



## Supply risks as drivers of green supply management adoption



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### ABSTRACT

The focus of this paper is on supply risks and green supply management. In particular, the study investigates whether the ability of the focal firm's purchasing function to mitigate different types of supply risks is related to the company's adoption of green supply management. The supply risk types include both direct risks – quality and price of the product/service and indirect risks – property rights, brand and image and outsourcing. Empirical data collected from 165 Finnish companies was used to examine the linkages of a firm's risk management abilities to the adoption of green supply management practices. Based on regression analysis it was found that quality and brand risk management ability are positively related to the adoption of green supply management, whereas price and cost risk management ability have the reverse effect. Thus, the strong cost and price risk management of a company may hinder the adoption of green supply management and companies with high spend are less interested in to adopt green supply management. Furthermore, firm's ability to manage the quality and brand risk in its supply chain drives it towards green supply management adoption.

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### 1. Introduction

Many of the recent studies in the supply management field have concentrated on topics of corporate social responsibility (CSR), sustainability and ecological issues and how these are connected and applied to supply chain management and purchasing (Seuring and Müller, 2008; Tate et al., 2012). Companies are widely reporting on responsible ways to do business and promoting their CSR programmes and codes of conduct. Still, the purchasers of retailers and manufacturers are not able to trace the origin of the raw materials and components nor to find out which are the companies involved in the entire supply network or in which kind of conditions the products are produced. Furthermore, increasing amounts of product recalls (cars, electronic equipment, toys, etc.), scandals in food supply chains (the origin and type of meat, melamine in milk, etc.) and other disruptions in supply channels have awakened substantial attention among the consumers and put high pressures on retail trade and manufacturing firms to be responsible regarding consumer safety. Moreover, the ecological impact of the purchased products, like pollution, inadequate waste management and recycling, CO<sub>2</sub> emissions (especially in transportation) and water and energy consumption in the production phase, are a serious concern. Indeed, there are numerous examples of the realisation of risks

arising from long supply chains and complex supply networks in today's global business atmosphere.

Company's sustainability is highly depending on its purchasing and supply management function in implementing sustainable supply (Schneider and Wallenburg, 2012). Furthermore, supply management function has a strong role in identifying and mitigating the supply chain risks (Zsidsin, 2003). This crucial role of supply management in a firm's risk management has been under scrutiny in several studies and from different viewpoints. Supply chain risks have been identified in different contexts, several risk typologies have been presented, various risk management and mitigation strategies have been designed and risk scenarios and cost effects have been modelled (Ghagde et al., 2012). The majority of these studies have focused on disruptions in the supply chain in manufacturing contexts.

However, according to Seuring and Müller (2008), there is a research gap in examining the connections of supply risks and the sustainable supply chain management. Furthermore, Ghagde et al. (2012) have pointed that there are two main streams lacking in supply risk research: behavioural perceptions in risk management and sustainability factors. Moreover, according to Tate et al. (2012), research is limited, especially concerning the potential of suppliers to influence their environmental footprint and how buyers impose sustainability practices on a supply chain or network. Therefore, we suggest that the concept of *green supply management* (GSM) (Bowen et al., 2001) – is a relevant phenomenon in these contexts. Further, we argue that the supply risk management is a key driver

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for green supply management adoption, since it has visibility to different actors and processes in the supply chain and therefore is also likely to affect the decisions made on environmental aspects of the firms' supply management practices.

Our study attempts to narrow the above-mentioned research gaps by examining the possible link between supply risk management and green supply management practices. The focus of this paper is the focal firm's purchasing functions' ability to manage specific types of *supply risks* (identified by several authors, e.g. Zsidişin, 2003; Christopher et al., 2011) and on its relationship to the adoption of GSM. This research setting is especially interesting, since it will help to find out what types of firms in terms of their risk management focus are aligned to adopt green supply management practices and what types of firms are less likely to do so.

## 2. Green supply management

According to Montiel (2008), the main body of the CSR and sustainability studies builds on social, economic and environmental elements. While there are arguments that these three elements are actually interdependent, the majority of the empirical studies treat these dimensions as independent components and may concentrate on one component in particular (Montiel, 2008). Our study follows this line of research design and focuses on the environmental element of sustainability by examining the adoption of GSM in firms and how it is influenced by the company's ability to mitigate different supply risks. In the following section the key concepts are defined.

### 2.1. Key definitions

In the field of supply chain management literature the concepts of 'green supply management' (Bowen et al., 2001; Large and Gimenez Thomsen, 2011), 'environmental purchasing' (Carter et al., 1998), 'green purchasing' (Min and Galle, 1997), and 'sustainable supply chain management' (Carter and Rogers, 2008; Seuring and Müller, 2008) have been often used interchangeably. According to (Seuring and Müller (2008, p. 1700) sustainable supply chain management is "management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social, into account which are derived from customer and stakeholder requirements." Keeping in mind our environmental scope in this study, we adopt the definition of Srivastava (2007, p. 54, 55), who focus on environmental element of sustainable supply management and defines green supply chain management as "integrating environmental thinking into supply chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final products to the consumers, and end-life management of the product after its useful life.". Furthermore, because our study is especially on the perspective of the purchasing function and limited to environmental element of it, the definition of green supply management of company's purchasing function can be laid out as Bowen et al. (2001, p. 175) have put it to be "activities that attempt to improve the environmental performance of purchased inputs, or of the suppliers that provide them".

### 2.2. Literature review and operationalisation

During the last couple of years, there has been a surge of academic articles and reviews on green supply management (e.g.

Sarkis et al., 2011; Tate et al., 2012; Walker and Brammer, 2012). Sarkis et al. (2011) identified applicable and explanatory organisation theories for green supply management, whereas Tate et al. (2012) claimed that there is still a lack of theoretical perspectives in green supply management research. Lately, it also has been suggested that green supply could be linked with the studies on value nets, customer value and shared value (Porter and Kramer, 2011). Overall, it could be stated that research on green supply management is growing rapidly, but the theoretical formation is still in an emergent phase.

Giunipero et al. (2012) have identified the drivers and barriers of sustainability in purchasing and supply management in general. According to their study, the main drivers are involvement of top management, government regulation, financial benefits, competitive advantage, ISO certification and customer demand. Barriers of sustainability are lack of consensus at the CEO level, costs of sustainability and economic conditions, lack of sustainability standards and appropriate regulations, and misalignment of short term and long-term strategic goals. In line with this, the awareness of GSM practices has increased rapidly due to the adoption of formal quality systems (such as ISO 14001), the tightening legislation and regulation on environmental protection (Chen, 2005), and the increasing expectations from internal and external customers (Schneider and Wallenburg, 2012). Furthermore, the essential drivers of GSM are the company's commitment to, supplier assessment of and supplier collaboration with environmental issues (Bowen et al., 2001; Large and Gimenez Thomsen, 2011). Moreover, a link between GSM and firm performance has been found (Carter et al., 2000; Klassen and McLaughlin, 1996). As Zhu et al. (2008) have stated, the levels of implementation of green supply management activities and programmes may vary between the industries, but higher implementation levels of green supply management are generally associated with better performance outcomes.

Despite the lack of unified theoretical background, there are lot of studies suggesting effective practices for GSM. First, GSM should be cost and strategy driven, economically justified and integrated with the company's processes (Handfield et al., 2005). Second, the whole lifecycle of the purchase should be evaluated in terms of its environmental impact. The lifecycle analysis of the purchases includes considering the origin, use and disposal and is congruent with the total cost of ownership analysis model examined by Ellram (1995). Hence, a firm's green supply management should play an active role, especially in the early phases of product innovation. Hallstedt et al. (2013) stated that the supply function of a firm has extensive and irreplaceable knowledge about suppliers and their offerings, which in turn provide insights regarding not only the innovation, but also the sustainability aspects. Third, the environmental impact of deliveries and transportation of purchased goods (Aronsson and Hüge Brodin, 2006) and sustainability practices of logistics service providers (Evangelista et al., 2011) are a concern in green supply management. Therefore, firms need to extend their ecological awareness and green practices over their supplier network and from the buying customer to the country of origin or to the last-tier supplier (Simpson and Power, 2005).

In operationalising the concept of green supply management (GSM), we follow Carter et al. (1998; the original article uses the term 'environmental purchasing'). They proposed that lifecycle analysis of purchases, target setting for recycling, participation in product development and taking account of environmental aspects in deliveries all reflect the level of green supply management in US companies. In our study, Carter et al.'s (1998; 2000) and Carter and Jennings' (2004) GSM scale is used as a measure for GSM adoption in companies.

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