

Preface

INTRODUCTION

Supply Chain Management (SCM) and its older brother, logistics, are popular but greatly misunderstood topics. Logistics is an integral part of supply chain management, which comprises of many other activities. In recent years, the area of supply chain management has received a great deal of attention from academicians, business managers, and consultants. Many organizations have realized the importance of making the complete supply chain competitive rather than concentrating on the efficiency improvement within individual processes or organizations. They have found SCM as an essential prerequisite to building a sustainable competitive edge for their services or products in the global market and increasing their profitability.

While interest in SCM is enormous, effective management of the supply chain does not seem to have been realized. One of the reasons for the lack of successful SCM efforts is the complexity of SCM itself. Research focusing on various issues at different levels of supply chain has tried to address the associated complexities. However, research in the area of SCM will not be able to offer much guidance to help the practice of SCM. This has been ascribed to the lack of a theoretical framework and also conceptual confusion in researching SCM. The scientific development of a coherent SCM discipline requires development of theoretical models to better describe supply chain management phenomena.

This book aims to clearly describe supply chain management and considers both theoretical and conceptual aspects of this concept. It also discusses different supply chain management strategies and the conditions leading to supply chain management. The next section introduces supply chain management and some primary definitions about it.

DEFINITION OF SUPPLY CHAIN MANAGEMENT

There is no universal and explicit definition of SCM and its activities in the literature. One of the reasons for this is the multidisciplinary evolution and origin of this concept. In fact, the concept of supply chain management has been considered from different points of view in the literature. Many different definitions for the supply chain management can be found; a selected few are: (a) “SCM is ... the systemic, strategic coordination of the traditional business functions and tactics across these businesses functions within a particular organization and across businesses within the supply chain for the purposes of improving the long-term performance of the individual organizations and the supply chain as a whole” (Council of Logistics Management (CLM), 2000); (b) “Supply chain management is ... the coordination

of production, inventory, location, and transportation among the participants in a supply chain to achieve the best mix of responsiveness and efficiency for the market being served” (Hugos 2003); (c) “The supply chain management involves all the activities associated with the flow and transformation of goods starting from raw materials till the finished product is delivered to the end user. It also encompasses all the associated information flows. Supply chain management integrates these activities through improved supply chain relationships in order to achieve a sustainable competitive advantage” (Handfiled 1999); (e) “Supply chain management is ... the chain linking each element of the manufacturing and supply process from raw materials through to the end user, encompassing several organizational boundaries” (Scott & Westbrook 1991), (f) “Supply Chain Management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all Logistics Management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, Supply Chain Management integrates supply and demand management within and across companies” (<http://cscmp.org/aboutcscmp/definitions.asp>).

Each of these definitions is influenced by a situation, directly or indirectly. So pursuit of a universal definition may result in unnecessary conflict and frustration.

EVOLUTION OF SUPPLY CHAIN MANAGEMENT

In the 1970s and early 1980s the intense global competition and cost pressures forced organizations to take a look at their operations to find where they could cut costs. First, they focused on optimizing the level of raw material, work in progress, and finished goods. Different organizations based on their own characteristics started focusing on achieving efficiencies in different areas such as procurement, manufacturing operations, distribution, etc. Hence, various models for production and operations management and control, such as Just in Time (JIT) and Total Quality Management (TQM), were developed. These models were oriented towards optimizing a sub part of the system. However, organizations soon felt the need for taking an integrated look at the entire supply chain to optimize the entire chain rather than individual parts. From this, the discipline supply chain management emerged (<http://www.citeman.com/10013-evolution-of-supply-chain-management/>).

SCM arose through the gradual integration of product design, product procurement, marketing, logistics, distribution, and operations as organizations came to realize that they are part of a value chain extending from raw material extraction to finished goods consumption and that all chain participants could benefit by smoothing the flow of product, information, and title (Brown 2005).

The evolution of supply chain management continued into the 1990s as globalization increased and internet emerged. Organizations realized the potential of information technology to transform their business dramatically in order to improve competitiveness. Organizations began to reengineer their business process rather than automating inefficient and old processes. This resulted in developing of ERP systems giving organizations complete visibility and integrating previously stand-alone system. In late 90s, the paper transaction was replaced with electronic communication, and the amount of lead-time which was required to replenish inventory decreased. In the 1990s, the Internet came into widespread use, and this provided a great opportunity for organizations to integrate E-commerce into their business. Today, SCM provides more strategic capability for organizations to improve competitiveness and profitability.

THE FOCUS OF THIS BOOK

This book is an essential reference for academicians and practitioners alike. The editors clearly highlight the following issues as the noteworthy features of this book:

- In general, there is an attempt to develop the material from updated sources including books, journal papers, conference proceedings, and internet sources. Hence, you will see references from recent years.
- The editors have attempted to provide a comprehensive and up-to-date source for SCM and to make accessible a number of topics that are not often found in textbooks. The majority of the textbooks cover some classic concepts of supply chain management such as: supply chain network design, integration and cooperation in scm, collaborative planning, etc. In this book, the contributors have tried to include more advanced and specific concepts such as: real-life supply chain planning, sustainability in supply chain, lean, agile, and leagile supply chain management, etc.
- Two important goals of this book are to present qualitative concepts and quantitative models. Many of the texts are looking at the SCM from only one aspect. However, in this book, aside from the nature of a chapter, by default, both aspects' importance are considered at the same time. Also, in order to enable better understanding, contributors have also tried to present case studies for most of the chapters.
- Last but not the least, some chapters such as Quantitative Models in Supply Chain, and Future Trends in SCM will interest readers and are not found in different sources.

AUDIENCE

This book is intended as a text covering the concepts of supply chain management. It is designed for either self-study by professionals and researchers, working in the various fields including management, industrial engineering, applied operations search and business at all levels, or classroom work at the undergraduate or graduate level for students who have a technical background in engineering, management, or business.

The book is designed for use in courses and course sequences that discuss supply chain management both conceptually and theoretically. It can also be used in separate courses in Business Management, Operations Management and etc. At the end of this chapter are chapter descriptions indicating these possibilities. The book should be useful to operations researchers, management scientists, and other specialists from the host of disciplines from which the concept of supply chain management is drawn.

Many chapters in the book can be omitted without interrupting the flow of the discussions. Roughly speaking, it is possible to skip former chapters and move on to later chapters in the book. The book was organized in this way so that it would be accessible to a wider audience, as well as to increase its flexibility.

ORGANIZATION

Apart from this preface introducing supply chain management briefly, the material in this book is organized into 2 separate sections, including 16 chapters. Section 1 is a self-contained introduction to

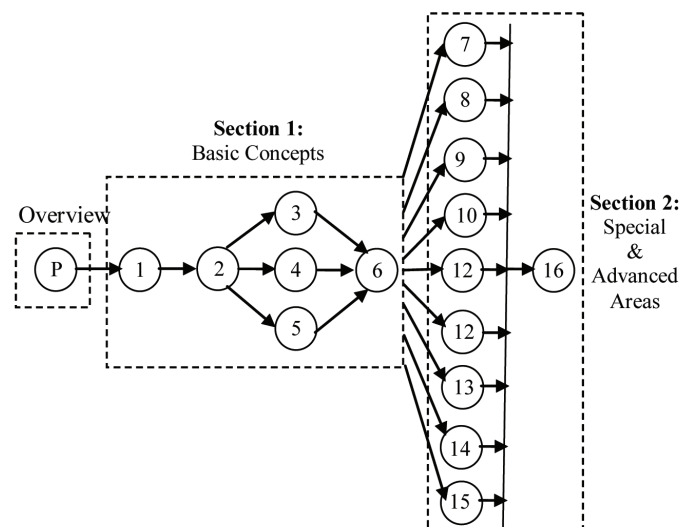
supply chain management covering the basic concepts of SCM, and has 6 chapters. Section 2 covers more advanced and special area of SCM and includes 10 chapters. Although each chapter stands alone in addressing the major issues in SCM, readers can study the book more deeply by following the sequence shown in Figure 1.

Next, the chapters are described individually.

Section 1: Basic Concepts

- Chapter 1 covers the most well known model of a supply chain, the Supply Chain Operation Reference (SCOR) model. In this chapter, authors have emphasized the importance of performance measurement and given a framework to evaluate the performance of the supply chain. The next part of this chapter is dedicated to supply chain typology classifying chain's attributes and can help managers to make decisions.
- Chapter 2 deals with one the most important strategic decision problems in the supply chain, supply chain network design, which can guarantee the efficient operation of the whole chain long term, if and only if it is designed efficeintly. To aim this, this chapter has a general overview of distribution networks and some of their models as well. Also, the author discusses about the clas-sification of performance measures, both qualitative and quantitative, used to measure efficiency and/or effectiveness of a system.
- Chapter 3 aims to study integration in the supply chain as a potent option to achieve competitive advantage and improve performance. In this chapter, the authors talk about the classic sourcing decision leading organizations to establish various types of relationship with each other. Then, different levels and types of integration, and partnership developement process with focus on parter selection, contracting and maintenance, are explained.

Figure 1. Sequencing the chapters dependently



- Chapter 4 is about coordination in supply chain. This chapter presents the importance of supply chain coordination, different coordination categories, and mechanisms. It also describes the important role of information technology and its related cost in supply chain coordination.
- Chapter 5 addresses issues of collaboration within the supply chain. After a brief introduction, the author describes the collaboration process and its different types. Then, at the next part of the chapter collaborative planning, forecasting, and replenishment, the most studied quantitative models and software application are reviewed. The chapter ends with a related case study.
- Chapter 6 aims to explain future trends and some research directions for variant areas in supply chain management. The main focus of this chapter is to provide a comprehensive source of information for researcher and practitioners to help them identify directions and areas for their future work.

Section 2: Special and Advanced Areas

- Chapter 7 discusses the supply chain planning. The definition of supply chain planning and its importance is the primary function of this chapter. Then, the authors present a comprehensive literature review on supply chain planning and optimization and will identify the gaps in its literature. Next, a mixed-integer non-linear formulation accommodating the identified gaps in the literature is presented to model complex real-life supply chain planning problems. Finally, this chapter ends with the evaluation of the available techniques and tools used for optimizing complex supply chain models.
- Chapter 8 focuses on Customer Relationship Management (CRM) and Supplier Relationship Management (SRM). First of all, different aspects of CRM, such as goals, perspectives, technologies, and integration of SCM and CRM, are explained. The second part of this chapter addresses issues of SRM including definition, components, advantages, and considerations of SRM. A comparison between CRM and SRM ends this chapter.
- Chapter 9 addresses a number of supply chain management paradigms. Concepts like sustainable/green supply chain management, lean, agile, and leagile supply chain management, and real-time supply chain management are described in this chapter. Further, the author talks about advantages and disadvantages of vertical/horizontal integration in supply chain management.
- Chapter 10 is about risk management. The definition of key issues in supply chain risk management (SCRM) and its classification are the primary functions of this chapter. Then, the stages of supply chain risk management process and the concept of integrated SCRM are explained. Further, the author discusses reasons to why firms do not take commensurable actions while they perceive serious supply chain risk, and recount a number of robust strategies to mitigate supply chain disruptions and challenges to implement these strategies.
- Chapter 11 is devoted to the concept of disruption in supply chain. First, the authors will talk about the phenomenon of supply chain disruption and its importance. Then, recent trends which necessitate careful planning of supply chain disruption are discussed, and finally, different ways for mitigating the adverse consequences of disruption are given to the readers.
- Chapter 12 is about competition in supply chain. After introducing competition in today's market and providing a literature review on the different ways used to model them, the authors will try to address different kinds of competitors exist in the field of supply chain and present works in each field in detail.

- Chapter 13 introduces sustainable development and its influences on supply chain management context. This chapter first presents environmental and social considerations and relevant stakeholders in supply chain management, and also offers some changes to manage the multi-dimensional and multi-stakeholder nature of the sustainable supply chain. Then, it gives us a framework to evaluate sustainability of a company as well as a supply chain.
- Chapter 14 focuses on stochastic programming. First of all, stochastic programming and some of its properties and methods of solving are reviewed briefly. Then, some properties of SCM, such as time horizons and source of uncertainty, are discussed. This chapter continues with problems and models of supply chain management that can be solved using stochastic programming.
- Chapter 15 addresses bullwhip effect, which is one of the factors preventing enterprises to attain their desired level of effectiveness. One of the most important factors in increasing or decreasing the bullwhip effect is forecasting method. In this chapter, the authors consider different forecasting methods and their associated bullwhip effect in a four echelon supply chain and utilize the bullwhip effect measure to compare the ineffectiveness of these methods and rank them.
- Chapter 16 proposes a comprehensive investigation about quantitative modeling in SCM area. In this chapter, supply chain models are classified based on techniques that are used to model the problem including game theory, simulation, metaheuristic algorithms, and fuzzy models. A brief introduction of each category and its applications in different fields of supply chain management are discussed.

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