

Green Supply Chain – From awareness to action



The Perspective

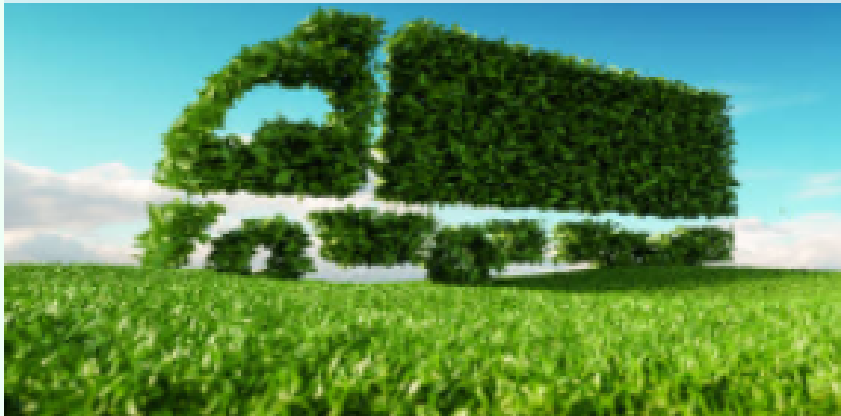
Since last couple of decades, growing impacts of global warming, climate change, waste and air pollution issues have involved increasing world-wide attention of experts worldwide. Today, one of the top priorities of an organization's modern corporate strategy is to portray itself as socially responsible and environmentally sustainable. As a focal point of sustainability initiatives, green supply chain management has emerged as a key strategy that can provide competitive advantages with significant parallel gains for company profitability. In designing a green supply chain, the intent is the adoption of comprehensive and cross-business sustainability principles, from the product conception stage to the end-of-life stage. In this context, green initiatives relate to tangible and intangible corporate benefits. Sustainability reports from numerous companies reveal that greening their supply chains has helped reduce operating cost, thus boosting effectiveness and efficiency while increasing sustainability of the business.



What is Green supply chain ?

Green supply chain management can be defined as Integrating environmental thinking into supply chain management, including ecological design of products, purchasing green materials and components, reengineering of manufacturing steps towards eco -friendly, reverse logistics management of the product after its useful life. The Global Supply Chain Forum defines SCM as "the integration of key business processes from end users through original suppliers that provide products, services, and information that add value for customers and other stakeholders". Green supply chain makes the applications of the key sustainable development strategy outstand. It emphasizes how green practices can be adopted in firms to mitigate the environmental degradations and increase the economic and operational performance of firms, Integrating environmental thinking into supply chain management, including ecological design of products, purchasing green materials and

components, reengineering of manufacturing steps towards eco - friendly, reverse logistics management of the product after its useful life. Building a green supply chain involves making trade-offs between minimizing your supply chain environmental impact and other business objectives including agility, efficiency, profitability, and customer service. Green supply chain management is achievable by organizations of any size and in any industry. Green supply chain management is an extension of supply chain management. It refers to assimilating environment thinking into supply chain management, comprising product design, sourcing and selection of material, process of manufacturing the product, delivery of the same, and management of the product after its usage. Green supply chain management not only improves operations but also improves agility, adaptability and promotes alignment. This process is eco-friendly and becomes a part of the corporate social responsibility.



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:

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

With the help of Green Supply Chain practices operational efficiencies can be improved. Following are some of the benefits that can be realized out of this initiative which is termed as CI benefits:-

- Continuous Innovations – It helps to alleviate risk and gives momentum to innovations.
- Continuous Improvements – Analysing GSCM activities generally leads to innovative processes and regular improvements
- Continuous Interactions – It involves negotiating policies with all the stakeholders like suppliers and customers, resulting into better alignment of business processes and principles.

Green practices in supply chain management

Some well-known green practices adopted by companies worldwide are as follows;

Green material sourcing

Green sourcing means sourcing or purchasing materials and components which have eco - friendly characteristics as reusability, recyclability and non - use of hazardous/dangerous chemicals. With more and more concerns on environmental protection, procurement professionals have been motivated to reconsider their existing sourcing, purchasing strategy and their impact on environmental sustainability.

Green marketing

Green marketing encompasses a broad range of marketing activities (e.g., planning, production,, process, price, promotion and after-sale service) designed to focus on the goal of organization to mitigate the harmful effects of their products. Green marketing practice promotes the products with environmental friendly properties. It contains the activities that can satisfy human desires of minimum negative effects on the environment.

Green distribution and warehousing

Green distribution and warehousing can reduce the waste and play an important role in energy reduction besides significantly improving overall performance of organization with better corporate image

Green manufacturing

Green manufacturing practices involve socially and environmentally accountable practices to mitigate harmful effects of manufacturing. Green practices reduce waste and improve the efficiency of manufacturing processes

Ecological design

Research has highlighted that 80% impacts on environment from product and related processes could be controlled with the adoption of ecological design in supply chain management. Ecological design incorporates many ideas like using cleaner technology processes, green raw material and components. Green design of products also supports reusing, recycling and remanufacturing of products, which not only helps firms to improve their environmental performance but also provide opportunity to reduce their costs

Green transportation and reverse logistics

Green transportation and reverser logistics practices provide opportunity to organizations to reduce their costs. Logistics overheads can be reduced through promoting efficiency of transportation system. The logistics activities integrated with rehabilitation comprise the practice of reverse logistics (reusing, recycling, and remanufacturing), which can produce the products that can be used again for customers.



Renewable energy and biofuels

Global logistics and supply chain operations mainly depend on energy as well as fossil fuel, which are the main cause of climate change, global warming and pollution with greater carbon and greenhouse gas emissions. Use of renewable energy and biofuels reduces carbon emissions and facilitate sustainable environmental and economic growth

Green Supply Chain Principles

1. Reduce environmental impact of all products, processes and materials
- Reduce environmental impact over the full life cycle of all products, processes, and materials by measuring, setting reduction goals and monitoring progress.
- Develop products and processes that are less harmful to the environment.

Minimize adverse environmental impact on air, land, and water.

- Reduce greenhouse gas emissions in production, logistics and other processes, by establishing a baseline, setting reduction goals and monitoring progress.
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- Minimize water consumption and water-related risks.

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Minimize the consumption of natural resources, raw materials, and fossil fuel inputs.

- Promote recycling and evaluate the potential to use recycled or used materials when they are available.
- Design and deliver to all customers, the most sustainable packaging by assessing its quality and cost over the full life cycle.

Greening the Supply Chain

Here's what you can do to adopt a 'Green Supply Chain Strategy.' Commitment:

- Gain executive commitment and sponsorship to visibly support program goals, strategies, and execution plans.
- Identify an accountable program champion.

- Define metrics and benchmark environmental impact in areas like waste generation, energy consumption, emissions, etc.
- Set targets and devise policies that offer guidance on how to achieve targets at every level of the enterprise and across the product life cycle.
- Ensure policy compliance goal/target achievement across the extended enterprise leveraging executive support.
- Develop a green corporate culture by offering training and workshops to employees and stakeholders, as well as incentives and recognition.
- Consider acquiring green certifications and performing green audits.

Supply Chain Visibility and Monitoring:

- Map your supply chain end-to-end to gain visibility to your multi-tier supplier network and sub-tier suppliers.
- Consider using a third-party supplier on boarding/network mapping service to reduce the cost of implementation and ongoing updates.
- Monitor supply network for environment-related news such as chemical spills and environmental compliance breaches

Green Procurement:

- Procure materials/parts from suppliers who adhere to green principals and processes (e.g. lean manufacturing) and have a strong green policy and standards.
- Deal with suppliers who acquire ISO14000, OHSAS18000, RoHS directives and behest stringent norms to control hazardous substances.
- Ensure that the material being purchased is non-toxic and recyclable.
- Perform quality checks at material inflow points.
- Implement inventory control strategies selectively to reduce stock and eliminate warehousing costs.

BENEFITS OF GREEN SUPPLY CHAIN MANAGEMENT



Literature review

Various studies in literature support the positive role of GSCM in the sustainability performance of the industry (Awan et al., 2017; Khan and Qianli, 2017; Khan et al., 2019). Corporations are inclined to adapt the GSCM to enhance their competitiveness and sustainability performance (Rao and Holt, 2005; Yang et al., 2013). With the growing concern for the environment, reducing costs and improving quality products have become the target for various businesses. There is now a focus on green production from product development up to the management of every step of the product life cycle. The environmental practice steps may involve eco-designs, recycling processes, reuse of the products with minimal cost expenditure, and clean production (Chavez et al., 2016). The literature on environmental management suggests that green operations are related to both products and their related practices of the environment. This reduces product damage and positively affects the supply chain processes involving natural resources (Choi and Hwang, 2015).

Green Manufacturing:

- Incorporate manufacturing processes that curb or control pollution/wastage.
- Design and redesign products to minimize production complexity, reduce energy consumption, and increase the product life span.
- Use non-toxic, lead-free materials for manufacturing.

Incorporate lean manufacturing to:

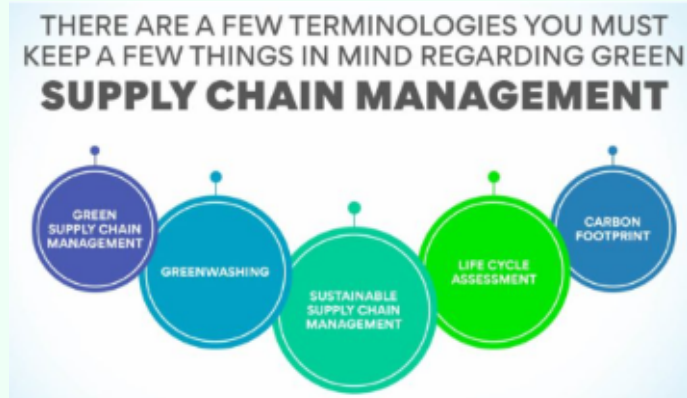
- Reduce defects and rework
- Control machine and process breakdowns
- Control inventory
- Reduce manufacturing space required

Green packaging:

- Downsize packaging to reduce material consumption.
- Use recyclable, reusable, non-toxic, and bio-degradable packaging material.
- Design warehouses to reduce energy consumption.

Green logistics:

- Hire vehicles designed to control for carbon emissions.
- Plan the transportation route to reduce mileage.
- Plan reverse logistics to collect used products and packaging from customers to recycle/reuse
- Green Supply Chain Management: The greening of supply chain processes to reduce negative environmental impacts
- Green washing: The act of making false or misleading claims about the environmental benefits of a product or service
- Sustainable supply chain management: A holistic approach to SCM that takes into account social, economic, and environmental concerns.
- Life Cycle Assessment: A tool to evaluate the environmental impacts of a product or service over its entire life cycle
- Carbon footprint: A measurement of carbon dioxide (CO₂) and other greenhouse gases emitted by an individual, organisation, event, or product.

**How can green supply chain management impact your business**

Green supply chain management can have a significant impact on your business in several ways:

- **Cost savings:** Implementing green supply chain practices can lead to cost savings in the long run. By optimizing energy and resource usage, reducing waste, and improving efficiency, you can lower operational costs and enhance profitability.
- **Supply chain resilience and agility:** Green supply chain practices often involve diversifying suppliers, adopting local sourcing strategies, and reducing dependence on scarce resources. These measures enhance supply chain resilience, allowing your business to navigate disruptions, such as natural disasters or geopolitical issues, more effectively.
- **Improved brand reputation:** Consumers are increasingly concerned about the environmental impact of the products they purchase. By adopting green supply chain practices, you demonstrate your commitment to sustainability, which can enhance your brand reputation and attract environmentally conscious customers.
- **Competitive advantage:** Green supply chain management can give you a competitive edge in the marketplace. Many customers prefer to support businesses that prioritize sustainability, and incorporating environmentally friendly practices into your supply chain can differentiate you from your competitors.
- **Regulatory compliance:** Governments and regulatory bodies are introducing stricter environmental regulations. By aligning your supply chain with green practices, you can ensure compliance with current and future regulations, avoiding penalties and legal issues.
- **Risk mitigation:** Green supply chain management helps mitigate risks associated with climate change and resource scarcity. By diversifying your suppliers, adopting renewable energy sources, and implementing disaster preparedness plans, you can reduce vulnerability to disruptions and create a more resilient supply chain.
- **Innovation and collaboration opportunities:** Embracing green supply chain practices often requires innovation and collaboration with suppliers, partners, and stakeholders. This can lead to the development of new technologies, processes, and business models, fostering creativity and creating growth opportunities.
- **Enhanced supplier relationships:** Implementing green supply chain practices involves working closely with suppliers to ensure they meet sustainability criteria. This collaboration can strengthen relationships, foster trust, and improve supply chain transparency, leading to more reliable and responsible supplier networks.
- **Life cycle assessment and transparency:** Green supply chain management involves conducting life cycle assessments of products to understand their environmental impact from raw material extraction to end-of-life disposal. By embracing transparency and sharing this information with customers, you can build trust and demonstrate your commitment to sustainable practices.

The Bottom Line

Green supply chain management is not only good for the environment, but it is also good for business. Companies that adopt green practices into their supply chains often see a decrease in costs, as well as an increase in efficiency. If more companies adopted green practices into their supply chains, we would see a decrease in pollution and a reduction in the amount of resources used.

Challenges of GSCM

If not managed efficiently, some factors also hinder the adoption of green supply chain practices.

- **Leadership Commitment** : When decision-makers are on board, developing a unified approach to creating a green supply chain strategy is simple. But, when decision-makers disagree, there can be contradictions throughout the supply chain. Issues in quality control, supply chain performance, and green initiatives' effectiveness arise.
- **Technology challenges** : Many software applications and advanced technology can support GSCM at different process steps. These could be warehouse management systems (WMS) that boost warehouse efficiency. It could also refer to the latest manufacturing tech that makes products using less energy.
- **Brand Image and Culture** : Green practices throughout the supply chain become seamless when the company and its culture support these initiatives. When company culture does not support green initiatives, it adversely impacts success. Therefore, involving the HR team in recruiting higher-skilled resources drives better results.
- **Costs**: The cost of revamping the infrastructure is higher; therefore, GSC development may seem costly initially. For example, firms add photovoltaic solar panels to their green warehouse roof, which help generate alternative energy. This minimizes their reliance on fossil fuels, reducing the facility's costs.

Knowledge Involving GSC experts can help companies use green resources best. It helps them implement sustainable solutions and optimize results. For example, not involving experts can reduce the strategy's effectiveness. Conversely, agility in planning a green logistics solution can eliminate the guesswork typical of sustainable distribution chains.

The latest green supply chain practices

The following supply chain trends and practices are helping organizations achieve greener operations and promote a more sustainable future for our planet:

- **Minimizing air freight:**

Shipping by air is extraordinarily efficient in terms of transporting goods quickly. Unfortunately, it's far from energy efficient. More organizations are seeing the value of using air freight to meet only immediate demand, while relying on ocean freight and rail transport to meet planned ongoing needs. Developing the right freight and transportation mix helps ensure you're equipped to meet customer demand while minimizing your environmental impact.

- **Investing in transportation infrastructure:**

Improvements to ports, railways, and roads, especially in emerging markets like Southeast Asia, are enabling more efficient transportation. That, in turn, has led to fewer carbon emissions. The next step? Building more charging stations for heavy electric trucks. The West Coast Electric Highway, a network of electric vehicle fast-charging stations that crosses California, Oregon, and Washington, is a good start in North America. But experts say that this infrastructure needs to develop at a faster pace throughout the world to keep up with demand for green trucks.

- **3D printing:**

Every day, 3D printing gains new applications across a range of industries—from aerospace to medical device manufacturing. What's more, 3D printing is more energy efficient and cost efficient than other equipment and processes used in the manufacturing industry. Why? For one, 3D printers are precise and lead to almost no material waste. For two, they enable manufacturers to create products on demand, reducing the chance of overproduction. By minimizing energy use and waste, 3D printers help lower carbon emissions. It's even possible to turn recycled materials into new products using a 3D printer.

- **Circular supply chains:**

Circular supply chains focus on recovering and recycling waste materials to turn them into saleable products. This approach can take many forms—from refurbishing old products for resale, as Apple does with its iPhones, to reprocessing old components to make brand-new products. Needless to say, adopting the circular economy model reduces waste and helps keep valuable materials out of landfills. And it can also be quite profitable for companies.

- **Carbon emissions trading:**

Carbon trading is the process of exchanging carbon credits among nations to minimize CO2 emissions. Each country has a cap on the amount of CO2 it can release. Nations with higher carbon emissions can then buy carbon credits from countries with lower carbon emissions, gaining the right to release more CO2 into the atmosphere. Individual companies can also engage in trading. The idea behind this system is that using fossil fuels comes with many hidden costs—from environmental degradation to health care needs resulting from poor air quality. Putting a price tag on the right to emit carbon gives nations and corporations a financial incentive to reduce their emissions. In fact, emissions trading systems around the world are growing in number.

Supply chain shakeup

The shakeup of global supply chains is an opportunity for India, but it comes with increased scrutiny. In recent years a rising number of multinational corporations have pledged to work only with suppliers that adhere to social and environmental standards. Typically, these MNCs expect their first-tier suppliers to comply with those standards, and they ask that those suppliers in turn ask for compliance from their suppliers—who ideally ask the same from their suppliers. And so on. The aim is to create a cascade of sustainable practices that flows smoothly throughout the supply chain, or, as we prefer to call it, the supply network. To capitalise on the realignment of global trade, India's manufacturers will need to convince these sustainability-conscious buyers that they, too, can keep up with global best practices.

Many of India's leading manufacturers are taking action. Shahi Group, a leading apparel exporter, is investing in solar and wind farms to meet a target of 100% renewable energy in its operations by 2026. Major conglomerates such as Godrej Group and Tata Group have invested in sustainable supply chain initiatives. Smaller businesses will also need to be aware of global expectations if they are to win or retain international clients in the years to come.

Conclusion

In the world, as the environmental awareness is increasing, firms are facing huge pressure from different stakeholders including government and customers to mitigate their harmful effect on the environment. Indeed, corporate sector needs to consider integrating their business practices in service and manufacturing industry with sustainability and reducing end-to-end supply chain costs and associated undesirable outcomes to achieve competitive advantage. Designing and to implementing a nature-friendly supply chain will help, in the long term, the planet, consumers and companies. Green supply chain can reduce the environmental pollution and production costs and it also can spur economic growth, create competitive advantage in terms of greater customer satisfaction, positive image and reputation and provide better opportunity to export products in pro-environmental countries.

Green supply chain management is a critical piece of the puzzle regarding sustainability and reducing our carbon footprint. In layman's terms, it is the process of managing the environmental impact of the supply chain. It can include anything from reducing energy consumption to recycling and composting. Why does green supply chain management matter? A growing number of consumers show interest in buying products with minimal environmental impact. If businesses want to stay competitive in today's market, they need to start implementing green supply chain management practices into their business.

Green supply chain management offers us the opportunity to reconcile economic growth with environmental sustainability. By integrating eco-friendly practices into every stage of the supply chain, we can minimize waste, reduce emissions, conserve resources, and protect fragile ecosystems. This approach not only benefits the environment but also creates value for businesses, fostering innovation, enhancing brand reputation, and opening doors to new markets.

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