

Chapter 13

Selection of the 3rd / 4th Party Logistics Provider: A Multi-Criteria Approach

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ABSTRACT

Logistics' role in today's global and competitive markets is critical for enterprises' viability, since it can provide the grounds for firms to become leaders of the markets by simultaneously achieving performance maximization and cost minimization. Towards improving competitiveness and achieving their targets enterprises mostly paid attention to production and generally developing their core business. In a way to also achieve high performances in their logistics workload, enterprises often outsource non-core business, such as transportation, warehousing, et cetera. In this light, outsourcing has become lately a very common practice. However, nowadays there are numerous competitive firms that offer such services and decision-making towards selection of the most effective one is usually challenging. Towards this direction, a multi-criteria analysis approach has been developed for the selection of the optimal outsourcing strategy involving a number of service logistics providers. The approach follows the path of an outranking multi-criteria method, namely ELECTRE III. The approach is illustrated through two case studies.

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1. INTRODUCTION

Logistics services are changing internationally. The late economic crisis has led enterprises around the globe to reinvent their internal processes and create new improved ones. Logistics services include the design, implementation and control of the production, storage and distribution processes of materials. Thus, logistics present a holistic approach of efficiently managing material flows during the whole products' or services' life cycle, from raw materials until those reach customers. In particular, logistics services' role is focused on meeting materials', components' and products' demands in terms of quantity, quality, time and place and at the lowest possible cost, using all available resources. In modern most competitive market environments, logistics can constitute the vehicle for pioneering enterprises to become leaders in the markets they are activated by achieving the twin peaks of excellence; cost and service leadership (Khan and Burnes, 2007; Christopher, 2005). Nowadays, the proper management of logistics services has become a critical factor for success due to the continuous growth of global markets. Towards improving competitiveness and achieving their targets, enterprises until recently mostly paid attention to production and generally developing their core business. On the other hand, outsourcing of non-core businesses has become lately a very common practice. In a way to also achieve high performances in their logistics workload, enterprises often subcontract non-core business, such as transportation, warehousing, etc.

In this light, this chapter aims to present a multi-criteria analysis approach for the selection of the optimal outsourcing strategy involving a number of service logistics providers. In practice, there are numerous competitive firms that offer logistics services and decision-making towards selection of the most effective one is usually challenging. Towards this direction, a multi-criteria analysis approach has been developed for the selection of the optimal outsourcing strategy involving a number of

service logistics providers. The approach follows the path of an outranking multi-criteria method, namely ELECTRE III. The rest of the chapter is organized as follows. Section 2 accommodates a brief analysis of logistics outsourcing functions and the main advantages of this policy, while in Section 3 the development of the proposed decision-support optimization methodology is presented. Moreover, in Section 3, we illustrate the methodology's applicability on two specific case studies. Finally, we conclude this work and provide useful directions for future research.

2. LOGISTICS OUTSOURCING SERVICES

Logistics outsourcing functions to third-party logistics (3PL) providers, involves the use of external companies to perform some or all of the firm's logistics activities (Chen, Goan and Huang, 2011; Hertz and Alfredsson 2003, Li et al. 2011; Jayaram and Tan, 2010; Boyson et al., 1999). The use of 3PL providers has been a source of competitive advantage for most companies (Gol and Catay, 2007; McDuffie et al., 2001).

Specifically, for the case of manufacturers dealing with hazardous materials, the strategic cooperation with qualified 3PL providers is an important issue. It is widely known, that the procedures of proper handling and safety transportation of hazardous materials pose a unique array of challenges due to high level of societal and environmental risks. Historical evidence has shown that accidents due to hazardous material releases during transportation can lead to consequences as heavy as those created by releases occurring at fixed plants (Leonelli, Bonvicini and Spadoni, 1999; Vélchez, Sevilla and Montiel, 1995).

The use of qualified 3PL providers generates a large number of advantages for manufactures dealing with hazardous materials. Bardi and Tracey (1991) and Lieb and Randall (1996), have conducted surveys in order to determine the extent

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