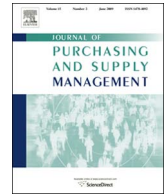




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It's a match! Choosing information processing mechanisms to address sustainability-related uncertainty in sustainable supply management

Kai Foerstl^{a,*}, Jan Meinlschmidt^b, Christian Busse^c

^a Chair of Supply Chain Management & Logistics, German Graduate School of Management & Law (GGS), Heilbronn, Germany

^b Volkswagen AG, Wolfsburg, Germany

^c Chair of Sustainable Production Management, Carl von Ossietzky Universität Oldenburg, Germany

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ABSTRACT

One of the most pressing challenges associated with sustainable supply management (SSM) is that buying firms cannot openly observe social and environmental conduct in their supply networks, as demonstrated by numerous sustainability scandals in recent years. Using eight in-depth case studies across four industries, we explore how firms manage sustainability-related uncertainties and the resulting information deficits within their upstream supply chain. We build on information processing theory and, more specifically, recent research that distinguished three forms of sustainability-related uncertainties in the supply network. Our study shows how sustainability-related uncertainties can be effectively matched by applying a fitting configuration of six information processing mechanisms. The effective choice of information processing mechanisms is contingent upon the type of sustainability-related uncertainty, but it also depends on additional factors such as economies of scale, path dependencies and trigger urgency as presented in this manuscript. We derive propositions how firms create fit between their information processing needs and capacity by means of choosing suitable information processing mechanisms for SSM. The paper can be used as a blueprint for the development of a SSM capability that accommodates a firm's unique sustainability-related uncertainty profile and the resulting information processing needs.

1. Introduction

In November 2016, Italian confectionary group Ferrero terminated all relations with its direct supplier Romexa SA and its sub-supplier Prolegis in Romania after allegations that children between six and eleven years old had been working for 0.25\$ an hour for 13-h shifts to produce toys for Kinder Eggs. Ferrero management stated that despite extensively auditing its direct supplier Romexa SA through a third party certification firm in May 2016, the incident at the sub-supplier Prolegis had gone undetected (Parker, 2016). Similarly, in 2015 environmental and animal-treatment-related misconduct by Ovis 21, an Argentinian wool supplier to Patagonia, the California-based outdoor apparel producer, was reported by the People for the Ethical Treatment of Animals (PETA). Even though Patagonia presents itself and its products as highly sustainable and environmentally friendly, the company was unaware of the cruel treatment of sheep by its supplier. Despite abandoning all supplier relationships with Ovis 21, the incident still caused a lasting credibility crisis for Patagonia (Graham, 2015). Sadly, many similar examples exist with respect to sustainability misconduct at supplier premises, which demonstrate that buying firms must find a way to

reduce their uncertainty regarding the conditions in their supply networks as a crucial prerequisite for effective sustainable supply management (SSM).

Even decision makers and procurement managers at sustainability champions still face uncertainty concerning the business conduct of their upstream supply chain (Carter et al., 2015; Lee et al., 2014). This sustainability-related uncertainty (SRU) increases substantially beyond the first-tier level (Grimm et al., 2014; Rauer and Kaufmann, 2015). This effect is intensified by the many different sub-level indicators that the triple-bottom line embraces (Kirchoff et al., 2011). As a result of rising stakeholder expectations for sustainability and general supply network complexity, the task of reducing SRU is central to firms today (Giunipero et al., 2012; Sarkis, 2012). Consequently, sustainability-related information processing has grown into a vital mission for buying firms (Rauer and Kaufmann, 2015). To enable deeper empirical insights and solutions to the task, we elaborate on effective information processing that enables buying firms to manage the SRU of their supply networks by answering the following research questions:

1. How do firms manage sustainability-related uncertainty in their

* Corresponding author.

E-mail addresses: kai.foerstl@ggs.de (K. Foerstl), jan.meinlschmidt@volkswagen.de (J. Meinlschmidt), christian.busse@uni-oldenburg.de (C. Busse).

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upstream supply network?

2. Why do firms choose specific information processing mechanisms over others in the pursuit of sustainable supply management practices?

As a theoretical foundation for our reasoning we rely on information processing theory (IPT). IPT posits that firms face information processing needs (IPN) as a result of uncertainty in their business environment. Firms need to establish a fit between their context-dependent IPNs (sustainability in our particular case) and their internal information processing capacity (IPC) to perform effectively (Tushman and Nadler, 1978). The introductory example highlights how lacking fit between SRU and IPC apparently jeopardizes buying firm performance. Thus, we build on and extend our own research that has distinguished three types of sustainability-related uncertainties in the supply network (Busse et al., 2017b) and show how these can be managed effectively through a matching configuration of six IPMs in the study at hand, using the same eight case studies. Based on abductive theory elaboration (Ketokivi and Choi, 2014), we develop an adapted and contextualized IPT framework that accommodates suitable IPMs for SSM at the upstream network level of analysis.

The paper offers various theoretical contributions. Most importantly, we provide empirically-grounded propositions as to how firms can counter the SRUs they face through a matching selection of IPMs. Therein, we provide the underlying rationale for these configurational choices. In that regard, we also show that solely building up IPC is not the only means by which to achieve fit between firms' IPC and IPNs in their SSM practices. Under certain circumstances, applying IPMs to reduce SRU directly at the origin can be more effective.

The paper also makes a contribution to managerial practice as it nurtures the understanding of the impact of distinct types of SRU and of the SSM mechanisms to counterfeit them. Finally, this research enlightens the social debate on the liability of buying firms for the conduct in their upstream supply networks. On the one hand, we elucidate what firms are capable of doing. On the other hand, our findings also caution how difficult it is to eliminate all information deficits.

The next section reviews SSM literature, relating it to IPT as theoretical foundation before outlining our research approach. Next, we show cross-case findings, leading to a comprehensive causal model and testable research propositions. The paper concludes in its theoretical and managerial implications, while highlighting its limitations and prospects for future research.

2. Theoretical foundation

2.1. Sustainable supply management

Because firms have outsourced many value-adding steps, a major fraction of the environmental and social impact generated during the production process of products occurs at supplier premises (Delmas and Montiel, 2009; Ehrgott et al., 2013). Since firms are able to influence the behavior of their suppliers, stakeholders have turned their attention to what happens at supplier sites and have begun blaming buying firms for environmental and social misconduct at suppliers' sites (Jiang, 2009; Murillo-Luna et al., 2008). The non-compliance of even a single supplier may be enough to tarnish the buying firm's reputation and cause it to incur financial loss (Simpson and Power, 2005). As firms have realized that their final products and supply chain processes cannot be more sustainable than their suppliers, they have started to engage in SSM (Krause et al., 2009; Rauer and Kaufmann, 2015) encompassing supplier selection, evaluation and monitoring, as well as development (Reuter et al., 2010). Such SSM commitment not only reduces the risk of reputational damage and financial loss (Hofmann et al., 2014; Walker and Jones, 2012), but also enables firms to differentiate themselves in the marketplace through green supplier championing (Blome et al., 2017), sustainable product characteristics (Kirchoff et al., 2011; Foerstl et al., 2015) and end-to-end sustainable

supply chain processes (Seuring and Müller, 2008). Thus, we define SSM as “the consideration of environmental, social, ethical and economic issues in the management of the organization's external resources in such a way that the supply of all goods, services, capabilities and knowledge that are necessary for running, maintaining and managing the organization's primary and support activities provide value not only to the organization but also to society and the economy” (Miemczyk et al., 2012, p. 489).

Literature has investigated numerous enablers of SSM related to information processing, such as cross-firm communication and information sharing (Beske et al., 2014; De Bakker and Nijhof, 2002; Paulraj et al., 2014). The integration of green information sharing among supply network partners enhances environmental adaptability and focal firm performance (Wong, 2013). Wu and Pagell (2011) discovered that firms use operating principles and technical standards. Moreover, previous literature has concluded that information unavailability and opaqueness were major obstacles to SSM (Sharfman et al., 2009).

The census of the SSM literature revealed that SRU and the resulting information processing needs are distinctive in three ways (Busse et al., 2017a). First, sustainability draws attention to the production process of goods and services as well as the characteristics and nature of the resulting products and services. Whereas toxic fluid emissions caused during the production process do not necessarily become apparent in the final product (as exemplified by the Patagonia example), other environmental misconduct does affect the nature of the products and potentially cause harm to consumers. As Sharfman et al. (2009, p. 2) stated, “environmental issues (in a supply chain context) are uncertain, ambiguous and equivocal.” Hence, if buyers disregard the process-related dimension of sustainability, this negligence potentially also leaves salient stakeholder claims unaddressed (Hofmann et al., 2014). Thus, firms must reach beyond traditional product-focused supplier evaluation criteria such as quality, unit costs, and delivery. Second, there are many sub-level categories and sustainability measurements beyond the top-level tripartite categorization of people (social dimension), profit (economic dimension) and planet (ecological dimension) (Elkington, 1998; Schleper and Busse, 2013). Third, the network level of analysis contributes to SRU; firms must consider sustainability-related information from potentially anywhere in their supply networks, but cannot control them entirely (Rauer and Kaufmann, 2015). Hartmann and Moeller (2014) found evidence that firm reputation is at danger even if misconduct occurs at lower tier suppliers. Thus, buying firm reputation is jeopardized as long as it remains unclear how to overcome and manage SRU as a precondition for successful SSM (Lee et al., 2014; Seuring and Müller, 2008). Yet, most of the invaluable contributions in the field primarily investigated IPC enhancing mechanisms for SSM, while only few studies investigated direct IPN reduction potential. Hence, little is known about the effective choice of matching IPMs.

In our own research program we recently delineated task, source and network uncertainty as the three main types of SRU (Busse et al., 2017a). Task uncertainty “stems from the aggregate of the products that are bought with regard to their amount, variety, novelty (...), and environmental (green) product characteristics” (p. 99). Source uncertainty arises “from the aggregate of suppliers (...) in the supply chain, given a certain network structure” (p. 99). Finally, supply chain uncertainty refers to “uncertainty that arises from the supply chain's structural characteristics referring to horizontal, vertical, and spatial complexity” (p. 102). Subsequently, these three uncertainty types are conceptually linked to IPT and its underlying IPMs for theory elaboration based on multiple case study analysis.

2.2. Information processing theory

IPT evolved in the 1970s in response to organizational design problems stemming from size-induced complexity (Galbraith, 1970). It

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