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Motivating low-carbon initiatives among suppliers: The role of risk and opportunity perception



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ABSTRACT

Regulators increasingly pressure companies to reduce greenhouse gas (GHG) emissions. In the case of many large corporations, most emissions originate from supply chain operations. Consequently, firms often pass on external pressures to their suppliers by requesting them to implement low-carbon initiatives. While existing research suggests that external pressures from both regulators and customers are mostly effective in motivating environmental action among suppliers, it remains unexplored how organizational perception of risks and opportunities influences this relationship. The purpose of this paper is to examine empirically how the perception of climate change-related risks and opportunities moderates the influence of external pressures on a supplier's decision to adopt low-carbon supply chain management (LCSCM) practices. The sample consists of 877 companies from 37 countries that supply to large multinational enterprises. Secondary data is sourced from CDP's Supply Chain Program and other databases and statistically analyzed using binary logistic regression models. The results show that a supplier's decision to implement LCSCM practices is mainly determined by customer requests to reduce GHG emissions and the stringency and effectiveness of climate change policies in its home country. Contrary to theoretical predictions, little empirical evidence is provided for a moderating influence of perceived climate-related risks and opportunities. However, in most cases a company's perception of both risks and opportunities is directly and positively related to LCSCM. Firm size is also found to be influential, while profitability, an industry's GHG intensity, a country's economic development and the private sector's responsiveness to environmental issues do not significantly affect suppliers' behavior.

1. Introduction

Due to the need for action on climate change, companies are increasingly under pressure to adopt appropriate response measures (Hill, 2001). Although the focus is often on large multinational corporations, typically only few suppliers of these corporations are responsible for the largest share of greenhouse gas (GHG) emissions. In the case of the retailing company TESCO, for example, suppliers are responsible for up to 85% of the company's carbon footprint (Tidy et al., 2016). Moreover, it is estimated that in the US, on average, around three quarters of a company's total emissions are caused by supply chain (SC) operations (Matthews et al., 2008). Consequently, suppliers are confronted with a growing number of requests from regulatory bodies and focal companies to adopt low-carbon supply chain management (LCSCM) practices (Jira and Toffel, 2013; Chen, 2015).

Although pressures from external stakeholders tend to motivate suppliers to implement green supply chain management (GSCM) practices in general (Zhu et al., 2005; Delmas and Montiel, 2009; Sarkis

et al., 2011), the effectiveness of such pressures in the context of climate change remains understudied (Das and Jharkharia, 2018; Jabbour et al., 2018). Furthermore, several authors have suggested that empirical research should focus more on the interplay between external and internal factors of GSCM adoption to reveal potential moderation effects (Kumar et al., 2014). In this regard, Sarkis et al. (2011) argue that scholars should address the following two research questions: (1) How do “external and internal factors interactively promote GSCM practices?”, and (2) “Why do heterogeneous responses to GSCM implementation from institutional pressures exist?”.

Previous studies suggest that especially a company's perception of risks and opportunities might be a decisive factor for the effectiveness of external pressures in motivating suppliers to adopt GSCM practices (Cousins et al., 2004; Lo, 2013; Roehrich et al., 2014; Seles et al., 2018). However, existing scholarly work suffers from two major limitations. First, it is predominantly conceptual in nature, and second, the primary focus on general environmental issues impedes its applicability to the particular issue of climate change (Das and Jharkharia, 2018). Recent

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research suggests that organizational perception of climate change-related risks and opportunities should indeed be considered when studying corporate behavior, since their recognition can be a potential driver or barrier to the implementation of emission reduction initiatives (Alves et al., 2017; Chen and Montes-Sancho, 2017; Elijido-Ten, 2017; Sakhel, 2017).

Motivated by the above-mentioned research gaps, the objective of the present study is to analyze empirically how corporate perception of climate change as risk or opportunity moderates the relationship between external pressures to reduce GHG emissions and a supplier's decision to adopt LCSCM practices. Since being a primary source of external pressure, we focus on two important stakeholder groups: regulatory bodies and customers. As pointed out by Sarkis (2018), broad perspectives are needed to reveal general principles of GSCM. In response to this, we provide a comprehensive global perspective by not limiting the scope of our empirical analysis to specific industries or countries. In doing so, we bring together two streams of literature, namely research on GSCM and research on business responses to climate change, and make the following contributions. First, we analyze whether pressures from customers and regulatory bodies are effective in motivating suppliers to act on climate change. We thus add empirical findings to the growing body of literature that examines the importance of external stakeholders for GSCM. Second, by drawing on SC risk management and organizational decision-making theories, we investigate how intra-organizational factors (i.e. a company's perception of perceived climate risks and opportunities) and external factors interactively promote the adoption of LCSCM.

The remainder of this article is structured as follows. In the next section, we review the literature on GSCM and outline potential risks and opportunities associated with climate change. In the third section, we build on existing research and organizational theories to derive research hypotheses. Subsequently, we introduce our data collection approach and the statistical methods used. Finally, we present and discuss our empirical results in consideration of possible implications for practitioners and future research.

2. Research framework

2.1. Low-carbon supply chain management

The issue of reducing GHG emissions in the supply chain is closely related to the concept of GSCM. Numerous scholars have addressed the topic of greening supply chains (Sarkis et al., 2011; Zhu et al., 2012). GSCM is concerned with the integration of environmental management into intra- and inter-organizational SC practices (Sarkis et al., 2011; Zhu et al., 2012). According to Zhu et al. (2012), a distinction can be made between external GSCM practices “that include transactions with suppliers and customers” (e.g. green purchasing, customer cooperation, investment recovery) and internal GSCM practices, i.e. “activities without direct supplier or customer involvement such as eco-design, environmental management, and financial policies within a manufacturer's direct control”. We view SC management in the context of climate change as a subset of the broader concept of GSCM. Instead of comprehensively addressing a variety of environmental problems, LCSCM focuses on activities aimed at managing and reducing the carbon footprint of supply chains (Das and Jharkharia, 2018). LCSCM is closely related to the concept of low-carbon operations management as put forward by Böttcher and Müller (2015) and defined as “the integration of carbon efficiency in the planning, execution and management of business processes” and entailing low-carbon products, production, processes and logistics (Jabbour et al., 2018). In accordance with the overarching GSCM concept, we propose to distinguish between external (e.g. collaboration with other supply chain actors on carbon emissions) and internal LCSCM practices (e.g. design of low-carbon products, reduction of production-related GHG emissions, carbon management system).

Extant literature has explored the determinants of GSCM practices,

including factors external to a firm, such as legislation, buyer requirements, competition, or pressures from consumers (Sarkis et al., 2011; Diabat and Govindan, 2011; Zhu et al., 2012; Govindan et al., 2016). Scholars have also examined relationships between supply chain actors (Klassen and Vachon, 2003; Vachon and Klassen et al., 2008) and the role of organizational characteristics and resources for GSCM implementation (Zhu et al., 2008; Muduli et al., 2013; Jabbour et al., 2014). Another stream of literature has looked at the outcomes of GSCM, both in terms of financial and environmental performance (Zhu and Sarkis, 2004; Zhu et al., 2005). Studies that focus specifically on climate change issues are fewer in number (Das and Jharkharia, 2018; Jabbour et al., 2018). Although climate change is one of the most pressing environmental issues, “the literature still remains fragmented along narrow research areas and several interdependencies between climate change and SC management are not well documented” (Dasaklis and Pappis, 2013). Despite this knowledge gap, some empirical work indicates that drivers and barriers (Jira and Toffel, 2013; Fernando and Hor, 2017; Jabbour et al., 2018; Luo et al., 2018) and performance outcomes (Böttcher and Müller, 2015; Mao et al., 2017) of LCSCM are similar to those of GSCM.

2.2. Climate change risks and opportunities

Many companies have only recently started to integrate climate change into their risk management (Sakhel, 2017). In general, climate risks can be defined as “any corporate risk related to climate change or the use of fossil fuels” (Hoffmann and Busch, 2008). While there are risks related to the physical dimension of climate change, i.e. the increased likelihood of extreme weather events such as heat waves, floods and storms, other risks mainly arise from climate-related regulation that aims at mitigating the adverse effects of global warming (Gasbarro et al., 2017).

Climate change can pose a risk to both suppliers and buyers (Cousins et al., 2004). Physical climate impacts can lead to disturbances in the SC, e.g. when critical infrastructure is damaged or due to shortages in raw material supply (Dasaklis and Pappis, 2013; Alves et al., 2017). Apart from that, buyers might not want to rely on suppliers that are based in regions particularly vulnerable to natural hazards. Besides threats related to the physical impacts of climate change, there are also indirect SC risks attached to climate change mitigation. Unsatisfactory environmental performance of upstream companies increases the indirect carbon footprint of downstream customers and can degrade their reputation (Cousins et al., 2004; Delmas and Montiel, 2009). Moreover, buyers might face financial risks if they possess a carbon-intensive SC, since costs for raw materials and energy might increase due to carbon taxation and could be passed along by suppliers (Lash and Wellington, 2007). Regulators could also halt the operations of non-compliant suppliers and, as a result, buyers might turn to suppliers that exhibit more ambitious action on climate change (Delmas and Montiel, 2009). Consequently, an increasing number of companies are requesting their suppliers to disclose carbon-related information, to implement GHG management systems and to integrate requirements into their supplier selection procedures (Jira and Toffel, 2013; CDP, 2017).

Climate change can also provide opportunities (Gasbarro et al., 2017). In line with the definition of climate risks, we define climate opportunities as any corporate opportunity related to climate change or the use of fossil fuels. Acting proactively on environmental issues can save energy-related costs, coincide with the development of valuable organizational capabilities and increase reputation leading to competitive advantages (Hoffman, 2005; Hart, 1995; Hopkins, 2010). To capitalize on the opportunities attached to climate change, companies should implement appropriate SC management strategies. Customer-supplier collaboration in innovation processes for low-carbon products, for example, might result in early-mover advantages and therefore improve the SC's overall competitiveness (Dasaklis and Pappis, 2013).

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