

**INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH  
TECHNOLOGY****ASSESSMENT OF GREEN SUPPLY CHAIN MANAGEMENT IN AN INDIAN  
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DOI: 10.5281/zenodo.817858

**ABSTRACT**

In the present scenario, there is a growing need for integrating environmentally sound choices into supply chain management research and practices among the organization. The main objective of this study is to assess the recent literatures of the Green Supply Chain management (GSCM) and also determine the environment concern of this emerging field. The study is focused on development of GSCM strategies which also includes that all the researchers from this review is focused on environmental and social sustainability towards operation management and the supply chain management. The important key that came out of this literature are green design, green management material, green marketing and distribution and reverse logistics. The purpose of this paper is to review the GSCM over the last fifteen years and guidelines to help academicians, researchers, and practitioners in better way to understand integrated GSCM from a wider Perspective. Perusal of the literature shows that a broad frame of reference for green supply-chain management (GSCM) is not adequately developed. Regulatory bodies that formulate regulations to meet societal and ecological concerns to facilitate growth of business and economy also suffer from its absence. This phenomenon is actually a global issue, as the majority of products consumed in developed countries have their raw materials, part of the manufacturing processes, and many other operations located in developing countries. Engaging the supply chain is the key to unlocking a sustainable future. The supply chain is the new frontier in environmental responsibility. Thus an area which is rich, with opportunity that remains mostly unexplored, where a number of pathfinders are starting to show others the value that can be found.

**KEYWORDS:** 2 Green supply chain Management, Reverses logistics, GSCM, win-win-win Scenario, Eco-design, Green Marketing, Green Purchasing, Green Supply Chain, Environmental Performance Index.

**I. INTRODUCTION**

Green supply chain management (GSCM) is considered as an environmental innovation. The concept of GSCM is to integrate environmental thinking into supply chain management (SCM). GSCM aims to minimize or eliminate wastages including hazardous chemical, emissions, energy and solid waste along supply chain such as product design, material resourcing and selection, manufacturing process, delivery of final product and end-of-life management of the product. As such, GSCM plays a vital role in influencing the total environment impact of any firm involved in supply chain activities and thus contributing to sustainability performance enhancement.

Among these large organizations there is now a broad recognition that within their vast, complex and sometimes opaque supply chains there are a number of sustainability challenges, resource risks, and efficiency opportunities. But despite this awareness, most have not been taking sufficient action to address them. By raising awareness of the positive aspects of supply chain action, it is possible to deliver tangible, meaningful results for the bottom line and the planet. This approach provided in-depth interviews about internal environmental management, reverse logistics, green purchasing, Eco-design, life cycle assessment, waste management, and green manufacturing. Waste management was the most widely used technique among the research participants, and green purchasing and life cycle assessment practices were less widespread.

Due to continuous glottalization and the innovative changes the organizations are inevitably required to response to quickly to the fast changing competitive environment. According to Herwani (2005) and Srivastava

(2007), Green supply chain management practices is considered as material management, green purchasing, green manufacturing, green design, reverse logistics and green distribution/Marketing that refers to the environmental integration of supply chain management with consumer's end-of-life management.

This vast, global supplier network therefore represents a major source for value creation, quality and innovation for the group, but also inherent risks if it would be left undressed. In order to better manage its supplier network and to capitalize on opportunities, our organizations tries to integrate their supply chain approach into a group-wide corporate sustainability strategy, as well as its functional purchasing strategy. This integration at a corporate level is to be support by a two-pronged approach;

- (1) Annual, internal target-settings;
- (2) Supplier engagement based on Eco-efficient including transparency and CO<sub>2</sub> emissions reporting criteria.

Engaging the supply chain is the key to unlocking a sustainable future. The supply chain is the new frontier in environmental responsibility – an area rich with opportunity that remains mostly unexplored, where a number of pathfinders are starting to show others the value that can be found. Large public and private sector organizations have enormous purchasing power, often engaging with thousands – or tens of thousands – of direct and indirect suppliers. By harnessing the power of their procurement decisions it is possible for them to cascade their own commitments throughout the supply chain.

There are two reasons why stakeholder theory is appropriate for explaining the motivational drivers for GSCM. Firstly, stakeholders are increasingly demanding that the companies in the AEE address environmental issues. Secondly, GSCM practices require inter-organizational collaboration with all stakeholders in a highly competitive environment (Walker & Jones, 2012). Stakeholder theory aims to identify and group the input and the output environments of each company (chiefly suppliers and consumers), its competitive environment (companies that produce similar products or offer similar services), and its regulatory environment (Delmas and Toffel, 2004 & DiMaggio and Powell, 1983. These stakeholder groups are thus included in this study because previous research suggests that the characteristics of specific groups impact the willingness of a focal company to adopt GSCM practices

## II. FACTORS AFFECTING GREEN SUPPLY CHAIN MANAGEMENT

- **Barriers** are elements in the supply chain that slow down, hinder in practicing green supply chain management. The opposite of a barrier are factors that facilitate or enable the diffusion of offshore wind and renewable energy.
- **Bottlenecks** are imbalances in the supply chain where the supply chain capacity is smaller than the demand. Traditional mathematical, statistical, and economic approaches to bottlenecks include capacity planning, queuing theory, calculations of optimal supply/demand balances, and simulations of the equilibrium. Bottleneck is defined as “Any resource whose capacity is equal to or less than the demand placed upon it.”
- **Constraints** are challenges faced by certain resources in the supply chain that cause the capacity to be less than optimal compared to demand. Within math or engineering, constraints equal conditions that must be satisfied by the solution in question. The theory of constraints outlines that for a broad definition of a system “At least one constraint exists that limits the ability of the system to achieve higher levels of performance relative to its goal”.

Improving environmental performance of product life cycle (PLC) is based on closed-loop and boundary-spanning collaboration to minimize negative environmental consequences along the various stages of the supply chain. Several studies have defined the green supply chain management (GSCM) through inter-organization collaboration. The GSCM collaboration focuses not only on reducing the environmental consequences of material flows but also on improving operational process and product quality by fulfilling the demands in the supply chain.

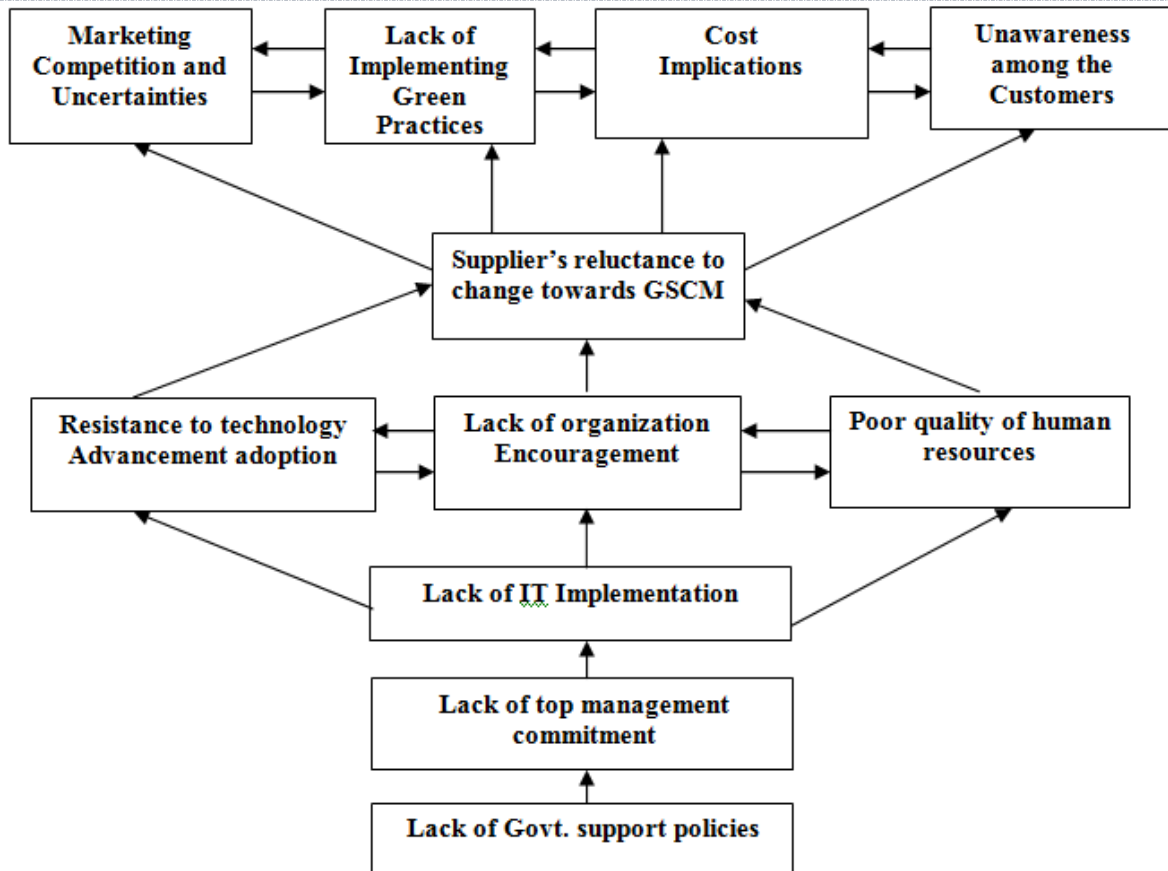


Fig.1 Barriers in implementing green supply chain management

### III. UNDERSTANDING GREEN SUPPLY CHAIN MANAGEMENT

#### Profiting from being green

Some companies have seen consumer interest in the environment as a plus, and have even been able to convert the interest of public in all things green into increased profits. A number of companies have shown that there is a proof of the link between improved environmental performance and financial gains. Companies have looked to their supply chain and seen areas where improvements in the way they operate can produce profits.

#### Companies are unaware of potential cost benefits

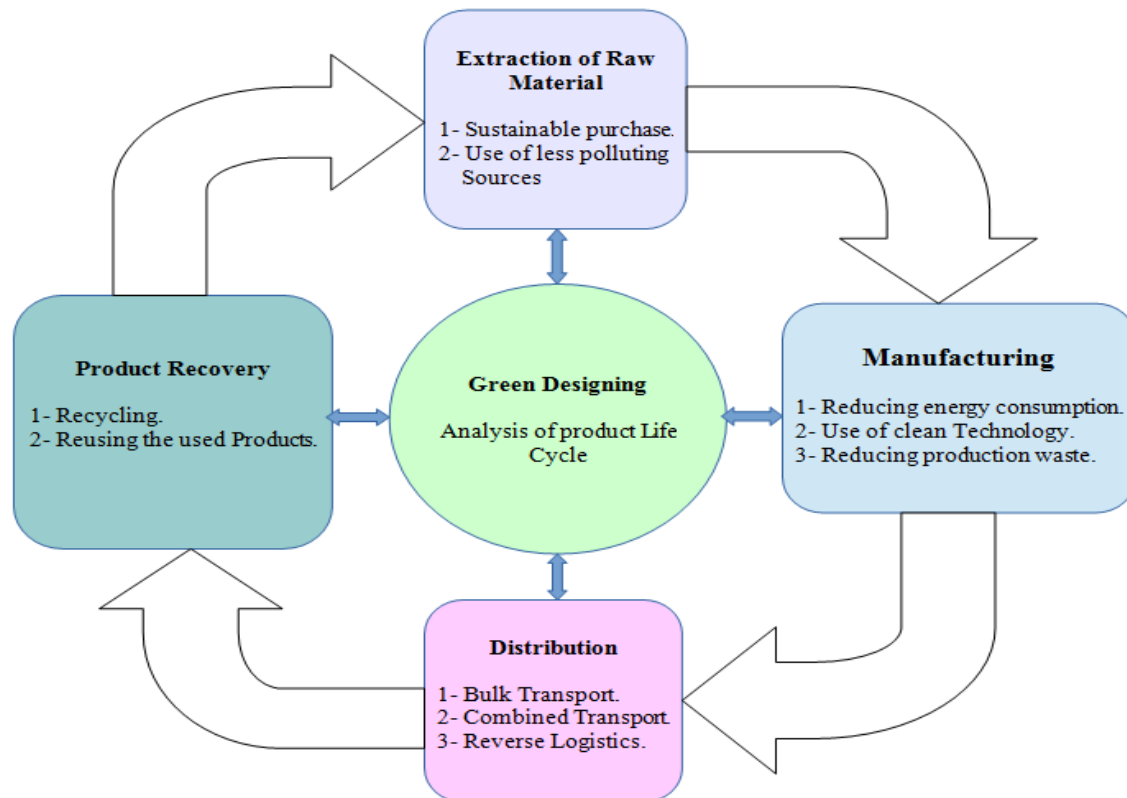
Companies can find cost savings by reducing the environmental impact of their business processes. By re-evaluating the company's supply chain from purchasing, planning, and managing the use of materials to shipping and distributing final products, savings are often identified as a benefit of implementing green policies. Despite the focus of public on the environment, benefits attributed to reducing a company's environmental impact are not in the forefront of supply chain executive's minds. It appears that many executives are still unaware that improved environmental performance means lower waste-disposal and training costs, fewer environmental-permitting fees and often reduced materials costs.

Hopefully, the interest in green issues and environmental concern by the public will not wane as economic issues become more important due to the faltering economy.

#### Optimized supply chain

Optimizing your supply chain means getting your customers what they want when they want it and spending as little money as possible while accomplishing that many in the supply chain world assume that fast, low-cost supply chain options are incompatible with a green supply chain. This, however, may not be the case. That's because green initiatives can often be cost savers. For example:

1. Reduction in shipping typically means less fossil fuel is burned.
2. By consolidating and optimizing material and packaging usage, fewer packing products are consumed.
3. When hazardous materials are taken out of the supply chain, lower costs are associated with handling and disposing of the materials.
4. When waste is minimized, so too are the costs associated with purchasing and disposal



*Fig.2 Phases of Green Supply Chain Management*

### GSCM Methodology

The more robustly green your supply chain becomes, the more it can become a public relations and marketing boom. Imagine letting your customers know that you're saving the planet x-number of tons of packaging material and y-number barrels of oil every year through your green supply chain initiatives. That's a metric that easily resonates with the public. And the cost reductions that you pass on to the bottom line easily resonate with your chief financial officer, your board of directors, and your shareholders.

Designing and implementing a greener supply chain is truly a win-win-win scenario for your company, your shareholders and your planet. When a supply chain becomes greener, waste is driven from it. When waste is driven from your supply chain (or any process), the cost of that process is reduced. When costs are reduced, everybody's happy. And of course, as a positive side-effect of greening your supply chain, you will also be helping the planet. If you want your company to strive for as greener supply chain, sell the green supply chain initiative as a cost savings initiative. Consumers will notice, too, and you might see other positive benefits

## IV. BENEFITS OF GREEN SUPPLY CHAIN MANAGEMENT

### Sustainability of Resources

Green Supply Chains sponsor the effective utilization of all of the available productive resources of organizations. By incorporating Green Supply Chain Management thinking through their entire business decision making process, organizations may now purchase green input resources that will flow through environmental friendly production process to produce the desired green outputs.

### **Lowered Costs/Increased Efficiency**

At the core of Green Supply Chain Management is the principle of reducing waste by increasing efficiencies. Effective management of resources and suppliers, can reduce production costs, promote recycling and also, the reuse of raw materials. Also, the production of hazardous substances can be reduced, thereby preventing organizations from being fined as a result of violating environmental regulations. Consequently, the relevant operational costs are reduced whilst; the efficiency of using resources is improved.

### **Product Differentiation and Competitive Advantage**

It helps an organization to position itself and its products as environmentally friendly in the customers' perception. Besides attracting new profitable customers for organizations, it will give competitive edge over the competitors in the market place. It will also strengthen the brand image and reputation in market place.

### **Adapting to Regulation and Reducing Risk**

Organizations adopting Green Supply Chain practices can reduce the risk of being prosecuted for anti-environmental and unethical practices. A demonstrated effort towards creating an effective Green Supply Chain through the sustained dedication of resources, activity, measurement and management protocol, will be highly regarded in the event that any questions arise.

### **Improved quality and products**

Organizations that produce products which are technologically advanced and environment friendly will find this will enhance the brand image and brand reputation in customers' mind.

## **V. CONCLUSION**

It is important for organizations to consider moving towards Green Supply Chain Management. It is not a fad: it is becoming a necessity. Implementing GSCM best practices has the potential to provide financial benefits environmental benefits and social benefits. It can also enhance a company's brand and reputation. A literature review of GSCM yields studies linking green, environmental, or sustainable concepts to traditional supply-chain management, demonstrating how GSCM practices, definitions, and decision frameworks affect business operations. Most studies emphasize reduction, re-manufacturing, recycling product design, process design, manufacturing practices, procurement, and some mixture of items across managerial levels. Integrating environmental concepts into these business functions ameliorates environmental pollution.

To achieve this, trade-offs throughout the supply chain are normally require. Monitoring and reducing carbon footprints makes good business sense because it eliminates waste and reduces costs. The exercise to reduce carbon footprints can also help organizations when choosing efficient business partners; it can also help them be better prepared, by mitigating risks associated with sudden changes in energy and fuel prices. Additionally, a lower carbon footprint can lead to an improved corporate brand and provide an advantage over competitors

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#### CITE AN ARTICLE

**Singh, B., Er, Singh, N. N., Er, & Sinha, P., Dr. (2017). ASSESSMENT OF GREEN SUPPLY CHAIN MANAGEMENT IN AN INDIAN INDUSTRY. *INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY*, 6(6), 493-498. doi:10.5281/zenodo.817858**