



Rationale for utilizing 3PL in supply chain management: A shippers' economic perspective

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ABSTRACT

In this paper we first propose a conceptual framework for evaluating 3PL (third-party logistics) utilization in SCM (supply chain management), in which it is assumed that shippers may enjoy advantages derived from four contributory sources of 3PL specialization: scale, know-how, searching ability, and IT skills. It is also supposed that shippers may particularly benefit from 3PL when facing uncertain business environments. We also apply principal–agent relationships to shippers and 3PL providers. Further, we see enhancing “agency efficiency” as important to obtaining the benefits of 3PL utilization. We also look at the role of 3PL provider selection, the “hold-up” problem under incomplete contracts, and asset ownership. After that we briefly discuss the utilization of 3PL and environmental concerns. These are the main points that we consider related to 3PL utilization. The main contribution of this study is to identify discussion points from models and theories, such as contract theory, that relate to the utilization of 3PL in SCM.

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1. Introduction

Recently the number of 3PL (third-party logistics) providers has increased rapidly in Japan as well as in other countries. 3PL providers are contracted to supply integrated logistics services and are closely related to SCM (supply chain management). In this paper we consider the rationale for utilizing 3PL in the supply chain. Efficient utilization of 3PL is expected to bring benefits such as reducing total costs. However, there seem to be certain conditions for utilizing 3PL efficiently. If so, what points should be considered? What are the necessary conditions for making efficient use of 3PL? It would be difficult in this paper to cover all of the various market and business forms of 3PL. Our purpose, therefore, is to identify discussion points related to the utilization of 3PL. We look, in particular, at features of 3PL utilization from an economic perspective, focusing on economic aspects of 3PL, the selection of 3PL providers, the problem of incomplete contracts, and asset ownership from the shipper's perspective. These points stem from arguments made in recent economic theories. The main contribution of this study is to identify discussion points where recent economic theories can be applied to the utilization of 3PL in SCM. Although we find many papers concerning 3PL and SCM, few seem to address such issues.

The paper is organized as follows. We provide an overview of 3PL in Section 2, then confirm the function of 3PL within supply chain management in Section 3. In Section 4, we focus on principal–agent

relationships, then point out the role of 3PL provider selection in Section 5. In addition, we look at recent arguments concerning contract theory before trying to relate this theory to 3PL utilization in Sections 6 and 7. After that, we examine environmental concerns related to utilization of 3PL in Section 8. Finally, we conclude in Section 9.

2. Overview of 3PL

To confirm the concepts of SCM and 3PL, we first explain them by drawing on papers by Nemoto and Tezuka [1] and Nemoto, Tezuka and Futamura [2]. The supply chain consists of a set of processes associated with the flow of goods, information, and money among firms, from the raw materials supply stage through the production and consumption stage and finally to the recycling stage. SCM is a tool for optimizing the supply chain through integrated management. Since SCM involves inter-firm activities, it encompasses functions such as raw materials supply, production management, transportation, inventory management, information system management, order processing, material handling, and customer management.

Furthermore, international SCM also includes procedures related to customs clearance. One of the main features of SCM is that vertical process integration from suppliers through customers can be performed through strategic inter-firm alliances. A well-designed SCM yields positive net value by creating benefits, reducing costs, and improving financial viability (such as profitability.) That such outcomes can be obtained without mergers (integrating all processes within one firm) may reduce the transaction cost of integration.

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The general idea of logistics is to strategically manage the total flow of goods. Logistics optimization, therefore, cannot be achieved only from the viewpoint of one firm; it requires total optimization of the flow of goods across all firms in the supply chain.

Firms that possess logistics know-how in coordinating economic resources may have opportunities to provide advice. Such logistics coordinators, also called third-party logistics (3PL) providers, have been gaining attention. 3PL is a type of industry in which the shipper's logistics activities can be outsourced. It is common 3PL practice not to outsource discrete logistics activities individually but rather to outsource multiple activities from the firm's strategic point of view. 3PL providers today have the following characteristics:

1. Integrated (or multi-modal) logistics service providers
2. Contract-based service providers
3. Consulting service providers

The advantages of using 3PL result from economies of scale (merits from large truck fleets, warehouses, etc.) and economies of scope that encourage firms to increase net value by reducing costs. The effects of these economies vary depending on whether the 3PL provider is an "asset-type" or "non-asset type" provider. The former owns logistics-related assets such as truck fleets or warehouses while the latter does not. In the Japanese context, therefore, non-asset type 3PL providers correspond to forwarders, generalized trading firms, or consultant firms.

Competent 3PL providers are skilled at coordination, enabling them to search out reliable partners or sub-contractors and efficiently manage the inter-firm flow of goods. Such abilities can be developed through experience as a 3PL. Later we will consider the sources of such experience and specialization.

At the same time, by outsourcing logistics activities firms are able to save on capital investment and reduce financial risk. Investment in logistics assets such as physical distribution centers or information networks usually requires large lump sum costs that involve financial risk. 3PL providers can spread their risk by outsourcing to sub-contractors.

Regarding the role of supply chain coordinators, the concepts of 4PL (fourth-party logistics) and LLP (lean logistics provider) have also recently been introduced. According to Vitasek [3], they differ from 3PL as follows:

1. A 4PL organization is often a separate entity established as a joint venture or long-term contract between a primary client and one or more partners.
2. A 4PL organization acts as a single interface between the client and multiple logistics service providers.
3. All aspects, ideally, of the client's supply chain are managed by the 4PL organization.
4. It is possible for a major 3PL logistics provider to form a 4PL organization within its existing structure.

In other examples, Craig [4] defines 4PL as a business process outsourcing provider while Mukhopadhyay and Setaptra [5] regard 4PL as a supply chain integrator. It is, however, sometimes difficult to differentiate between 3PL and 4PL as their definitions sometimes overlap in terms of their functions. Further, in the Japanese context, the concept of 4PL seems to be regarded as a kind of non-asset type 3PL provider.¹ In the following, therefore, we utilize the term 3PL/4PL where it seems necessary.

3. The functions of 3PL in supply chains

3PL has attracted considerable research attention. Marasco [7] conducted a comprehensive review of 3PL using a content analysis

framework (Fig. 1). Among the many issues about 3PL raised in Fig. 1,² we focus on the following³: constructing SCM and the conditions under which 3PL providers are well-utilized by shippers. To examine this problem, for the present, we make two assumptions. First, a shipper constructs a supply chain. Second, the shipper outsources integrated logistics activities in their supply chains to 3PL providers.

Under these circumstances, we focus on 3PL provider specialization. 3PL providers provide shippers with specific logistics activities in an integrated chain. Such effects of specialization might have a number of sources.

First, specialized 3PL providers have the advantage of their own experience. (The accumulation of experience can be described as the accumulation of know-how.) Experienced 3PL providers engage in logistics activities more cost-efficiently.⁴

A representative example of know-how is IT-related activity. IT-related activities such as database management or data processing in inventory or warehousing play a major role in the provision of logistics services. IT-related activity requires specialized skills and offers easy differentiation from other providers.

Another example is the recent utilization by many Japanese firms of 3PL providers when entering new foreign markets such as ASEAN. Many Japanese firms require logistics management experience in these markets because they lack know-how; 3PL providers are frequently utilized in such international contexts.

The know-how of experienced 3PL providers might make for more efficient logistics activity that enhances supply chain performance. Logistics performance may influence overall supply chain performance. Therefore, shippers may outsource logistics activity to 3PL providers when entering foreign market and making supply chains.

These advantages of experienced 3PL providers come from a learning effect: the more services they provide, the less they cost. Shippers that utilize 3PL providers enjoy such effects. If the experience of 3PL providers can be imitated by others, however, shippers will see little effect over the long run from utilizing 3PL providers. When constructing international supply chains, however, such imitation seems to pose many difficulties.

A second effect of specialization is related not to producing activities but to searching and information advantages.⁵ We next focus on 3PL searching ability. 3PL providers may not provide all logistics services by themselves but rather outsource to subcontractors. That is, competent 3PL providers are highly skilled at coordination, enabling them to search out reliable partners and subcontractors to efficiently manage the inter-firm flow of goods.

With regard to informational advantages, 3PL providers must not only search out sub-contractors but sometimes also partners and customers. For example, as Nemoto, Tezuka and Futamura [2] have observed, Japanese generalized trade firms or forwarders acting as non-asset type 3PL providers have constructed efficient supply chain logistics schemes when entering the Chinese logistics market. They did so by selecting better Chinese domestic carriers. In this case, the high searching ability of 3PL providers enabled better selection of China domestic providers to achieve a more profitable (more cost efficient) outcome. Such profits could be shared so shippers also gained. High searching ability depends on 3PL provider information advantages. In undertaking such activity, 3PL providers can be seen as intermediaries between shippers and individual subcontractors.

We assumed that shippers would construct supply chains so we could evaluate 3PL providers by their searching (or intermediaries) and abilities. If shippers can select an appropriate 3PL provider, they

² Marasco [7] used a framework to clarify much of the literature related to 3PL. Such literature is easily accessible.

³ Nemoto and Tezuka [1] consider the relationship between SCM and 3PL in detail.

⁴ Domberger [8] comments on the relationship between outsourcing and specialization.

⁵ The relationship between experience and searching ability might not be independent.

¹ Lie [6] pointed out that Toyota Motors integrated its 3PL providers and established a new company as a 4PL provider in 2007.

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