

## **GREEN SUPPLY CHAIN- A TOOL TO ERADICATE THE PROBLEMS OF GLOBAL ENVIRONMENT**

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### **ABSTRACT**

The objective of this paper is to analyze minutely possible environmental challenges to the supply chain management and its impact on environment. How carbon emission and other environmental problems affect the supply chain design? It is a million dollar question. We believe that green supply chain would prove to be a revolutionary step in supply chain management. In order to maintain green environment three important factors should be taken into consideration, i.e., appropriate rules & regulations, strong information system and a progressive mind-set of the general public. Green supply chain is not only the need of environment rather it is the need of the organizations too for no organization can survive longer in the market until and unless its products are not eco-friendly as well as customer-friendly. It is, therefore, advisable for the corporate world to manufacture their products as per the guidelines of green supply chain.

**KEYWORDS:** Carbon Emissions, Environmental Challenges, Green Supply, Global Warming

### **INTRODUCTION**

Green Supply Chain: We are responsible for environmental disturbances throughout the world, e.g., disorderly weather patterns from record heat waves to severe rains, snowfall and hurricanes. "The burning of oil and other fossil fuels release carbon dioxide, which blankets the earth and ultimately the heat"[1]. In addition to environmental problems we are also encountering with the resource weakening problems. "The World Bank reports that 80 countries now have water shortage that threatens health and economies while 40 percent of the world, i.e., more than 2 billion people, have no access to clean water or sanitation"[2]. A Green Supply Chain can be explained as "the process of utilizing environment friendly inputs and transforming these inputs with the help of change agents - whose chemical reactions can be recycled within the existing environment. This process helps in developing the outputs recycled at the end of their life-cycle so as to create a sustainable supply chain." The total concept behind this process is to lessen the costs and improving eco-friendly environment.

There are so many fine examples of successful green supply chain, e.g., "Interface Corporation which is a leading manufacturer of materials for commercial interiors. In its new Shanghai carpet factory a liquid is circulated through a standard pumping loop similar to those used in nearly all industries [3]. Many successful companies are looking forward to green supply chain concept which, in fact, is smart supply chain concept. The companies are also facing problems due to various activities of their suppliers. There are so many companies which are conducting environmental audits and also suggesting "rules of conduct" to check the activities of their suppliers. Companies are concentrating towards sustainability in their activities to ensure their profit. Being green and ethical across the supply chain is no more optional but it is a question of survival for the business organizations because the graph of consumer's awareness is going up rapidly.

Environmental issues, such as recycling, laundering, green factories, packaging, waste, bi- fuels, organic clothing and fair-trade are the focal points of attention for the retailers and suppliers [4].

Sustainability is the need of the hour now-a-days and the companies are framing their strategies in such a way so as to provide them sustainability as well as growth in the business. Accordingly, in order to maintain sustainability the companies educate their suppliers about making their process of supply chain as green as possible. With the growing awareness about global warming, health issues and other environmental issues, customers will raise more queries as they are always observing and judging the products from their perspectives. The companies should, therefore, prepare themselves accordingly and welcome those queries which help them in making their manufacturing processes and supply chain green. They will also have to look after how green their carbon footprints are and how they can recycle the same. New levels of responsiveness are expected to be seen among suppliers, manufacturers and logistics service providers which would be beneficial for the manufacturers, suppliers, and logistics service providers so as to accommodate their supply strategies accordingly and to cope with the demands of the customers.

### **BENEFITS OF BECOMING GREEN**

Corporate world is viewing this concept of going green with a positive outlook as it safeguards public interest and can also fetch good profits. A number of companies have begun to realize that improved environmental performance will ultimately yield additional financial gains. Companies are observing their supply chain as well as the areas where they can improve and earn good profits.

Green policies give way to cost savings which is beneficial for the companies by reducing the environmental impact of their business processes. By re-evaluating the company's supply chain, from purchasing, planning, and managing the use of materials to shipping and distributing final products, savings are often identified as a benefit of implementing green policies. There are so many sources of motivation for the companies to become green. One important source of motivation is government regulations and industrial norms. The other important factor is Corporate Social Responsibility. Firms are also highly motivated by the concept of CSR (Corporate Social Responsibility) as it is their prime responsibility to be socially and ethically accountable towards their customers and they should take care of customers' demands which directly or indirectly affect their brand and market perception. It is not simply within the four walls of the companies to tackle the problems to be green. For example, the efforts by some companies to attain cleaner water consumption and alternative energy sources for server firms are now being joined by a focus on making supply chains more environmental friendly. Realizing that being green and efficient are not mutually exclusive, companies are looking at multiple levels of the supply chain for improvements. The main areas of focus within the supply chain are material selection, sourcing policies, resource consumption and greenhouse gas emissions and fulfillment or transportation.

### **MATERIAL SELECTION**

Material selection is about considering the appropriate product and packaging materials according to government rules & regulations, customer parameters and corporate sustainability requirements. Companies are adopting environmental friendly policies, e.g. by using less packaging material which also fetch profit due to lighter and cost-efficient supply chain process.

## **SOURCING POLICIES**

The decision about where and from whom they source materials is very much crucial for the companies. It also opens gates to vendor selection and development from the view point of quality assurance and transportation. Companies such as HP and Patagonia continuously take feedback about their green standards. Such efforts of transparency motivate everyone to be more efficient and greener.

## **RESOURCE UTILIZATION**

Companies are tremendously searching ways to reduce their greenhouse gas impact, particularly in water, gas and energy consumption. For this purpose, organizations are verifying resource consumption, putting queries like, "Can we reduce the consumption of water and energy within our four walls?" or "Can we improve shipping efficiency to reduce carbon emissions?" By taking care of natural resources, companies can not only decrease their environmental impact, but they can also multiply efficiencies to their supply chains in areas like transportation.

It is a well known fact that, transportation provides many opportunities to bring both environmental and business efficiencies to an organization. Companies must see this fact very seriously so as to be greener in their supply chain; how they can reduce the distance in movement of material; how they deliver their packaged goods; and what precautionary steps should be taken in case of packaging. Of course the concept of Green supply chain is very good but companies have to look at the economic impact which will always be their first consideration because they cannot afford to be green at the cost of financial implications. The large and successful companies are taking green initiatives because they are finding a profitable balance between economic and environmental aspects. The concept is the same for all the concerns but it is not an easy task. For example, a company seeking to balance environmental issues with business need to have strong financial base and other basic facilities like transportation etc. The logical aspects in this scenario raise so many questions in front of us like: Is it fuel efficient? Does it leave too large a carbon footprint? If so, can we ship via rail or a different mode to reduce costs and subsequently be greener?

The major challenge before the companies is gaining insight of its entire carbon (CO<sup>2</sup>) footprint. Because there are so many components that go into measuring CO<sup>2</sup> (or CO<sup>2</sup> equivalents), it raises the question - can the footprint really be measured and a dollar value assigned? Both the science and calculations for CO<sup>2</sup> footprints are nearly impossible to measure and accurately account for. This causes many obstacles for companies to maintain fair balance between business and environmental friendliness [5]. Another major challenge before the companies is how to have a crystal clear view of carbon footprints so that they can apply a value chain perspective - extending their view of the supply chain so as to include their suppliers' suppliers and their customers' customers. For the identification of the areas where energy use can be reduced, companies need to closely examine the entire value chain.

Being green is not an overnight concept for the companies as it takes a long journey. For example, Cisco maintains supplier relationship management for the up-liftment of the green supply chain, rather than taking it on the transportation side only. They take reviews quarterly regarding their procedures to ensure they and their suppliers are working within Cisco's green guidelines. They are also taking care of their packaging aspect, i.e how to package and ship their goods while reducing the amount of packaging materials. Companies should develop their research departments to explore new ways to keep their process green so that they can serve the nation while achieving profits and growth in their respective areas of business. At every step of the product life cycle the companies should adopt appropriate strategies to

make the supply chain greener and more efficient.

There are so many techniques by which companies can keep their supply chain green, e.g. Companies should concentrate more on local markets as it not only reduces the costs of transportation but ultimately also reduces carbon emissions. Moreover, it provides a more rapid response to replenishment and time to market, making the business cycle more efficient.

One of the best approaches for the Companies is to identify the optimal transportation network. Optimal transportation networks provide opportunities to consolidate parcel shipments into less-than-truckload (LTL), LTL shipments into truckload shipments, and to convert air shipments to more efficient ground shipments where feasible [6].

## **CARBON EMISSIONS**

### **Carbon Dioxide and Climate Change**

We are constantly burning fossil fuels such as gas, coal or oil and consequently carbon dioxide is released into the atmosphere. In a natural carbon cycle, carbon dioxide is re-absorbed by plants and trees. However, we are burning fuels where the carbon dioxide is trapped under the earth's surface for millions of years and we're doing it so quickly that plants and trees that are alive now have no chance of soaking it up. Further, we're cutting down rainforests as well [7].

We are, therefore, facing the evils of global warming as a result of this extra carbon dioxide. Due to this extra carbon dioxide in the atmosphere the overall temperature of the planet is increasing (global warming). As a result of this global warming the climate is disturbed a lot and we are experiencing unpredictable and harmful changes in the form of floods and hurricanes to heat waves and droughts. So, to be on safer side we should try to reduce the risk attached with global warming and also check how much fossil fuel we are burning. This whole process is indeed not so easy to accomplish.

## **UTILIZING ENERGY**

We are, undoubtedly, in the habit of burning fossil fuels in order to create energy to keep warm our houses, fuel our cars, cook our food and so on. The fossil fuel is either burnt directly, e.g. gas in the boiler, petrol in the car, etc. etc. or it is burnt in a power station to drive turbines to generate electricity. The total carbon emission for which we as individuals are responsible is called our carbon footprint. However, it is not an easy task to measure the indirect emission on a day-to-day basis but on the contrary it is bit easier to measure the rate of direct emission. For this we can take data from the amount of gas and electricity we use in our houses, the petrol or diesel we burn in our car and the number and distance of flights we take. The Carbon Account is a tool to help you measure these direct emissions [8].

## **ENVIRONMENTAL CHALLENGES**

There are so many threats to environment which should be taken care of. Some of these environmental threats can be eradicated with the help of green supply chain. Challenges which are of prime concern are as under:-

We are moving at a very fast speed and using our natural resources without taking care about their scarcity. Companies manufacture products without any consideration to the by-products coming out. These by-products affect a lot to our environment, with anthropogenic emissions which is the prime cause of environmental problems. Emissions of almost all green-house gases continue to rise. The harmful gases, decreasing level of ozone layer, smog and dust particles have emerged as significant health risks, triggering or exacerbating respiratory and cardiac problems, especially in

vulnerable people such as children, the elderly and asthmatics, in developed and developing nations alike.

The increasing frequency of natural calamities over the past so many years have put more people at greater risk, with the shorter life span and significant health risks. Accordingly, if we go green we can lessen such environmental threats and improve our living standards too.

Green products safeguard us from the evils of global-warming and the dangerous carbon emissions. Not only it saves our environment but also we can have longer life-span by consuming green products which are eco-friendly and customer-friendly.

## PACKAGING GREEN PRODUCT

Another area where company can concentrate on is packaging of products. The following are a few ways green packaging:-

- Establishing cordial relations with suppliers and customers and exchanging views about how to maintain ideal ways of packaging and to save resources and keep an eye on wastage of inventory;
- Introducing logistics beams and air bags in trailers to double-stack pallets safely to eliminate damage in transit;
- Educating customers about the benefits of recycling and go hand-in-hand with the opportunities of recycling;
- Introducing multi-pack shipping boxes so that the number of boxes utilized for packaging is reduced;
- Implementing such a design of green packaging is indeed a very beneficial and advisable step for the welfare of customers, environment as well as the companies.

## DESIGNING GREEN PRODUCT

Companies are very much aware of the end stage of their products' life-cycle. This is a point where companies do lot of research work for the product would sustain longer if it is designed keeping in consideration the environmental elements and adopting green ways. Attention is hereby invited to the following important points in this regard:-

- It is very much understandable that supply chain, with collaboration of green concerns, suits every stage of business. It is indeed a matter of great concern that still a large number of companies are not adopting this concept with due zeal and enthusiasm. However, they should understand that by applying green ways in their manufacturing processes, supply chain processes, product packaging etc., they can not only save their resources, time and costs but they can also create a strong data base of loyal customers.
- Remarkable level of savings can be achieved due to green initiatives by reducing transportation costs, packaging costs; strong customer supplier relations as it all add value to the supply chain. Companies should honestly follow the concept of going green. Once companies start giving due consideration to this concept the supply chain managers will need to concentrate on the following points which are of utmost importance :-
- **Recycling:** Considering the importance of recycling supply chain system, the Government of India has framed the appropriate rules & regulations in this regard. This will require a close watch on the supply chain where goods have to return to the supply chain to be broken down and properly disposed.
- **Designing Greener Product:** Designers will introduce those components and raw materials which are safe and

less harmful to the environment.

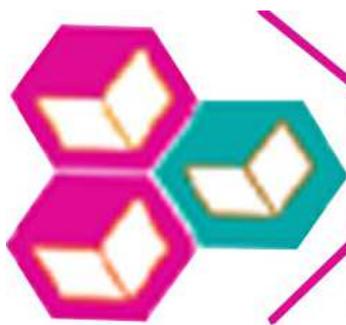
- **Supply Network Compliance:** It is very essential for the companies that they should avoid suppliers which are not environmentally conscious.

## CONCLUSIONS

Green supply chain management is the need of the hour to counteract today's environmental threats. It is the right time that we should re-engineer our business processes and concentrate on the factors which are environmental friendly. Supply chain can be smart with the green initiatives and it is the best tool which can safeguard the interests of customers, government, business groups as well as the environment. With the execution and implementation of green supply chain the dangerous effects of by-products in the form of carbon dioxide, packaging materials and hazardous materials associated with product design, manufacturing and delivery can be avoided. With the advancement of green supply chain we can also save our resources by applying the concepts of recycling, saving electricity, banning of plastic bags, less paper work etc. In this way we would be saving our planet from the effects of global warming and also increasing our life-span. In a nutshell we can confidently acclaim that green supply chain is surely the ultimate way of addressing the problems of global environment.

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