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Interrelationships of risks faced by third party logistics service providers: A DEMATEL based approach

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ABSTRACT

This paper analyses the interrelationships between risks faced by third party logistics service providers (3PLs) in relation to one of its customers using DEMATEL. Novel analysis of both within and between risk categories and generation of threshold value to prioritize risks generate useful insights. Results show that arms-length relationship between the customer and the 3PLs has strong influence on other risks and there is a need for collaborative relationships between 3PLs and its customers. Moreover, analysis indicates that the 3PLs need to improve internal processes related to quality management, flexibility of its operations and also geographical coverage of their services.

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1. Introduction

Risk management is “the identification, analysis and control of those risks which can threaten the assets or earning capacity of an enterprise (Dickson, 1989). Risk management can be considered as an integral part of supply chain design (Christopher and Lee, 2004) to avoid negative impact of risks on supply chain performance.

Logistics risk management is part of supply chain risk management which also includes sourcing risk management, risk management in production operations apart from logistics risk management. Supply chain risk management is in turn part of the overall discipline of risk management. The position of logistics risk management with respect to supply chain risk management and risk management is shown in Fig. 1.

Logistical risks have been considered as an important category of risks faced by firms. Such risks can be related to transportation, storage and inventory (Cavinato, 2004). Many organizations outsource entire or some parts of the logistics activities leading to the emergence of third party logistics service providers (3PLs) (Langley et al., 2003; Hong et al., 2004). Outsourcing logistics services to 3PLs can improve the performance of the customer organizations (Handfield and Nichols, 1999; Leuschner et al., 2014) and the portfolio of services provided by 3PLs has an impact on the performance of the clients using the 3PL services (Rajesh et al., 2011). But, there has been reports of less than successful partnerships with 3PLs due to expectation mismatch, poor contracting, etc. (Ackerman, 1996; Greco, 1997). Power et al. (2007) report that 3PLs provide opportunities for customers to improve multiple performance elements simultaneously such as cost and flexibility and thus help to overcome trade-offs between those measures. But, outsourcing of logistics activities also has its own challenges. Lack

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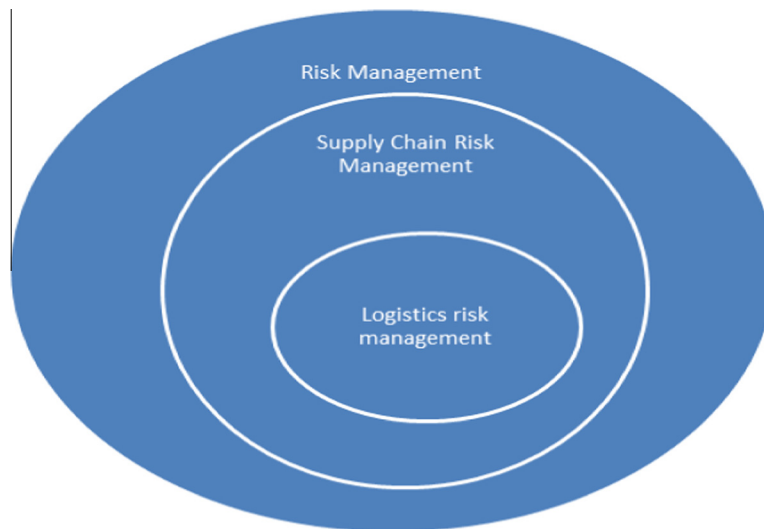


Fig. 1. Position of logistics risk management with respect to supply chain risk management and risk management.

of responsiveness to customer needs is cited as a problem of outsourcing of logistics functions (van Damme and Amstel, 1996). Disruption to inbound flows, inadequate provider expertise, inadequate employee quality, and inability of 3PL providers to deal with special product needs and emergency circumstances, incompatibility of information systems between shipper and 3PL, the failure of 3PL to meet a shipper's future growth needs, and lack of security are some risks associated with using services provided by 3PL (Ellram and Cooper, 1990; van Laarhoven et al., 2000; Svensson, 2001; Selviaridis and Spring, 2007; Ansari and Modarress, 2010; Tsai et al., 2012). At the same time 3PLs themselves face risks from their own operations, due to financial constraints as well as from shippers who transfer those risks to 3PLs (Vitasek et al., 2015).

Supply chain risk management literature has primarily focussed on management of risks from the point of view of the focal firm or considering its immediate component suppliers. Supply chains are increasingly being subjected to catastrophic events such as the 2011 Tōhoku earthquake and tsunami or common events such as inability of logistics service providers to cater to the spike in demand during holiday seasons. But, in research on the logistics triad involving the supplier, customer and the logistics service provider, the role of the carrier is often considered to be passive or marginal (Mason and Lalwani, 2004) and there is limited research on analysis of risks faced by logistics service providers. Moreover, relationships between such risks faced by logistics service providers are not known. The 2015 third party logistics study mentions that "it would be useful to better understand the roles that 3PLs may play in partnership with their customers to identify and then mitigate, eliminate or deal with the types of risks that may affect the overall supply chain process" (Langley et al., 2015). But, we are unaware of any academic research in which a collaborative approach has been followed by a 3PL and its customers to better understand the logistics risks.

In this research, we address the above gaps in the literature by identifying risks faced by a third party logistics service provider (3PL) and by analysing the interrelationships between those risks by collaboration between 3PLs and one of its customers using a multi-criteria decision making approach called Decision Making Trial and Evaluation Laboratory (DEMATEL). The key research question addressed in this study is how are the different risks faced by a 3PL related to each other. The specific objectives are to identify the cause and effect groups within the broad categories of risks as well as within and between each category. Such an understanding of the relationship between various risks is necessary to prioritize the risks and take necessary corrective action. Our novel analysis based on DEMATEL using threshold value to prioritize risks and analysing influence of risks between categories generated useful insights and actionable points for the participating organizations. The results showed the debilitating effect of lack of trust and arms length relationship and pointed for coordination and collaboration of efforts of the customer and its logistics service providers. The research also pointed out that the 3PLs also need to develop processes for managing quality, improve flexibility of their operations and extend the geographical coverage of their services.

The paper is organized as follows: Section 2 will introduce a literature review on supply chain risks and risks faced by logistics service providers. The methodology is discussed in Section 3 followed by analysing the interrelationships between risks faced by a 3PL in Section 4. The results are discussed in Section 5. The managerial implications are discussed in Section 6 followed by conclusion in Section 7.

2. Literature review

In this section, we provide a brief overview of supply chain risk management followed by classification and sub-categorization of risks faced by 3PLs and application of multi-criteria decision techniques in supply chain risk management. Our review results in a comprehensive classification of risks affecting logistics service providers.

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