

## Sustainable Supply Chain Management in the Book Publishing sector

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### Abstract

In recent years, the term sustainability has been considered by the academic community in the management, logistics and supply management areas. The emerging concept of sustainable supply chain management tries to balance economic long-term benefit of the members of the supply chain, as well as the environmental and social decisions, in order to satisfy the interests of the individual members of a supply chain and their stakeholders. The aim of this paper is to analyze the current status of sustainable supply chain management and its application to the Book Publishing sector. For this purpose, a review process of selected papers applied to the Book Publishing sector is carried out, from which the main conclusion is that there are no references which consider in an integrated way all partners in the supply chain Book Publishing industry (e.g. publishers, printers, distributors, retailers).

**Keywords:** *Supply chain management, Sustainability, Sustainable supply chain management, Social responsibility, Economic sustainability, Book Publishing sector.*

### Introduction

The supply chain management (SCM) encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities (Council of Supply Chain Management Professionals, 2012), for the purposes of improving the long term performance of the individual companies and the supply chain (SC) as a whole (Mentzer *et al.*, 2001). The emergence of global supply chains during the last decades has been due to the economic benefits associated with shifting production to countries with lower labor costs and less strict regulations. This has involved a significant increase in long distance transport and logistics activities associated. However, despite being economically feasible, these supply chains are not sustainable from the point of view of its negative impact in relation to environmental and social aspects. For example, relocation of manufacturing activities in countries far from the final customers can increase the carbon footprint associated with production and delivery of products to end customers as well as destruction of employment in countries of origin.

Sustainable Supply Chain Management (SSCM) have been emerged in recent years as a new management approach which tries to embed economic, environmental as well as societal decisions in supply chains (Wu and Pagell, 2011) and offers the opportunity to differentiate from other companies by being equitable in the fair utilization of natural resources. Some examples of SSCM case studies in different sectors can be found in the literature such as Textile (Seuring and Müller, 2008), Chemical (Foerstl *et al.*, 2010) or Automotive (Olugu *et al.*, 2010), but there are not available studies focused on Book Publishing sector. The aim of this paper is to analyze the current status of SSCM and its application to the Book Publishing sector.

The rest of the paper is arranged as follows: the next section introduces the review methodology. Section 3 offers a description review about SSCM issues. Section 4 presents a brief literature review about SSCM initiatives in the Book Publishing sector. Section 5 proposes some initiatives related to sustainability in Book Publishing sector. Finally, the last section provides conclusions and directions for further research.

## Review Methodology

The search process was carried out with scientific-technical bibliographic databases such as ISI Web of Knowledge and Google Scholar. The following search criteria were applied: sustainable supply chain management, green supply chain management, corporate social responsibility, sustainability and environmental issues in book publishing sector. Furthermore, the bibliographic references of the articles studied have served as a continuous search reference. At the conclusion of this period, a collection of 70 references was collected with a time frame covering 1971 to 2012.

Two groups may be distinguished in these reviewed works; on the one hand, articles in which different supply chain management concepts and sustainable practices are proposed in general terms while, on the other hand, articles that propose different sustainable supply chain management solutions for the Book Publishing sector. This last group consists of 14 references which references were obtained from journals (7 references), conferences (3 references) and professional publications from publishers associations (4 references).

## Sustainable Supply Chain Management

Responsible concepts such as sustainability or sustainable development first appeared in 70s and were widely used by practitioners in environmental and development areas. In these years, sustainability was employed to describe an economy in equilibrium with basic ecological support systems (Stivers, 1976). On the other hand, the most accepted and widely used definition of sustainable development was proposed by the Brundtland Commission which stated this concept as “[...] a development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” (World Commission on Environment and Development, 1987, p. 43).

Apart from the several definitions of sustainability, the model proposed by Elkington (1998, 2004), called the Triple Bottom Line (TBL), has been taken as a reference to materialize the sustainable concepts in management environments. From a microeconomic perspective, this model simultaneously considers economic,

environmental and social goals, at whose intersection there may be activities that not only positively affect the natural environment and society, but which also result in long-term economic benefits and competitive advantage for the companies.

In recent years, the term sustainability and the integration of economic, environmental and social issues have begun to appear in the literature related to business management, operations management, logistics and supply chains. Srivastava (2007) presents a comprehensive and integrated view of the published literature on all the aspects related to Green Supply Chain Management (GrSCM), by focusing on ecological and reverse logistics issues such as green design (Zhang *et al.*, 1997); green purchasing (Zhu and Geng, 2001); repairable inventory (Guide *et al.*, 1999, 1997b); production planning and control for remanufacturing (Bras and McIntosh, 1999; Guide *et al.*, 1997a, b); issues in green manufacturing and product recovery (Guide *et al.*, 1996; Gungor and Gupta, 1999); reverse logistics (Carter and Ellram, 1998; Fleischmann *et al.*, 1997); logistics network design (Fleischmann *et al.*, 2001, 2000; Jayaraman *et al.*, 2003) and industrial ecology and industrial ecosystems (Bey, 2001; Hui *et al.*, 2001; Sarkis and Cordeiro, 2001; Zhu and Sarkis, 2004).

On the other hand, Carter and Rogers (2008) and Seuring and Müller (2008) present complete literature reviews about the sustainability concept in the management and logistics areas and SSCM, respectively. According to Carter and Rogers (2008), in the management literature, most of the existing conceptualizations of organizational sustainability have focused on ecological sustainability, with an implicit consideration of social and economic responsibilities (Jennings and Zandbergen, 1995; Shrivastava, 1995; Starik and Rands, 1995). However, in operations management literature, social aspects of sustainability have been often addressed explicitly and added to the ecological perspective (Daily and Huang, 2001; Hill, 2001; Sarkis, 2001). On the other hand, within the field of supply chain management, researchers have examined several stand-alone topics of environmental and social issues. Svensson (2007) identifies several sustainable business practices in supply chains such as corporate social responsibility (Dyllick and Hockerts, 2002); sustainable supply network management (Young and Kielkiewicz-Young, 2001); supply chain environmental management (Lippmann, 1999); green purchasing strategies (Min and Galle, 1997); environmental purchasing (Zsidisin and Siferd, 2001); environmental marketing (Sheth and Parvatiyar, 1995); environmental marketing management (Peattie, 1995) and environmental product differentiation (Reinhardt, 1999); reverse logistics (Zikmund and Stanton, 1971); sustainability labelling schemes (De Boer, 2003); environmental management (Hoffman, 2000) and life-cycle assessment (Welford, 1999) and ISO 14000-certifications (International Organisation for Standardisation, 2012).

Based on previous definitions of SCM (Lambert, 2008; Mentzer *et al.*, 2001) and the Triple Bottom Line model (Elkington, 1998, 2004), Carter and Rogers (2008) presents a framework for SSCM and define it as the strategic, transparent integration and achievement of an organization's social, environmental and economic goals in the systemic coordination of key inter-organizational business processes for improving the long-term economic performance of the individual company and its supply chains. However, Seuring and Müller (2008) conclude that research is still dominated by green and environmental issues, while social issues and also the integration of the three dimensions of SSCM are still rare.

## Sustainable Supply Chain Management in the Book Publishing sector

The importance of the Book Publishing sector lies in being the first cultural industry in Europe with an annual sales revenue of book publishers of approximately 23 billion EUR according to a survey conducted by the Federation of European Publishers for the year 2009. A total of about 515.000 new titles were issued by publishers in 2009. The largest markets in terms of publishers' turnover in 2009 were Germany, followed by the UK, France, Spain and Italy. European publishers held a total of close to 6,5 million different titles in stock, the countries reporting the largest availability being the UK (2,4 million), Germany (around 1,2 million), Italy (almost 700.000), France (over 600.000) and Spain (over 400.000).

The Book Publishing Supply Chain includes the publishers, the printers and paper manufacturers, the distributors and logistics suppliers and the bookstores. The structure and logistics flows of a current Book Publishing Supply Chain are showed in Figure 1. The emergence of new publishing formats, both printed and electronic, has changed the traditional structure of the sector and the relations among its members, creating a complex structure involving a large number of possible scenarios depending on the production amounts, the supply of raw materials, the geographic location among members, or return rates from bookstores. The characteristics of these different scenarios determine the sustainability of books during their life cycle including the forward and reverse logistics.

There exist different initiatives for the improvement of the Book Publishing Supply Chain. They are focused on improving the efficiency of the information flows by means of encoding (Federation of National Associations of Distributors of Editions in Spain, 2012), communication procedures (Spanish Association of Publishers Guilds, 2012) and databases (Spanish Confederation of Booksellers' Associations, 2012), however, to the best of our knowledge, there is no research work in the SSCM literature related to the Book Publishing sector. Only, there are some studies dealing with individual sustainable practices or environmental aspects. For instance, Green Press Initiative (2008) discusses the impacts that producing books and newspapers have on global climate change. The report also identifies the greatest sources of greenhouse gas emissions associated with publishing, and provides the steps that will yield the greatest reductions in climate impacts. Because of increasing concern about

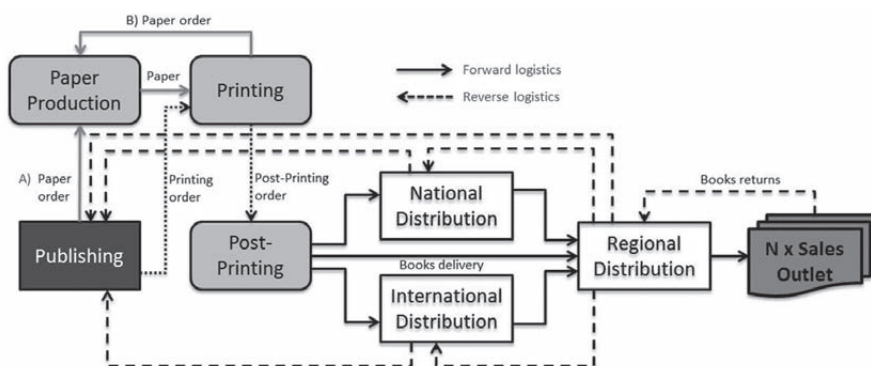


Figure 1. Book Publishing Supply Chain.



global climate change and carbon emissions as a causal factor (Rotz *et al.*, 2010), the term “carbon footprint” has become popular over the last few years. Carbon footprint is a measure based on life cycle thinking and the Life Cycle Assessment (LCA) methodology and it is referred to the quantity of GreenHouse Gases (GHGs) produced during a product’s life cycle (Pihkola *et al.*, 2010). In this sense, Chowdhury (2010) studies the carbon footprint of the knowledge industry, from creation to distribution and use of knowledge, and provides comparative figures for digital distribution and access by conducting an extensive literature search to produce data relating to the CO<sub>2</sub> emissions from various industries and activities such as book and journal production, photocopying activities, information technology and the internet. Moreover, Matthews *et al.* (2008) develop equations for calculating carbon footprint in the United States Book Publishing sector.

Matthews *et al.* (2002), Williams and Tagami (2002) and Xu *et al.* (2008, 2009) assess the environmental impacts and energy consumptions associated with the distribution of books via e-commerce and conventional retail in USA and Japan. Matthews *et al.* (2002) present two LCAs of online versus traditional retailing, one for the case of the USA and a subsequent one for Japan. In terms of methodology, the former uses an extended version of Economic Input–Output Life Cycle Assessment (EIO-LCA) (Carnegie Mellon University Green Design Initiative, 2001), which includes total supply chain effects, while the latter is based on a traditional LCA. Both studies consider the energy consumed in distribution, packaging and personal transport, but beyond these basic factors, the focus issues are different. The US study has a larger system boundary, and highlights switching of truck–rail–air modes and inventory reductions associated with online retailing, while the Japan work focuses on the effect of population density, mode of consumer transport, and changes in residential energy consumption. Williams and Tagami (2002) significantly improve the estimation of energy used in sales and distribution via e-commerce and traditional retail by taking into account the consumer travel to and from bookstore (for the traditional model), the relative efficiency of bulk shipping versus courier services, relative energy consumption induced at home for an on-line purchase versus that of retail outlets, including the life-cycle energy of personal computer use at home. Xu *et al.* (2008, 2009) explore the dynamics of an e-commerce market and the associated environmental impacts from a bottom-up perspective using an agent-based model. A conceptual meta-theory from psychology is adopted to form the behavioural rules of artificial consumers choosing different methods of buying a book, including conventional bookstores, e-commerce, and a proposed self-pick-up option.

Logistics is an essential process that seeks to optimize flows of materials and products in supply chains and configurations of supply networks (Sadegheih *et al.*, 2010). Kim *et al.* (2008, 2009) present a sustainable networked delivery (SND) system applied to a case study of book distribution sector. The SND system is a combination of e-commerce and centralized pickup point (PP), with the PP being a location that the consumer will already be visiting regularly. Transportation energy consumption and concomitant emissions in the three delivery systems (traditional networked delivery (TND) system, e-commerce networked delivery (END) system, and sustainable networked delivery (SND)) were compared. According to Kim *et al.* (2008, 2009) this new system produces fewer emissions than conventional and e-commerce delivery systems and offer meaningful economic benefit such as the costs of delivery and packaging, to the online retailer and consumer.

In the last decade, logistics activities associated with the handling and management of products and materials to be recovered or returned to supply chain processes are termed Reverse Logistics Services (RLS). RLS have attracted considerable attention due to society's increasing concerns over resource consumption and environmental impact (Hanafi *et al.*, 2011). In this sense, there are several works in the literature that address the use of reverse logistics in the Book Publishing sector. Wu and Cheng (2006a) explore the key factors of the reverse logistic in the Chinese Book Publishing industry based on the Analytic Hierarchy Process (AHP). Wu and Cheng (2006b) compare the characteristics of reverse logistics in the publishing industry among China, Hong Kong, and Taiwan by using a multiple-case approach in combination with EIQ (entry of order, items, and quantity) analysis. Finally, Table 1 classifies the works reviewed in terms of application area in Book Publishing sector.

## Discussion

After the review process, we can observe that the majority of references deal with the calculation of the carbon footprint and environmental impacts associated with the activity of the sector. On the other hand, improvement of logistics and distribution activities is only approached by two references, while the management of materials to be recovered or returned through reverse logistics processes has been addressed by two papers. However, there is no reference which includes all actors in the supply chain Book Publishing sector or addresses globally the activities related to production, distribution, waste management and recovery of returned products, and the development of social responsibility policies focused on corporate employees, suppliers or customers. From these results, we propose several areas to be considered with the aim of improvement of the sustainability of the Book Publishing sector: (1) improvement of the competitiveness of companies involved in the Book Publishing supply chain by reducing production, distribution and operational costs; (2) improvement of the environmental performance through the optimization of materials and energy consumption along the entire supply chain and the identification of new ways for waste management and valorization through the development of a reverse logistics system; and (3) improvement of social

**Table 1.** Applications areas of reviewed references.

Author	Application area in Book Publishing
Green Press Initiative (2008)	Carbon footprint and environmental impacts
Chowdhury (2010)	Carbon footprint and environmental impacts
Matthews <i>et al.</i> (2008)	Carbon footprint and environmental impacts
Matthews <i>et al.</i> (2002)	Carbon footprint and environmental impacts
Williams and Tagami (2002)	Carbon footprint and environmental impacts
Xu <i>et al.</i> (2008)	Carbon footprint and environmental impacts
Xu <i>et al.</i> (2009)	Carbon footprint and environmental impacts
Kim <i>et al.</i> (2008)	Logistics and supply chain configuration
Kim <i>et al.</i> (2009)	Logistics and supply chain configuration
Wu and Cheng (2006a)	Reverse Logistics
Wu and Cheng (2006b)	Reverse Logistics

performance through the improvement of worker conditions, use of raw materials from sustainable sources, networking and partnership with all the actors involved in Book Publishing Supply Chain, company's image enhancement and improvement of quality of life in general.

Some initiatives to be carried out to improve the sustainability of the Book Publishing could be: (1) analysis of the Book Publishing Supply Chain characteristics, modeling of material and information flows among the different actors and identification of improvement points for reduction of energy or material consumption and means for increasing efficiency in production or logistics; (2) creation of a reference model for sustainable forward and reverse logistics operations, which should include network configuration, supply chain and logistics planning, physical distribution and logistics assessment; and (3) identification and characterisation of environmental hot spots within the whole value chain of the book production based on carbon footprint calculations and development of a LCA tool.

## Conclusions

This paper has reviewed the current status of the Sustainable Supply Chain Management concept and its application to the Book Publishing sector. The conclusions drawn from our review affirm that, in the literature, there are several works dealing with individual sustainable practices, mainly the study of environmental impacts and the calculation of carbon footprint, but no references which consider in an integrated way all partners in the supply chain Book Publishing industry (e.g. publishers, printers, distributors, retailers). Also, there are no mathematical programming and simulation models that enable production, inventory and transportation planning in the publishing sector. Besides, there are no references that address issues such as mass customization or demand driven supply chains. Thus, models are needed which consider the flow of materials, energy consumption and information throughout the supply chain and that allow economic, production and environmental managers to align their decisions with strategic, economic and social objectives of the entire supply chain.

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