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Seven Step Model: Traditional to Green Supply Chain Management Transformation

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ABSTRACT

Organizations are often unclear how to transform themselves from a traditional supply chain management to a green supply chain model. We interviewed several suppliers to design a transformation process. We illustrate a seven-step model ground in Stakeholder Theory on how those suppliers transformed themselves to be a green supplier.

Seven Step Model: Traditional to Green Supply Chain Management Transformation:

- Calculate total cost of ownership and identify the green aspect of cost of ownership.
- Identify the touchpoints between product lifecycle and greening process.
- Evaluate all bases of touchpoints.
- Obtain “buy-in” from stakeholders.
- Develop green strategy for product lifecycle.
- Integrate (change management, process reengineering, and technology) and implement green strategy.
- Assess metrics and set up a continuous improvement process.

KEYWORDS: Green supply chain, management, transformation, model

INTRODUCTION

Technological advances and intensified global competition in the market for products and services have contributed to numerous studies in examining the effectiveness and efficiency in supply chain management. Green supply chain management (GSCM), a concept that attempts to address these environmental concerns and efficiency improvements in supply chain processes, have been the subject of many recent studies. Due to environmental concerns, regulators, communities and employees, are demanding efficient actions from firms (Paulraj et al., 2017). Moreover, there is a consistent growth in the evaluation of green supply chain management practices and performance (Tseng, Islam, Karia, Fauzi, & Afrin. (2019).

Because of the growing awareness regarding environmental sustainability issues by consumers it is becoming important for manufacturers to adopt green supply chain management practices

to remain competitive. The environmental awareness of customers has pushed manufacturers to adopt cleaner production techniques and implement GSCM practices. Mathiyazhagan, Govindan, Hag & Geng 2013). GSCM activities not only have to be adopted within the organization but in addition need to be coordinated with suppliers and customers (Green, Zelbst, Meacham & Bhadaurin, 21012).GSCM can result in improved organizational performance, Past studies have shown that the adoption of GSCM practices leads to better performance particularly economic performance. These improvements are across all size organizations and industries. The improved economic performance is because of better sales, profits, and market share. Other potential benefits of GSCM are better operational efficiency with reduced energy consumption lower scrap rates and inventory levels. (Geng, Mansoiuri & Aktas, 2017).

In 1989, Walmart launched one of the first major retail campaigns to sell environmentally safe products in recyclable or biodegradable packaging. The corporation promoted these eco-friendly products by labeling them with green-colored shelf tags. The idea was to improve the company's impact on the environment through a commitment to three ambitious goals including 100 percent renewable energy, zero waste, and sell products that sustain the resources and the environment (Scott, 2005). Walmart also cultivated deeper relationships with its suppliers in addressing the environmental concerns. In the past, retail textile buyers selected manufacturers based on the cost and quality of their products. Walmart, however, interacted with suppliers, more often, more directly, and for a greater duration than ever before. These closer relationships were necessary to sustain initiatives like the organic cotton project (Plambeck & Denend, 2008).

Walmart has forged ties further upstream to become more efficient and to reduce costs. The company 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. Recently, they are finding opportunities to eliminate the shipment to China and have all processing done in Guatemala. Going directly to Guatemala 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 (Plambeck & Denend, 2008). According to Plambeck and Denend (2008), at the heart of Walmart's business sustainability strategy is a shift from generating value through price-based, transactional interactions toward generating value from longer-term, collaborative relationships with nonprofits, suppliers, and other external stakeholders. Through its sustainable value networks, Walmart gains a whole-system perspective that helps the retailer find profitable ways to address environmental issues such as fishery depletion, climate change, and pollution. Walmart set the goal of a 5 percent reduction in packaging by 2013. It has been widely reported that the retail giant expects the cut in packaging will save 667,000 metric tons of carbon dioxide from entering the atmosphere.

With increasing consumer awareness and regulatory compliances, organizations with GSCM practices will have a competitive advantage over others who are either lagging or reluctant to embrace GSCM. Many organizations are reluctant because they are not convinced how to deploy GSCM in ways that can benefit them from their desired cost savings and creation of value. An earlier study (Beamon, 1999) recognized five issues of environmental management in GSCM. The first issue is how to find out the environmental factors driving the green supply chain. The second is to understand the differences between the traditional supply chain and the green supply chain. The third is to understand the risks arise from practicing the green supply

chain. The fourth is how to measure the performance for the green supply chain and the final problem is to develop a process that would create an effective green supply chain.

This paper illustrates how companies must collaborate and partner with their suppliers in order to produce a more effective green supply chain process. A seven-step model, grounded in the theoretical perspectives of the Stakeholder Theory, is developed to illustrate how suppliers can transform themselves from a traditional supplier to be a green supplier.

LITERATURE REVIEW

Since Carter and Rogers (2008) introduced the concept of sustainability —the integration of environmental, social, and economic criteria that allow an organization to achieve long-term economic viability —the environmental concerns in supply chain have received more attention in the literature and in business in recent years. Green supply chain has recently received much attention among researchers and practitioners of operations and supply chain management and has been the subject of numerous extensive studies in recent years due to environmental concerns and awareness. In a traditional supply chain process, the resources from suppliers are used by the manufactures to produce and sell products to retailers and consumers (Beamon, 1999). But the green supply chain would integrate the environmental elements into the supply chain process, and the goal is to address the influences and relationships between supply chain management and the natural environment. This would enlarge the consideration of whole manufacturing process to relate and include environment influences by products. For example, in April 2010, IBM announced that it will require its 28,000 suppliers in more than 90 countries to install management systems to gather data on their energy use, greenhouse gas emissions and waste and recycling. Those companies in turn must ask their subcontractors to do the same if their products or services end up as a significant part of IBM's $40 billion global supply chain. The suppliers must also set environmental goals and make public their progress in meeting those objectives (IBM. 2009).

Traditionally, environmental management in business has been limited to complying with the environmental laws and regulations, and their financial consequences. However, environmental awareness has been associated with competitive advantage in business, particularly when the companies taking a constructive approach to environmental issues, look beyond their current process to find and eliminate sources of waste. in this approach, the focus is on the value embodied in the product and process and maximization of the benefit attained from environmental initiatives (Walton, Handfield & Melnyk 1998). Still, there is another approach that integrate total quality environmental management (TQEM) into its planning and operations processes that includes not just executives and workers, but customers, suppliers, and neighbors (Makower, 1994).

Beamon (1999) explores Lamming and Hampson's definition of green supply chain as the environmental impact of the production process from the original resource to the end of the production including the disposal process. Zhu and Cote (2004) define the green supply chain as finding a 'win-win' strategy for both suppliers and distributors on marketing performance and environmental issues. In order to meet these requirements, the company needs to connect the suppliers to import environmental products.

Zhu and Sarkis (2004) notes various definitions of the green supply chain. Green, Morton, and New (1996) define it in the context of the environment in purchasing and innovations.

Narasimhan and Carter (1998) define green supply chain as the activities that involve recycling, reduction, reuse, and substitution of materials. Godfrey (1998) defines the green supply chain as monitoring and improving environmental performance of the supply chain management. Messelbeck and Whaley (1999) assert that the green supply chain would be researching, developing, manufacturing, storing, transporting, and using a product, as well as disposing of the product's waste.

GREEN SUPPLY CHAIN BENEFITS

In the green world, every production process should meet the requirement of environmental protection policy. The public is aware that they need to protect the environment. In order to respond to the demands of the consumers and environmental groups, the manufacturers need to use any necessary means to improve the production flow process to reduce any pollution by any possible measure (Fiksel, 1996). On the other hand, the green supply chain needs to help the manufacturers to benefit from these changing processes. The companies could decrease the cost of the materials, maintenance, operation, and repairing by checking and investing the inventory operation. In addition, the companies could benefit from recycling materials and disposes products and decrease the risks to the workers' heaths by using environmental protection technologies during the production processes.

The benefits of green supply chain are much more than environmental protection. The green supply chain does not only provide the benefits by reducing hazardous wastes or purifying toxic water but also has the potential of sustainably social improvement, utilization of resources usage, and ethical perception development. Green supply chain provides both direct and indirect benefits. Direct benefits include reduction of air emission, waste water and solid wastes, decreasing of consumption for hazardous/harmful/toxic materials, decreasing of frequency for environmental accidents, improving an enterprise's environmental situation, decreasing of cost for materials purchasing, cost for energy consumption, fee for waste treatment, and fee for waste discharge, decreasing of fine for environmental accidents, reduction of cost of supply chain and cost of production, reducing cost of ownership of customer, and lowering resource consumption. On the other hand, GSCM gives indirect benefits on implanting the conscious of environmental protection, building up stronger connection among stakeholders, satisfying customer needs, and developing the relationship of society. Furthermore, a company should consider adopting of the green supply chain since the GSCM will give great benefits on customer relationship, resources management, cost reduction, product differentiation, competitive advantage, supply chain management, regulation and risk management, branding, return on investment, employee regulations, and ethics of business (Khiewnavawongsa and Schmidt, 2008).

THE GREEN SUPPLY CHAIN IMPROVEMENT PROCESS

The evolution to a greener supply chain is a continuous process with no final end point. Because it is an endless nature of becoming greener an appropriate method for developing a green supply chain is the continuous improvement methodology. Kazan or continuous improvement focusses on the reduction of waste and improving efficiency. The purpose of continuous improvement is to eliminate waste (muda) in all areas of an organization and the supply chain. Waste is considered anything that customers are not willing to pay for. (Bhuiyan and Bahel, 2005). Waste can take the form of pollution. With a continuous improvement process in mind, a seven-step model for greening the supply chain was developed.

The stakeholder Theory (ST) asserts that managers have a fiduciary duty not merely to the corporation's stockholders, but to the corporation's stakeholders— to those groups that are either vital to the survival and success of the corporation or whose interests are vitally affected by the firm (Smith & Hasnas, 1999). One of the four theories offered by Donaldson and Preston (1995) states that ST is managerial in that it recommends attitudes, structures, and practices and requires that simultaneous attention be given to the interests of all legitimate stakeholders. The seven-step model integrates the view of the stakeholders of a firm to develop a green supply chain strategy.

This seven-step approach was developed after interviews with business managers involved in the green supply chain process in companies located in Midwest US. The seven steps are listed below for transforming an organization's supply chain process to a greener or more sustainable supply chain:

- Calculate total cost of ownership and identify the green aspect of cost of ownership.
- Identify the touchpoints between product lifecycle and greening process;
- Evaluate all bases of touchpoints;
- Obtain "buy-in" from stakeholders;
- Develop green strategy for product lifecycle;
- Integrate (change management, process reengineering, and technology) and implement green strategy;
- Assess metrics and setup a continuous improvement process

Calculate Total Cost of Ownership and Identify the Green Aspect of Cost of Ownership

The first step in developing a greener organization is to document all the costs and causes of waste and pollution within the organization's operations and supply chain. In conventional supply chains, the most visible costs are considered while ignoring less apparent costs, pollution, and waste. An example of this is when selecting a supplier only considering the purchase cost while not considering other less visible factors such as the environmental performance of the supplier. In a cost analysis, organizations would normally review all their purchases as a first step towards developing a strategic sourcing plan (Monczka, Handfield, Giunipero, & Patterson, 2014). In considering environmental aspects of purchases, all costs will be considered including not only purchase costs, but also the generation of waste and pollution. All steps and activities in the supply chain need to be considered and costs, waste, and sources of pollution identified. Once the costs and causes of pollution and waste are identified a plan can be developed to reduce the sources of waste and develop a greener supply chain in the following six steps.

Identify the Touchpoints Between Product Lifecycle and Greening Process

The second step in this process is to identify touchpoints or responsible parties in the supply chain. The product life cycle includes the introduction, growth, maturity, saturation, and decline stages. Touchpoints would include suppliers and logistics providers that could be sources of waste and pollution in those stages. This step identifies specific responsible parties where each source of cost and waste take place.

Evaluate All Bases of Touchpoints

Once the major touchpoints are identified each specific point is evaluated to see how it is responsible for costs, waste, and pollution. Possible changes that can be made to make the overall process greener are identified at each touch-point location. Touchpoint evaluations for

example could identify alternative suppliers that are closer and require less energy costs for transportation.

Obtain "Buy-in" from Stakeholders
The next step is to identify and obtain buy-in from stakeholders that are impacted by the greening process. Stakeholders would include customers, suppliers, employees, stockholders, government agencies, and local communities. In this step the organization works with each of the stakeholders to make sure the stakeholder's needs are met in the process of developing a greener supply chain.

Develop Green Strategy for Product Lifecycle
After working with each of the touch points and stakeholders the next step is to develop a holistic strategy for implementing a more greener supply chain and product lifecycle. Individual alternative changes to each of the touchpoints are evaluated for their impact on the performance of the whole supply chain. The basic principles of green strategy include repair, recycle, recover, repair, regeneration, remanufacture, reduction, and waste management (Glavic & Lukman, 2007).

Integrate and Implement Green Strategy
A detailed plan to transform the supply chain is developed based on information from all the previous steps. Change management, process reengineering, and technology strategies should be included in the integration. The transformation plan that includes those strategies should be implemented. Key metrics are developed and used to determine the effectiveness of the change. These metrics will serve as a yardstick to determine progress made in the supply chain transformation process.

Assess Metrics and Setup a Continuous Improvement Process
After changes have been implemented key measures are evaluated to determine the effectiveness of the transformation. Since this is a continuous process the organization returns to step 1 to develop further process improvements.

CONCLUSION AND FUTURE RESEARCH

We are planning to use qualitative research methods to analyze several consumer product manufacturing companies in Midwest. It focuses on five fields including materials used in product design for the environment, product design processes, supplier process improvement, supplier evaluation, and inbound logistics processes to find out the relationship between those processes.

A study by Cote, Lopez, Marche, Perron, and Wright (2008) examined three medium-sized companies in Burnside Industrial Park, Nova Scotia, and evaluated the challenges and opportunities for reducing greenhouse gas emissions and solid waste which are of significant concern to the Nova Scotia federal government. The study reviewed the procurement policies and practices of large corporations which serve as both suppliers and customers and the results show that time and financial resources are the greatest factors that limit many companies to employ environmental-based processes.

After analyzing the supply chain process for these companies, the paper shows that the design department and purchasing department should work together to make an environmental product from the resource directly because a lot of materials need to be concerned with the recycling issue and avoid any impact on the environment after producing the merchandise. We proposed that the company should use its purchasing power to influence the suppliers to let them evaluate their process into the green process. A qualitative study using the interview data is being planned.

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