

Sustainable Management of the Supply Chain

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Abstract: *In recent years, the theme of sustainable management of the supply chain has received increasing attention and has become a field of research increasingly popular. It promotes taking into account the sustainability factor within a supply chain. Thus, companies have to tackle multiple new challenges, since immense pressure exerted by several factors. The objective of this paper is to present a review of recent work on different concepts of supply chain and sustainable development, while specifying different close relations between them.*

Keywords: Management of the supply chain; Sustainable development; Green Supply Chain Management (Green SCM); Sustainable Supply Chain Management (Sustainable SCM).

1. Introduction

During the last two decades, the concentration on the optimization of the operations was transformed from a specific installation or from an organization of the supply chain. The concentration on supply chains is a stage towards the widest adoption and the development of the durability, because the supply chain considers the product of the initial transformation of raw materials until the delivery to the customer [1].

The interaction between the sustainable development and the supply chains establishes a critical stage of recent examinations of the operations on the environment [2] and operations of the sustainable development [3].

The search and the practice regarding management of the supply chain can affect the politics, the science or the social science by presenting alternative scenarios for the development of the sustainable supply chains [1].

Recently, Supply Chains become a priority for the stakeholders and establish a way of distribution of the social responsibility of companies [4]. In this context, new approaches appear such as "green" and "sustainable" supply chain management (SCM).

Having examined the academic reality of the SCM, we looked for in the literature, its disciplinary origin and how Supply Chain Management was defined. We so tried to clear the practices identified and observed by the various authors in companies. Two new concepts of the Sustainable SCM (SSCM) and the Green SCM (GSCM) revealed. This article, based on a literature review, examines the links between sustainable development and green supply chain management.

2. The sustainable development (SD)

The concept of the sustainable development was introduced by the Committee Brundtland in 1987 [5], and emphasizes

the interdependence between the social, economic and environmental factors. Indeed, Brundtland [5] defined the sustainable development as one « Development which meets the needs of the present without compromising the capacity of the future generations to be answered in their ». The years later, the charter of the environment, registered in the constitution in 2005, show that the public politics have to favor the sustainable development by the balance enter "the environmental protection", "the economic development" and " The social progress" [6].

2.1 Three dimensions

Elkington underlined the interdependence between the social, economic and environmental factors, in 1998, by creating the concept of "triple Bottom Line" [7].

Among the various approaches regarding sustainable development, one of the most known is that the durability bases itself on three pillars: the economic, the social and the environmental, which are often indicated as Triple Bottom Line (TBL) [8]; [9].

Based on the economic dimension, the concept of sustainable development considers the world of the capital as assets and flows [10]. However, this vision does not limit itself to the monetary or economic assets, but also considers other types of assets, as the environmental or natural, human and social properties, including the development of the economy and the society, as well as the environmental economy and the environmental issues of management [11]. The economic category includes the impacts of the organization on the economic conditions of its stakeholders, and the impacts of the economic systems at the local, national level and at the world level [10]. Economic indicators* thus show the circulation of assets between various stakeholders and the main economic impacts of the organization on the society in general [12].

The environmental pillar of the sustainable development includes the privilege of natural resources in the production of renewable resources and its restraint in the production of

not renewable resources, on the basis of the capacity of the natural ecosystems of auto-cleaning and the reduction of waste and pollution by ways of preservation of the energy and the recycling [13].

As for the environmental indicators*, they include the performance bound to inputs, such as raw materials, energy and water, and in the production. They also include the performances connected to the biodiversity, and to the environmental conformity, among other relevant information, such as the environmental spending and the impacts of products and services [12].

The social dimension is strongly bound to the notion of social responsibility of companies, resulting from the interdependence and the interconnectivity between the stakeholders connected directly or indirectly to companies [14].

According to the Institute Ethos [15], the social responsibility of companies can be understood as a way of management defined by the ethical and transparent relation of the company with its stakeholders and by the implementation of objectives of the company by encouraging the sustainable development of the society, the conservation of the environmental and cultural resources for the future generations, the respect for the diversity and the promotion of the reduction of social inequalities. Indicators of social performance so aim at identifying the fundamental aspects of the performance such as the practices of the work, the human rights, the society and the responsibility for the product [12].

Moreover, many organizations have treated the indicators of sustainable development with different ways. The following table summarizes indicators definitions of various organizations [16].

Table 1: Importance of sd indicators regarding different organizations

Guiding Document	Emphasis Of Indicators
UN (1992) Agenda 21	“Countries at the national level and international governmental and non-governmental organizations at the international level should develop the concept of indicators of sustainable development in order to identify such indicators. [...]” (para. 40.6) “Relevant organs and organizations of the United Nations system, in cooperation with other international governmental, intergovernmental and non-governmental organizations, should use a suitable set of sustainable development indicators [...]” (para. 40.7)
OECD (2001) The DAC Guidelines – Strategies for Sustainable Development	“Monitoring and evaluation needs to be based on clear indicators [...]” (p. 27)
UNDESA (2002) Guidance in	“An important element of the M&E process is the development of indicators -

Guiding Document	Emphasis Of Indicators
preparing a National Sustainable Development Strategy: Managing Sustainable Development in the new millennium	benchmarks or thresholds. These indicators [...] should reflect the status and trends of a particular process element or product. Based on these indicators annual reports should be prepared to enable stakeholders see progress made.” (para. 43)
IIED (2002) Sustainable Development Strategies: A Resource Book	“Indicator-based assessments are more transparent than that of accounts and narrative assessments and can be compared over time.” (p. 135)
OECD (2006) Good Practices in the National Sustainable Development Strategies of OECD Countries	“Indicators can be used to track progress along sustainable paths and provide the foundation for performance targets. They also contribute to policy transparency and accountability in sustainable development strategies.” (p. 27)

a These indicators are cited as an example to distinguish each dimension of sustainable development, for this reason we will not focus on their categorization namely strategic, tactical and operational.

2.2 From the sustainable development to Sustainable Supply Chain

Basing on the literature, the management of the supply chain is defined as "a management of a network of interconnected companies implied in the final supply of the packaging's of products and service required by the end customers" [17]. Secondly, the concept of management of the supply chain can be spread by adding him the aspect of the durability [18]. In other words, the durability makes reference to an integration of the social, environmental questions, and economic [19].

Shrivastava [20] defines the sustainable development as "the potential of reduction of the long-term risks associated to the depletion of resources, to the fluctuations in energy costs, to the liabilities of the product, to the pollution and to the waste management". Here, the sustainable development is approached under a more ecological angle without explicit consideration of the social aspects.

On the other hand, Sikdar [21] takes another point of view which includes three aspects: social, environmental and economic. According to him, the sustainable development is "a wise person balances between the economic development, the management of the environment and the social equity". To reach this balance, companies should confront certain pressures. These pressures, of environmental and social type compulsory for companies, do not concern the only organization, but all the members of the supply chain, that each of them must be implied in the service of a sustainable supply chain to satisfy the needs for his customers [22].

Dalé, and al. [10] stipulate that the major challenge for organizations is the understanding of the impact of the durability on the internal and external stakeholders.

Consequently, organizations, wishing to improve the durability of their supply chain, will have to be more proactive and will begin to watch their suppliers on sale functions [23]. In this way, the durability is generally operationalised in the functioning and the domains the management of the supply chain (SCM) through triple Bottom line (TBL) [7].

So, we can define the sustainable supply chain as "the management of the environmental, social and economic impacts, and the encouragement of the best practice of governance, throughout the life cycles of goods and services" [24]. The objective of the sustainable supply chain is to create, to protect and to increase the long-term environmental, social and economic value for all the parts concerned to put products and services on the market.

3. The Interaction between the Durability and the Management of Supply Chains

The sustainable management of the Supply chain fires its roots of the management of the supply chain that is it is based on the adoption and the extension of its concepts [18].

3.1 Characteristics of the durability approached by the definitions of the management of the sustainable supply chain

An analysis of the definitions proposed for the SSCM revealed that although every three dimensions of "triple bottom line" were explicitly approached, they were not present in all the proposed definitions [1].

Jorgensen and Knudsen [25] are the only authors who limited their attention on the social dimension. As for Seuring [26], Badurdeen and al. [27], and Haake and Seuring [28] concerned the combinations (overalls) of the environmental and social aspects of the sustainable development. Indeed, Wittstruck and Teuteberg [29] highlighted the ethics within the framework of the social function of the durability, and suggested a definition for the SSCM which emphasizes the environmental and ethical aspects of the durability in the supply chain.

The study of Closs and al. [30] concerned a combination of economic and environmental characteristics of the sustainable development by highlighting the importance of the substantial marketing and the examination of the alternative platforms of energy in the supply chain.

On the other hand, other definitions treated every three aspects of "triple bottom line" [19], [22], [31], [32], [33]. Indeed, Crankcase and Rogers [19] mentioned explicitly the importance to improve the long-term economic performance of the company.

3.2 Green SSCM (GSCM)

Sustainability in supply chain management context (SCM) is studied with others kind of practices. Among practices we

find especially those that link potentially the concepts of sustainability and SCM: Green Supply Chain Management (GSCM) and Sustainable Supply Chain Management (SSCM) [14]. Due to the growing concerns of environment in recent years, the contributions on GSCM are becoming a duty via awareness of pollution problems accompanying industrial development [34]. So GSCM is an approach that improves the performance of processes and products [35]. It integrates environmental thinking in the management of the supply chain. In fact, this integration converts SCM into SCM compatible with environmental sustainability or green SCM [36].

Consequently, Wee et al. [37] defined GSCM as an "integration of environment considerations into supply chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers, and end-of-life management of the greening products".

Multiple approaches have been cited in recent work, for practical implementation of green SCM. They aim to mitigate the problems associated with interruptions or delays in green supply chain and to protect a company's reputation and brand damaging from public controversy [34]. For example, these approaches can include the concepts of environmentally sound management [38], vendor meetings [39], and the implication of labor [40].

Green SCM aims, moreover, to contain the waste in the industrial system to save power and prevent the dissipation of hazardous materials into the environment [41].

3.3 Sustainable SCM or SSCM

Based on their complementary definitions of sustainable development and a literature review of supply chain management, Carter and Rogers proposed their own model definition and sustainable management of the supply chain. They defined the SSCM as "strategic and seamless integration, and the achievement of social, environmental and economic goals of organization in the systematic coordination of key inter-organizational business processes to improve the economic long-term performance of individual company and its supply chain" [42].

Sustainable management of a supply chain represents thus managing the flow of materials, information and assets, in addition to cooperation between companies compose chain while taking into account the objectives related to economic, social and environmental aspects of sustainable development, which result from the demands of their customers and stakeholders [10]. In other words, the sustainable management of a supply chain requires a broader vision and must highlight the economic, environmental and social aspects of business practices [43]. It embodies the plans and activities of the company include both environmental and social issues in the SCM to improve the sustainability performance of the company and those of its suppliers and customers [22]; [44].

On their part, Seuring et al. [22] define sustainable management of the supply chain in their editorial as "the management of information flow and cooperation based on economic, environmental and social goals and stakeholder expectations". In other words, the adoption of environmentally friendly practices and socially desirable can contribute to improving the economic performance of the company, but it can also be the case that better economic results allow the adoption of sustainable practices [45].

On the conceptual level, sustainable SCM suppose taking into account a larger number of data than a conventional SCM [36]. Indeed, according to Jorgensen and Knudsen [25], sustainable SCM is the means by which companies manage their social responsibilities in the production process dislocated covering organizational and geographic boundaries.

As for the Haake and Seuring [28], the SSCM includes "The set of policies for managing the supply chain detained, actions and relationships formed in response to concerns about the natural environment and social issues with respect to the design, acquisition, production, distribution, use, reuse and disposal of company's products and services".

In addition, SSCM is "adding sustainability management processes of the existing supply chain, to take account of environmental, social and economic business activities" [46] (see fig.1).

- The economic dimension of sustainable development particularly suits the literature on Supply Chain Management (SCM);
- The environmental dimension of sustainable development converges with Green Supply Chain Management (Green SCM);
- The social dimension of sustainable development is placed in a Social Supply Chain Management (Social SCM).

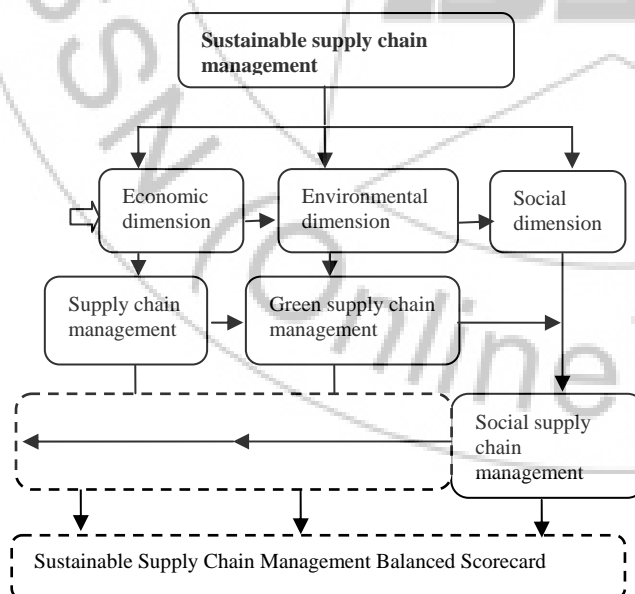


Figure 1: The First Dimensions of Sustainable Supply Chain Management (Sustainable SCM) [47]

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