

CAN A FRAMEWORK UNDER PRESSURE EXPLAIN GREEN SCM STRATEGY?

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ABSTRACT

Due to the growing concerns for environmental resources, companies have been challenged to reconsider their business models and to restructure their supply chain processes to create more sustainable supply chain 'being a steward for the environment'. There are a number of pressures that impact supply chain management and such pressures have impressed the consumers and customers alike to demand sustainability. We present a five pressure framework for green supply chain management in this paper. The framework includes pressures applied from suppliers, customers, internal, external, and supply chain performance of organizations. We use this framework to explain the green supply chain strategy.

Keywords: Supply Chain Management, Green, Framework, Performance Pressures

Introduction

Green supply chain has been the subject of an extensive research in the recent years due to environmental protection awareness. The original supply chain process uses resources from suppliers to produce and sell products to retailers and consumers. Green supply chain management (GSCM) is being environmentally responsible and envisioning sustainability of an organization with respect to its supply chain management. The impact of GSCM is on every aspect of the supply chain from sourcing of supplies to disposal of final products. GSCM is traditional supply chain management with performance measures on environment and sustainability enhancement with the cooperation of suppliers and distributors.

The benefits of GSCM are much more than environmental protection. GSCM not only reduces hazardous wastes but also improves sustainably in terms of social improvement, utilization of resources, and ethical perception of industrial development. GSCM provides both direct and indirect benefits. In term of direct benefits, GSCM helps reduction of air emission, waste water, and solid wastes; decrease of hazardous materials consumption; decrease the frequency of environmental accidents; decrease purchasing and energy cost; decrease waste treatment fees, waste discharge, and environmental accidents; reduce the costs of supply chain and production; lessen cost of ownership; and lower resource consumption. On the other hand, GSCM provides indirect benefits by implanting the cognizance of environmental protection, building up stronger supply network among stakeholders, satisfying customer and consumer requirements, and developing societal relationships to improve their sustainability. From a marketing perspective, green supply chain has the potential to improve customer relationship, enhance resources management, reduce cost, augment product differentiation, boost competitive advantage, cultivate supply chain management, provide regulation and risk management, promote branding, add return on investment, and reform ethics of business (Khiewnavawongsa and Schmidt, 2008).

Organizations have adopted sustainability as part of their strategic process in building long-term shareholder value. The sustainability of an organization is assessed and evaluated according to its economic, environmental, and social performances. This implies corporate responsibilities and commitment in management of resources that optimizes economic contributions as well as the impacts upon the natural resources and the societal resources. McDonalds in India has a 100% outsourced supply chain (Cheema, 2011). Food ingredients, for example, are supplied by Tier-1 and Tier-2 suppliers. Tier-2 suppliers include lettuce and potato growers, poultry farms, and companies which manufacture coating systems that coat the vegetable and chicken patties. Those ingredients are supplied to Tier-1 suppliers who process the supply into vegetable patties, chicken patties, French fries, etc. The products are then transported in refrigerated trucks to the company's four distribution centers spanned across the country from where they are transported to the 217 McDonald's restaurants across the country. There is a significant reverse logistics involved to bring back the package crates to bakeries, another Tier-1 supplier. McDonalds is doing whatever it can to commit itself to sustainability and to make efforts to ensure that their business practices and policies make a positive impact on society by outsourcing. However, the emissions from road transportation impact the citizens' respiratory and hearing health as well as the quality of air and water. Moreover, there is a growing perception among organizational leadership and consumers that environmental considerations in supply chains are important. Hence, any long-term view of global outsourcing and consumption needs to adopt a GSCM strategy.

What should be the strategy for an organization to implement GSCM? What are the factors that impact GSCM in organizations? How can an organization realize those impacts and envision an organizational strategy around GSCM?

In this study, we examine the literature in GSCM and provide a framework to answer these questions. Such a framework, based on Porter's five-force model (1980), will help the managers to conceptualize GSCM strategies. The framework includes pressures applied from suppliers, customers, internal, external, and supply chain performance of organizations to explain the green supply chain strategy. The study concludes with a discussion on future work.

The Impacts of Green Supply Chain

Due to environmental concerns, green supply chain has been the subject of numerous studies in recent years. In a traditional sense, managing environmental issues has been limited to implementing controls to comply with the environmental regulations. Davies (2009) pointed out that environment awareness is associated with competitive advantage when organizations extend their current processes to discover and eliminate the sources of waste. Many companies have certified their Environmental Management Systems (EMS) to ISO 14001, the global EMS standard (Peglau, 2005), and many have adopted uncertified EMSs. A number of studies question the legitimacy of an organization's EMS in challenging the supplier to become more environmentally sustainable as it may not require organizations to improve their environmental performance instead of focusing on creating and documenting environmental policies and procedures (Krut and Gleckman, 1998). On the other hand, companies adopting EMS may have a greater tendency to expand their focus beyond their organizational boundaries and utilize GSCM practices to minimize system-wide environmental impacts.

Khiewnavawongsa and Schmidt (2008) explained the significant influences of GSCM in an organization and it involves assessing the environmental performance of their suppliers and by requiring suppliers to undertake measures that ensure environmental quality of their products and evaluating the cost of waste in their operating systems (Handfield et al., 2002). However, GSCM practices also extend to the entire value chain when organizations inform buyers of ways to reduce their impacts to the natural environment (Handfield et al., 2004). Those actions can have direct and indirect environmental impacts on an organization's final product or service. Khiewnavawongsa and Schmidt (2008) also explained that government, market, industry, competitors, and the organization can force the company to implement GSCM.

Trowbridge (2001) highlighted the significant performance of environmental supply chain management processes at Advanced Micro Devices (AMD). Khoo et al. (2001) indicated that green supply chains of aluminum are focused on a balance of low total market cost and low transport pollution, fast deliveries between plants, promotion of recycling of scrap metal, and conservation of energy. In the green world, all production processes are necessary to meet the requirements of the environmental protection policy. In order to respond to the demands of the consumers and environmental groups, the manufacturers need to improve their manufacturing flow process. On the other hand, the green supply chain needs to help the manufactures to benefit from these changing processes. The manufacturing companies could benefit from recycling materials, disposing products, and mitigating the risks of workers' health by using all possible environmental protection technologies during the production processes.

Khoo et al. (2001) use four factors in their model including distances from one plant to another plant, models of transportation, number of the products to be transferred, and the best locations for scrap metal. They found that their model could help organizations to manage their cost effectively in transportation, marketing, recycling of scrap metal, and energy conservation when they design a green supply chain in their processes.

Framework for Green Supply Chain

Davies (2009) pointed out the competitiveness of organizations as performance pressures. Khiewnavawongsa and Schmidt (2008) underlined the external pressures to the organization to form a GSCM strategy. Khoo et al. (2001) on the other hand underscored the internal pressures of organizations to form a GSCM strategy. The increasing awareness of the relationships between profit, people, and the planet has increased consumer demand for sustainable products (Kleindorfer et al., 2005). Consumers, especially younger consumers, are developing an increasingly heightened environmental awareness and are starting to prefer "green" products (Lo and Leung, 2000). The ISO 14000 series of environmental management systems as well as environmental audits imposed on suppliers have sustainable impacts of suppliers and has forced suppliers to be conscious of GSCM (Pujari et al., 2003). The impacts that were cited in the above section can be summarized by few pressures that are imposed on organizations towards GSCM as illustrated in Figure 1.

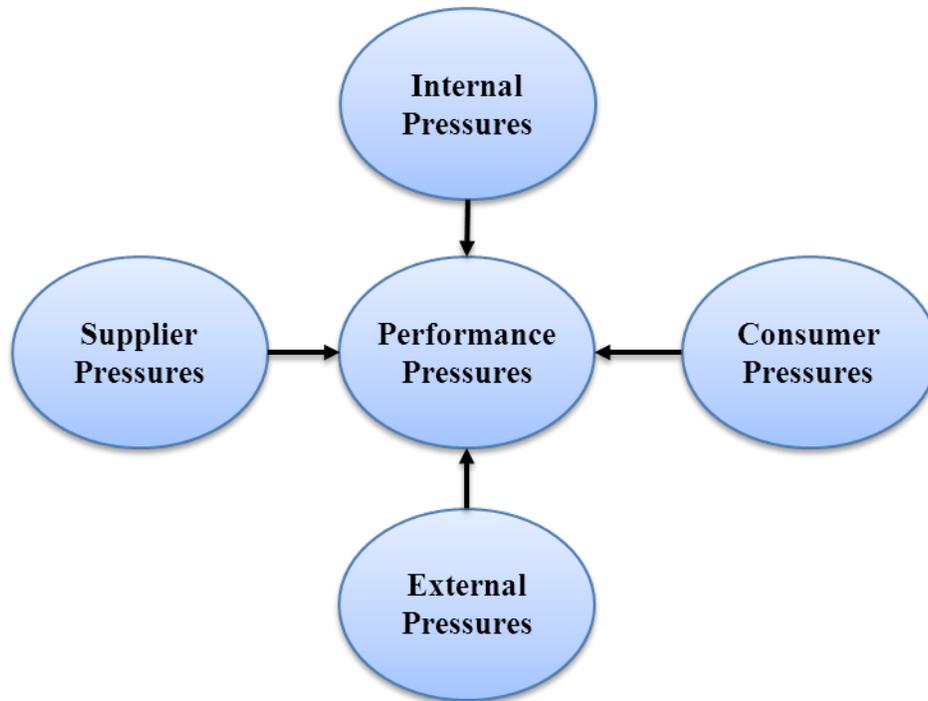


Figure 1 GSCM Framework due to pressures

External pressures

The external pressures of GSCM emerge from government or industry regulations, legislative/legal compliances, environmental compliances, and ISO/standard compliances. For example, ISO 14000 series has been standardized to limit and control amount of hazardous and toxic wastes or pollutions from any industry areas. The regulatory structures affect the operation of both suppliers and manufacturers through environment standards and the regulatory processes. Regulatory agencies demand organizations to comply with standards and require them to publicly disclose information about their waste releases. Under these pressures and threats of noncompliance penalties, an organization should decide to adopt an environmental management system to utilize GSCM practices. For example, regulatory changes in automotive paints have forced car manufacturers to require their suppliers to reduce their use of regulated chemicals in the production process (Geffen and Rothenberg, 2000). Additionally, pressures from regulators may encourage organizations to adopt proactive environmental practices in an effort to form collaborative relationships and explore more non-regulatory ways in which government can encourage greater environmental improvements (Andrews et al., 2003).

Internal pressures

According to Walker et al. (2008), there is a range of different internal organizational-related green supply chain management drivers as well as barriers. Internal pressures include business policies, cost reduction, quality improvement, value creation, employment involvement, internal processes, and new green technology. When applying green processes to the main operations, the

company can recycle, reuse, and remanufacture. The company can gain credibility from customers and suppliers after implementing green processes. An increased pressure from investors has also been observed in the development of environmental policies (Trowbridge, 2001). GSCM is used to integrate processes that measure the environmental impact of supply chain on the organization's final product. For example, to avoid environmental risks from its suppliers, Dow Chemical, one of the largest global producers of chlorine, partnered with its transportation supplier to design rail cars that were two times thicker than that was required by US regulations and by the chemical industry association. The company's decision was based on a discovery that, in the event of a derailment, the rail car had a significant probability of puncturing upon impact and placing neighboring communities and ecological systems at risk.

Customer pressures

Customer pressures are based on customer green demand, customer collaboration, and market pressure. Customer and market pressures may influence an organization's decision to adopt and rely on GSCM practices (Gupta and Piero, 2003). 15 percent of US consumers routinely pay more for green products and another 15 percent seek green products if they do not cost more (Ginsberg and Bloom, 2004). GSCM adoption may help organizations to improve an environmentally conscious reputation. For example, GE introduced an "Ecoimagination" initiative a few years back and hopes to double its revenue from environmentally clean technology such as fuel-efficient jet and train engines, wind turbine power, energy-saving fluorescent light bulbs and water purification projects. A reputation like that may invite patronage from consumers and generate opportunities for business with other organizations that value these principles (Darnall and Carmin, 2005). Toyota's environmentally car, Prius, is very popular among consumers and Toyota expects to sell millions of hybrid cars and SUVs worldwide Ford Motor, Nissan, General Motors and other automobile manufacturers are preparing to launch better hybrid cars as well.

Supplier pressures

Supplier pressures are supplier demand, supplier collaboration, supplier reputation, supplier size, and supplier willingness. Suppliers in a supply chain are willing to change their operations and processes to green manufacturing since they recognize benefits that come with the green supply chain such as cost reduction. In addition, green supply chain will have a greater benefit when all suppliers in the chain team and change supply chain processes to green processes. Suppliers who ignore environmental policies and environmental supply-chain initiatives may their expose customer firms to greater environmental risk (Hall, 2001). For example, IBM wants its suppliers to define and deploy an environmental management system; measure existing environmental impacts and establish goals to improve performance; publicly disclose their metrics and results; and share these requirements to other suppliers of IBM (Bicknell, 2010).

Supplier pressure in GSCM can be mapped into green requirements in sourcing and delivering processes as organizations can hold their suppliers to higher environmental standards in sourcing, packaging, and in delivery of supplies. IBM, for instance, has developed a list of guidelines for their suppliers that require suppliers to publicly disclose their environmental impact as well as demand those regulations to their own suppliers. Rather than IBM

investigating its entire supply chain, each stage of the chain must ensure that the previous stage is environmentally responsible. Whole Food supermarket has made a Palm Oil Pledge to use certified sustainable palm oil in their brands. Wal-Mart has developed a packaging scorecard that provides metrics by which suppliers can quantify the effect of their packaging system by concentrating on greenhouse gas emissions, material choices, and chemical composition (Jannise, 2010).

Performance pressures

Performance pressures demand competitive advantage, financial performance, and stakeholder satisfaction. A company has to survive in green competitive environment by envisioning and implementing a good production and operations management strategy. The result of such strategies will be shown in return on investment, profits, and stakeholder satisfaction. Wu and Pagell (2011) argue that companies are being forced to reconsider their business models and restructure their supply chain operations due to the increasing demand for natural resources and need for environmental protection. According to their study, becoming sustainable is to balance environmental issues and business profitability. Any decision about the trade-off between short-term profitability and long-term sustainability involves uncertainty and risks. Zhu and Sarkis (2006) focused on three fields that include environmental condition, operational performance, and management performance. They found that the performance pressures are the major pressures since the company has to operate under monitoring methods and survive in the competitive environment by performing a good enough strategy of production and operation management. For example, Wal-Mart used to buy cotton from Turkey, ship it to China for spinning and knitting, and then ship it again to Guatemala to be cut and sewn. Currently, Wal-Mart is finding opportunities to eliminate shipment to China and have all processing done in Guatemala as it not only saves time and money for Wal-Mart, but also further reduces the company's impact on the environment by lessening the amount of fuel and other resources used in shipping. Wal-Mart's business sustainability strategy is towards generating value from long-term, collaborative relationships with nonprofits, suppliers, and other external stakeholders (Plambeck and Denend, 2007).

The Five-Pressure framework and the Five-Force Model

Table 1 illustrates how these five pressures conform to Porter's five-force model. According to Porter (1980), there are five forces that challenge competitive companies within the same industry and those forces determine the attractiveness and long-run success of the company. The five competitive forces include threat of entry of new competitors, threat of substitute products, bargaining power of buyers, bargaining power of suppliers, and intensity of competitive rivalry. In our study on GSCM, we find that those five pressures are similar to Porter's five forces.

Table 1. The Five-Pressure framework and the Five-Force Model	
Green Supply Chain Framework	Porter Five Forces model
<i>External pressures</i> Regulatory, legislative/legal, environmental, and ISO/standard compliances	<i>Entry of new competitors</i> Compliances for example, the capital costs and necessary compliance with regulations makes entry to the pharmaceutical industry almost

	prohibitively expensive for new entrants.
<i>Internal pressures</i> Technology issues Changes in business policies Cost reduction opportunities Quality improvement Relative value of products and services	<i>Substitute products</i> New technology and new substitute products Changes in environment, culture, etc. Costs of switching to substitutes Relative price and performance of substitutes
<i>Customer pressures</i> Customer green demand Customer collaboration Market pressure	<i>Buyer bargaining power</i> Customer demand Buyers threaten to integrate backward into the industry Dominant buyers
<i>Supplier pressures</i> Supplier green demand Supplier collaboration Supplier reputation/size Supplier willingness	<i>Supplier bargaining power</i> Many buyers and few dominant suppliers Undifferentiated, highly valued products Suppliers threaten to integrate forward into the industry
<i>Performance pressures</i> Competitive advantage Financial performance Stakeholder satisfaction	<i>Intensity of competitive rivalry</i> Structure of competition Structure of industry costs Degree of differentiation Strategic objectives

Conclusion and Future Research

Strategic corporate social responsibility increases the value of supply chain network by investing in social and environmental aspects of GSCM to strengthen company competitiveness. A symbiotic relationship with the green supply chain environment expands the success of an organization. In order to transform environmental concerns into competitive advantage, organizations need to establish prevent environmental problems. Environmental concerns in production and operations processes are viewed in this study within a broader context of creating a value in supply chain network while integrating various market players and their pressures.

Purchasing managers often consider that green supply chain management issues may benefit by being aware of the external influences of regulation, customers, competitors, and suppliers. Suppliers in a supply chain are willing to change their behaviors to a green production because they recognize the great benefits that come with the green supply chain such as cost reduction. In addition, it will have a greater benefit when all suppliers in the chain team up and change to green processes.

From the definitions of green supply chain, it is critically important to understand the context of environmentally motivated pressures and identify their impacts on supply chain process in order to respond effectively with technical, organizational, and regulatory innovations. The five

pressure framework that we have developed for green supply chain management present a holistic view of the supply chain focused on total quality environmental management and optimization in the supply chain process. This approach of green supply chain management would require the establishment and implementation of new performance measurement systems. Each of these factors can interact with the other pressures and those impacts may be measured and evaluated empirically. These measurement systems should enable organizations to become and remain competitive while achieving sustainable processes protecting the environment.

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