Introduction

Supply chain management (SCM) is the process through which a company manages the sourcing and procurement of inputs, the processing and manufacture of products and services, and their delivery to the consumer (figure 1). The primary objective of supply chain management is to meet consumer demand with more efficient use of resources including labor, inventory, stock, and distribution capacity. Accordingly, supply chain management aims to integrate major business functions and business processes within and across companies into a cohesive and high-performing business model capable of quickly reacting to dynamic market demands and rapidly changing features. SCM provides opportunities through which private sector companies can extend their influence in pollution control and abatement beyond their own operations and into their supply chain. This involves coordination and collaboration with partners throughout the value chain, which can include suppliers, intermediaries, third-party service providers, and customers.

The term “supply chain” includes all organizations, activities, and processes associated with all stages of the business processes involved in the planning, sourcing, processing, manufacturing, and delivery of goods and services. This process begins with suppliers of raw materials and inputs, proceeds to processors and manufacturers, and culminates to the delivery of completed goods and services to consumers and end users. The supply chain of multinational corporations can be complex, extensive and may be global in nature, whereas the supply chain of national or smaller enterprises will be less complex, smaller in scale, and local in nature, involving only local contractors, subcontractors, and home workers. Globalization has led to increased visibility of the environmental and social (E&S) impacts associated with the sourcing and processing of raw materials. Increased visibility has led to heightened consumer awareness and increased demand that firms ensure E&S sustainability through the entire supply chain.

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The key objective of supply chain management is to increase the efficiency of the activities and processes involved in the planning, sourcing, processing/manufacture and delivery of goods and services to end consumers. Increased efficiency may be achieved across either part of or the entire supply chain and typically is associated with improved productivity, increased product quality, improved logistics and ultimately a reduction in costs. Many aspects of SCM already consider resource utilisation and cost savings. As such the inclusion of a sustainability dimension in supply chains and SCM builds on the underlying business case for SCM.

Sustainability is thus becoming an integral component of supply chain management. There is no single, universally accepted definition of supply chain sustainability and it is often described in general terms through tools like responsible sourcing, green supply chains and triple value chain management (TVC), or more generically through corporate social responsibility. The application of E&S sustainability criteria to supply chains has focused on physical products such as food and clothing. This focus extends to the sourcing of raw materials, their processing, and their use in the manufacture of intermediate and final products.

**Description of Supply Chain Management**

*Description of Supply Chain Management.* A basic supply chain management system has five key components.
1) **Plan** The overall strategy of the SCM program including the development of SCM metrics for monitoring;

2) **Source** Identification, evaluation and selection of suppliers of goods and services; procurement contracting including performance guarantees and targets; and monitoring;

3) **Manufacture.** Make or manufacturing component, which refers to the execution of processes needed to produce, test, and package your products or services;

4) **Delivery.** The system for receiving orders from customers, developing a network of warehouses; getting the products to the customers; invoicing customers and receiving payment from them; and

5) **Return.** A responsive and flexible network for receiving defective and excess products back from customers and supporting customers who have problems with delivered products.

There are a number of models to help manage supply chains, such as Supply Chain Operations Reference model (SCOR), developed by the global Supply Chain Council as a cross-industry standard diagnostic tool for supply chain management. The Supply Chain Operations Reference (SCOR®) model is the product of Supply Chain Council (SCC). The SCOR model provides a framework that links business process, metrics, best practices, and technology features into a unified structure to support communication among supply chain partners and to improve the effectiveness of supply chain management and related supply chain improvement activities (available to SCC members at http://supply-chain.org/). An individual firm can apply SCM across the entire sourcing – production – distribution process or to any of its components.

**Integration of Environmental and Social Criteria into Supply Chain Management.** SCM is an umbrella that encompasses the entire process from plan to sourcing to manufacture to distribution. Environmental and social sustainability criteria can be integrated into each of the five key components of SCM. For each of these components there are various E&S tools through which the firm may define, monitor and evaluate E&S performance of the SCM component (figure 2).
E&S Sustainability of Supply Chains

Supply Chain Sustainability. There is no universally accepted definition of supply chain sustainability. Specific definitions and supporting principles and criteria vary by sector and commodity. In general terms the following environmental and social issues are considered - labour use, water use, energy efficiency, pollution prevention, biosecurity, social impacts (e.g., displacement, indigenous people), loss of biodiversity, forest conversion and land use and sustainable use of living resources.¹

Figure 3 illustrates a simple supply chain for an individual firm. The potential for the firm to promote E&S sustainability within its supply chain involves the following factors:

1. Position of the firm within the supply chain of the product. Firms involved in sourcing of raw materials or commodities may either have direct responsibility for sourcing (for example mining) or have short supply chains which may nonetheless involve a large number of producers (for example smallholder agricultural commodities). In contrast, firms involved in the manufacture of end products have an extensive chain of suppliers involved in sourcing of raw materials, processing and manufacture of intermediate products. Market-based power to demand changes in supplier policy, behavior and product attributes is strongest with the primary suppliers of the firm.

2. Various factors affect the ability of a firm to promote improved sustainability:

- Where the introduction of sustainability considerations in the supply chain leads

¹ The IFC Sustainability Policy and Performance Standards focus on only two aspects of environmental and social sustainability of supply chains, namely labour use (i.e., use of child and forced labour) and biodiversity.
to mutual advantage and the costs are neither excessive nor disproportionate to benefits, it is more straightforward to promote E&S sustainability within the supply chain.

- Downstream enterprises requiring inclusion of E&S criteria in their supply chains may be required to invest resources in building the capacity of their suppliers to ensure that they understand and are able act upon E&S requirements. Such activities include defining and sharing industry benchmarks, identification and analysis of alternatives, and joint implementation of selected sustainability initiatives.

- Leverage refers to the ability to demand E&S sustainability performance within the supply chain. Higher leverage is associated with access to proprietary technology and knowledge, greater market share, and greater purchasing power, resulting in a greater dependence of suppliers on the end user. Where the firm has complex operations with multiple tiers of suppliers, its leverage will diminish toward the more distant tiers.

- The position of the firm at a national, regional, or global level affects its ability to bring about change within value chain.

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**Figure 3. Diagrammatic Illustration of a Firm’s Supply Chain**

![Diagram showing a firm's supply chain](image-url)
Strategies and Tools for Promoting Sustainability in the Supply Chain.

Assessment Ideally E&S sustainability criteria should inform development of a firm’s supply chain. This could be achieved by ensuring that E&S criteria are integrated into the process of identifying and evaluating potential suppliers. However, in recognition that, for the most part, such E&S criteria are developed and applied retroactively, the firm should conduct an assessment of its supply chain to identify key E&S issues associated with the sourcing of raw materials, commodities and intermediate products. Subsequently, the firm should assess the ease with which E&S sustainability criteria can be integrated into component supply chains. Together these assessments will inform the firm about priority risks, key areas of legal and regulatory non-compliance, and as such direct the development of supply chain policy and actions.

Building Awareness Definition and operationalization of a firm’s supply chain sustainability requirements vis-à-vis its supply chain may require a period of building awareness amongst key suppliers, and an appropriate transition period during which key suppliers can develop the capacity to meet requirements.

Defining Supply Chain Sustainability Requirements There are a range of possible requirements that a firm could require of its suppliers so as to promote E&S sustainability within the supply chain. These include:

- Development of an E&S Policy and Code of Conduct Key suppliers can be asked to develop and E&S policy or Code of Conduct specific to the key E&S risks and impacts associated with their operations.

- Legal and Regulatory Compliance As part of E&S policy development, firms typically assure compliance with legal and regulatory environment.

- Supply and Procurement Contracts Firms may include E&S performance requirements in contracts with their suppliers. Often such requirements include the need to adopt and implement appropriate management systems, to obtain relevant product certification, and among other things, to develop Codes of Conduct. In defining E&S contractual obligations, the firm should ensure that the length of contract reflects the type of investment needed to achieve E&S requirements. Where appropriate, the firm should also ensure that an adequate time period is provided to meet E&S requirements.

- Requiring Certification for Established E&S Standards There are an increasing number of globally recognized industry and commodity standards that include E&S sustainability issues. Firms may ask suppliers to adopt standards and ensure certification that operations and products comply with the requirements of the standards.
• **Requirements to Use Recognized E&S Management Systems**  Firms may ask other firms to adopt recognized E&S management systems including ISO14001, OHSAS 18001, SA8000, AA1000, and Enviro-Mark (web-based).

• **Supplier Assessment and Approval**  A firm may also require suppliers to develop their own supply chain management policy and procedures.

• **E&S Reporting**  A firm may ask its suppliers to provide reports including E&S risks and impacts and their management. This might include energy usage, greenhouse gases, disposal and recycling of waste products; water consumption; occupational health and safety; legal non-compliances and regulatory notices, and major E&S events, among others.

• **Capacity Building**  Depending on the position of the end user and the degree to which supply chain sustainability is a sector-market norm, a firm may elect to support suppliers unable to immediately meet new E&S criteria with capacity building and other resources.

• **Monitoring and Verification**  Requiring E&S supply chain sustainability is typically associated with the need to monitor and verify. Firms may assign staff to conduct regular monitoring of key suppliers or otherwise seek third party verification of E&S performance, use of management systems and compliance with the requirements of product standards.

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**Small and Medium Enterprises**

When considered individually, SMEs are not major contributors to E&S issues. However, in aggregate they represent a substantial contributor to environmental and social issues, this being exacerbated by the often limited enforcement of E&S law and regulations in the sector.

With regard to E&S sustainability of supply chains, it is recognized that small and medium enterprises (SMEs) are generally at the end of the supply chain, and as such are more likely to be subject to E&S supply chain sustainability requirements (described above) from the firms they supply. SMEs can both prepare for and increase their competitive advantage by proactively seeking to meet some of the E&S supply chain sustainability requirements. Activities might include development of an E&S management system, development of E&S policy and Code of Conduct, participation in SME for those concerned with E&S management, and inclusion of E&S reporting requirements.

Finally, requirements for E&S sustainability in the supply chain may require both time and capacity building. SMEs should seek to partner with the firms they supply to draw on expertise and resources, and partner for improved E&S performance.
Business Drivers and Constraints / Barriers of Sustainability in the Supply Chain

Business Drivers Additional business drivers for the inclusion of a sustainability dimension in SCM are outlined below:

- **Market Demand** Consumers are increasingly aware of and concerned with the E&S sustainability of the products they consume. This awareness and concern has translated into market pressure for producers to integrate sustainability concerns into their production and their supply chain. Market pressure is perhaps most widely recognized for agro-commodities (for example palm oil, soy, sugar, cotton, cocoa, coffee) and forest products (including timber and paper) where end users are demanding that producers source sustainably, and, where relevant, are active in the development of sustainable sources. The proliferation of voluntary commodity standards promoting sustainable production and supply chains reflects such market pressure.

- **Brand Competitiveness and Reputation** As market demand drives supply chain sustainability, firms active in defining, adopting, and integrating supply chain sustainability into their operations are seen to be leading the market and developing a competitive advantage. This advantage stems both from an ability to define how the specific market is addressing supply chain sustainability concerns and building business models around agreed approaches. It also reflects market level competitive advantages involving loyalty of the supply base, brand differentiation and increased competitiveness. Finally, in certain sectors, addressing E&S sustainability concerns is a key aspect of establishing and maintaining reputation.

- **E&S Legislation and Regulatory Requirements** Environmental and social legislation and regulatory directives may include performance requirements, material mandates, and extended producer responsibility. Substantial amounts of environmental legislation and regulations require companies to ensure supply chain compliance. Examples include US biosecurity legislation and regulations, and EU directives such as Reduction of Hazardous Substances (RoHs) 2002/95/EC July 2006; Waste Electrical and Electronic Equipment (WEEE) 2002/96/EC February 2003; and Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) June 2007. As such, the development of legislation in one region may involve new requirements that enterprises subsequently pass on to their suppliers in their supply chain.

- **Resource Scarcity and Price Volatility** As noted above, SCM is traditionally concerned with resource efficiency and cost savings, and as such many SCM activities that are common practice already include an E&S sustainability dimension. Assessment of supplier use of resources (including energy and water) and promotion of industry best practices in terms of resource use efficiency are becoming common practice.
Constraints / Barriers  Acceptable E&S supply chain sustainability requirements vary according to a number of factors; these include sector, industry, and commodity. In the vast majority of cases, a firm can promote E&S performance in the supply chain through a relatively limited and straightforward series of requirements. As the complexity of the supply chain increases and it becomes increasingly difficult to promote and verify E&S supply chain sustainability, it becomes increasingly difficult to address supply chain sustainability. Listed below are types of requirements relating to sustainability in the supply chain.

Market Supply Chain Sustainability and Existence of Standards  It is more straightforward to apply supply chain sustainability requirements in a market environment already familiar with key aspects of these requirements. Further, the existence of relevant E&S benchmarks and standards is a useful but not necessary condition for application of E&S supply chain sustainability requirements.

Defining Boundaries of Responsibility  A firm’s position in the supply chain will determine the number of its suppliers and the length and complexity of its supply chain. In principle it may be desirable to trace the origin of component products to their raw material, but this is difficult in practice. As such, firms focus on their primary suppliers in requiring supply chain sustainability.

Chain of Custody and Traceability  Chain of custody and product traceability is a necessary condition to verify production practices including environmental and social sustainability. While most products have a verifiable chain of custody it is not always possible to trace this to the point of origin. For example, the aggregation of agricultural commodities is usually associated with the loss of traceability to the point of production, for example, the farm. As such there are limits to which E&S sustainability criteria can be applied to the entire supply chain.

Leverage Over Supply Chain Players  Leverage refers to the ability to demand E&S sustainability performance within the supply chain. As a result, the client should focus on the primary tier of suppliers, and possibly the secondary ones to have a meaningful impact.

Cost  The introduction of E&S sustainability criteria into the supply chain involves costs for the firm and its suppliers. For the firm demanding E&S supply chain sustainability there is a need for: (i) expertise to understand production processes within the supply chain and key E&S issues associated with these processes; (ii) expertise to define E&S supply chain sustainability requirements and integrate these into day-to-day operations through contracting, monitoring and verification.

Interaction with other Tools

Other guidance notes in the Pollution Management Sourcebook, including the following, are linked with Sustainability in the Supply Chain:

- Life Cycle Assessment
Guidance Notes on Tools for
POLLUTION MANAGEMENT

- Environmental Management Systems
- Cleaner Production
- Labeling and Certification
- Corporate Environmental and Social Responsibility Programs

References and Resources on Sustainability in the Supply Chain


Internet Sources

Business for Social Responsibility (BSR). A leader in corporate responsibility since 1992, Business for Social Responsibility (BSR) works with its global network of more than 250 member companies to develop sustainable business strategies and solutions through consulting, research and cross-sector collaboration: www.bsr.org

Council of Supply Chain Management Professionals (CSCMP). Council of Supply Chain Management Professionals (CSCMP) provides resources and services for its members through mentoring, speaking, sponsorships, roundtables and writing articles for our publications: www.cscmp.org

Institute for Supply Management (ISM) Founded in 1915, the Institute for Supply Management (ISM) is a not-for-profit association that provides opportunities for the promotion of the profession and the expansion of professional skills and knowledge: www.ism.ws

Supplier Ethical Data Exchange (Sedex) Sedex, the Supplier Ethical Data Exchange, is a membership organization for businesses committed to continuous improvement of the ethical performance of their supply chains: www.sedex.org.uk
Supply Chain Council (SCC) Supply Chain Council (SCC) is a global nonprofit organization whose methodology, diagnostic, and benchmarking tools help organizations make dramatic and rapid improvements in supply chain processes. SCC has established the supply chain world’s most widely accepted framework for evaluating and comparing supply chain activities and their performance: www.supply-chain.org