences supply shortages. As a result, all three case-study companies try to leverage the advantage of Hong Kong and Taiwan to meet the challenge of service supply constraint in Mainland China.

The current economic recession has seriously affected the firms operating in China. All three case-study companies have attempted to find new ways to help clients decrease operational costs and inventory.

Operational efficiency is essential for logistics firms. All three case-study companies have been proactively working on their internal systems and processes in order to enhance efficiency. Specifically, they try to adopt advanced IT technology and improve their operations systems. They also constantly look at their internal operations processes and re-engineer the processes. Concurrently, they investigate customers' operations processes and business settings in order to identify potential areas for improvement. In turn, they often come up with new solutions and new service packages.

All three case-study companies focus on their service quality. This focus is closely related to their strategies in China. They all believe that high-quality services can provide a basis to differentiate themselves in the China market. They use various key performance indicators to measure their service quality and identify areas for improvement. They continuously work in new ways in order to improve their service quality and enhance their service effectiveness.

All three firms work hard to develop new service offerings in order to widen their service portfolio. They try to maintain good services relating to logistics operations as well as develop value-added services to facilitate customers' physical flows. They also integrate services relating to customers' financial and information flows to enhance total supply chain

effectiveness. As a result, customers can achieve better performance in their supply chains. All three firms strive for providing customers one-stop shopping as a means to differentiate themselves in the market.

Oriental Logistics and DEG specifically mentioned growth as a driving force. This is probably due to the fact that Oriental Logistics and DEG are medium-size firms and focus mainly on the China market. Compared to Schenker Logistics, a major global logistics player, they are relatively small. They cannot match the economy of scale and synergistic effects of larger companies. Speedy innovation and new service development can help small- and medium-size firms gain more business and grow in size. In turn, they can enhance their supply chain competencies to compete with the global players on scale, efficiency, and effectiveness.

Barriers

As shown in table 4, all three case-study companies regard cost and time as barriers to innovation, of which cost is considered to be of a greater concern. In many cases, their new ideas are attractive and the potential benefits may be substantial, but customers are normally reluctant to accept them due to high costs of development. Many customers in China treat logistics as a source of costs and are not aware of the fact that better logistics performance can create more business value and lead to competitive advantage. Thus, they are not willing to invest more money in logistics innovation. Since logistics innovation usually requires changes of rules and processes in the supply chain, it takes times to communicate and implement among supply chain members. However, the longer it takes, the riskier uncertain causes may hold back or even stop the innovation efforts.

In addition, all three case companies mention employees' capability as a barrier to innovate. Their employees, especially ones working in daily

Table 4/Barriers to Logistics Innovation

Barriers	Oriental Logistics	Dimerco Express Group	Schenker Logistics
Cost	√	√	√
Time	√	√	√
Employee ability	√	√	√
Resource	√	√	×
Unqualified suppliers	×	√	√
Internal communication	×	×	√

Note: √ – considered as a barrier; × – not considered as a barrier

operations, do not have very strong education backgrounds. They are reluctant to change. Many of them have very little or even no knowledge of logistics and supply chain management. In many cases, it is hard to explain to them the benefits of certain innovation and changes. As a result, they are not willing to adapt and modify their working methods, which make the innovation implementation difficult. Therefore, all three companies have invested heavily in training to upgrade their employees' logistics and supply chain management knowledge and capability.

Oriental Logistics and DEG specifically shed light on the issue of resources as their barriers to innovation. In essence, these two firms are medium-size firms. Comparing to the global giants, they have relatively fewer resources to invest in innovation. They are tied up with daily operations and tend to put resources into their operations. However, successful innovations require constant investment and investigation. Even though the potential benefits are great, it usually takes a fairly long time to achieve the economic returns. Therefore, small-and medium-size firms can be less innovative due to limited resources.

DEG and Schenker Logistics regard unqualified suppliers as another barrier to logistics innovation. These two firms outsource certain activities to local logistics service providers, particularly in Mainland China. Local logistics service providers are usually good at following customer instructions. However, they are not innovation-oriented. It is very seldom that local logistics service providers proactively come up with suggestion and innovative ideas. When DEG and Schenker Logistics bring up new solutions, local logistics service providers often have a hard time comprehending and cooperating. Thus, DEG and Schenker Logistics are forced to give up certain ideas. In comparison, Oriental Logistics does not mention unqualified suppliers as a barrier. In fact, Oriental Logistics is very aware of the problems associated with using local logistics firms. They strive to develop their comprehensive logistics capability to avoid relying on local logistics providers.

Among the case-study companies, only Schenker Logistics highlights internal communication as a barrier to innovation. Schenker Logistics' clients are mainly global firms. The global clients operate their supply chain globally. Schenker Logistics in China might come up with new ideas for operations in China. However, since their clients' operations in China is only part of the global operation, any change or modification might affect the entire supply chain. Hence, Schenker Logistics in China needs to communicate with its headquarters and other affected offices in order to ensure internal rules or norms are not violated and support is

available. Usually, the internal communication process is time consuming. Misunderstandings during the communication process can terminate the whole innovation process. In contrast, being smaller and flatter, Oriental Logistics and DEG enjoy the efficient communication. They even specifically mention that their prompt communication and decision-making mechanisms have helped them to react faster to market changes.

Effects of Logistics Innovation

All three case-study companies have experienced positive effects of logistics innovation. Table 5 presents our findings. These effects can be categorized into operational and financial aspects. Operationally, logistics innovation can lead to efficient and effective operations as well as wider service portfolios. Through logistics innovation, logistics firms can either provide more logistics-related services or combine other value-added services into the total service package. In sum, logistics innovation allows logistics firms to generate customized solutions that create more value to their customers and themselves.

Financially, all case-study companies enhance their financial performance as a result of customer satisfaction gained through logistics innovation. In turn, they can enhance the relationships with their clients. Clients tend to retain the relationships because of the logistics firms' innovative capability. In many cases, logistics firms even obtain more businesses from the same clients. Moreover, logistics innovation can help logistics firms capture a better reputation in the market. Satisfied clients would also refer these logistics firms to their suppliers and customers. Therefore, new businesses can be created. Logistics innovation also helps logistics

Table 5/Effects of Logistics Innovation

Effects	Oriental Logistics	Dimerco Express Group	Schenker Logistics
Efficiency	√	√	√
Effectiveness	√	√	√
Wider service portfolio	√	√	√
Customer satisfaction	√	√	√
Enhance relationship with clients	√	√	√
Growing sales	√	√	√
Reputation	√	√	√
Positive financial performance	√	√	√

Note: √ – considered as a positive effect of logistics innovation; × – not considered as a positive effect

firms to differentiate themselves in the marketplace, allowing them to gain competitive advantage and achieve better business performance.

Discussion

All three case-study companies have paid great attention to their clients since they value the relationships with their clients. Customers' requirements have been found to be the most crucial driving force for logistics innovation. Clients' new service requirements are usually a reflection of market changes, such as a reaction to a new demand of the clients' customers, and the strategic direction of clients. Logistics innovation can help logistics firms meet clients' changing requirements and lead to customer satisfaction. Satisfied clients tend to retain and even strengthen the relationships with their logistics firms. This finding coincides with the findings of Panayides and So (2005)—relationship orientation is positively related to logistics innovation. Relationship orientation plays a critical role for healthy supply chains.

All three case-study companies constantly interact with their clients and try to obtain more knowledge about their clients. They study clients' product characteristics and market positions to better understand clients' operations. Further, they examine clients' supply chains to take a holistic view of clients' supply chains and find logistics innovation opportunities. For instance, they investigate clients' operations in China and their role in the global supply chain. They also research clients' suppliers and customers in terms of location and requirements. Internally, our case companies educate their employees and provide them with logistics and supply chain management knowledge. The purpose is to foster supply chain orientation (Mentzer et al. 2001) so their employees can take clients' suppliers and customers into consideration when serving them. In this way, they can proactively design innovative solutions to better operate clients' supply chains. Thus, we propose that supply chain orientation is positively related to logistics innovation.

It is crucial to point out that logistics firms handle logistics operations as their businesses. Like all firms, logistics firms need to make money and grow. Logistics firms are usually operating in highly competitive markets. Our case-study companies confirm that they face fierce competition in China. Instead of lowering prices at the expense of service quality in order to compete, our case companies choose to focus more on innovation so they can differentiate themselves and create higher profit by providing quality services, and innovative and customized solutions. Therefore, we propose that market force is positively related to logistics innovation.

All three case companies strive for delivering superior customer value to their clients. It drives the case companies to innovate. This finding supports what Grawe, Chen, and Patricia (2009) found: customer orientation is positively related to service innovation. However, our case companies not only listen to their clients carefully, but also try to understand clients' latent and unmet needs. They do not simply follow clients' ideas and develop new solutions reactively. On the contrary, they proactively generate innovative ideas and present them to clients. They respond to market intelligence obtained from current and potential clients as well as competitors. By using the market information, they try to apply the latest technology and broaden service packages for their clients. It indicates that our case companies are essentially market-oriented (Jaworski and Kohli 1993; Slater and Narver 1999). Thus, we propose that market orientation is positively related to logistics innovation.

All of the case companies have a strong desire to grow. They continuously look for opportunities to obtain more business and try to exploit the opportunities. They always come up with new suggestions and offer wider service portfolios in order to get more business from existing clients. They also combine value-added services with their basic service package to increase sales from current clients. Our case companies target their clients' business partners and try to develop customized solutions for them to expand their client bases. Furthermore, they conduct market research to identify unmet needs in the market. They work out business plans to fulfill those unmet needs and attract new customers. All these opportunity seeking and exploiting behaviors indicate that our case companies are entrepreneurial-oriented (Slater and Narver 1995; Hult and Ketchen 2001). Their strong desire to grow and their entrepreneurial spirit lead them to constantly innovate. Therefore, we propose that entrepreneurial orientation is positively related to logistics innovation.

In table 5, the empirical data demonstrate that logistics innovation can lead to various kinds of positive effects. Similar to those of Richey, Genchev, and Daugherty (2005) and Panayides and So (2005), the findings also indicate the positive relationship between logistics innovation and operational performance. The empirical results further confirm Wallenburg's (2009) study that logistics innovation can lead to customer satisfaction and customer loyalty. The case studies have clearly shown that logistics innovation can result in positive financial performance. All case companies claimed business performance improvements, financial gains, and reputation and customer loyalty (brand value) are results of the logistics innovation

Figure 2 A Proposed Theoretical Conceptual Model of Logistics Innovation for 3PL

efforts. Thus, it is proposed that logistics innovation can create tangible and intangible supply chain effects (to both 3PL and their clients, even to their 3PL firms’s suppliers).

From the above analysis in this section, a theoretical conceptual model is conjectured in figure 2. The findings on barriers complement existing literature and provide additional insights. Particularly, cost and time have been regarded as the biggest obstacles to logistics innovation. This finding is consistent with current logistics outsourcing practice. Many firms outsource their logistics operations because they want to reduce cost rather than create value through innovation (Cui, Su, and Hertz 2009). These firms often have a basic understanding of logistics management, but are not aware of the fact that enhanced logistics operations can generate competitive advantage. As a result, they are reluctant to support and invest in new supply chain enhancement ideas.

Conclusion

This research has served as an initial attempt to explore logistics innovation in China. Drawing on case-study findings of 3PL firms in Taiwan, Hong Kong, and Mainland China, we systematically investigated the driving forces, barriers, and effects of logistics innovation. It is found that customer requirements, situational factors, efficiency and effectiveness enhancement, provision of wider service portfolios, and differentiation are key rationales for 3PL firms to innovate in China. Equally, increased geographical coverage and growth also play positive roles in driving innovation in 3PL firms.

In comparison, cost, time, and employee capability are key hindrances to innovation in 3PL firms in China. In addition, limited resources, unqualified suppliers, and ineffective internal communication are potential

constraints to logistics innovation. Logistics innovation can lead to positive supply chain effects for supply chain members. First, logistics innovation can result in positive operational performance by increasing efficiency, effectiveness, and service portfolio. Second, logistics innovation can enhance relationships with clients, grow sales, uplift reputations, and enhance financial performance.

Supply chain orientation, market orientation, and entrepreneurial orientation are positively related to logistics innovation. These orientations are all part of the business strategies with strong linkage to the future resource deployments in supply chains. Additionally, the existing literature rarely discusses the influence of market forces on logistics innovation. However, the empirical findings in this research indicate that market forces play a crucial role on the innovation of 3PL firms. Therefore, it is proposed that market forces are positively related to innovation. A theoretical conceptual model to link the drivers and supply chain effects to logistics innovation is developed in this study. A follow-on quantitative study to examine the validity and reliability of this conceptual model will contribute further to the theoretical foundation of logistics innovation.

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