



# Drivers of green supply management performance: Evidence from Germany

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## ABSTRACT

Five potential drivers of green supply management performance were identified in the literature review: green supply management capabilities, the strategic level of the purchasing department, the level of environmental commitment, the degree of green supplier assessment, and the degree of green collaboration with suppliers. These constructs were used to form a structural model explaining the environmental performance and the purchasing performance. The model was analysed with SmartPLS 2.0 using data collected among German purchasers. The results suggest that the degree of green supplier assessment and the level of green collaboration exert direct influence on environmental performance. These two practices are driven by the strategic level of the purchasing department and the level of environmental commitment of the firm. Whereas commitment influences green assessment directly, the impact of commitment on green collaboration is mediated by the capabilities of the purchasing department. Furthermore, the results show that environmental performance has a positive impact on purchasing performance.

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## 1. Introduction

Protecting the environment is an ethical value in itself. Ethics establishes moral norms in consideration of the natural environment. Individuals should feel obliged to protect and maintain the sources of human life. They “should have a sense of responsibility for their actions and the consequences that these actions provoke” (Oliveira de Paula and Negrão Cavalcanti, 2000, p. 110). These moral requirements are not only relevant for private individuals but also for managers acting as representatives of their companies. Managers have the duty to take into account the attitudes, values and beliefs of the public regarding environmental protection. Nevertheless, environmental responsibility is not only an encumbrance to managers. Environmental commitment could be a source of competitive advantage and sustainable development of a firm. In summary, environmental performance is a concern for managers due to reasons ranging from regulatory and contractual compliance, to public perception and competitive advantage (Theyel, 2001).

Many firms have realised that customers and other stakeholders do not always distinguish between a single company and its partners in the supply chain. Also, the lead company in a

particular supply chain is often held responsible for the adverse environmental impacts of all organisations within its supply chain (Rao and Holt, 2005; Kovács, 2008). Managers of a focal firm select and govern business partners throughout the supply network. Therefore, they are responsible for the environmental performance of the entire supply chain (Seuring and Müller, 2008). For this reason, Green Supply Chain Management (GSCM) is a concept that is gaining popularity. Green Supply Chain Management is defined as a buying firm’s plans and activities that integrate environmental issues into SCM in order to improve the environmental performance of suppliers and customers (Bowen et al., 2001). Greening the supply chain is one of the three major issues of sustainable SCM besides the economic and social dimensions (Seuring and Müller, 2008).

Although the literature on GSCM has been growing during the last decade, there are still some areas that need further research. Intra- and inter-firm diffusion of best practices and the transfer of environmental technologies were identified as critical areas needing research (Angell and Klassen, 1999). Theyel (2001) pointed out that “the literature offers insight on potential patterns in supply-chain relations for improving environmental performance. However, more understanding is needed on the ways firms work with their customers and suppliers for environmental purposes and whether supply-chain interaction helps firms improve their environmental performance”. More recently, Vachon and Klassen (2006) stated that little research has focused on the management of the interactions with immediate

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customers and suppliers and their potential impact on an organisation's environmental management. This paper tries to cover these gaps and focuses on how to extend green practices to immediate suppliers. The emphasis of this research is on the greening of supplier–customer relationships (Green Supply Management), as buying firms are normally in the strategic position to exert significant influence on the environmental behaviour of their suppliers.

Green Supply Management (GSM) is being adopted by industry, but the extent and mode of implementation vary significantly (Rao, 2002). In some instances, it takes the form of questionnaires or suppliers' visits to assess suppliers' environmental performance (Noci, 1997). In other cases, companies go for a partnering and mentoring approach, such as site visits, exchange of personnel, technical assistance, and various other tactics (Lamming and Hampson, 1996; Handfield et al., 1997; Geffen and Rothenberg, 2000; Zsidisin and Sifert, 2001). Although companies can follow both approaches simultaneously, few papers have considered the joint effect of these two different approaches on environmental performance improvement (see Theyel, 2001; Klassen and Vachon, 2003; Lee and Klassen, 2008).

Furthermore, only few papers have considered the development process of the preconditions needed to adopt these approaches of supplier environmental improvement. Bowen et al. (2001) identified the following potential drivers of green supply: a more strategic purchasing approach and the supply capabilities developed by a proactive firm's environmental management. There is also a gap in the literature concerning the impact of environmental performance improvements on purchasing performance. Carter et al. (2000) found evidence for a positive influence of environmental purchasing activities on firms' financial performance. However, from a supply perspective the performance outcome of a purchasing department (Sanchez-Rodriguez et al., 2005) is more relevant to evaluate the appropriateness of the assessment and the collaboration approach than the general financial performance of the firm.

Therefore, the purpose of this paper is to analyse the effectiveness of different approaches used to extend sustainable practices to suppliers. More specifically, the research objectives of this paper are (1) to study the impact of different approaches (green assessment and green collaboration) on environmental performance improvement; (2) to analyse the factors that drive or contribute to the implementation of such efforts; and (3) to investigate the impact of environmental performance improvement on the performance outcome of a purchasing department.

The structure of the paper is as follows: first, we provide a literature review and the conceptual model and related hypotheses. Next, we explain the methodology employed. Then, we present the results and discuss them. Finally, we highlight the main conclusions and managerial implications and provide some directions for future research.

## 2. Literature review and hypotheses

The literature on GSCM has been growing as organisations and researchers have begun to realise that the management of environmental programs and operations do not end at the boundaries of the organisation (Zhu et al., 2005). Different authors offer insights on the potential of developing supply chain related programs for improving environmental performance (see for example, Florida, 1996; Handfield et al., 1997; Geffen and Rothenberg, 2000; Klassen and Vachon, 2003; Zhu and Sarkis, 2004; Rao and Holt, 2005; Lee and Klassen, 2008).

Similar to the concept of SCM, the boundary of GSCM depends on the goal of the researcher (Zhu et al., 2005). Zhu et al. (2008)

provided an empirical examination of the construct of GSCM practices. Their results suggested that GSCM practices implementation should be multifaceted and should include the following factors: internal environmental management, green purchasing, cooperation with customers, eco-design practices, and investment recovery. In this paper, we will focus on green supply or green purchasing.

### 2.1. Green supply management

Environmental or green purchasing is the integration of environmental considerations into purchasing policies, programmes, and actions. The objective of green purchasing is to facilitate recycling, reuse, and resource reduction (Min and Galle, 1997; Carter and Carter, 1998). Purchasing can contribute to environmental performance in a number of ways: buying packaging materials that can be more easily recycled or reused (Min and Galle, 1997; Carter and Carter, 1998), participating in the design stage and suggesting alternative sources of supply, asking upstream members of the supply chain to commit to waste reduction goals (Carter and Carter, 1998), using early supplier design involvement (Carter and Carter, 1998), evaluating supplier performance, selecting suppliers based on environmental criteria (Noci, 1997), etc. As a boundary spanning unit, purchasing generally plays an important role in communicating green concepts and efforts to other companies (Green et al., 1996).

Different authors have considered different aspects of environmental purchasing. For example, Drumwright (1994) established a typology of companies that approached environmental purchasing. Zsidisin and Hendrick (1998) explored the extent of involvement that purchasing managers had in some environmental issues. Carter et al. (1998) provided a reliable and valid scale for environmental purchasing and examined the impact of different organisational factors on these activities. Bowen et al. (2001) explored the role of supply management capabilities in green supply. Min and Galle (1997), Noci (1997), and Zhu and Geng (2001) considered supplier selection based on environmental criteria. Walton et al. (1998) examined how managers were able to drive environmentally friendly practices within their own supply base. Our paper focuses on this latter aspect: the effectiveness of different practices used to extend sustainable practices to suppliers.

### 2.2. Extending sustainable practices to suppliers: supplier development

Buying firms that encounter shortcomings in supplier performance or supplier capabilities have several options: (1) invest resources to increase supplier performance, (2) manufacture the purchase item in-house, (3) search for an alternative supplier, or (4) a combination of the previous three (Krause et al., 2000). This paper is based on the premise that the buying firm has chosen option one (supplier development). Handfield et al. (2000) define supplier development as any activity that a buyer undertakes to improve a supplier's performance and/or capabilities to meet the buyer's short term or long term supply needs. To improve supplier performance buying firms have different options, including (1) supplier assessment, (2) providing suppliers with incentives to improve performance, (3) instigating competition among suppliers, and (4) working directly with them with training or other activities (Krause et al., 1998).

To improve suppliers' environmental performance, the practices adopted by industry vary significantly in the extent and mode of implementation (Rao, 2002). In some instances it takes the form of questionnaires or suppliers' visits, and some authors have shown that these evaluative practices help reduce

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