



What is required for greener supplier selection? A literature review and conceptual model development



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ABSTRACT

This paper examines the existing literature on green supplier selection. In total, 60 articles are reviewed, all published in peer-reviewed journals between 1991 and 2011. The articles are analyzed in terms of several general variables such as type of research and theoretical viewpoint, as well as more specific variables such as the supply chain position considered, stages of the supplier selection process studied, and the perspective taken on environmental criteria. The main findings are threefold. First, analytical research, focusing on developing normative decision models for the final stage in green supplier selection is clearly most dominant, employing a wide range of techniques. Second, empirical research is less prominent and generally lacks a clear theoretical background. Third, very little conceptual research has been done linking green supplier selection to an organization's strategy. Research on green supplier selection is highly fragmented and in danger of overemphasizing the technical aspects of supplier selection. Based on this review of the articles, a conceptual model of green supplier selection is presented, aimed at integrating the different dimensions of green supplier selection and identifying directions for future research.

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1. Introduction

Over the last two decades, environmental considerations have become a significant issue in purchasing (Deans, 1999; Min and Galle, 1997; Preuss, 2005). Today, both the public and private sector face increasing pressure to consider the environmental aspects in their purchasing policies from a growing number of government regulations, stakeholders and NGOs. This consideration of the environmental aspects is recognized as green purchasing or green procurement. As a result of green purchasing, companies and industries, which provide environmentally friendly products and services, can receive more recognition for their efforts. More firms are then likely to be motivated to design, produce and provide environmentally friendly products and services. Thus, the green market expands, and green purchasing is regarded as a contribution to sustainable development. The first green purchasing initiatives appeared during the 1980s and 1990s (Dowlatshahi, 2000).

Green purchasing has significant implications for the firms implementing it, especially when it comes to the criteria used in supplier selection. Until the early 1990s, purchasing policies, supplier selection and evaluation processes were dominated by

criteria such as price, quality and delivery (Weber et al., 1991; Dowlatshahi, 2000). Green purchasing, however, requires the inclusion of environmental criteria in supplier selection, which leads us to the concept of green supplier selection (GSS) (Lamming and Hampson, 1996; Noci, 1997). By “green” we refer to the environmental aspects within the sustainability concept. It should be noted that the environmental aspect is often mentioned as one of the three aspects of sustainability, the others being social and economic aspects (Elkington, 1998).

Selecting a supplier can be regarded as an important decision, not only in the sense of providing the purchasing organisation with the right materials, products or solutions at a competitive cost level, but also in the sense of improving its environmental performance, e.g., through avoiding hazardous materials or considering alternative solutions that require less materials and/or energy. A firm's environmental efforts will not likely succeed without integrating the company's environmental goals with its purchasing activities (Walton et al., 1998). However, GSS is often far from straightforward. There are multiple environmental criteria one could include, and the operationalization of these criteria into meaningful, practical and measurable variables often poses challenges, both for purchasers and suppliers (Jabbour and Jabbour, 2009; Lloyd, 1994).

The existing literature on supplier selection is quite extensive, and much attention has been paid to what kind of mathematical models can be used for supporting decision-making (De Boer et al.,

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2001; Wu and Barnes, 2011) and what kind of criteria are used in supplier selection (Stamm and Golhar, 1993; Weber et al., 1991). Neither the review of decision models for supplier selection by De Boer et al. (2001) nor a follow up study by Wu and Barnes (2011) explicitly addresses green supplier selection. Furthermore, previous studies by Weber et al. (1991) and Stamm and Golhar (1993) do not report any environmental criteria. There is, therefore, a clear need to assess and review the literature on GSS. Providing a comprehensive review on GSS is the first major contribution of this paper. In addition, based on the review, we develop a conceptual model of GSS, aimed at integrating its key dimensions. This is the second important contribution of the paper.

Noteworthy literature reviews addressing the environment or sustainability in related but broader fields, have been recently published; Giunipero et al. (2012), Hojmoose and Adrien-Kirby (2012), and Miemczyk et al. (2012) in purchasing and supply management, Carter and Easton (2011) and Seuring and Müller (2008) in supply chain management. They look at the broader field, excluding both the studies of mathematically conceptualized models and the public sectors (with the exception of Hojmoose and Adrien-Kirby in the latter case). In contrast, this review includes literature on GSS comprehensively, focusing more specifically on the selection process rather than the purchasing function or supply chain management in general. Furthermore, it should be clearly noted that this paper does not focus on decision models for GSS per se, but includes all the literature which discusses environmental aspects in supplier selection. In this sense, the scope of this review is broader than the reviews by De Boer et al. (2001) and Wu and Barnes (2011) who focused specifically on decision models.

This paper aims to answer the following questions: “What characterizes the existing studies on green supplier selection?”, “What are the unaddressed or overlooked areas within green supplier selection research?” and “What could be the future directions of research into green supplier selection?” This paper provides an overview of the existing articles on GSS, demonstrates useful categorizations for analyzing these articles, and proposes a conceptual model that can be used for researchers and practitioners in the field of GSS. Thus, we aim to assist both researchers and practitioners.

The organization of the paper is as follows. First, we provide definitions of three key terms. Second, the methodology for the literature review is presented, as well as the framework for analyzing the articles. Then, we present the analysis of the articles found. Next, based on the analysis of those articles, a conceptual model for GSS is suggested. The paper ends with a conclusion regarding the characteristics of the literature on GSS, unaddressed aspects, potential further research, and implications for researchers, practitioners and policy-makers.

2. Definition of key terms

2.1. Definition of green purchasing

The concept of green purchasing has obtained a place in the field of supply chain management and various definitions of green purchasing have been developed. One of them is:

...green purchasing is an environmentally-conscious purchasing practice that reduces sources of waste and promotes recycling

and reclamation of purchased materials without adversely affecting performance requirements of such material (Min and Galle, 2001, p. 1223).

Another definition, using a term “environmental purchasing”, also emphasizes the efficient use of materials and reduction of overall consumption:

...environmental purchasing is defined as purchasing's involvement in supply chain management activities in order to facilitate recycling, reuse and resource reduction (Carter and Carter, 1998, p. 660).

Zsidisin and Siferd (2001) have pointed out that a weakness of the Carters' definition is that it provides a view of environmental issues solely from a purchasing perspective, and, furthermore, that it does not capture the holistic and synergistic impacts that intra- and inter-organizational practices have on the natural environment. They offer an extended definition as follows:

Environmental purchasing for an individual firm is the set of purchasing policies held, actions taken, and relationships formed in response to concerns associated with the natural environment. These concerns relate to the acquisition of raw materials, including supplier selection, evaluation and development; suppliers' operations; in-bound distribution; packaging; recycling; reuse; resource reduction; and final disposal of the firm's products (Zsidisin and Siferd, 2001, p. 69).

We will follow the definition by Zsidisin and Siferd (2001) since this definition recognizes the potential environmental impact caused in the relationship between suppliers and purchasers, and, in addition, explicitly mentions the involvement of supplier selection and evaluation in green purchasing.

2.2. Definition of the supplier selection process

Supplier selection is usually referred to as one activity, yet comprises several tasks (Cousins et al., 2008; De Boer et al., 2001; Van Weele, 2010), as illustrated in Fig. 1. It typically starts with the process of identifying needs. Then, purchasers agree on measurement criteria for potential suppliers, and a call for tenders is communicated to potential suppliers. A selection is made after reviewing the information submitted by candidate suppliers. This usually takes several rounds, and the final choice is made from a number of qualified suppliers. In addition, it may also include a post-selection evaluation of the supplier's performance (Morton, 2002). The information obtained from a post-selection evaluation may be stored and made available for later use and improvement. The evaluation of supplier performance is sometimes also referred to as “monitoring suppliers” (Zhu and Geng, 2001) or “application feedback” (Wu and Barnes, 2011). By including post-selection evaluation in our model of supplier selection, we extend previous models of the supplier selection process (De Boer et al., 2001; Wu and Barnes, 2011) without changing their core structure.

2.3. Viewpoints on environmental criteria

It is generally recognized that a wide range of environmental criteria are used to measure environmental impact. They are applied in the supplier selection process, in addition to the conventional criteria such as price, quality, and delivery. Environmental criteria are

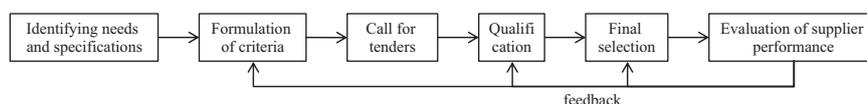


Fig. 1. Supplier selection process (Cousins et al., 2008; De Boer et al., 2001; Van Weele, 2010).

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