THE ROLE OF CAPABILITIES IN LOGISTICS SERVICE BUSINESS

Sirpa Multaharju, Jukka Hallikas
Lappeenranta University of Technology, School of Business
P.O. Box 20, FI-53851 Lappeenranta, Finland
Tel. +358 50 368 3328, email: sirpa.multaharju@lut.fi

Introduction

The global competition of supply chains, market uncertainty and fluctuations in supply caused by tight economic condition and technological changes set continuously increasing requirements for logistics performance and logistics industry in general. The concept of logistics capability is broadly examined within logistics user companies, such as manufacturers and retailers. Nevertheless, there are no studies in earlier literature that would have considered the logistic service capability in itself (*i.e.,* excluding the other firm-specific capabilities) from the logistics service provider (LSP) viewpoint. Instead, their performance and competitiveness as a whole are widely examined. The topic of this paper is interesting and important because the significance of logistics is essential for competitiveness of user companies (*e.g.* Mentzer *et al*., 2004) which are outsourcing their logistics functions more and more to LSPs. Furthermore, total freight volume is expected to increase globally but simultaneously transport routes are shifting according to the changing centers of economic gravity. This will cause increased competition among LSPs on the traditional routes between USA, Europe, and China. In fact, material flows on these conventional routes are not expected to decrease but their relative importance is anticipated to decline. (Christopher, 2011; Jeschke, 2011)

Superior performance in logistics service sector is largely based on knowledge, transformation of knowledge, and development of competencies both internally in companies as well as in cooperation between the logistics service provider and the logistics service user. Furthermore, the competitive advantage of logistics service provider is formed and re-formed from strategic logistic resources such as physical, human, information, knowledge, and relational resources, which are bundled together by service providers in order to create inimitable and firm-specific capabilities (Wong and Karia, 2010; Halldorsson *et al*., 2007; Mentzer *et al*., 2004). Therefore, theoretically this study is founded on the resource-based view of a firm (RBV). Logistics is a source of competitive advantage for manufacturers, assemblers, technology companies, and retailers (*e.g.* Mentzer et al., 2004). Thus, tightened global competition in industries, uncertain business environment and technological developments have forced manufacturers and retailers searching for differentiation and competitive advantage from logistics function. This has set challenges for developing logistics capabilities of a firm and companies have begun to purchase logistics expertise by outsourcing logistics functions to LSPs. As benefits of logistics outsourcing have proved to be *e.g.* decreased logistics costs, decreased inventory levels, and improved customer satisfaction. However, sometimes the expected benefits, *e.g.* cost reductions, are not realized for some provider-based reasons, and thus, it is important to understand the operational logistics capabilities of service provider.

In the current study, we understand logistics more operational and tactical *action* than strategic supply chain *management* and we consider logistics as a part of a wider concept of supply chain. Respectively, Third Party Logistics (3PL) focus on the *logistics* activities that are needed for moving goods from A to B as well as to hold resources that are needed for these purposes. Fourth Party Logistics (4PL), in turn, act as logistics service integrator in *supply chain level* integrating, amongst others, the competencies of different 3PLs as a part of supply chain capability, creating value for customers. (Mentzer *et al*., 2004; Win, 2008)
In earlier literature, logistics capabilities are comprehensively examined as a part of capability portfolio of manufacturers and analyzed as competencies through which companies can achieve competitive edge (*e.g.* Mentzer et al., 2004; Zhao et al., 2001; Lynch et al., 2000 and; Morash et al., 1996.)
The role of logistics service provider is to create value for customers in the form of more competitive logistics and to provide profit for its shareholders. In literature, the competitiveness of LSP is examined as a whole. It is obvious that the firm-specific capabilities, such as organizational strategy, structure, and organizational culture are vital for LSP's competitiveness but in this study they are excluded. For LSPs, logistics capabilities are core competencies and thus they are analyzed from strategic perspective in literature, *e.g.* Liu Wei-hua et al. (2012); Liu Xiaohong et al. (2010); Wong and Karia (2010) and; Lai (2004). This paper concerns logistics service capabilities of logistics service provider from both customer perspective and as LSP's internal capability profile. The idea is to address the

differences between 3PL and 4PL performance in providing logistics service-related tasks as well as to identify those capabilities a 3PL should develop in order to become a 4PL provider.

Literature review

According to RBV, competitive advantage is achieved through firm-specific resources and capabilities. Resources are heterogeneously distributed among companies and are imperfectly mobile (Barney, 1991) as in logistics field, resources are distributed across logistics service providers, forwarders, freight and fleet operators, and logistics users. In logistics sector knowledge has been cumulated over time and turned to tacit knowledge, which is impossible to transfer from one LSP to another. Capabilities "are complex bundles of individual skills, assets and accumulated knowledge exercised through organizational processes that enables firm to coordinate activities and make use of their resources" (Olavarrieta and Ellinger, 1997, p. 563). Logistics capabilities can be *e.g.* abilities to manage supplier relationships, customer service and order fulfillment. Capabilities are maintained and improved by using them; the more capability is used the more it is refined. (Wong and Karia, 2010; Olavarrieta and Ellinger, 1997)

Logistics outsourcing, characteristics of 3PL and 4PL

Manufacturers began to outsource transportation and warehousing at the early 1980s forced by tightened competition. Selviaridis and Spring (2007) have analyzed the benefits of logistics outsourcing, such as improved customer satisfaction, increasing flexibility to market requirements and reduction of total logistics costs. As main risks they recognized, *e.g.* the loss of control over the logistics function and customer contacts, expected cost reductions that are not realized due to LSP's reason and inadequate provider expertise.

The characteristics and differences between 3PL and 4PL are presented in Table 1. Differences, according to Win (2008) are Asset basis, Accountability, Role in supply chain, Business impact, and Performance measurement. As 3PL deals with logistics activities, its function is operational and tactical whereas 4PL's function is more strategic. Geographic coverage of 3PL is regional or national (Carbone and Stone, 2005) and 4PL function as one face to customer and it manages supply chain globally.

Characteristic	3PL	4PL
Function	Operational, tactical	Strategic
Main assets	Transportation fleet, warehouses, logistics IT-systems	Sophisticated IT-systems, knowledge, networks
Role and task	Transportation, warehousing, freight forwarding	Logistics-, supply- and demand chain integration: Identifies, integrates, controls and manages
Geographic coverage	Regional, national	Global
Capability	Operational logistics capability	Strategic supply chain capability
Accountability	Partial: internal resources and/or 3PL as subcontractor	Total singular accountability
Business impact	Influences time and place utilities	Controls time and place utilities
Measurement	Costs	Value creation within customer organization

Table 10: Characteristics and differences between 3PL and 4PL. Adapted from Win (2008).

Logistics capability

Logistics capabilities have mainly been explored as in-house logistics functions of manufacturer companies and retailers (i.e. logistics users) and reported as one source of competitive advantage. In earlier literature logistics capabilities have been classified *e.g.* as follows: Demand-oriented capabilities, Supply-oriented capabilities, Process capabilities, Information capabilities and Coordination capabilities (*E.g.* Mentzer *et al.*, 2004; Zhao *et al.*, 2001; Lynch *et al.*, 2000 and; Fawcett *et al.*, 1997; Morash *et al.*, 1996). Afterwards, when logistics service users started to outsource their logistics functions to service providers over 30 years ago, success factors of logistics service providers have been of interest of both logistics researchers and managers (*e.g.* Liu Wei-hua *et al.*, 2012; Liu Xiaohong *et al.*, 2010; and Wong and Karia, 2010). However, researches have focused mainly on

LSPs' competitiveness and capability to success on the market as a whole rather than on LSPs' logistics service capability in itself.

For our empirical study we reviewed some other relating literature. Accoring to Dyllick and Hockerts (2002, p. 131), corporate sustainability is defined as "meeting the needs of a firm's direct and indirect stakeholders' without compromising its ability to meet the needs of future stakeholders as well". They state that in order to achieve long-term sustainable competitiveness, a firm needs to satisfy all the three dimensions of sustainability called triple bottom line, namely economic, social, and environmental dimension. Because our study is about logistics, the perspective of this paper is in environmental sustainability. Environmental sustainability can be affected by logistics choices, especially by transportation through reducing the carbon footprint. Evangelista *et al.* (2013) highlight the role of logistics buyers in promoting greener logistics. According to Dey *et al*. (2011), logistics companies can differentiate themselves from competitors by sustainability initiatives. However, the investigation of van Hoek and Johnson (2009) revealed that due to changing price of energy and fuel, decision-making still remains economic performance-driven rather than environmental or social performance-driven.

Another issue from literature that has impact on logistics process is the knowledge of local market and conditions in specific context. This comes out for example in cross-border settings between two countries, especially if they differ from each other economically, socially, politically, legally, or business culturally. The lack of knowledge of local market and formalities is one factor causing significant time and cost inefficiencies as well as delays in border crossing points. (Carbone and Stone, 2005). As material flows and risks are worldwide, LSP companies can benefit from horizontal cooperation *e.g.* through accessing into local market knowledge (Verstrepen *et al*., 2009).

In our empirical study we form a logistics capability profile of LSP company adopting approaches of Mentzer *et al*. (2004); Zhao *et al*. (2001); Lynch *et al*. (2000); Fawcett *et al*. (1997) and Morash *et al*. (1996) as described above in this section. Moreover, we utilize and combine to the framework earlier researches on LSP companies as well as other related literature.

Empirical case study

AHP application

We have applied Analytical Hierarchy Process (AHP) for studying the logistics capabilities in a case environment. AHP is an expert method that allows structuring and decomposing a decision problem into a hierarchy of parts. According to Saaty (1999), it is possible to form a complete picture of the whole system through structuring a system into clusters and subdividing clusters into smaller pieces. In AHP, the criteria at each level of hierarchy are then weighted against other criteria that give the relative global (G) and local (L) weights to the criteria attributes. The mathematical foundations of AHP applications are presented, for example, in Saaty (1999). In this study, the AHP is used in the first stage of the empirical part for structuring the logistics service capabilities into hierarchy. In the second stage, we assign weights for the criteria (service capabilities) by using the expert input. A pair-wise comparison weighting method is used which implies that the relative importance of each capability is assessed against other capabilities inside each capability category by using a scale of 1 to 9. This gives the capability priority weight in a local (item) level of the model. In the final stage, we then compare the performance of two alternative business models against capabilities. AHP has been used in the recent logistics literature, for example in the assessing an organization's logistics strategy (Meadea and Sarkis, 1998), the benchmarking of the logistics performance (Chan et al., 2006), and the evaluation of logistics providers (Perçin, 2009). Thus, an AHP method seems to provide a useful tool for evaluating logistics capabilities and performance.

The case company

The case company is a medium size leader logistics service provider, which has operated in international logistics business for decades. The company owns warehouses, transportation fleets, and facilities not only in Finland but also in its strategic locations in some other countries. In addition, it cooperates with several companies horizontally and has a few partners through which it has access to extra capacity in its strategically important countries. As informants in expert evaluation and comparison process of this empiric study were the experienced director of this leader logistics company and an expert who has a long operative managerial experience from both the leader logistics company and a governmental logistics organization.

The framework

In this framework the components of logistics service capability are grouped to Demand-Oriented Logistics Capabilities, Supply-Oriented Logistics Capabilities, Process Capabilities, Information Management Capabilities and Coordination Capabilities. The capabilities and components are described next below.

1. Demand-Oriented Service Capabilities consists of *Delivery reliability* and *Delivery speed* (*e.g.* Morash *et. al*., 1996); *Logistics quality*, (*e.g.* Mentzer *et al*., 2004); *Customer Service* and *Responsiveness to target market* (*e.g*. Morash *et al*., 1996); *Ability to introduce new services* and *Ability to provide solutions to customer-specific needs* (*e.g.* Lynch *et al*., 2000).
2. Supply-Oriented Service Capabilities includes *Widespread distribution coverage; Selective distribution coverage* and *Low total cost distribution* (*e.g*. Mentzer *et al*., 2004)*; Environmental* sustainability (*e.g*. Evangelista *et al*., 2013)*; Local market knowledge* (*e.g*. Carbone and Stone, 2005).
3. Process Capabilities involve *Ability to attain the lowest total cost logistics; Ability to seek solutions to logistics problems before they occur; Ability to differentiate logistics service offering; Ability to simplify the overall logistics process; Ability to provide uniform quality; Ability to innovate* (*e.g*. Lynch *et al*., 2000); *Ability to assess overall logistics performance* (*e.g*. Fawcett *et al*. 1997).
4. Information-management capabilities are formed of *IT-technology; Information sharing; Connectivity* (*e.g*. Zhao *et al*., 2001) and*; Ability to acquire, analyze, store and utilize relevant information* (*e.g*. Mentzer *et al*., 2004).
5. Coordination capabilities consist of *Ability to integrate / cooperate with external partners;* Verstrepen *et al*., 2009); *Ability to cooperate with external stakeholders; Ability to coordinate internal functions; Ability to monitor internal and external functions* (*e.g*. Mentzer *et al*., 2004).

This framework, formed on logistics service related to factors from literature, is next approved in expert evaluation through AHP model.

AHP hierarchy for Logistics service capability

Table 2 illustrates the AHP comparison and results based on the expert evaluation. Both local and global values are presented in the Table 2. Local value means the relative importance of the alternatives on the same hierarchical level under one category. Global value means the relative importance of the factor in terms of the primary goal, which is to evaluate the capabilities of logistics service provider. In the AHP, the sum weights of attributes in the same hierarchy level equals to 1. The higher the relative weight of the attribute in the model, the more important is its role in the model. The first level capability categories (Demand, Supply, Process, Logistics information management, and Coordination) are set equal (0.2) in the model.

The following individual capabilities (components) are seen as the most important in the overall assessment: Ability to provide solutions to customer-specific needs, Responsiveness to target market, Low total cost distribution, Local market knowledge, Ability to asses / evaluate overall logistics performance, Ability to acquire, analyze, store and utilize relevant information, and Ability to integrate / cooperate with external partners.

1.. Demand-oriented capabilities (L: ,200 G: ,200)
1.7. Delivery reliability (L: ,106 G: ,021)
1.2. Delivery speed (L: ,021 G: ,004)
1.3. Logistics quality (L: ,021 G: ,004)
1.4. Customer service (L: ,106 G: ,021)
1.5. Responsiveness to target market (L: ,319 G: ,064)
1.6. Ability to introduce new services (L: ,106 G: ,021)
1.7. Ability to provide solutions to customer-specific needs (L: ,319 G: ,064)

3. Process Capabilities (L: ,200 G: ,200)
3.1. Ability to attain the lowest total cost logistics (L: ,024 G: ,005)
3.2. Ability to seek solutions to logistics problems before they occur (L: ,122 G: ,024)
3.3. Ability to differentiate logistics service offering (L: ,122 G: ,024)
3.4. Ability to simplify the overall logistics process (standardize) (L: ,122 G: ,024)
3.5. Ability to provide uniform quality (a consistent approach…) (L: ,122 G: ,024)
3.6. Ability to asses / evaluate overall logistics performance (L: ,366 G: ,073)
3.7. Ability to innovate (L: ,122 G: ,024)

2. Supply-oriented capabilities (L: ,200 G: ,200)

2.1. Widespread distribution coverage (availability) (L: ,030 G: ,006)

2.2. Selective distribution coverage (L: ,148 G: ,030)

2.3. Low total cost distribution (L: ,443 G: ,089)

2.4. Sustainability (L: ,063 G: ,013)

2.5. Local market knowledge (L: ,316 G: ,063)

4. Logistics information-management Capabilities (L: ,200 G: ,200)

4.1. IT-technology (hard- and software, network) (L: ,045 G: ,009)

4.2. Willigness to share information (L: ,136 G: ,027)

4.3. Connectivity (L: ,136 G: ,027)

4.4. Ability to acquire, analyze, store and utilize relevant information (L: ,682 G: ,136)

5. Coordination capability (L: ,200 G: ,200)

5.1. Ability to integrate / cooperate with external partners (L: ,682 G: ,136)

5.2. Ability to integrate / cooperate with external stakeholders (L: ,136 G: ,027)

5.3. Ability to coordinate internal functions (L: ,136 G: ,027)

5.4. Ability to monitor internal and external functions (L: ,045 G: ,009)

Table 11: AHP hierarchy and relative weights for logistics service capabilities

In the second stage of the AHP assessment, two alternative logistics service models (3PL and 4 PL) are compared in terms of capability fit. In other words, we pairwise compare how well each business model capability performs against alternative concepts. Figure 1 shows the performance sensitivity of alternative business models when capabilities are evaluated against alternative business models. It illustrates that 3PL performs better in Demand and Process capability groups. On the other hand, 4PL performs better in Information and Coordination capability groups. Overall evaluation shows that both models perform rather equally, which implies that both models can provide advantages for customers.

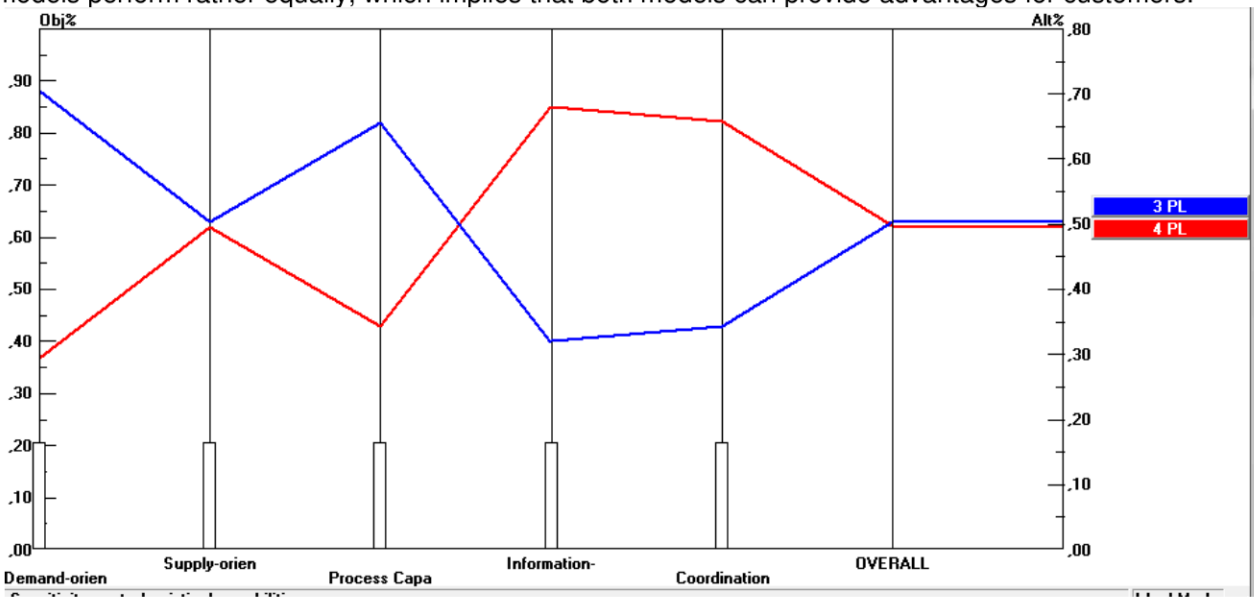

Figure 6: Performance sensitivity of alternative business models

This preliminary test of the AHP logistics capability framework provides interesting opportunities for both service providers and service customers. Service provider is able to develop its logistics service offer based on the identified capability gaps. Service provider is able to create a capability profile, which assures the competitive position in the markets. The customer sets priorities on the capabilities and selects a provider which capability profile fits for the customer preferences. Thus, the customer is able to evaluate alternative service providers based on their capability profile. From managerial perspective, the results indicate that 3PL should develop its information management capabilities as well as the capabilities to coordinate partners, stakeholders and internal functions in order to grow into a 4PL provider. In addition, one more capability that is worth to maintain and develop is the Knowledge of local market and conditions which has an important role and impact on global supply chain context that often covers several border crossings from a supplier of raw material to the end user.

Conclusions

In this study we have discussed logistics service capabilities that contribute directly for LSP's performance, *i.e.* its ability to provide logistics services and solutions, such as storing and moving goods, value-added services as well as related information flows. We developed a framework for logistics service capability of logistics service provider, structured a model on AHP method, and applied the model in the contexts of 3PL and 4PL providers. In this study we categorized logistics service capabilities to five different groups, which are Demand-Oriented Service Capabilities, Supply-Oriented Service Capabilities, Process Capabilities, Information-Management Capabilities and Coordination Capabilities. When the applicability of the individual service capabilities (components) were evaluated and compared between 3PL and 4PL service providers' business models, the results showed that the overall performance is somewhat equal. However, 3PL seems to perform better in Demand and Process capability groups, whereas 4PL performs better in Information and Coordination capability groups. In Supply capability group, 3PL proved to be only slightly better than 4PL. Consequently, in order to become 4PL provider, 3PL should develop its Information management capabilities and Coordination capabilities. In this study, the other firm-specific capabilities affecting on a firm's performance were excluded. Also, reverse logistics capability was excluded as this study concerned only forward logistics and supply chain issues. In future, this topic can be examined more detailed *e.g.* with multiple case studies involving some logistics users and some LSP companies also from other European countries for getting wider overview of logistics service capability of LSP company.

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