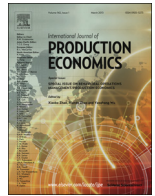




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Sharing environmental management information with supply chain partners and the performance contingencies on environmental munificence

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ABSTRACT

The literature on production economics has highlighted the importance of information exchange with supply chain partners for achieving performance gains. In addition to managing information to enable product flows, trading enterprises increasingly emphasize environmental management information (EMI) sharing with their upstream suppliers and downstream customers to satisfy their environmental quests. This study seeks to investigate the performance value of EMI sharing with supply chain partners in a trading context from the resources dependence perspective. Using survey responses collected from 210 trading firms in Hong Kong, we find that EMI sharing with suppliers can bring cost and environmental performance, but not profit related benefits. The cost and environmental performance benefits due to EMI sharing with suppliers are more salient when the trading firms operate at high environmental munificence. On the other hand, the results show positive effects in profit and cost performance when the trading firms disclose EMI with their customers. Nevertheless, such sharing with customers brings no environmental related benefits. Managers should understand the performance effects of EMI with supply chain partners and formulate action plans considering environmental munificence to increase their performance success.

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1. Introduction

As the environmental awareness of the business community increases, trading enterprises have begun to recognize the need for environmental management information (EMI) sharing with their supply chain partners to compete for performance. In supply chain management (SCM), information exchange is considered key to managing physical product flows and improving cost and service performance of enterprises (Wu et al., 2014). Research in production economics have also been conducted to understand the use of information technology to facilitate logistics activities such as cargo tracking, warehousing, and shipment notice handling, in support of product movement in the supply chain (Gunasekaran and Ngai, 2012). While there are research studies on inter-

organizational information systems for managing the supply chain (Humphreys et al., 2001), a literature search using ABI/INFORM and Science Direct finds limited research studies specifically addressing EMI and the performance value of the information sharing with supply chain partners. One recent study examines the level of in-company environmental management on externally-oriented environmental management, which involves information exchange between suppliers and customers for cooperation (Grekova et al., 2014). Nevertheless, the study focuses on the dynamics between internal and external environmental management without providing an analysis on the performance value of environmental information sharing. The lack of research in this area is surprising given that environmental management and information sharing are pertinent to SCM. A study investigating food supply chain found that different partners use and perceive environmental information differently. The lack of EMI can compromise their collaborative efforts for green SCM practices and ability to achieve sustainable competitive advantage (Soler et al., 2010). As environmental management requires efforts beyond individual firms to encompass supply chain partners, developing

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the capability on EMI is critical for enterprises to sustain their business with a balance on protecting the environment (O'Rourke, 2014).

This study seeks to fill this research gap on EMI and the performance links from the resources dependence perspective with three contributions. First, we empirically investigate the links between EMI sharing of trading firms with their supply chain partners (customers and suppliers) and the profit, cost, and environmental performance outcomes. Second, the performance contingencies of EMI sharing with customers and suppliers under high and low levels of environmental munificence are examined. Third, we advance theoretical knowledge and provide managerial insights on the performance value of EMI for SCM.

1.1. Conceptualization of EMI sharing and the performance value

In environmental management studies on manufacturing operations, collaboration with supply chain partners is considered as an essential factor to succeed in the supply chain. Zhu et al. (2011) examined the role of environmental supply chain cooperation in influencing the relationship between implementing environmental management-based practices and performance outcomes of manufacturing enterprises. Their results highlight the need for supply chain coordination to gain success. In the coordination, one of the neglected areas for manufacturers is EMI sharing with their supply chain partners. To reduce information asymmetry, it is desirable for firms to communicate their environmental management practices and performance to outside stakeholders including customers and suppliers to improve supply chain coordination (Ramanathan et al., 2014). Doing so can also help establish an environmentally friendly corporate image and convey a signal to supply chain partners that their operations are environmentally friendly and responsible.

In the literature, there are studies examining the role of information technologies (IT) to achieve environmental sustainability (Cai et al., 2013). By the use of IT, firms can better reduce environmental damages and lessen impact on the environment by allowing people to manage the life cycle of their products and services (Elliot, 2011). While the importance of information sharing for SCM has been recognized for long time (Humphreys et al., 2001), the environmental management dimension has not received due research attention. Indeed, generation and dissemination of corporate environmental information is considered crucial for firms to prevent environmental damages caused by production activities, products, and their uses. Such information can be broadly classified into four categories. They include organizational information for use internally (e.g., documented environmental goals and activities), organizational information for use externally (e.g., mandatory environmental reporting submitted to authorities and stakeholders), information related to products for use internally (e.g., key performance indicators for evaluating product performance), and information related to products for use externally (e.g., eco-labels and environmental claims) (Erlandsson and Tillman, 2009). While these four environmental management information categories are generic, they help to increase the awareness that EMI sharing should not be confined to internal operations of enterprises but rather extend to cover external partners including suppliers and customers for greater effectiveness.

EMI sharing is important not only for coordinating a supply chain and improving corporate reputation, but also for conformance to international regulations on environmental protection. For instance, firms exporting to the European Union must fulfill the European Union Directive that controls the use of azo-dyes (e.g., aromatic amines, blue colorant, and formaldehyde, etc.) in their textiles and garments in order for their products to enter the market. This EPR policy concept aims at extending producers' responsibility for their products to the post-consumption stage

with an emphasis on waste prevention with supporting practices such as recycling, reprocessing, and reusing the components and materials with residual values. In closing the supply chain loop of their products, firms need EMI sharing to work with their upstream suppliers and downstream customers to mitigate the environmental damages caused by their products (Lai et al., 2014). Toward achieving this end, EMI sharing is important for suppliers to understand and contribute to eco-design for 3Rs pertaining to reduction, recycling, and reuse in materials management throughout the life cycle of products. As achievement of the 3Rs emphasizes use of standardized materials and adoption of modular design, it is important to communicate these requirements at the product design stage involving suppliers for inputs. EMI sharing with suppliers contributes to eco-design in such a way that product components can be easily disassembled for recycling and reuse with the environmental burdens lessened. Firms also need EMI sharing to better engage suppliers for eco-design to facilitate the subsequent take-back activities. On the other hand, sharing of EMI with customers is critical to involve the latter in the product return process. In coordination with customers for product take-back, recycling, and final disposal, it is highly dependent on customer willingness to participate. Sharing of EMI is helpful to obtain customer support, improve corporate image, and enhance organizational positioning in the marketplace. Indeed, the importance of incorporating environmental consideration in logistics and SCM has been increasingly recognized in recent years (Jabbour et al., 2014).

This study aims to investigate the performance values of EMI sharing with suppliers and customers and the performance contingencies with high and low levels of environmental munificence facing the focal trading firms. We use the resources dependence theory (RDT) to examine the contingency of the EMI sharing-performance link on environmental munificence. The RDT theory argues that firms are dependent on their operating environment and collaborative activities with other actors in the environment to succeed (Ulrich and Barney, 1984; Pfeffer and Salancik, 1978). This theory highlights the importance of interactions of firms with other parties for resources under their operating environment. While the literature tends to link coercive practices and win-lose approach regarding resources dependence in relationship management, this study argues from a collaboration perspective that firms and their supply chain partners (suppliers and customers) seek to create value for each other in EMI for performance benefits. Rather than working in an adversarial manner, firms will work collaboratively with their supply chain partners in their environmental management initiatives in terms of resources for performance. Specifically, this study seeks to answer the following two research questions:

Question 1: Is EMI sharing with supply chain partners associated with better performance outcomes for trading firms on cost, profit, and environmental performance?

Question 2: To what extent the environmental munificence faced by trading firms influence their EMI sharing and performance outcomes?

1.2. EMI sharing with suppliers and performance

EMI is defined in this study as management information related to the practice of environmental management in organization. Sharing EMI requires behavioral actions to involve supply chain partners for environmental management. For instance, providing suppliers with EMI for planning and communicating with the standards and requirements. On customer side, such actions include providing customers with information on environmentally-friendly products and taking

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