

Green Supply Chain Management: A Review

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ABSTRACT: Environmental issues are key factors that determine the success of organizations in the green economy era. Green Supply Chain Management (GSCM) is a leading philosophy to improve the ecological efficiency and control the negative environmental impact. The purpose of the paper is to briefly review the recent literatures of the GSCM and also determine the new direction area of this emerging field. The study is focused on development of GSCM 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.

KEYWORDS: Green supply chain management(GSCM), supply chain management(SCM), Reverse logistics, Green manufacturing.

I.INTRODUCTION

Increased industrialization and ever growing consumerism has led to a situation where industrial pursuits of mankind have started to cast an unfavourable impact on environment that may prove self-destructive for the former. But as on today, there is an increased awareness on part of their industries, governments and even consumers for conserving environment and cutting down on pollution. In the wake of this, it is required to introduce environmental friendly practices in industrial supply chains to ensure that there is no degradation of environment; coupled with materialization of economic gains. The inception of Green Supply Chain Management (GSCM), conceptually taken its roots during the Industrial Revolution. However lately it came to the forefront with increased sensitivities of the nations & society towards mitigation of the industrial or other waste's malefic effects on environment. As the concept of Supply Chain Management (SCM) gained attention making manufacturing firms integrated with suppliers & customers through various supply & distribution logistics networks in order to ship products to customers with competitive advantage, the environmental concerns led the companies to incorporate mechanisms regarding disposal, recovery, recycling & reuse of material/energy waste generated within the ambit of supply chain infrastructure. The green supply chain management is increasingly becoming an important strategy for the sustainable development of the enterprises, which is the enterprise to obtain and enhance the international competitiveness in an effective manner. The green supply chain is a kind of modern management mode which is integrated the thoughts of the environmental protection.

Green supply chain (GSC), is also called environmentally conscious supply chain (ECSC) or environmentally supply chain (ESC), which has its roots in both environment management and supply chain management literature. Adding the 'green' component to supply chain management involves addressing the influence and relationships between supply chain management and the natural environment. (Xu, et al. 2013).

The objective of the GSCM is win-win strategy to benefit the environment as well as the overall performance of the company. Most of the companies are keen to implement GSCM and it has become a future goal for many companies. GSCM mainly includes green design, green sourcing, green manufacturing, green transport and reverse logistics. Research on GSCM is still in its infancy and needs proper framework guiding its implementation. The paper explores the key performance indicators that are important for effective GSCM implementation. The relative importance of these factor will certainly facilitate the top management to make their strategy for incorporating environmental factor in their overall company policy/mission statement.

The GSCM implementation and performance assessment is relatively important for survival in an ever-increasingly competitive environment. Within the circular economy context; companies that aim to improve GSCM must constantly monitor their performance. In order to integrate the circular economy concept into GSCM, it is required to achieve an optimal balance of environmental, economic, logistics, organizational, and marketing performance indicators. The aim of GSCM is to reduced costs and resource consumption, decreased environmental pollution through green production, improved market share, stronger brand image, and increased economic performance by improving environmental and social performance (Dawei et al., 2015).

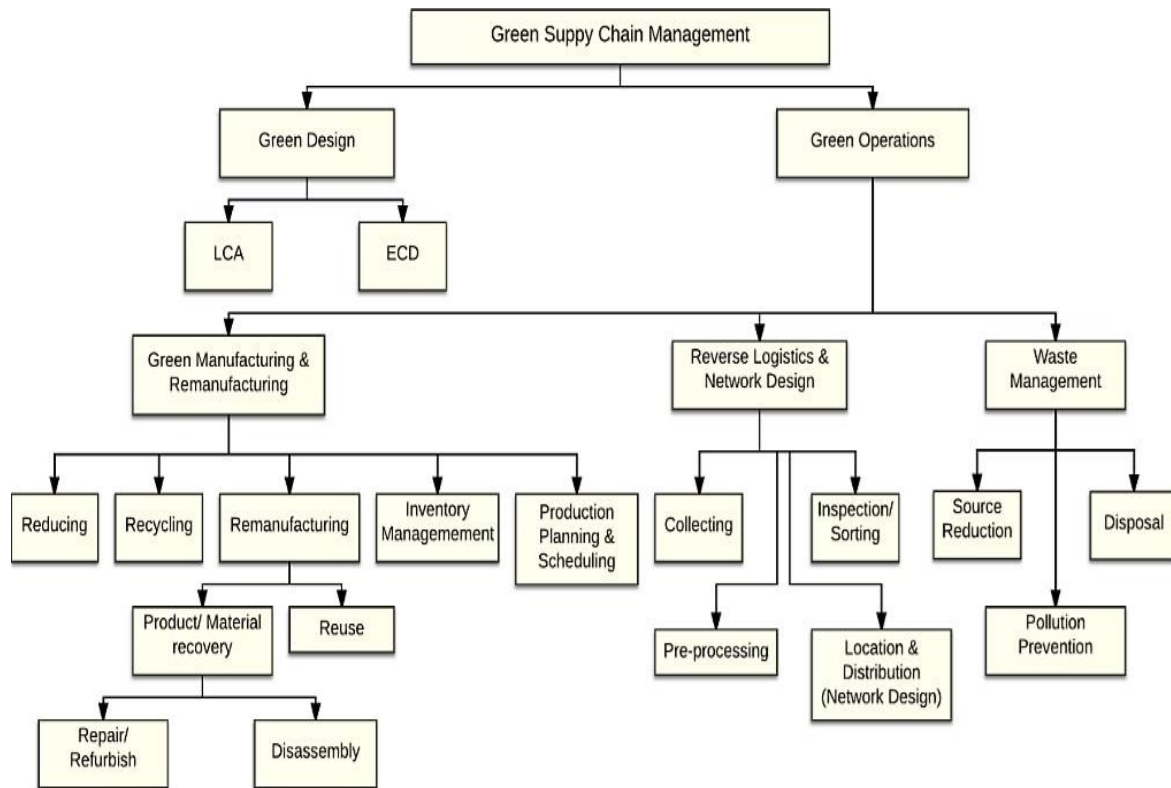


Fig.1 Classification of GSCM practices in Automobile Industry (Srivastava, 2007)

II.LITERATURE REVIEW

The concept of green supply chain was first arisen by the Michigan State University in 1996 during an "environmentally responsible manufacturing" research. It was proved to be an effective way of management by the scholars in Michigan State University. Later they found the establishment of green supply chain management in these enterprises such as IBM effectively solved the conflict between economic interests of environmental protection,so people admires it(Lu,L et al,2007). A useful definition of green supply chain is captured by Hervani (2005) who states that a "green supply chain is a concept that combines green procurement, environmental management of manufacturing materials, environmental circulation, marketing, and reverse logistics". Sundarakani et al. (2010) add another dimension asserting that "green supply chain management can be defined as the integration of environmental thinking into supply chain management, including product design, supplier selection and material sourcing, manufacturing processes, product packaging, delivery of the product to consumers, and end-of-life management of the product after its use".

The growing importance of GSCM is driven mainly by the escalating deterioration of the environment, e.g., diminishing raw material resources, overflowing waste sites and increasing levels of pollution. However, it is not just about being environment friendly; it is about good business sense and higher profits. In fact, it is a business value driver and not a cost centre. In addition, the regulatory requirements and consumer pressures are driving GSCM. Hence, the scope of GSCM ranges from reactive monitoring of the general environment management programmes to more proactive practices implemented through various Rs (reduce, re-use, rework, refurbish, reclaim, recycle, remanufacture, reverse logistics, etc.) (Srivastava, 2007)

Since the beginning of the 21st century, the topic of protecting ecological environment and realising sustainable development is achieving increased concerns. Many governments in the world have paid great attention to environmental problems to guide their economic construction and social development basing on the idea of sustainable development. The green supply chain management (GSCM) emerged under these circumstances, which emphasises on strengthening the environmental factors in the supply chain.(Ai Xu et al. 2013)

According to Zhu and Sarkis (2006), GSCM practices can be described as green procurement and manufacturing activities, which encompasses green design, manufacturing, recycling, according to green standards. In order to implement effective GSCM, companies should combine internal and external GSCM practices by encouraging the collaboration of suppliers and customers to increase profit and market share and achieve competitive advantage.

Wang et al. (2005) proposed that GSCM model involves manufacturing contractors, i.e., suppliers, manufacturers, distributors, retailers and recyclers, consumption contractors, i.e., those involved in developing products, resources and recycling waste materials; logistics contractors, covering material, information, capital and knowledge flows; and social systems, such as regulation, culture and ethics. The main GSCM initiatives are green or eco-design, green procurement (e.g. certified vendors, buying eco-friendly materials), eco-friendly packaging and transportation, reuse, and remanufacturing or recycling products (Eltayeb and Zailani, 2009).

Zhu et al. (2008) used different forms of scales to measure GSCM for continuous improvements, implementation of GSCM and benchmarking. According to Green et al. (2012), environmental performance involves reducing environmental pollutant levels, while economic performance focuses on the decrease of environmentally related material and energy consumption costs. Zhu et al. (2008) showed that there is a relation between environmental measures and economic performance. Zhu et al. (2013) highlighted that the existence of the mediation effects indicates the need for producers to integrate internal and external GSCM activities in order to realize the full performance potential. Also, enhancing environmental performance will contribute to the corporate image and thus, greater sales and profits in the long run.

Reverse logistics is the process of retrieving used product from the point of consumption to the point of origin for possible reusing, recycling, and remanufacturing (Rao & Holt, 2005). It represents the transformation of used products into reusable products. Reverse logistics practices include collection, combined, inspection, selection, cleaning, sorting, recycling, recovery, redistribution, and disposal.

III. BARRIERS OF GREEN SUPPLY CHAIN MANAGEMENT

In last few decades, there is a growing importance of Green supply chain management (GSCM) due to continuous degradation of environment e.g.- increasing pollution, wastage of natural resources, extinction of animals and harmful effects on human. A growing awareness among industries to implement GSCM is observed. There are many barriers which hinders successful implementation of GSCM.

- Lack of government support to adopt Environmental friendly policies
- Complexity of measuring/monitoring environmental practices of suppliers
- Problems in maintaining environmental suppliers
- Lack of new technology,
- Complexity to design, reuse/recycle products,
- Lack of technical expertise
- Lack of Human resource
- Lack of effective environmental measures
- Fear of failure
- Lack of professionals exposed to green systems,
- Lack of Environmental Knowledge
- Perception of —out-of-responsibility| zone
- Disbelief about environmental benefits
- Lack of awareness about reverse logistics,
- High cost for hazardous waste disposal
- Non-availability of bank loans to encourage green products/ processes,
- High investments and less Return on-Investments
- Lack of training courses/consultancy/institutions to train,
- Monitor and mentor progress specific to each industry
- Lack of customer awareness and pressure about GSCM,
- Lack of Corporate Social Responsibility
- Lack of top management involvement,
- Restrictive company policies,
- Poor supplier commitment and unwilling to exchange information,
- Lack of Inter-departments cooperation, (Kannan et al 2014).

IV.BENEFITS OF GSCM

1.Economic benefits from increased efficiency:

Green supply chain management practices help in reducing wastes. Companies with such initiatives decrease handling costs and even expensive inputs. The company gains competitive advantage through green supply chain management methodologies.

2.Competitive advantage through innovation:

Efficient production is enhanced through the use of cleaner technologies, process innovation, and waste reduction. Reduction in wastes equals dollars earned. If we take the example of Arvind Eye Care, we can witness the true level of process innovations done in order to come up with competitive advantage. The eye care has welfare of eradicating blindness from a place like rural India and hence it follows certain ways like increasing the efficiency of doctors to operate more number of patients if there is innovation in the set procedures and processes.

3.Improved product quality:

Supply chain partnerships help maintain associations between and suppliers leading to increased command and control over product design and quality.

4.Consistent corporate environmental goals:

In an era of complex, non-vertical manufacturing, companies include supplier outreach to address corporate environmental goals.

5.Improved public image:

Consumers, stakeholders and personnel react confidently to companies with a status for decent environmental performance.

V.CONCLUSION

The environmental image and environment consciousness of customers are increasing in the market day by day. It has pushed SMEs to think about clean and green production by implementing of GSCM. This paper presents insights into the conceptualization and methodological research bases of the GSCM. The review enables us to understand the state of art practices in the area of GSCM. In general, the GSCM is an effective management approach for enterprises to pursue the strategy of sustainable development and to improve performance and competitiveness. Green Supply Chain Management as understood from the above inferences and analysis of various literature reviews improves the operations of an organization by employing environmental solutions like

- Improvement in agility as it helps mitigate the risks and hence augments up innovations,
- Increased adaptability as green supply chain leads to innovative processes and continuous enhancements,
- Promoting alignment as green supply chain management deals in the negotiating policies with suppliers and customers who in turn lead to better alignment of organization processes and principles.

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