

Preface

The focus of this book is the engineering design and planning of supply chain systems. A supply chain system can be loosely described as a system that—through procurement, production, and distribution—delivers goods to satisfy the demands of customers. Most organizations have a supply chain supporting their mission, ranging from traditional business supply chains, to military logistics, to disaster relief or medical delivery systems. As a consequence, there exists a very large variety of supply chain system types with different goals, constraints, and decisions. But a systematic approach to the design and planning of any supply chain can be based on the principles and methods of system engineering. Systems engineering methodology uses three fundamental components: data, models, and solution algorithms.

This book is targeted at several audiences. The first target is a course for upper-level undergraduate students on supply chains. The second target is use in a capstone senior design project in the supply chain area. The third target is an introductory course on supply chains either in a master of engineering or a master of business administration programs. The last audience consists of students enrolled in logistics or supply chain postgraduate or continuing education courses.

The book can be roughly divided into four sections. The first section focuses on data management. Since most of planning and design requires making decisions today so that supply chain functions can be executed efficiently in the future, this section introduces forecasting principles and techniques. The next two sections treat decision making in the two primary areas of transportation and inventory. The second section of the book focuses on transportation systems. First, the characteristics of transportation assets and infrastructure are shown. Then four chapters focus on the planning of transportation activities depending on who controls the transportation assets. The third section of the book is focused on storing goods. The last section of the book is focused on supply chain systems that consider simultaneously procurement, production, transportation, and inventory, as well as the design of the supply chain infrastructure or network design.

In each chapter, first a model of the process being studied is developed followed by a description of practical solution algorithms. More advanced material is typical-

ly described in appendices. This makes it possible to use an integrated, breadth-first treatment of supply chain systems by using the initial material in each chapter. A more in-depth treatment of a specific topic or process can be found towards the end of each chapter.



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