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Review of GSCM Practices for Environment Protection and Company Profit

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ABSTRACT

The aim of this present paper will be to evaluate and describe GSCM drivers, practices and performance among various Indian manufacturing organizations. Balancing economic and environmental performance has become increasingly important for organizations facing competitive, regulatory, and community pressures.

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Introduction

Environmentally sustainable (green) supply chain management (GSCM) has emerged as an important organizational philosophy to achieve corporate profit and market share objectives by reducing environmental risks and impacts while improving ecological efficiency of these organizations and their partners companies. The number of organizations contemplating the integration of environmental practices into their strategic plans and daily operations is continuously increasing day to day. Numerous initiatives have provided incentives for organizations to become more environmentally benign. Organizations view many of these environmental programs, which may include technological and organizational development projects, as possible alternatives for gaining or maintaining a competitive advantage. One environmental program area that continues to gain in importance is one that focuses on the external relationships among organizations. Environmentally conscious business practices have been receiving increasing importance from both researchers and practitioner's point of view. Interdisciplinary research has integrated the efforts of management, engineering, physical and social sciences to investigate the issues relevant to this GSCM. Similarly, multifunctional groups within organizations and external stakeholders have a role in decisions related to organizations and the natural environment. Green supply chain decisions are one of the latest issues facing organizations with strong internal and external linkages.

The aim of this present paper will be to evaluate and describe GSCM drivers, practices and performance among various Indian manufacturing organizations. Balancing economic and environmental performance has become increasingly important for organizations facing competitive, regulatory, and community pressures. With increased pressures for environmental sustainability, it is expected that

enterprises will need to implement strategies to reduce the environmental impacts of their products and services. To establish their environmental image, enterprises have to re-examine the purpose of their business. Success in addressing environmental items may provide new opportunities for competition, and new ways to add value to core business programs. Approaches, such as cleaner production, environmental management systems and eco-efficiency, etc. have been implemented for green management practices. Environmental impacts occur at all stages of a product's life cycle. Therefore, GSCM has emerged as an important new archetype for enterprises to achieve profit and market share objectives by lowering their environmental risks and impacts and while raising their ecological efficiency (van Hock and Erasmus, 2000). The supply chain consist of all parties who are involved in fulfilling a customer request, including the suppliers, transporters, warehouses, retailers and customers themselves.

Supply Chain Management

The supply chain continues to be adopted by organizations as the medium for creating and sustaining a competitive advantage and overall environmental protection (Ireland and Webb, 2007). Such a displacement is understandable considering the potential benefits of successful supply chain management (SCM). The term supply chain management has been defined by Mentzer et al. (2002) as, "the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole" and by Lambert et al. (2006) as, "the integration of key business processes from end-user through original suppliers, that provides products, services, and information that add value for customers and other stakeholders.

In the broader sense SCM has been classified in many of ways but keeping the aim of the present research paper only SSCM and GSCM are discussed. Sustainable supply chain management (SSCM): Review of the sustainability literature, SSCM has defined as the strategic, transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key inter organizational business processes for improving the long-term economic performance of the individual company and its supply chains. Of course, the social and environmental dimensions of SSCM must be undertaken with a clear and explicit recognition of the economic goals of the firm. Thus, like Carter and Jennings (2002), these are not suggesting that organizations blithely undertake social and environmental goals relating to the supply chain. In fact, in the same vein as Porter and Kramer (2002), the SSCM perspective advocates that such undertakings would be socially irresponsible unless considered within the broader context of a firm's overall strategic and financial objectives.

Driving forces of supply chain management: The driving forces of SCM stem from two sources external pressures and potential benefits from strategic SC alignment. External pressures include such forces as advances in technology and increased customer demand across national borders (Mehta, 2004); maintaining lower costs while meeting these diverse needs and intensified competition utilizing relationships among vertically aligned firms (Togar and Ramaswami, 2004). These pressures have begun shifting the focus of individual firms vying for market presence and power to supply chains competing against supply chains (Bhattacharya et al., 1995).

Benefits of strategic supply chain management: The second main driving force entails the potential benefits from successful supply chain collaboration. Literature has discussed benefits; increased inventory turnover, increased revenue, and cost reduction across the chain are the most sought. Collaboration not only enables partners to reduce one another's costs but also allows inventory to cycle through to customers faster. The two-fold result is increased revenues and decreased costs that can be shared across the chain. Two other core benefits include decreased order cycle times and greater product availability.

Green Supply Chain Management (GSCM)

Scott and Westbrook (1991) and New and Payne (1995) pointed out that SCM stands for the chain connecting each element of the manufacturing and supply process from raw materials through to the end users, and handling integration of all participating firms contributions in the supply chain. Over the past decade, SCM has played an important role for organizations' success and subsequently the Green Supply Chain (GSC) has emerged as an important component of the environmental and supply chain strategies of a large number of companies. Although the term "environment" or "greening" has an ambiguous meaning in various fields, the term indicates not only harmonizing corporate environmental performance with stockholders' expectations but also developing a critical new source of competitive advantage in terms of management perspective (Gupta, 1994). According to Gupta (1995), environmental management relieves environmental destruction and improves environmental performance by institutionalizing various greening practices and initiating new measures and developing technologies, processes and products.

In recent years, numerous studies have attempted to find and explore GSCM. Green supply refers to the way in which innovations in supply chain management and industrial purchasing may be considered in the context of the environment. Narasimhan and Carter (1998) define GSCM as the purchasing function including reduction, recycling, reuse, and the substitution of materials. The GSC covers wide areas of GSCM practices and SCM's participants and practices from green purchasing to integrated supply chains flowing from suppliers, to manufacturers, to customers, and to the reverse supply chain (Zhu and Sarkis, 2006; Rao and Holt, 2005). Brown et al. (2001) suggests two main types of green supply management process: greening the supply process and product-based green supply. Greening the supply process stands for accommodations made to the firm's supplier management activities for considering environmental perspectives. In addition, product-based green supply focuses on changes to the product supplied and attempts to manage the by-products of supplied inputs. According to Pagell et al. (2004), leaders of the logistics and supply chain department should balance low cost and innovation process while maintaining good environmental performance. Through supply chain analysis, organizations are able to check whether environmental issues can be incorporated into industrial transformation processes (Green et al., 1996). To implement GSCM, organizations should follow GSCM practices which consist of environmental supply chain management guidelines. Numerous studies have tried to identify GSCM practices in organization which are referred to such internal systems as environmental and quality management systems. Internal environmental management is critical to improving the organization's environmental performance (Zhu et al., 2008). Zhu and Sarkis (2004) indicate that quality management lubricates implementation of GSCM. They suggest that under rigorous quality control, organizations can improve their environmental practice by learning from experiences of their quality management programs.

Some studies focused on external environmental factors such as customers and suppliers. To improve their own environmental supply chain performance, organizations need the interactions with the government, suppliers, customers, and even competitors (Carter and Ellram, 1998). Cooperation with suppliers and customers has become extremely critical for the organizations' to close the supply chain loop (Zhu et al., 2008). Importance of the design process in environmental management is well demonstrated by the existing literature. Reuse stands for both the use of a product without-manufacturing and is a form of source reduction. Recycling is the process which makes disposal material reusable by collecting, processing, and remanufacturing into new products (Kopicki et al., 1993). As an environmental practice, resource reduction enables firms to minimize waste which results in more efficient forward and reverse distribution processes (Carter and Ellram, 1998). Eco-design, design for environmental management, enables organizations to improve their environmental performance and close the supply chain loop by handling product functionality while minimizing life-cycle environmental impacts (Zhu et al., 2008).

Gscm in India

India is one country where the issues related to GSCM is going to become even more critical. Recent studies have shown that a majority of world's manufacturing will be carried out in Asia in the next couple of decades.

As a major manufacturing country, India has many opportunities, but they also face substantial environmental burdens with this opportunity (Rao, 2002). Moreover, developing countries such as India are becoming increasingly industrialized. As part of supply chains, India has been used as a point of disposals of end-of-life products for multinational organizations and developed countries. For example, the end-of-life products have been shipped to developing countries, such as India, where these developing countries do not have the infrastructure or tools available to care for the end-of-life products (Puckett and Smith, 2002), causing greater environmental burden on these nations. The appropriate development of GSCM concepts and practices may indeed aid these countries by lessening the environmental burden of both manufacture and disposal of products, while even potentially improving their economic positioning.

Literature Review

The literature in GSCM has been growing as organizations and researchers begin to realize that the management of environmental programs and operations do not end at the boundaries of the organization. Overall, research in corporate environmental management and its operational relationships have been growing in recent years with a number of papers outlining these relationships (Angell and Klassen, 1999; Geyer and Jackson, 2004; Gupta, 1995; Hanna and Newman, 1996; Sarkis, 2001; Melnyk et al., 2002), including the identification of a need to investigate GSCM. GSCM is strongly related to inter-organizational environmental topics as industrial eco-systems, industrial ecology, product life cycle analysis, extended producer responsibility and product stewardship. In a broader sense, GSCM also falls within the purview of the burgeoning literature of ethics and sustainability which incorporates other social and economic influences. GSCM's definition has ranged from green purchasing to integrated supply chains flowing from supplier, to manufacturer, to customer and reverse logistics, which is "closing the loop" as defined by supply chain management literature (Zhu and Sarkis, 2004). Similar to the concept of supply chain management, the boundary of GSCM is dependent on the goal of the investigator. In this case, there may be focus on a single level supplier-manufacturer-customer relationship. The research in GSCM addresses a variety of issues ranging from organizational research and practice in GSCM (Geffen and Rothenberg, 2000; Hall, 2001; Theyel, 2001; Zsidisin and Siferd, 2001) to prescriptive models for evaluation of GSCM practices and technology (Faruk et al., 2002; Handfield et al., 2002; Sarkis, 2003).

Gscm Practices

There is a multidimensional expansion of the literature in the area of corporate environmental management; my research work may focus on four GSCM practices (internal environmental management, external GSCM including green purchasing and cooperation with customers including environmental requirements, investment recovery, and eco-design practices). These four areas represent some of the main internal and external activities and functions within organizational supply chain management (Zhu and Sarkis, 2004). Whether GSCM practices cause or relate to positive or negative economic performance is still mixed. Alvarez et al. (2001) indicated that environmental management such as GSCM has a positive relationship with an organization's economic performance. The most common GSCM practices involve organizations assessing the environmental performance of their suppliers, requiring suppliers to

undertake measures that ensure environmental quality of their products, and evaluating the cost of waste in their operating systems

Capabilities for Adopting GSCM

Organizations that have expertise with GSCM have developed their knowledge-based competencies by guaranteeing the environmental quality of incoming goods. Like Environmental Management Systems (EMSs), GSCM practices require organizations to have strong inventory control systems. These systems reduce redundant stock materials and unnecessary inputs in the production process (Rosenberg and Campbell, 1985). Organizations that rely on these systems manage materials, productive capacity and other organizational information (Rosenberg and Campbell, 1985). The skills required to adopt GSCM are therefore complementary to the capabilities required for the successful adoption of EMSs in as much as both systems encourage enterprises to reduce input use and decrease waste associated with input choices, which are important for minimizing impacts to the natural environment. Collaboration across internal departments is essential to maintaining robust GSCM practices. However, traditional organizational structures generally are fragmented with purchasing departments operating separately from marketing and sales, and operations functioning independently from human resources, with each having their own goals (Trowbridge, 2001).

External Pressures FOR Adopting GSCM

Regulatory pressures are often associated with an organization's decisions to adopt GSCM practices. These pressures arise from threats of noncompliance penalties and fines and requirements to publicly disclose information about toxic chemical releases. 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. These less coercive forms of regulatory pressure are becoming increasingly relevant as governments expand their programs that encourage eco environment and adoption of GSCM practices. In adopting and relying on GSCM practices, organizations may be able to communicate more effectively to government that they are committed to improving their environmental performance and corporate social responsibility.

Finally, organizations are subject to pressures from the community that include environmental groups, community groups, the media, labor unions and industry associations (Hoffman, 2000). Each of these groups can marshal public support for or against an organization's environmental performance. GSCM adoption may be one way for organizations to indicate to community stakeholders that their environmental management practices are sound. Doing so is increasingly important because community stakeholders often do not distinguish between an organization's environmental practices and the practices of its suppliers.

In sum, GSCM practices may be complementary because organizations that adopt them possess comparable internal competencies and endure similar institutional pressures.

Importance of GSCM

Looked at in this way, the literature gives extensive reasons why GSCM will become increasingly important for more and more companies in the future. The list of stakeholders interested in environmental strategies ranges from customers, competitors, potential investors, employees,

neighbors, environmental legislation, and non-governmental organizations (NGOs) (Basu & Wright, 2008; Vachon & Klassen, 2006). As an example of stakeholder pressure, Robinson & Wilcox (2008) see the biggest impact coming from big, internationally operating companies. After surveying some of the biggest companies worldwide, they found that more than 90% of these companies are considering demanding environmental sustainable practices from their suppliers in future. More than 50% stated that they have already implemented some form of green-minded supplier qualification.

These companies expect that their suppliers start to think green and act accordingly. The research of Reiskin, White, Johnson & Votta (1999) supports these findings. They see a shift from production-focused to service-focused industries, which are accompanied by outsourcing. Instead of delivering quantity, suppliers are expected to deliver quality and solutions for problems which benefit the environment. Thus, suppliers have to deal with environmental issues of their customers in a more sustainable way. This in turn leads to different prerequisites for the relationship between supplier and customer. The conventional relationship sees conflicting interests. The supplier wants to increase his volume sold (e.g. chemicals), whereas the customer wants to decrease this volume and his costs. In the service focused industry, both customer and supplier want to increase the value and efficiency of the service (e.g. fewer chemicals, higher output). Trowbridge (2011) discerns between internal and external drivers for the implementation of GSCM at chip manufacturer Advanced Micro Systems (AMD). Internal drivers are the willingness to improve risk management due to potential interruptions in the supply chain, and the collaboration with suppliers to find alternative materials and equipment to minimize environmental impacts. External drivers are mainly customer requests, investors and non-governmental organizations (NGOs). More and more customers are trying to get information about the environmental impact of products and make their buying decision dependent on that. NGOs like Greenpeace or World Wide Fund for Nature (WWF) expose companies harming the environment and through that affect customer behavior. It is frequently mentioned that saving resources and energy cuts down costs. Profitable pollution prevention is an inherent mechanism in making production processes more efficient (e.g. the amount of energy needed to produce iron and steel has fallen continually since the Industrial Revolution).

Thus the need for the implementation of green practices has many reasons, but the aspiration of a sustainable competitive advantage is for many authors the decisive reason for GSCM. The facing of environmental issues is not just a precondition for long term survival but also for long-term profitability (Taplin, 2001). Nonetheless, one motivation is not widely accepted in the literature, namely automatic superior economic advantages coming with environmental practices. Some research questions the guaranteed generation of win-win situations through GSCM practices (Reinhardt, 1998; Zhu & Sarkis, 2007). Regulatory pressure is increasing continuously. Reinhardt (1998) observes that ultimately environmental quality needs governmental regulation, as the environment is a public good. According to him, people and especially companies will not spend any more on environmental issues than is required to achieve their own maximizing economic goals, as these investments would not benefit themselves in

total. So the need for green practices is often not just out of own choice, but compulsory by law.

Advantages of GSCM

Several researchers have different points of view about the advantages of the implementation of GSCM:

★ A report for the Business for Social Responsibility Education Fund (Suppliers' perspectives on greening the supply chain, 2001) enumerates cost reductions, greater operational efficiencies, and enhanced value to customers, increased sales, positive media attention, and positive ratings from investment firms as benefits of the implementation of GSCM.

★ Seuring (2001) sees the improved relationships between the supply chain members as a source of competitive advantage.

★ Thierry, Salomon, van Nunen & van Wassenhove (1995) mention that greener products help to get and retain environmentally conscious customers and employees. Furthermore future liabilities can be lowered, as well as insurance rates and disposal costs. Even future legislation could be influenced through lobbying, and pro-active companies would gain an advantage. Rao (2007) sees other main motivators in the Philippine context. Here the customer pressure and the desire to avoid potential export limitations come first. Customer pressure is based on the customer demands in developed countries, who want more green products. Therefore the whole supplier base needs to conform to these world-class standards, especially to the ISO 14000.

More motivators for greening the supply chains are reducing the risk of environmental hazards, fear of bad publicity, cost of non-compliance, governmental penalties and just to demonstrate an image as an environmentally responsible company. Thus, eventually globalization can be identified as a main driver for the development of GSCM. As most products are made by more than one company, there needs to be an alignment of decisions and strategies to use scarce resources effectively (Piplani, et al., 2008).

Existing GSCM Practices

Sarkis (2003) enumerates four basic environmentally conscious end-of-life practices: reuse, remanufacture, recycle, and disposal alternatives. A fifth practice is reduction, not just applicable as an end-of-life strategy, but especially important during manufacturing and distribution. Reuse, remanufacture, and recycling are similar and vary just in the degree of reuse of the material. Reuse is characterised by little impact on the physical structure of the material, remanufacture practices use just parts of the original material and components are substituted. Recycling can change the physical structure completely. Handfield et al. (2005) add a few strategies for environmental impact reduction: green design, substitution, extension of products' life cycle through material selection, support of suppliers, and life cycle assessment (LCA). Green design considers the product level and the manufacturing level. On the product level this means environmentally friendly materials are used, but, also, already considers the manufacturing process of the product. Thus, aiming for less use of energy, water and so forth. Substitution is inherent in green design and means the omission of hazardous materials in favour of environmental friendly materials. Extension of a product's life cycle is again connected to green design. A product is designed in advance, in a way that the whole product is not obsolete at the end of the life cycle, and that parts can be reused in the new product. The support of suppliers encompasses all procedures helping suppliers to work in a sustainable way including improving their

manufacturing processes, clear instructions for a green product, or cross-organizational teams. LCA addresses the environmental burden of a product, not only at product composition, or at the processing stage, but at the whole physical life cycle of a product from the extraction of raw materials to end-of life (Heiskanen, 2002). Thus, LCA confronts market actors with new responsibilities. A producer is not just responsible for the environmental damage in the own production processes, but must consider the environmental pollution from other states as well. The four phases of product life cycle have an important influence on the decision about environmental practices. The introduction phase is focused on investment in product research and development, in the growth phase increasing production capacities and logistic channels are of importance, the maturity phase is characterized by the implementation of process and cost efficiencies, and in the decline phase products divestments are necessary (Sarkis, 2003).

All practices mentioned up to now have resulted from greening the operational life cycle which include inbound logistics, production or internal supply chain, outbound logistics, and possible reverse logistics (Rao, 2007). Sarkis (2003) proposes a slightly more detailed segmentation as stages in the supply chain: Procurement decisions; Production processes; Distribution and transportation, Reverse logistics operations and packaging. Procurement decisions influence the environmental efforts through purchasing green products and exerting influence on the suppliers. Production processes can have numerous impacts on the environmental performance of a company, for example the ability to integrate reusable or remanufactured components into the system, or design of the processes to prevent waste and pollution. Some decisions in distribution and transportation include the locations of outlets, mode of transportation, or just in-time practices. Reverse logistics operations are assigned to return recyclable or reusable materials and consists of several stages as well, including collection, separation, densification, transitional processing, delivery and integration (Sarkis, 2003). Geyer & Jackson (2004) focus their work on supply loops, which are end-of-life strategies. This includes diverting end-of-life products from dumping to collecting them for recycling. These secondary resources substitute primary resources in the supply chain. Packaging is mostly interlinked with the other components of the organisational life cycle, and is focused on a minimization of waste and its impact on the environment (Sarkis, 2003). In particular, improvements in the area of packaging and transportation promise savings and improvements in the environmental performance simultaneously (Matthews, 2004).

Differences Between GSCM and Traditional Supply Chain

The green supply chain focuses on changes in the following five aspects compared to traditional types of supply chain:

- (1) The goal: - The traditional supply chain aims to lower the cost and improve the efficiency of supply chain enterprise so as to maximize the economic benefits. Green supply chains also seek to maximize economic benefits, to decrease the consumption of non value adding part or resources and energy and to reduce the emissions of pollutants – all in an effort to create a socially responsible enterprise, and to balance the economic benefits, social effects and environmental effects.
- (2) Management structure of supply chain:- For green supply chain management, environmental performance is included in

the enterprise's internal and external management, which is lacking in traditional supply chains.

- (3) Business model. A green supply chain means a more complete business model. Elements including low carbon and environmental protection must be included in the entire logistics and supply chain to realize a complete green and low carbon supply chain system through the whole life cycle, from raw material sourcing and industrial design to production and delivery.

- (4) Business process. The traditional supply chain starts with suppliers and ends with users, and the products flow is one-way and irreversible, known as "Cradle- -to-Grave". The green supply chain changes this management mode and hopefully realizes "Cradle-to-Reincarnation". In green supply chain thinking, product flow is circular and reversible and all products must be managed throughout the entire life cycle, and beyond so that "waste" finds a second life or becomes raw material available for new production or other purposes.

- (5) Consumption pattern. The consumption pattern of the traditional supply chains is a voluntary initiative governed by consumer interests and business activities. Green supply chains can be promoted through green government procurement, corporate social responsibility, and sustainable consumption education and practices.

Conclusions

The exhaustive literature review various points are come out for the future research. Such as, now a day's organizations are focusing more tightly on their core competencies and relying on their suppliers to a greater degree for non-core activities such as new product development through early design and concurrent engineering (Pralhad and Hamel, 1990; Ragatz *et al.*, 2002). These organizations are choosing to adopt their green supply chain to avoid inheriting environmental risks from less environmentally conscious suppliers (Klassen and Whybark, 1999). The global automotive industry is an example of one sector that collectively is considering the environmental attributes of its suppliers to avoid environmental risks. It is also corporate social responsibility commitment by incorporating its global supply base and reducing its supply chain risks. As the global financial crisis goes deeper, a growing number of international trade disputes are arising, with trade barriers based on environmental issues being more frequently applied. In general, India's environmental standards are lower than those of developed countries due to the differences of development stage, but the international community tends to mistake the products of "Make in India" as high-carbon and heavy-polluting products. Today, significant changes have taken place in the international market, and India, as a major exporter, is directly or indirectly forced to address environmental issues that could become barriers to international trade. A fully realized green supply chain management program would be beneficial not only for India to reduce environmental impacts and energy consumption domestically, but also to avoid the economic risks arising from green barriers to international trade. Furthermore, the public's increasing recognition of green products will promote a change from the traditional procurement mode to green procurement for governments and enterprises. With huge buying power represented by government and large enterprises, green procurement can quickly promote changes in production throughout the industrial supply chain.

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