

Preface

On the Way to Environmental Friendly Supply Chain Management

Traditionally, supply chain management is defined as design, planning, and control of flow of goods among a number of independent entities from sourcing base to the final consumers. For the last 20 years, environmental issues of supply chain management have gained a growing concern among academia and practitioners. First, this was because governments imposed new regulations for environment protection in a number of countries around the world and then researchers have included these new constraints and objective functions in their models to represent better the new reality. The second reason is because companies have faced the need to seek for new ways of costs reduction and appropriate products returns management. The effort to improve supply chains using environmental friendly management approaches results in manufacturing performance improvements by developing new ways to manage product quality, quantity, and production system flexibility by collaborating with suppliers, dealers, and consumers. In order to do this, companies have to fix their common environmental objectives, sharing technical information about products, planning and processes, or starting common programs to reduce adverse impacts over the environment.

The aim of this monograph is to present the emerging environmental issues in the organization and management of supply chains. The scope of the book takes into consideration how the emerging environmental regulation might be transformed into business practices. Therefore, authors present, in individual chapters, innovative approach to eco-friendly organization and coordination of logistics processes and supply chain configuration.

In this monograph the emphasis is placed on three main areas:

1. Environment and supply chain operations—the objective of this area is to present a general framework to understand how supply chain operations can be improved when environmental issues are taken into account;
2. Reverse logistics—example of electronic and electric equipments waste management; this area is devoted to a broad field of reverse logistics. The chapters

included in this area are good examples of supply chain best practices in equipment waste recovery and management;

3. Sustainability issues—sector specific solutions. The last part presents good examples of both quantitative and qualitative studies where the reader will see the application of environmental management to real cases.

The aim of the first chapter is to present the main performance criteria, social, and environmental, which are used for finding the optimum of the enterprise and its supply chain using GRAI approach. This criterion is used as one way for helping enterprises to improve themselves for being competitive faced with the new economic context to model.

The next chapter aims to identify the enablers to sustainability in the supply chains and their mutual relationships. The author proposes the classification of the enablers to explain better their influence on the supply chain management in sustainable manner.

In the subsequent chapter the authors propose a conceptual process framework of problems occurring in organizations of transport processes within distribution systems. This solution is tested in the apparel industry, which is characterized by a high demand for transport services.

Chapter 4 contains analyses of e-markets for waste management in Poland. The authors evaluate a number of existing information platform to present their advantages and weaknesses. It is an interesting study of how information technologies can contribute to further development of the reverse logistics.

The problems of reverse logistics organization and optimization are described in the five subsequent chapters. Emphasis is placed on the electronic and electric equipment waste management (WEEE). The WEEE is the fastest growing waste group among all. It is mainly because of very short life cycle, growing demand, and decreasing cost of products. The analysts estimate that the number of PCs is growing about 12 % annually. At that pace, it will reach two billion units by early 2014. Also, the number of mobiles and household appliances is growing very rapidly. As a result the volume of e-waste is increasing three times quicker than other waste categories. According to the WEEE Forum¹ the European Union itself is generating over eight million tons of e-waste per annum.

The authors in Chap. 5 discuss the problems of complex relations between reverse supply chain participants. Companies have problems to stimulate the time and quantity of returns. Due to dynamic changes in the recovery network planning many weeks in advance is difficult because forecasts quickly become outdated. The authors propose a model to overcome these difficulties.

The next chapter focuses on optimizing the recycling process of electronic appliances. A methodology that takes into account technical, economic, legal, and environmental issues is proposed by the authors.

¹ www.weeeforum.org

In [Chap. 7](#) the authors present a decision support platform for the strategic and operational planning in reverse logistics applied to a multi-stage collection network of electronic and electric equipment. This chapter concerns a holistic approach on reverse logistics including a hierarchical process of decision making on the allocation of customers and vehicle routing with different transportation modes.

The problem of vehicle routing is also addressed in the subsequent chapter, where the authors present how the European Union Directive 2002/96/EC on Waste of Electrical and Electronic Equipments (WEEE) might be transformed into vehicle routing practices. The integer programming is applied to solve the problems in the recovery networks.

The problems of reverse logistics for WEEE are concluded by the chapter on the impact of the emerging environmental regulation of batteries on the Spanish collection and recovery system. The authors identify the main problems regarding this system as well as propose the improvements to the current reverse logistics system.

The last part of the book presents the problems and applications typical for selected industries. The idea of sustainable development emphasizes the rationalization of the demand for resources and services.

[Chapter 10](#) presents advanced techniques applied by the authors for the detection and quantification of biomass. On the basis of analysis of the previous results, logistics models are developed for determining the optimal collection points, transportation routes, and location of the processing industries.

In the next chapter focus is placed on the food industry. The authors conduct analyses of the environmental impact of mass and energy flows when the product moves from “cradle to grave” and the product life cycle to predict the operation and use of energy associated with the production. They also propose some improvements related to forward and reverse logistics operations in order to increase the energy efficiency of the company.

Sustainability issues in the tourism industry are described in the subsequent chapter. A detailed description of the sustainable tourism model at Vall de Núria is given. The authors explain how a friendly tourist destination is achieved by application of environmental awareness to regional development.

The transport sector is crucial for sustainable development. The development of the railway infrastructure might significantly contribute to the the reduction of congestion and CO₂ emissions. The authors in this chapter present how new business models might enable railway companies to improve their services, reduce operating costs, and minimize the environmental impact of transport operations. They provide an initial overview of business model renewals in the European railway sector and their environmental impactations.

The final chapter presents the influence of e-commerce development on urban logistics. The authors identify the impact which e-groceries have on distribution processes. They analyze ways to better use the last mile delivery vehicles in order to lower greenhouse gases emission in urban areas.

This monograph provides a broad scope of the current issues important for the development of the environmentally friendly supply chain management. It is a composition of theoretical trends and practical applications. The advantage of this book is the presentation of practical applications from a number of different countries around Europe.

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New Trends and Applications

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