Greening of Supply Chain

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ABSTRACT

Supply Chain Management is becoming an important concept in modern manufacturing. The next generation manufacturing system should be about green manufacturing—our manufacturing and supply chain operations should have done of green in them. We should not waste; if we do, we should recycle them. Supply Chain Management is the process of planning, implementing and controlling the operations of the supply chain with the purpose of satisfying the customer’s requirement as efficiently as possible. Less control and more supply chain partners led to the creation of Supply Chain Management concepts. The purpose of Supply Chain Management is to improve trust and collaboration among supply chain partners, thus improving inventory visibility and improving inventory velocity. Green Supply Chain Management (GSCM) is a relatively new green issue for the majority of Indian Corporations. Adding the “green” component to Supply Chain Management involves addressing the influence and relationships of Supply Chain Management to the natural environment. Keeping this in view, this paper has been written which gives an overview on Green Supply Chain Management.

Introduction

Business the world over is threatened by the globalization of markets, ever shortening product life-cycles, the need to lower costs, and ever increasing demands of the customer. The speed and manner in which business is conducted has radically changed. Aggressive leadership by some of the world’s biggest companies—Wal-Mart, GE and DuPont among them—green growth has risen to the top of the agenda for many businesses. From 2007–2009 eco-friendly product launches increased by more than 500%. An IBM survey found that two-thirds of executives’ sees sustainability as revenue driver, and half of them expect green initiatives to confer competitive advantage. This dramatic shift in corporate mind set and practices over the past decade reflects growing awareness that environment responsibility can be platform for both growth and differentiation.

In the face of highly competitive markets, enterprises today consider supply chain management to be the key area where improvements can significantly impact the bottom line. Supply Chain Management has traditionally been viewed as a process wherein raw materials are converted into final products, then delivered to the end-consumer. This process involves extraction and exploitation of the natural resources. It is important to note that we live in a decade where environmental sustainability has been an important issue to business practice. Since the early 1990’s, manufacturers have been faced with pressure to address Environmental

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Management (EM) in their supply chains. This is not an easy task to do however, adding the ‘green’ concept to the ‘supply chain’ concept adds a new paradigm where the supply chain will have a direct relation to the environment. This is interesting because, in history, these two paradigms were once in head-on collision with each other: Supply chains, in an operational sense, are about extracting and exploiting raw materials from the natural environment.

Green Supply Chain Management

Green Supply Chain Management (GSCM) has emerged as a key approach for enterprises seeking to become environmentally sustainable. The notion of Green Supply Chain Management implies the insertion of environmental decisions within the traditional concept of Supply Chain Management.

"Green Supply Chain Management is integrating environment thinking into supply chain management, including product design, material sourcing, and selecting manufacturing processes, delivery of the final product to the consumers, and end-of-life management of the product after its useful life."

The key themes that came out in the literature over the last twenty years are the concepts of: green design, green operations, green distribution, reverse logistics, waste management and green manufacturing. The very first green supply chain came into context in 1989. Kelle and Silver’s (1989) article was the first of this literature that developed an optimal forecasting system for organizations to use to forecast products that can be potentially be reused.

Areas of Green Supply Chain Management:

Green Supply Chain Management (GSCM) addresses the four interrelated areas of the supply chain:

- Green Procurement
- Green Manufacturing
- Green Distribution
- Reverse Logistics

Green Procurement: Green procurement is sourcing form environmentally concerned and economically conservative business, and a concept of acquiring a selection of products and services that minimizes environmental impact. This includes supplier selection, supplier evaluations and supplier training.

Supplier selection includes suppliers and contractors practices green production, environmentally friendly design for products and free from hazardous substance. Supplier Classification is based on their features and risk level. The main purpose is to encourage suppliers to establish their hazardous substances internal management system. This will help to achieve effective control on environmental-friendly design for products and be hazardous substance free through source management. Supplier evaluation measures supplier’s efficiency in managing hazardous substances. Some of the certificate obtained by supplier for environmental protection efforts or hazardous substances management (ISO 14001 or TS16949 or QC080000 or OHSAS18001), will add to the supplier’s credentials.

Supplier training meetings helps to promote and communicate methods in implementing its green supply chain management system as well as items that suppliers shall cooperate with procurer. This will create a win-win situation for both procurer & suppliers based on green product consensus.

Green Manufacturing: Green manufacturing is defined as production processes which use inputs with relatively low environmental impacts, which are highly efficient, and which generate little or no waste or pollution. Green manufacturing can lead to lower raw material costs, production efficiency gains, reduced environmental and occupational safety expenses, and improved corporate image. Supply chain management might include involvement with "design for the environment" with suppliers. Green design is an important component to Green supply chain management. It is about designing a product or a service that encourages environmental awareness. Many companies are examining the design of their products to identify where the use of raw materials can be reduced or waste materials be replaced. Indeed many businesses are reviewing each component to identify whether it can be manufactured or purchased more cheaply. When designing packaging options, companies are examining cheaper and less wasteful materials. Each production process should be examined to minimize the waste of raw materials. In manufacturing operations processes that waste material that cannot be recycled or reused should be eliminated. Even in processes that produce waste that can be recycled should be examined due to the costs in recycling processes. As well as minimizing the waste of raw materials in manufacturing processes, the use recycling waste material can be expanded. Improvements in the technology of reclaiming waste material has meant that companies that previously discarded waste products now have the ability to re-use that material. As the recycling technology becomes more available the costs will inevitably fall helping businesses with waste issues. Quality control is built into all manufacturing processes but is usually focused on the finished product rather than minimizing waste. Quality management should include the goal of minimizing the waste of raw materials as well as producing a quality product. Improving the overall quality of a company’s manufacturing process will reduce waste overall and it will increase the quantity of finished goods that pass quality inspection.

Green Distribution: Green distribution is consists of green packaging and green logistics. Packaging characteristics such as size, shape, and materials have an impact on distribution because of their effect on the transport characteristics of the product. Better packaging, along with rearranged loading patterns, can reduce materials usage, increase space utilization in the warehouse and in the trailer, and reduce the amount of handling required. Activities such as just in time or quality management intertwine with environmental criteria. Companies should improve truck utilization. What this means is that the complete weight and volume of the truck should be utilized. The container is filled completely, yet the maximum permissible weight is not reached. To maximize the utilization of the truck, products that cube-out and weight-out should be loaded together in a truck. Some products weigh-out, i.e. the truck reaches its maximum permissible weight while the maximum volume is not filled. Some components cube-out to maximize the capacity of the truck. The truck’s bodies can be designed cubical or cube-out, and the railroads instead of road as Rail is the most efficient means of transportation. The coefficient of friction between metal and metal is lower than rubber and road. The Railways has started becoming more customers friendly. Customers can own their wagons. Wagons can be designed to meet the specific and special requirements of customers. Goods can be loaded on parcel vans which travel at the same speed as rail and express trains. Coastal Shipping & shipping through inland waterways should be encouraged.

Getting the supply chain network right would reduce transportation. The supply chain network implies location of plants, distribution centers, warehouses and distribution centers. As a thumb rule about 70% of the cost of a supply chain is fixed at the network design stage itself. Network design and optimization should be done whenever there is a change in the supply chain – acquisition of a company, setting up a new plant, changes in distribution structure. For example, a lot of companies have recently move to strategic location to take advantage of the tax holidays that companies got by setting up factories there.

Reverse Logistics: Reverse logistics is the process of retrieving the product from the end consumer for the purposes of capturing valuable parts or for disposal. Activities include collection, combined inspection/selection/sorting, re-processing/direct recovery, redistribution, and disposal. Usually comprises those activities related to the disposal and sale of excess stock, including recovery and recycling opportunities. Green Operations in terms of reverse logistics is an important concept. Reverse logistics as a process where a manufacturer accepts previously shipped products from consumers for possible recycling and re-manufacturing. Reverse logistics have been widely used in automobile industries such as BMW and General Motors. Doing this would allow help firms become more competitive in their own industry. Collection is the first stage in the recovery process. Products are selected, collected and transported to facilities for remanufacturing. Used products came from different sources and points from the point for product recovery facility to begin the converging process. Sorting and Recycling are also an important mechanism when sorting reusable products. Collection schemes should be classified according to materials whether separated by the consumer (separation at source) or centralised (mixed waste). The goal is to sort products that can be
reused to reduce costs of making new products.

Implementation & Benefits of Green Supply Chain Management

"Green is not going away. It's not a fad. In Europe they don't even call it green. They don't call it sustainability. They just call it the way to do business. And that's what's going to happen here," predicted Brett Wills, a senior sustainability coach of HPS Inc. Adopting sustainable supply chain practices is no longer an option; it's what you have to do to stay in business. Green Supply Chain Management concept, due to the increasing concern about environmental issues, many Supply Chain Management professionals find it necessary to understand the problems from system perspective rather than in single business entity. Green Supply Chain Management is then the attempt to measure, analyse and improve performance among many various members to ensure that these companies are operating in environmental friendly manner.

Many Supply Chain Management initiatives start with performance measurement, Green Supply Chain Management is no exception. Deploying appropriate metrics will help executives understand current performance. Examples of Green Supply Chain metrics are as below:

<table>
<thead>
<tr>
<th>Process</th>
<th>Metrics</th>
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<tbody>
<tr>
<td>Plan</td>
<td>Compliance Costs</td>
</tr>
<tr>
<td></td>
<td>Non Compliance Costs</td>
</tr>
<tr>
<td>Source</td>
<td>% of orders receive with correct packaging</td>
</tr>
<tr>
<td></td>
<td>% of suppliers with correct EMS system</td>
</tr>
<tr>
<td>Make</td>
<td>Energy costs as % of production costs</td>
</tr>
<tr>
<td>Deliver</td>
<td>Fuel costs as % of deliver costs</td>
</tr>
<tr>
<td>Return</td>
<td>% of carriers meeting environmental criteria</td>
</tr>
<tr>
<td>Cross - Process</td>
<td>Liquid Waste Generated (Tons or kg)</td>
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<tr>
<td></td>
<td>Solid Waste Generated (Tons or kg)</td>
</tr>
<tr>
<td></td>
<td>% Recycled Waste (Tons or kg)</td>
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There are various process and steps which will help in having the greener supply chains. We may follow following steps to have Greener Supply Chain:

a) Communication- Communicate in advance to your suppliers, they need time to adapt so give them opportunity, but ultimately they cannot halt change.

b) Involve your staff- top down decision making won't work; you need to encourage a culture change across all department

c) Think local-shorter supply chain have advantage, so check your own region first

d) Look for accreditations: there are many governing bodies and marks of approval (ISOs, Fairtrade etc.); get to know most relevant ones for your business

e) Take small steps; it might seem like a huge task, and it can be, so don't try to do it all

Benefits of Green Supply Chain Management

Organisations can enjoy several benefits by greening their supply chain, such as:

Sustainability of Resources - GSCM helps in proper and effective utilisation of available productive resources of organisations. Organisations will purchase 'green' input resources for environmental friendly production process to produce desired outputs.

Lowered Costs/Increased Efficiency - Effective management of suppliers can reduce transaction costs and promote recycling and reuse of raw materials. Also, the production of waste and hazardous substances can be cut, preventing corporations from being fined as a result of violating environmental regulations. Consequently, the relevant handling and operational cost involved can be further reduced and, in the mean time, the efficiency of using resources can be enhanced.

Product Differentiation and Competitive Advantage - It helps the organisation in positioning its product differently in customer's mind. Besides attracting new profitable customers for organisation, it will give competitive edge over competitors in market place. It will strengthen the brand image and reputation in market place.

Adapting to Regulation and Reducing Risk - Organisations adopting GSCM practices can reduce the chances of being prosecuted for anti-environmental and unethical practices.

Improved quality and products - organisation will produce products which are technologically advanced and environment friendly. This will enhance the brand image and brand reputation in customers' mind.

Besides above, there are following advantages that can be generated by GSCM:-

- Positive impact on financial performance
- Effective management of Suppliers
- Dissemination of technology, advanced techniques, capital and knowledge among the chain partners.
- Transparency of the supply chain
- Large investments and risks are shared among partners in the chain.
- Better control of product safety and quality
- Increasing of sales
- Find beneficial uses for waste

Conclusion

Green Supply Chain Management (GSCM) is a relatively new green issue for the majority of Indian Corporations. Adding the "green" component to Supply Chain Management involves addressing the influence and relationships of Supply Chain Management to the natural environment. Green business practices that maintain and sustain good environmental quality are increasingly becoming a vital component of business organisation. In the future companies will be moving to a sustainable supply chain. The harsh reality is that we need to change what we are doing from a supply chain standpoint in order to ensure that future generations will have resources to use in their lifetime. The benefit of implementing a green sustainable supply chain is that we can improve the profitability of our company and help the environment. Green can not only be profitable, but the right thing to do. Whatever path you chose to in direction to green initiatives people will see your green initiatives as independent of your other activities and offerings. Rather, they will view your efforts as part of the organization's overall approach. That means the companies that ultimately succeed in growing will be distinguished by their commitment to corporate wide sustainability.

Bibliography