

Chapter 1

Global Sustainable Supplier Selection: A Literature Review

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ABSTRACT

Supplier selection is critical for sustainability management in global supply chains. In this chapter, the authors present a content analysis based literature review for global sustainable supplier selection. The supplier selection is investigated along four dimensions, namely economic, environmental, social, and global. The results of the study yield that environmental and social criteria are often used together for supplier selection whereas global risk criteria are rarely used, even less as we move along multiple tiers of the supply chain. From the review, the authors also identified the top criteria along these four dimensions for global sustainable supplier selection. Along the economic dimension, the top three criteria are quality, cost, and general supplier characteristics. The social dimension has employees, transparency and engagement, and local communities' influence as the top criteria. Along the environmental dimension, the top criteria are pollution and hazardous emissions, standards and management systems, green product and design, and green competencies and processes. The top criteria along the global dimension are distance, other risks, and politics and economy.

INTRODUCTION

Supplier selection is an established field in operations research. De Boer et al. (2001) define problem definition, criteria selection, pre-selection of candidates, and final decision as the four phases of the supplier selection process. Problem definition and category and criteria selection can be addressed by qualitative and quantitative methods. Example of qualitative method are brainstorming or visual analysis

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that can be applied in pre-selection; in contrast, quantitative methods are used for more fine-grained category selection and making final decision. Examples of quantitative methods are various kinds of mathematical programming models such as Linear, goal, and multi-objective programming, analytical hierarchy and network process (AHP/ANP), data envelopment analysis (DEA), simple multi-attribute rating technique (SMART), artificial neural networks, and various integrated solutions combining those approaches (De Boer et al., 2001; Ho et al., 2010; Agarwal et al., 2011).

The models proposed for solving the supplier selection problem so far are largely limited to the simple case of domestic sourcing and hence often neglect the specific risks of global sourcing (Chan and Kumar, 2007). With the concept of sustainable development entering into the political and business arena since the late 1980s (WCED, 1987), sustainability-related information has been successively included into the supplier selection process (e.g., Handfield et al., 2002; Bai and Sarkis, 2010; Shaw et al., 2013). During the last decade, a corpus of papers which incorporate global risks and sustainability issues into supplier selection models has emerged in operations research literature (Zimmer et al., 2017, Vahidi et al., 2018, Alikhani et al., 2019). However, there are currently very few studies that address this critical problem of beyond first tier suppliers at all and even less that suggest a systematic methodological procedure for supplier selection considering various sub-supplier levels (Gold and Awasthi, 2015).

In this paper, we address the theme of global sustainable supplier selection. For the purpose of this study, we define supplier selection models as one that integrate specific risks from global sourcing with sustainability performance criteria operationalized as triple bottom line (economic, environmental, social) (Dyllick and Hockerts 2002). Further, we investigate how far supplier selection models incorporate risks from beyond first tier suppliers (i.e. from second tier suppliers and suppliers further up the chain). Recent research has shown that it is not enough for focal companies to manage their direct suppliers since major sustainability problems are often linked to their supply chain further upstream (Grimm et al., 2014). Focal companies are held responsible for the misconducts of these beyond first tier suppliers, potentially leading to consumer anger and boycotts (Hartmann and Moeller, 2014). Despite these substantial risks involved, multi-tier supply chains have been barely considered in SCM research (Tachizawa and Wong, 2014) and even less in supplier selection models in operations research (Awasthi et al., 2018).

The remainder of the paper is structured as follows. Section 2 presents the methodology of the literature review. We then provide a descriptive analysis of main features of the paper sample, followed by a systematic review of supplier selection techniques, supplier selection criteria and industrial focus of the papers in section 3. The condensed findings of this analysis are presented qualitatively along with frequency and contingency analysis in section 4. Finally, we conclude our paper with promising avenues for future research in section 5.

RESEARCH METHODOLOGY

The procedure of doing a literature review as content analysis has previously been adopted in the fields of operations research (Brandenburg, 2014); its application in the field of supply chain management has been discussed in-depth by Seuring and Gold (2012). According to Fink (2005), a research literature review represents a rule-governed and traceable design for identifying and assessing a corpus of scholarly works in a certain field (Fink, 2005). A literature review hence evaluates research that has originated around a specific topic; in this way, it sheds light on the state-of-the-art of academic knowledge and may be considered an indispensable component – and is often regarded the initial step – in the theory

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