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# “Greening” a Supply Chain

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## Introduction

'Brand Image', 'Corporate Social Responsibility' and 'Government Regulations' are the top-of-mind responses associated with the term GSC (Green Supply Chain). However, these reasons are not compelling enough for a company to adopt a GSC as it is not expected to improve the bottom line of a company.

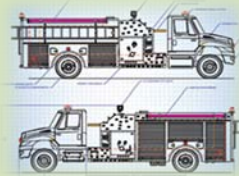
In the wake of the global financial crisis, 'Cost-cutting' has become the buzzword that is pushing away the GSC initiatives off the table. The question arising in one's mind is that why should a company invest in a GSC initiative at this juncture of time? How would a GSC help improve the profitability of a company? Are there any reasons beyond 'Corporate Social Responsibility', 'Brand Image' and 'Compliance to Government Regulations' to adopt a GSC?

This issue of WCS Opinions would help to break some myths about adopting a GSC. It would take a look at the evolution of GSC and throw light on some of the GSC initiatives that could improve the profitability of a company.

# 1. Areas within a company's supply chain that can have an adverse impact on the environment

## A Supply Chain

Tier 2 Supplier → Tier 1 Supplier → OEM → Distributor → Retailer → Customer



### Product Design

- Limited scope for reuse and recycling
- Limited fuel efficiency of product



### Production Planning

- Inefficient manufacturing process
- Inaccurate forward planning leading to higher or insufficient inventories



### Raw Materials Procurement

- Use of materials that are not environment friendly
- Wastage of material



### Raw Materials Warehousing

- Light and heat used in running warehouse
- Increased transportation due to far off placement of warehouses



### Inbound Logistics

- Pollution caused by movement of vehicles
- Inefficient transportation networks



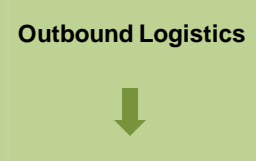
### Material Handling

- Material wastage during material handling
- Transportation during material handling



### Manufacturing

- Inefficiency in manufacturing process
- Waste disposed during operations



### Outbound Logistics

### Finished Goods Warehousing

### End Customer



### Disposal of wastes

- Improper disposal of the products
- Absence of waste treatment plants

Issues within a Supply Chain

## 2. Understanding “Green”

The word *Green* comes from the Old English adjective ‘*growan*’ which means ‘to grow’. In broadest terms, green implies the activities that are supportive of both, human life and otherwise. *Green* initiatives refer to those initiatives that give a high importance to the ecological and environmental goals.

In the context of a supply chain, often the goals of implementing green initiatives were earlier thought to be mutually exclusive to the objectives of running an efficient and hence a profitable supply chain. However this thinking is slowly changing and in due course of time companies might link GSC to companies profitability as well.

## 3. Common reasons for companies to adopt GSC initiatives

### 3.1 Government compliances

Government regulations are often imposed on the most prominent and visible environmental concerns. Most of the regulations are industry-specific, and include variety of directives likes fuel-economy standards, material bans and imposing pollution limits. Companies are forced to adopt the regulations and they hardly look at them from a point of view of returns. Although companies undertake green initiatives, they do not completely alter the existing processes in the supply chain and just make some modifications in order to comply with the regulations.

An example of regulations is the recent announcement from President Obama pertaining to new national auto emissions and efficiency standards that will require automakers to boost the average fuel efficiency of cars sold in the United States to 35.5 miles per gallon by 2016. This will require automobile manufacturers to go for improvements in the product design to comply to the new standards; this would mean an additional cost for the company.

### 3.2 Environmental concerns raised by stakeholders

With the growing awareness of environmental protection, there is more pressure on companies to neutralize their impact on the environment. Various Non Government Organizations and forums often force companies to invest in green. The initiatives taken in such cases are more from a view to pacify the demands of groups.

Greenpeace is an example of an independent global campaigning organization that promotes actions against companies that are not environmentally conscious.



*Companies are forced to adopt the regulations and they hardly look at them from a point of view of returns*



*The most compelling reason for companies to adopt Green Supply Chain would be to reduce the operational costs and get a good return on investment*

### 3.3 Improving investor relationships

With an intention of improving investor relationship, companies adopt green initiatives and get the initiatives highly publicized.

With investors mapping GSC initiatives with sustainability, companies are actively investing in GSC initiatives increasing keenness amongst investors to invest in the company. For example *Environmental Reporting* and *Environmental Performance* is considered amongst the criterion for assessment of sustainability for companies under the *Dow Jones Sustainability Index*.

### 3.4 Improving brand image

Improving the brand image seems to be one of the most convincing reason for a company to invest in a GSC initiative. This also helps in improving the top line of companies. Selling organic products in malls is an example of this.

Recently Dell was recognized as the number one green technology brand by IT study released by Strategic Oxygen and Cohn & Wolfe (Cohn & Wolfe is a strategic public relations agency dedicated to creating, building and protecting the world's most prolific brands)

### 3.5 Corporate Social Responsibility

For companies, taking up GSC initiatives seemed to be a way to showcase the Corporate Social Responsibility. This seemed to have a higher weightage in large companies as compared to small companies. Recently Disneynature has pledged to plant a tree for every ticket sold for Earth, its documentary series.

***“All the reasons are fine, but can we have one strong reason to adopt a GSC initiative”***

This is the most likely response of a typical practical businessmen. Although the reasons mentioned above are good-to-have reasons, they lack the appeal in today's business scenario. The most compelling reason for companies to adopt Green Supply Chain would be to reduce the operational costs and get a good return on investment.

In the following sections we will see as to how by introducing a good number of GSC initiatives, companies would be able to achieve significant cost-savings.

## 4. Evolution of strategies for adoption of GSC initiatives



### 4.1 Reactive Strategy

Under this strategy, the company would adopt the GSC activities initiatives which are set by the regulatory bodies. These would be the actions taken by companies to avoid the legal liability. The most prominent example of this is the adoption of ISO:14000 standards.

The strategy is mostly adopted by the companies that are in the early stages of adoption of GSC initiatives; these are often the first set of GSC initiatives to-be adopted by a company. In such cases the company implements worldwide-established environmental practices and need not invest in identifying any new environmental friendly practices.

### 4.2 Proactive Strategy – For Competitive Advantage

As the Reactive Strategy need not be enough to gain a competitive advantage, companies push for the next level of adoption where they align the GSC initiatives with the its business strategy. The company would take up the initiatives well before any other company thereby gaining competitive advantage. It is a stage where a company would proactively invest to look into the environmental impact of its product and processes. Product designs, manufacturing processes and packaging would be the areas for application of initiatives under this strategy.

**What would be the next wave in adoption?** - Although the Reactive and the Proactive (Competitive Advantage) strategies enable the adoption of GSC initiatives, they cannot compel its adoption on the grounds of reducing costs. With companies seeking value for every dollar spent, an approach would evolve which would help companies consider GSC initiative at par with other investment plans in the company.

### 4.3 Proactive Strategy - Value-Seeking Strategy

This strategy would be based on improving operations-based efficiency of a company and hence improving upon the bottom line of the company. The strategy would have goals that would talk about cost-reduction as the primary driver and would be easily fitting in into the existing goals of the company as it would be in line with the financial objectives. The activities coming under the ambit of this strategy would require innovation as there would be a need to identify newer areas in the supply chain where environmental impact and related costs could be reduced.



*The strategy (Value-Seeking Strategy) would have goals that would talk about the cost-reduction as the primary driver and would be easily fitting in into the existing goals of the company as it would be in line with the financial objectives*

## 5. Getting the strategy from board room to shop floor

Broadly, there are two ways of getting this strategy to work:

**Radical Change Program**

**Continuous Change Program**

### 5.1 Radical Change Program

This would be a top-down approach initiated by the management of a company. Under this program, the most prominent problems would be handled first. The program is likely to correspond to high amount of investments and is high-risk/high-return initiative. It would require a greater involvement from the management and a elevated level of engagement between the customers and the suppliers. The program is likely to stimulate innovative ideas for its implementation.

However, being a high-risk initiative, significant amount of skepticism is likely to be associated with these initiatives.

#### Steps involved in this approach would be as follows:

Identification of all the activities within the supply chain and environmental impact - assessment

Identification and short listing of the activities that have a higher environmental impact

Mapping out of the required changes and estimation of cost-reduction and ROI by implementation of the new activities

Prioritization all the improvement initiatives and developing a roadmap for implementation (starting with the initiative with the highest impact)

Execution of the plan and monitoring the change

Example of a Radical Change Program is the i2 Transportation Management solution used by Kimberly-Clark for whom transportation cost was around 6% of its net sales. The system has been extremely successful in enabling Kimberly-Clark to find the most cost-effective operators by route and consequently reduce its costs. This program led to a reduction in mileage of 608,000 kilometers and a 540,000 kg reduction in CO<sub>2</sub>; it corresponded to an estimated USD 1.6 million savings.



*The program is likely to correspond to high amount of investments and is high-risk/high-return initiative*

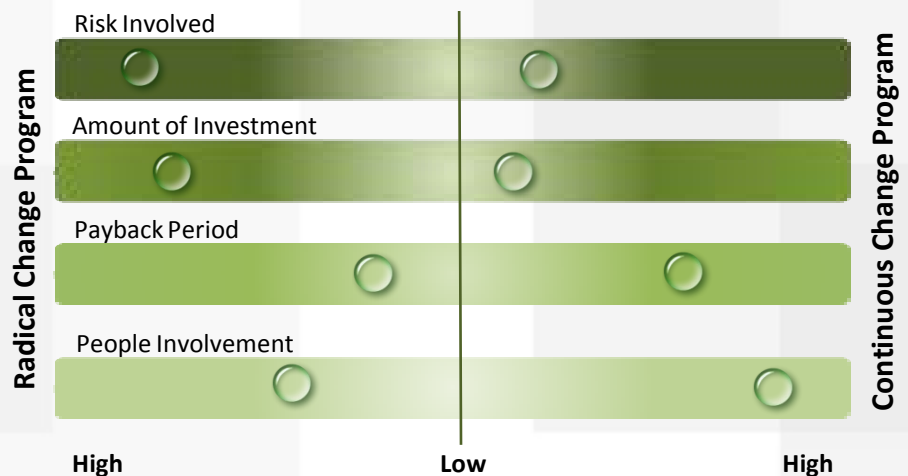
## 5.2 Continuous Change Program

This program would involve small initiatives taken by the employees of the company for neutralizing the environmental impact of the activities of the company. It is a bottom-up program which calls for a high level of participation from the employees. The success of the program would depend on the continuity of the initiatives taken by the company.

Unlike the Radical Change Program, this program corresponds to low-risk/low-return initiative. Hence it does not call for the kind of investments required by a Radical Change Program. Moreover it does not call for knowledge-intensive activities like product redesign or material substitution but calls for small initiatives from the employees. Though the return on individual initiatives could be low but the aggregate effect of all of the initiatives would be significant.

An example of a small yet significant initiative is the HP's Bulk Pack effort, which places multiple units of product in a single large, re-closable carton. A single pallet of individually packed cartons (servers, in this case) comprised of 24 units, while the Bulk Pack held 32 units with better security and item tracking. Targeting package waste reduction, this move helped cut handling costs for customers in receiving, inventory, and deployment by 73%; it also eliminated 75% of waste disposal costs.

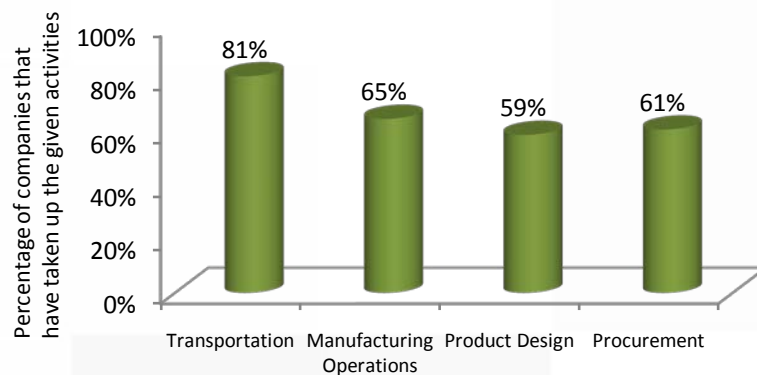
## 5.3 Following is the comparison between Radical and Continuous Change Programs



*Though the return on individual initiatives could be low but the aggregate effect of all of the initiatives would be significant*

## 6. Activities performed for adoption of GSC

Following graph represents the response given by companies who have adopted GSC pertaining to the different areas of supply chain<sup>(1)</sup>



### 6.1 Following activities are commonly performed to adopt a GSC

#### 6.1.1 Logistics Optimization

Logistics is the first-on-the-list of companies to be considered as it is the part of the supply chain that has an obvious impact on the environment. Network optimization and changing the mode of transportation are one of the well developed and most common set of initiative adopted by companies <sup>(1)</sup>. These initiatives in turn help companies reduce their fuel costs and become more cost-efficient.

DHL, the world's largest express and logistics provider was able to save upto 7% of its costs (in Mexico that has 13,000 shipments, 18,000 lanes, and 1,500 locations) owing to better optimization, better use of vehicles and stops per vehicle.

#### 6.1.2 Manufacturing Process Optimization

This approach is based on optimizing the utilization of resources during the manufacturing. It also takes into consideration, optimizing the processes or substituting for the processes that have negative impact on the environment. The approach has a focus on increasing yield and improving the performance. It is quite different from lean manufacturing as lean manufacturing need not be necessarily green and it can be even inefficient in terms of carbon emissions.

Xerox optimized the energy intensive toner manufacturing process by introduction on Embrittling agent; it thereby reduced the power consumption upto 22% saving more than 30 million KWH of energy by end of 2008.



*It(Manufacturing Process Optimization) is quite different from lean manufacturing as lean manufacturing need not be necessarily green and can be even inefficient in terms of carbon emissions*



*This approach (Optimum Packaging) calls for achieving a golden mean between the impact of putting in place reverse logistics and impact of not reusing the secondary packaging*

### 6.1.3 Product Redesign

Product redesign implies modifying the product design so that the impact on the environment is low during the use of the product throughout its lifecycle. It also requires to reduce the wastage during the manufacturing of the product. Therefore manufacturing efficiency and logistics are taken into account for product design.

Epson made significant changes in the design of Twin Optimized Reflection Lamp (E-TORL) used in its projectors; as a result there was a 90% reduction in power consumption making it highly energy efficient

### 6.1.4 Optimum Packaging

In most of the cases for consumer products, packaging around the product is discarded as primary packaging cannot be reused. Here, reverse logistics could be put in place to utilize the secondary packaging. This approach calls for achieving a golden mean between the impact of putting in place reverse logistics and impact of not reusing the secondary packaging.

Wal-Mart implemented its Packaging Scorecard in February 2008 and is used to evaluate the packaging used by all of its suppliers in terms of its eco-friendliness, including factors that reduce waste as well as packaging and transportation costs.

The company's "sustainable scorecard" system is an initiative to push up to 60,000 of its suppliers worldwide to decreased the amount of packaging they use by 5%, saving USD 3.4 billion in a year. The programme was expected to reduce the amount of carbon dioxide entering the atmosphere by 667,000 metric tons.

### 6.1.5 Green Procurement

Green Procurement is the system of procurement of those products that have a minimum impact on the environment at all stages of the lifecycle of the product. Green procurement is based on the principles of reuse, recycle and reduce.

An example of Green Procurement is the procurement of *Blue Angel Eco-label Printer* by which there would be half the environmental impact as compared to that of buying conventional equipment. Assuming a multi-functional device prints about 50,000 pages per year and has a service lifetime of five years, the device with the Blue Angel—as compared to one without it - reduced roughly 1,150 kilograms of carbon dioxide equivalents. The equipment can save around USD 1100 based on lower costs for electricity, toner and paper.

## 6.2 Areas that need a revival of focus for adoption of GSC initiatives

### 6.2.1 Warehousing

Warehousing seems to be an area less susceptible for being culprit for inducing impact on the environment. However, warehouses consume a lot of resources even in the idle state. They absorb heat and hence consume a lot of energy to operate. They can be a source of pollution during the material handling process as well.

A solution for reducing the impact of warehousing would include optimum utilization of space and improving throughput of inventory in the warehouse. In terms of improving the design of building, the initiatives would include use of high reflectance roofs, daylighting, use of recycled construction materials, use of recycled water, and optimizing the flow of inventory within the warehouse.

The concept of *Green Warehousing* is fast gaining popularity with some firms offering software for reducing the carbon footprint of the warehouse.

A symbol for a energy-efficient warehouse is the Pinnacle XXIII warehouse in Romeoville is a 650,000-square-foot building which could now be illuminated only by the sunlight that comes through 365 skylights; it has been rated 94% energy efficient by Energy Star. Moreover more than 30% of the materials used to construct the building were purchased within a 800 kilometer radius, and 95% of the construction waste was recycled. As a result of green initiatives energy consumption of the building could be reduced by 40%.

### 6.2.2 Optimizing manufacturing by-products

This area focuses on the extension of supply chain to include the reduction and elimination of by-products manufactured in the supply chain. This approach encourages the clean-and-lean technologies for manufacturing.

Some of the very small initiatives pertaining to manufacturing by-product are utilization of waste heat from industrial process for conditioning space and the use of waste engine oil for heating purposes.

The concept of Clean Manufacturing which is fast gaining popularity is based on the optimizing by-products, which is in turn based on improving a companies productivity, profitability and competitiveness.



*Warehousing seems to be an area less susceptible for being culprit for inducing impact on the environment. However, warehouses consume a lot of resources even in the idle state*

The benefits of clean manufacturing are reduction of scrap and rework, reduction of hazardous waste, and prevention of liability costs.

By including the environmental concepts of Clean Manufacturing in TPS, Toyota's European production facilities were able to achieve a Zero waste going to landfill since 2007.

### 6.2.3 Product life-extension

This is one of the approaches which are not likely to be adopted by companies as they want to upgrade their customers as frequently as possible. The approach would not be adopted by Original Equipment Manufactures as it would go against the goal of customer upgradation; however this approach would increase the value created by the product. Implementing this approach would require the company to develop offerings that allow capturing more value from the product.

A study revealed that if everyone in the UK who owns a mobile phone delayed upgrading by a year, it would save the same amount of CO<sub>2</sub> as taking 213,000 cars off the road for a year.

### 6.2.4 Product recovery at the end-of-life and remanufacturing

The disposition of product has a huge impact on the carbon footprint of the product. E-waste has now become a global issue. To avoid the impact of disposition, measures should be taken in the design phase of the product. Most of the companies do not take this aspect into account as product disposition is done by the customers and hence is beyond the scope of the company.

In addition to making policies for product disposition, focus should be given to re-manufacturing of the product. Re-manufacturing would help to utilize the value remaining in the product at the end of its life.

For example between 65% and 80% of the material content of a mobile can be recycled and re-used. Even some of the non-recyclable plastics can be used in other ways, bringing the total up to about 90%.

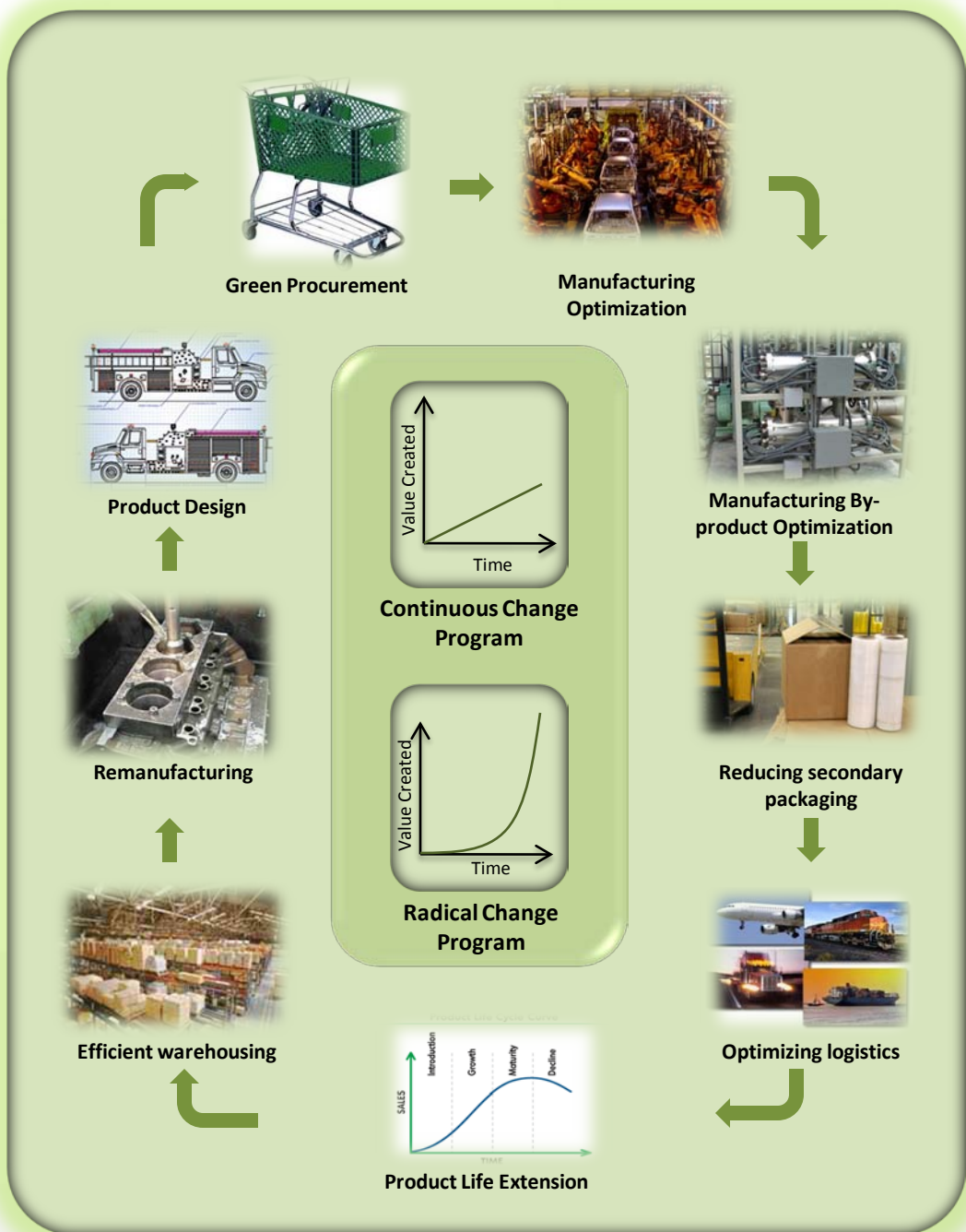
## 7. Conclusion

Time would come when GSC initiatives would no longer be looked at as merely some measures to improve the brand image or as an activity related to Corporate Social Responsibility. GSC would be looked at as an activity which gives positive return on investment and hence be given the same weightage as any other investment proposal. Hence it be would looked at as an initiative to reduce the costs and increase the profitability of the company.



*The approach (Product life-extension) would not be adopted by Original Equipment Manufactures as it would go against the goal of customer upgradation; however this approach would increase the value created by the product*

## Activities that can green a supply chain



- **Manufacturing Optimization** – Xerox saved more than 30 million KWH of energy by 2008
- **Packaging** – Walmart helped save USD 3.4 bn for its suppliers
- **Product Design** – Epson's E-TORL could reduce power consumption by 90%
- **Green Procurement** - Blue Angel procured equipment that saved EUR 680 per unit
- **Logistics** – Network optimization helped DHL save 7% of its logistics cost
- **Product Life Extension** – Delaying mobile phone upgrading
- **Warehousing** – The exemplary Pinnacle XXIII warehouse in Romeoville
- **Remanufacturing** – 65% and 80% of the material content of a mobile can be recycled and re-used
- **Optimizing by-products** - Toyota's European production facilities were able to achieve a Zero waste going to landfill since 2007



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