

PART 1

Introduction

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Introduction to Green Supply Chains

Arguably, since the wide recognition of Supply Chain Management (SCM) in the late seventies, nothing in SCM has captured the imagination of the public, corporate management, and policy makers as much as the recent concept of Green Supply Chains. This is driven by a multitude of reasons which appeal to all these constituencies in different ways.

Green Supply Chain Management (GSCM) has emerged as a key approach for enterprises seeking to make their businesses environmentally sustainable. The notion of GSCM implies the insertion of environmental criteria within the decision-making context of the traditional supply chain management.

At our current place in history, Green Supply Chain Management has become a key strategic issue for organizations of all sizes and types rather than just a talking point for idealists and hobbyist do-gooders. For example, the idea of Corporate Social Responsibility (CSR) is now fully incorporated in many legal and ethical frameworks governing how organizations function within society. Society now fully expects organizations to be responsible for all direct and indirect impacts of their actions, and those of their suppliers, employees, directors, and even customers.

For the CEOs, the boards, and the senior executive teams, Green Supply Chain Management offers a systematic way to comprehensively manage their entire business in a manner that meets their CSR obligations and profitability targets.

Demographics, information explosion, and past environmental degradation are creating organizational pressures and market opportunities for more and more Green products and services. Public activism is forcing policy makers and organizations to accept that sustainability is more than just a buzzword. Key decision makers in organizations are now expected to consider the social and environmental impacts of their current activities. Indeed, the more strategic the view of environment-related CSR activities is within a supply chain, the more benefit to the organization. Environmental considerations are now key centre points of the decision-making process rather than an unpalatable afterthought to the decision.

Our Green Supply Chain Planning framework also introduces a systematic way to win in this new game of putting environmental considerations in the centre of decision making, whilst still being the most profitable.

Green Supply Chain Management will therefore fully integrate environmental considerations into traditional supply chain management. This covers all aspects of supply chain management including product design, procurement, sourcing and supplier selection, manufacturing and production processes, logistics and the delivery of the final product to the consumers, along with the end-of-life management of the product. Therefore the total or the end-to-end supply chain can be covered (for example see Part 8, Case Study 1 that shows how this has been tackled by one organization).

Green Supply Chains therefore address four interrelated areas of the supply chains: upstream, downstream, within the organization, and the connecting logistics process:

- Upstream activities of a manufacturing product organization include the Green Design, Green Procurement, and evaluation of suppliers' environmental performance.
- Downstream activities usually comprise those activities related to the usage of the products till it is finally consumed. This includes any recovery and recycling opportunities after it has provided its utility and also the disposal and sale of excess stocks.
- Within the organization, Green Supply Chain Management includes those activities related to Green Design, Green Packaging, and Green Production.

- In logistics, activities such as just-in-time, fulfillment, lot size management, and quality management all have clear connections to environmental criteria.

As consumers have become more aware of environmental issues, such as global warming, they have now started asking questions about the products they are purchasing. Nowadays, organizations routinely face queries about how Green their manufacturing processes and supply chain are, how wide the carbon footprint is, how wasteful their packaging is, and how they will recycle.

Some organizations have been able to convert the public's interest in Green issues into increased profits. A number of projects within organizations have shown that there is a clear link between improved environmental performance and financial gains. Organizations that have looked to their supply chain have discovered areas where operational and environmental improvements can produce profits.

For example, General Motors was reported to reduce disposal costs by \$12 million by establishing a reusable container programme with their suppliers. While the motivation for this project may have been a desire to reduce costs, GM found that the environmental cleanup that resulted was actually a very marketable message for the public and policy makers.

Numerous such projects remain deeply buried in many organizations despite their best intentions and attempts to flush them to the surface. A systematic approach is therefore very clearly required.

Similarly, cost savings can also result from reducing the environmental impact of the organization's processes. By re-evaluating the organization's supply chain, from purchasing, planning, and managing the flow of materials through the entire supply chain, savings are often additionally identified as a benefit of implementing Green policies.

Despite the public's focus on the environment, benefits attributed to reducing an organization's environmental impact are not in the forefront of many supply chain executives' minds. It appears that many executives are still unaware that improved environmental performance means lower waste disposal, lower training costs, and often, reduced materials costs. For this reason Green Supply Chain Management is a cause for the boards and the CEOs, as well as the senior executive teams of organizations.

1.1 Benefits of Green Supply Chains

Organizations can enjoy several benefits by greening their supply chain and the following are some of the key benefits.

1.1.1 Positive Impact on Financial Performance

Despite ample evidence to the contrary, there persists a myth that going Green involves additional expense. Some of the factors responsible for persistence of this myth are inertia, the lack of a systematic approach, and an unwillingness to engage in sustained and changed thinking that is necessary to create a Green Supply Chain.

However, the most fundamental benefit of Green Supply Chains is a positive long-term net impact on the financial performance of the organization. This has been proven by both analysis and empirical evidence.

1.1.2 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 an environmentally friendly production process to produce the desired Green outputs.

1.1.3 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.

1.1.4 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 a competitive edge in the market place. It will also strengthen the brand image and reputation in the market place.

1.1.5 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.

1.1.6 Improved Quality and Products

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

Besides the above six benefits, there are additional advantages that can be generated by CSCM:

- effective management of suppliers;
- dissemination of technology, advanced techniques, capital, and knowledge among the supply chain partners;
- transparency of the supply chain;
- large investments and risks are shared among partners in the supply chain;
- better control of product safety and quality;
- increased sales and revenue;
- beneficial uses for waste.

Benefits of Green Supply Chain are further described in Table 1.1.

Table 1.1: *Benefits of Green Supply Chains*

	Benefits
Environmental	<p>Integrated environmental considerations and supply chain management process reduces emission of greenhouse gases by recognizing that supply chains consist of discrete decisions, each of which has environmental impacts</p> <p>Reduction in waste, pollution, and environmental degradation</p>
Technological	<p>Creates a platform for further technological advancement by identifying areas where they would have maximum impact on reducing environmental degradation</p> <p>Provides a systematic process whereby greening opportunities can be identified throughout a supply chain</p> <p>Dedicated technologies can be developed for the processes having greening opportunity</p> <p>Enables more efficient use of resources</p> <p>Increased visibility of the financial and operational benefits</p>
Economical	<p>Increased organizational profitability due to positive net financial impact of Green Supply Chain projects</p> <p>Reduced procurement costs from more efficient energy and materials use</p> <p>Reduced compliance and disposal costs from decreased waste generation and use of hazardous materials</p> <p>Significant new organization because of customer-related environmental initiatives</p> <p>Increased benefits by merging supply chain optimization efforts and environmental management efforts</p>
Regulatory	<p>Keeps the organization well ahead of the regulatory wave, creating an impetus for innovation, organizational learning, and change</p> <p>Addresses the issue of global warming which is one of the most important concerns of environment experts and policy makers across the world</p> <p>Addresses public and regulatory hostility towards environmentally harmful organizations</p>
Social	<p>Positive word-of-mouth, viral marketing opportunities, and recognition as one of the leaders</p> <p>Increased sales for environmentally preferable products result in clean neighbourhood</p> <p>Safer workplace and clean working environment</p> <p>Better health, reduced occupational health and safety costs, and manpower costs</p>

1.2 Traditional and Green Supply Chains

In a traditional supply chain, the flow of materials and information is linear and from one end to the other. There is a limited collaboration and visibility. Each supply chain partner has limited information regarding, for example, the carbon footprint and greenhouse gas emission of the other partners. Hence, each player may be concerned about his own footprint and may try to reduce this, irrespective of the impact on upstream and downstream supply chain. There may be some focus on end-to-end supply chain costs but due to limitations of information sharing, the costs are far from optimized in most cases.

An example follows in Figure 1.1.

In contrast, Green Supply Chains consider the environmental effects of all processes of supply chain from the extraction of raw materials to the final disposal of goods. Within the Green Supply Chain (see Figure 1.2), each player motivates other players to go Green, and provides the necessary information, support, and guidance, for example, through suppliers' development programmes or customer support. Environment objectives and performance measurement are then integrated with financial and operational objectives.

With this integration, the Green Supply Chains then will strive to achieve what any individual organization on its own could not possibly achieve: minimized waste, minimized environmental impact while assuring maximized consumer satisfaction, and healthy profits.

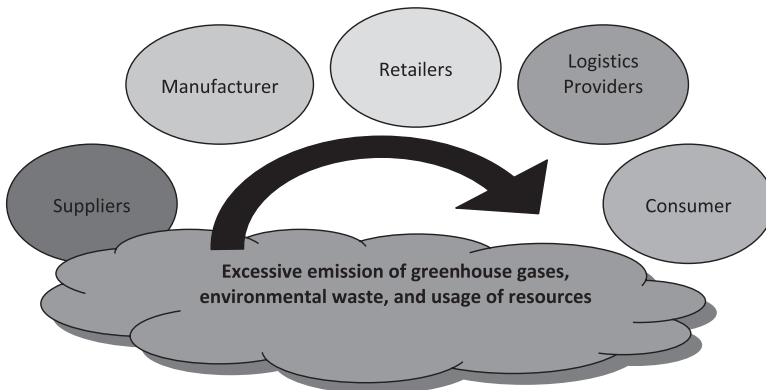


Figure 1.1: *Traditional supply chain*

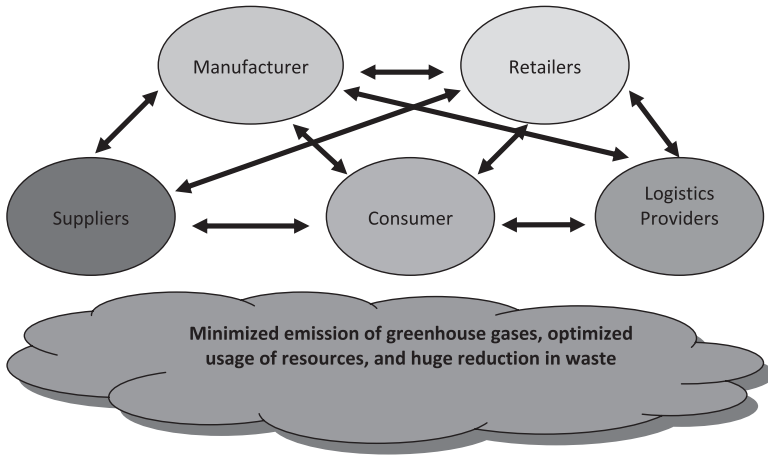


Figure 1.2: Green Supply Chains

Some of the key differentiators of Green Supply Chains are:

- The top management commitment to a culture of continuous improvement and the ongoing collaborative innovation towards “Greener” supply chains.
- Allowing all of the supply chain partners a role in creating specifications, options, and examining alternatives during the product design phase itself.
- The efficient use of technology to capture data, run scenarios, communicate information, and to make decisions.
- The removing and getting out of a traditional strategic “stage gate” sourcing mentality that creates rigid parameters on information dissemination, collection, and analysis.
- Making sustainability a cost issue, as well as a CSR issue.

1.3 Green Supply Chains and Corporate Social Responsibility (CSR)

One of the best definitions of Corporate Social Responsibility is perhaps provided by Archbishop Desmond Tutu’s *The Benchmark Foundation*. It states:

“Corporate Social Responsibility (CSR) is the decision-making and implementation process that guides all company activities in the protection and promotion of international human rights, labor and environmental standards and compliance with legal requirements within its operations and in its relations to the societies and communities where it operates. CSR involves a commitment to contribute to the economic, environmental and social sustainability of communities through the on-going engagement of stakeholders, the active participation of communities impacted by company activities and the public reporting of company policies and performance in the economic, environmental and social arenas.”

There is a strong connection between Corporate Social Responsibility and Green Supply Chains. One of the most effective tools to achieve Green transformations in the corporate world is Green Supply Chain Management. It focuses on sustainable design that increases environmental and social awareness across the supply chain. Sustainable design involves re-engineering of design processes to meet current and future human needs without compromising the environment. The basic objectives of sustainability are to reduce consumption of non-renewable resources, minimize waste and create healthy, productive environments through:

- using fewer materials;
- avoiding toxic substances and choosing renewable or recyclable substances;
- designing for disassembly;
- minimizing energy use, moving to the use of renewable energy, and extracting energy from waste in some cases;
- keeping a product or its parts or materials in productive use for their optimal lifespan, so slowing or preventing the linear flow of materials from extraction and processing to disposal.

Despite an area of significant overlap, GSCM is however not a subset of CSR. While CSR focuses on areas under the direct control of a particular organization, Green Supply Chain thinking goes beyond that to recognize that in today's corporate world, the area of influence of an organization persists far beyond its boundaries. Hence GSCM calls on all partners of a particular supply chain to collaborate to create an end-to-end Green Supply Chain to assure a sustainable and prosperous future.

1.4 Drivers of Green Supply Chain

There are five types of environmental stakeholder group who drive Green initiatives within an organization (see Figure 1.3):

1. Regulatory stakeholders, who either set regulations or have the ability to convince governments to set standards.
2. Consumers, who seek emotional resonance alongside the cost and convenience factors of where and when they buy a particular product.
3. Organizational stakeholders, who are directly related to an organization and can have a direct financial impact on the organization.
4. Community groups, environmental organizations, and all those other potential lobbies, who can mobilize public opinion in favour of, or against, an organization's environmental policies.
5. Media, who have the ability to influence society's perceptions.

Based on the roles of each player in the supply chain there are different incentives to migrate towards Green Supply Chains and briefly these are as follows:

- Factors that drive manufacturers towards Green Design and Green Production include:
 - Legislation
 - Corporate customer requirements

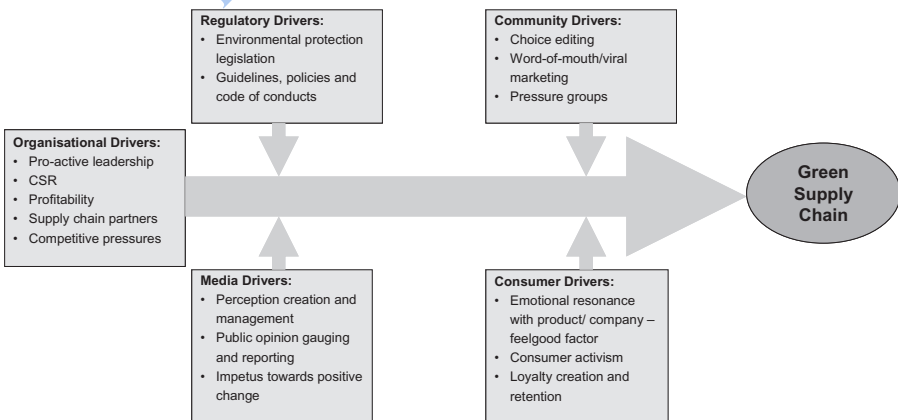


Figure 1.3: Drivers of Green Supply Chain

- Competitor standards
- Voluntary agreements
- Maximizing product understandings
- Environmental drivers of suppliers include:
 - Customers requirements
 - Consumers
 - Legislation
 - Consumer organizations and NGOs
- Logistics providers are implementing Green practices due to government regulations and customer expectations and agreements.

1.5 Green Supply Chain Framework

At this stage, we introduce our Green Supply Chain Framework which forms the foundation of our action manifesto towards Green Supply Chains and will be used throughout this book

This framework broadly divides the movement towards Green Supply Chains into the following seven key areas of interest:

- Green Supply Chain Planning
- Green Procurement and Sourcing
- Green Supply Chain Execution
- Carbon Management
- Green Supply Chain Migration Strategy
- Green Supply Chain Continual Improvement
- Green Supply Chain Performance Evaluation.

This book will be organized around these key areas:

- Green Supply Chain Planning is covered in Chapter 3.
- Green Procurement and Sourcing are covered in Chapter 4.
- Green Supply Chain Execution is covered in Chapters 5 to 9.
- Chapter 10 covers Carbon Management.
- Chapter 11 covers Migration Strategy and our implementation blueprint.
- Chapter 12 covers Continuous Improvement.
- Finally, Chapter 13 covers Green Performance Evaluation.

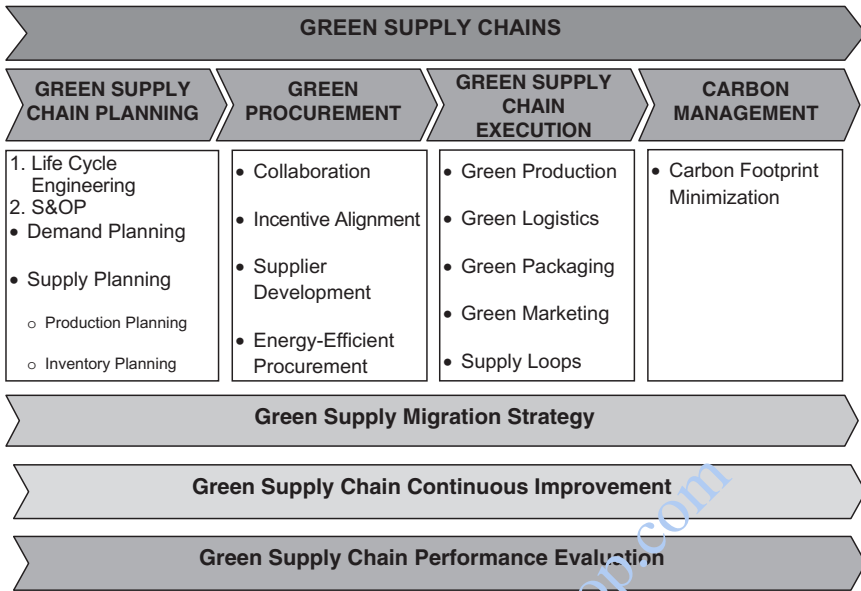


Figure 1.4: Green Supply Chain Framework

The simplified framework in Figure 1.4 is based on the detailed framework explaining each of the parameters and processes of Green Supply Chains which is reproduced above. This detailed framework summarizes various processes of Green Supply Chains and provides an overview of the migration strategy and continuous improvement. This can serve as a roadmap and a guide in readers' journey towards Green Supply Chains (see Figure 1.5).

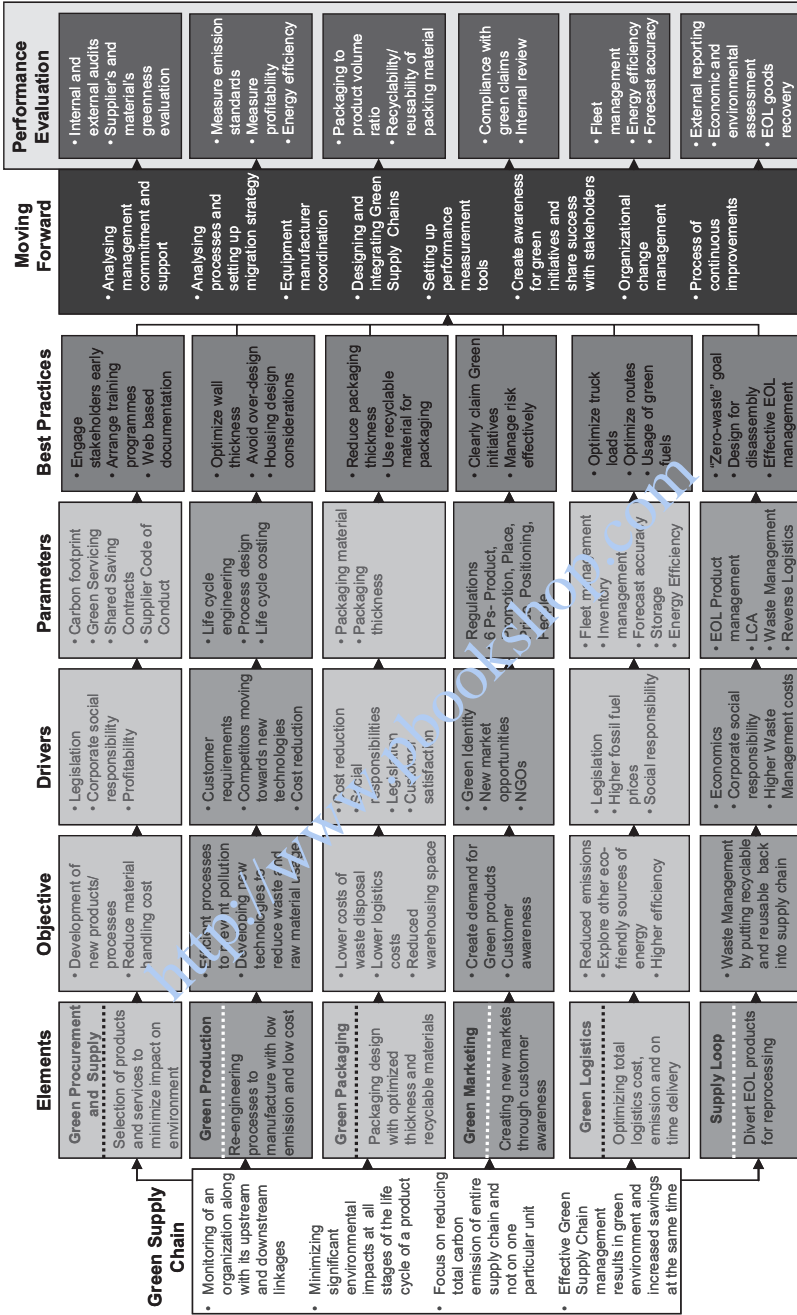


Figure 1.5: Green Supply Chain – Detailed Roadmap

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