

Chapter 22

A Conceptual Model for Greening a Supply Chain through Greening of Suppliers and Green Innovation

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ABSTRACT

Nowadays, more organisations are focusing on how to improve their environmental performance, partly driven by recent regulations in this area. This means that green supply chain management plays an important role over traditional supply chain management. Companies could gain competitive advantage through the proper management of their supply chain activities, for example, purchasing management. In fact, organisations can now generate more business opportunities than their competitors by addressing environmental management successfully. More specifically, it has been identified that implementation of green innovation can become a company's order winner. However, not many studies have investigated the relationships between the greening of suppliers, green innovation, environmental performance and competitive advantage. The objective of this article is to propose a conceptual model, developed from a review of relevant literature and performance indicators, and to identify how future research can address these issues.

INTRODUCTION

Rapid technological advancement has made life more convenient, but has also resulted in increas-

ingly shorter product life cycles. Consequently, as products are replaced and disposed of more frequently, there are negative impacts on the environment, such as more waste. One of the most effective ways to tackle such environmental problems is to focus on waste prevention and

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control at the source through green procurement (Min and Galle, 1997). More importantly, well-designed environmental standards can increase producers' incentives to adopt green product and technological innovation (Shrivastava 1995). As a matter of fact, some of the leading international organisations have developed their own environment management systems and criteria to motivate their suppliers. For example, Sony's "Green Partner Standards" (Sony Corporation, 2009), and HP's supply chain social and environmental responsibility (Hewlett-Packard, 2008). Avery (1995)'s study found that in 1993 only 40% of 1000 buyers of office equipment and supplies in the UK were taking part in environmental initiatives within their organisation, but the figure had soared to 80% in 1995.

It is therefore becoming very important for organisations to adopt green innovation and implement Green Supply Chain Management (GSCM) within their value chain (Steger, 1993). Rao and Holt (2005) conducted empirical research and found a positive relationship between GSCM practices and competitiveness and economic performance. In general, organisations can further reduce production cost and increase their economic efficiency through such initiatives (Porter, 1991). Furthermore, improvement in corporate environmental performance and compliance with environmental regulations can contribute to a company's competitiveness (Bacallen, 2000).

The implementation of GSCM has been found to contribute towards corporate competitiveness and environmental performance by a number of authors (e.g. Rao, 2002; Tukker et al., 2001; Cairncross, 1992; Hart, 1995; Schmidheiny, 1992; Shrivastava, 1995; Porter and Linde, 1995; Vermulen, 2002). GSCM can be broadly classified into external and internal environment management (Rao, 2002). In terms of external environment management, it is related to the greening of suppliers (Bowen et al., 2001; Lloyd, 1994; Rao, 2002; Hamner, 2006; Makower, 1994; Green et al, 1998; Rajagopal and Bernard, 2006). Internal

environment management can be reflected by green innovation, which can also be divided broadly into product and process innovations (Klassen and Whybank, 1999; Porter and Van der Linde, 1995; Hart, 1995; Schmidheiny, 1992). Green innovation has not been addressed well in the green supply chain management literature in spite of the fact that it can create a competitive advantage for firms (Porter and Van der Linde, 1995; Chen et al., 2006). In addition, not many studies have investigated the relationship between the greening of suppliers, green innovation, environmental performance and competitive advantage. The objective of this article is thus to propose a conceptual model, based on a review of relevant literature and performance indicators on the factors discussed above, to identify areas for future research.

The rest of this paper is organised as follows. The next section reviews relevant literature on the factors discussed above, namely, the capability of greening the supplier, the capability of green innovation, competitive advantage and environmental performance of firms. Moreover, the indicators of the above factors are reviewed as well. Then, a conceptual framework is proposed which aims to study the relationships between these factors. Finally, the conceptual model and literature review are used to identify where future research is needed in this area.

BACKGROUND: A REVIEW OF KEY FACTORS

Green Supply Chain Management (GSCM)

Recently, industrial practitioners have recognised the concept of GSCM as selecting suitable suppliers, who are qualified to meet the environmental directives or a company's internal green design standards, for enhancing their environmental performance. Cousins et al. (2004) pointed out that

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