

## Supply Chain Engineering Models And Applications Operations Research Series

Supply chain management decisions are made under the conflicting criteria of maximizing profit and customer responsiveness while minimizing supply chain risk. Multiple Criteria Decision Making in Supply Chain Management provides a comprehensive overview of multi-criteria optimization models and methods that can be used in supply chain decision making. Presenting the contributions of internationally known authors, researchers, educators, and practitioners, this new book in the Operations Research Series provides readers with a single source guide to recent developments in this area. The focus of the book is on the design and operation of the supply chain system, which involves connecting many production and distribution systems, often across wide geographic distances, in such a way that the businesses involved can ultimately satisfy the consumer demand as efficiently as possible, resulting in maximum financial returns to those businesses connected to that supply chain system. The book includes several case studies on the design and operation of supply chain networks in manufacturing and healthcare.

**Biomass to Biofuel Supply Chain Design and Planning under Uncertainty: Concepts and Quantitative Methods** explores the design and optimization of biomass-to-biofuel supply chains for commercial-scale implementation of biofuel projects by considering the problems and challenges encountered in real supply chains. By offering a fresh approach and discussing a wide range of quantitative methods, the book enables researchers and practitioners to develop hybrid methods that integrate the advantages and features of two or more methods in one decision-making framework for the efficient optimization of biofuel supply chains, especially for complex supply chain models. Combining supply chain management and modeling techniques in a single volume, the book is beneficial for graduate students who no longer need to consult subject-specific books alongside mathematical modeling textbooks. The book consists of two main parts. The first part describes the key components of biofuel supply chains, including biomass production, harvesting, collection, storage, preprocessing, conversion, transportation, and distribution. It also provides a comprehensive review of the concepts, problems, and opportunities associated with biofuel supply chains, such as types and properties of the feedstocks and fuel products, decision-making levels, sustainability concepts, uncertainty analysis and risk management, as well as integration of biomass supply chain with other supply chains. The second part focuses on modeling and optimization of biomass-to-biofuel supply chains under uncertainty, using different quantitative methods to determine optimal design. Proposes a general multi-level framework for the optimal design and operation of biomass-to-biofuel supply chains through quantitative analysis and modeling, including different biomass and waste biomass feedstock, production pathways, technology options, transportation modes, and final products Explores how modeling and optimization tools can be utilized to address sustainability issues in biofuel supply chains by simultaneously assessing and identifying sustainable solutions Presents several case studies with different regional constraints to evaluate the practical applicability of different optimization methods and compares their performance in real-world situations Includes General Algebraic Modeling System (GAMS) codes for solving biomass supply chain optimization problems discussed in different chapters Everyone can impact the supply chain Supply Chain Management For Dummies helps you connect the dots between things like purchasing, logistics, and operations to see how the big picture is affected by seemingly isolated inefficiencies. Your business is a system, made of many moving parts that must synchronize to most efficiently meet the needs of your customers—and your shareholders. Interruptions in one area ripple throughout the entire operation, disrupting the careful coordination that makes businesses successful; that's where supply chain

management (SCM) comes in. SCM means different things to different people, and many different models exist to meet the needs of different industries. This book focuses on the broadly-applicable Supply Chain Operations Reference (SCOR) Model: Plan, Source, Make, Deliver, Return, and Enable, to describe the basic techniques and key concepts that keep businesses running smoothly. Whether you're in sales, HR, or product development, the decisions you make every day can impact the supply chain. This book shows you how to factor broader impact into your decision making process based on your place in the system. Improve processes by determining your metrics Choose the right software and implement appropriate automation Evaluate and mitigate risks at all steps in the supply chain Help your business function as a system to more effectively meet customer needs We tend to think of the supply chain as suppliers, logistics, and warehousing—but it's so much more than that. Every single person in your organization, from the mailroom to the C-suite, can work to enhance or hinder the flow. Supply Chain Management For Dummies shows you what you need to know to make sure your impact leads to positive outcomes.

Adaptive Supply Chain Management develops new viewpoints on the SCM goal paradigm, problem semantics, and decision-making support. Drawing upon years of research and practical experience, and using numerous examples, the authors unite conceptual considerations of supply chains with a constructive level of engineering and solutions to real-world problems. Adaptive Supply Chain Management provides advanced insights into dynamics, complexity, and uncertainty in supply chains from the perspectives of systems analysis, control theory, and operations research. It also considers supply chain adaptability, stability, and crisis-resistance. Providing readers with a comprehensive view of advanced SCM concepts, constructive mathematical techniques and models, Adaptive Supply Chain Management is an invaluable text for practitioners and researchers who specialize in SCM and operations.

Supply Chain Management concerns organizational aspects of integrating legally separated firms as well as coordinating materials and information flows within a production-distribution network. The book provides insights regarding the concepts underlying APS, with special emphasis given to modelling supply chains and successfully implementing APS in industry. Understanding is enhanced through the use of case studies as well as an introduction to the solution algorithms used.

Winner of 2013 IIE/Joint Publishers Book-of-the-Year Award Emphasizing a quantitative approach, Supply Chain Engineering: Models and Applications provides state-of-the-art mathematical models, concepts, and solution methods important in the design, control, operation, and management of global supply chains. The text provides an understanding of

Sustainability of Products, Processes and Supply Chains: Theory and Applications presents the recent theoretical developments and applications on the interface between sustainability and process systems engineering. It offers a platform for cutting-edge, holistic analyses of key challenges associated with computer-aided tools for incorporating sustainability principles and approaches into the design and operations of multi-scale process systems, ranging from molecular and products systems, to energy and chemical processes, and supply chains.

Presents recent theoretical developments and applications on the interface between sustainability engineering and process engineering Offers cutting-edge, holistic analyses of key challenges associated with computer-aided tools for incorporating sustainability principles and approaches into the design and operations of multi-scale process systems Brings together the perspectives of leading researchers to stimulate innovative thinking in terms of sustainability

In today's rapidly changing business environment, strong influence of globalization and information technologies drives practitioners and researchers of modern supply chain management, who are interested in applying different contemporary management paradigms and approaches, to supply chain process. This book intends to provide a guide to researchers, graduate students and practitioners by

incorporating every aspect of management paradigms into overall supply chain functions such as procurement, warehousing, manufacturing, transportation and disposal. More specifically, this book aims to present recent approaches and ideas including experiences and applications in the field of supply chains, which may give a reference point and useful information for new research and to those allied, affiliated with and peripheral to the field of supply chains and its management.

: Information is power in supply chain operations, negotiations, continuous improvement programs, and process improvement, and indeed in all aspects of managing an operation. Accurate and timely information can result in better decisions that translate into improvement of bottom line results. The development and effective use of cost modeling as a method to understand the cost of products, services, and processes can help drive improvements in the quality and timeliness of decision making. In the supply chain community an understanding of the actual cost structures of products and services, whether with new or non-partner suppliers, can facilitate fact-based discussions which are more likely to result in agreements that are competitively priced and with fair margins. Further, accurate cost models which are cooperatively developed between supply chain partners can form the basis for joint efforts to reduce non-value-added costs and provide additional focus towards operational improvement. While many organizations feel confident they have an understanding of the cost structure for products and services produced internally, cost modeling often uncovers areas where significant cost improvement can be obtained. Cost of quality is a particular type of internal cost model that analyzes the true costs associated with the production of less than perfect products and services. The development of a cost of quality model can provide insight into how products or services of higher quality can be produced at lower cost. This book provides the business student or professional a concise guide to the creation and effective use of both internal and external cost models. Development of internal cost models is discussed with illustrations showing how they can be deployed to assist in new product development, pricing decisions, make-or-buy decisions and the identification of opportunities for internal process improvement projects. The creation and use of external cost models are discussed providing insight into how their use can drive collaborative improvement efforts among supply chain partners, better prepare for price negotiations, and keep negotiations focused on facts rather than emotions--all while allowing for future discussions with preferred suppliers to focus on more strategic and operational improvement initiatives, and less on pricing. A number of detailed cost model examples are provided to educate on both how cost models are constructed, and to demonstrate how they have been effectively deployed

This book discusses supply chain management, focusing on developments within modelling the dynamic behaviour of the supply chain. Aimed at postgraduate students, researchers and practitioners, this book provides an in-depth knowledge of the dynamics of supply chains. Business trends such as the globalisation process and the increase of competition across many industrial sectors have forced companies to concentrate on their core competences and to outsource those activities in which they do not excel. As a consequence, companies no longer produce and distribute their goods in isolation, but being part of a supply chain or supply network, i.e. a set of interrelated companies who ultimately deliver the goods and services to the final customer. Despite the prevalence of supply chains as the primary form of production and distribution, their performance can be seriously hampered by the complex dynamics resulting from the collaboration and coordination (or lack thereof) among their members. This book provides the reader with modelling tools to understand, analyse and improve the dynamic behaviour of supply chains. It assembles seminal works on supply chain models and recent developments on the topic in order to provide a comprehensive, unified vision of the field for researchers and practitioners who wish to grasp the challenges of supply chain management. Aside presenting the main elements, equations and performance indicators governing the dynamics of a supply chain, and the book

addresses issues such as the effect of timely and accurately sharing the information across members, the influence of restrictions on the productive capacities of their members, or the impact of the variability of the lead times, among others. Furthermore, more complex supply chain structures such as non-serial supply networks or closed-loop supply chains are modelled and discussed. Relevant managerial insights regarding the causes of supply chain underperformance, as well as avenues to improve their efficiency can be extracted from the resulting models.

Quantitative models and computer-based tools are essential for making decisions in today's business environment. These tools are of particular importance in the rapidly growing area of supply chain management. This volume is a unified effort to provide a systematic summary of the large variety of new issues being considered, the new set of models being developed, the new techniques for analysis, and the computational methods that have become available recently. The volume's objective is to provide a self-contained, sophisticated research summary - a snapshot at this point of time - in the area of Quantitative Models for Supply Chain Management. While there are some multi-disciplinary aspects of supply chain management not covered here, the Editors and their contributors have captured many important developments in this rapidly expanding field. The 26 chapters can be divided into six categories. Basic Concepts and Technical Material (Chapters 1-6). The chapters in this category focus on introducing basic concepts, providing mathematical background and validating algorithmic tools to solve operational problems in supply chains. Supply Contracts (Chapters 7-10). In this category, the primary focus is on design and evaluation of supply contracts between independent agents in the supply chain. Value of Information (Chapters 11-13). The chapters in this category explicitly model the effect of information on decision-making and on supply chain performance. Managing Product Variety (Chapters 16-19). The chapters in this category analyze the effects of product variety and the different strategies to manage it. International Operations (Chapters 20-22). The three chapters in this category provide an overview of research in the emerging area of International Operations. Conceptual Issues and New Challenges (Chapters 23-27). These chapters outline a variety of frameworks that can be explored and used in future research efforts. This volume can serve as a graduate text, as a reference for researchers and as a guide for further development of this field.

Winner of 2013 IIE/Joint Publishers Book-of-the-Year Award Emphasizing a quantitative approach, Supply Chain Engineering: Models and Applications provides state-of-the-art mathematical models, concepts, and solution methods important in the design, control, operation, and management of global supply chains. The text provides an understanding of how companies plan, source, make, and deliver their products to create and/or maintain a global competitive advantage. It emphasizes application of operations research models and methods to optimize the various components of an integrated supply chain. The authors have carefully constructed the book so that it is not so "micro" in its focus that the perspective on the larger business problem is lost, nor is it so "macro" in its treatment of that business context that it fails to develop students appreciation for, and skills to solve, the tactical problems that must be addressed in effectively managing flows of goods in supply chains. Building students knowledge of the first principles of supply chain engineering, the book covers the traditional issues in operations, logistics, and supply chain management forecasting demand, managing inventories, managing transportation, and locating facilities. It also includes a number of new optimization tools such as risk pooling, for addressing these problems, based on recent research. In addition, the authors treatment of managing customer-supplier relations supplies a fresh perspective that draws on recent research using multiple criteria optimization methods. Moreover, the chapter on managing risks in supply chains presents important problems that extend beyond the traditional treatment of supply chain management. Building a bridge between theory and practice, the authors pull all of these themes

together in the culminating chapter that solidifies students understanding of managing global supply chains.

Using strategic supply chain network design, companies can drive consistent dramatic savings throughout their global supply chains.

Logistics experts at IBM and Northwestern University have brought together the rigorous principles and the practical applications supply chain designers need to improve the flow of physical products across the globe.

Supply chain management is a well-developed area. The traditional supply chains are dynamic systems which include the forward and reverse flows of physical products and the related information and fund. However, a service supply chain is different because the real "product" may take the form of a "service" which implies that many traditionally cruc

The managed flow of goods and information from raw material to final sale also known as a "supply chain" affects everything--from the U.S. gross domestic product to where you can buy your jeans. The nature of a company's supply chain has a significant effect on its success or failure--as in the success of Dell Computer's make-to-order system and the failure of General Motor's vertical integration during the 1998 United Auto Workers strike. Supply Chain Integration looks at this crucial component of business at a time when product design, manufacture, and delivery are changing radically and globally. This book explores the benefits of continuously improving the relationship between the firm, its suppliers, and its customers to ensure the highest added value. This book identifies the state-of-the-art developments that contribute to the success of vertical tiers of suppliers and relates these developments to the capabilities that small and medium-sized manufacturers must have to be viable participants in this system. Strategies for attaining these capabilities through manufacturing extension centers and other technical assistance providers at the national, state, and local level are suggested. This book identifies action steps for small and medium-sized manufacturers--the "seed corn" of business start-up and development--to improve supply chain management. The book examines supply chain models from consultant firms, universities, manufacturers, and associations. Topics include the roles of suppliers and other supply chain participants, the rise of outsourcing, the importance of information management, the natural tension between buyer and seller, sources of assistance to small and medium-sized firms, and a host of other issues. Supply Chain Integration will be of interest to industry policymakers, economists, researchers, business leaders, and forward-thinking executives.

Supply Chain Design and Management introduces the concept of a sharing mechanism that will ensure the sustainability of a supply chain by fair distribution of costs and benefits. This book provides a holistic view of the supply chain from product development, purchasing, manufacturing, distribution and storage, to retailing. The presentation of the enabling technologies in supply chain management will help companies better understand their options. § Provides a step-by-step framework for designing supply chains at the strategic level § Written for those who deal with the supply chains on a day-to-day basis as well as those new to the field § Provides a synthesis of best practices for managing supply chains at the tactical level § Provides a review of the state-of-the-art in enabling information technologies and business applications § Explains the concepts with examples from the industry and simple mathematical formulations § Is accessible to graduate students for an excellent understanding of how supply chains work and can join the industry armed with the knowledge of the workings of supply chains

Winner of IIE Book of the Month, December 2013 The introduction of reverse supply chains has created many challenges in network design, transportation, selection of used products, selection and evaluation of suppliers, performance measurement, marketing-related issues, end-of-life (EOL) alternative selection, remanufacturing, disassembly, and

product acquisition management, to name a few. Under the guidance of an expert editor and with contributions from pioneers in the field, *Reverse Supply Chains: Issues and Analysis* addresses several important issues faced by strategic, tactical, and operation planners of reverse supply chains, using efficient models in a variety of decision-making situations providing easy-to-use mathematical and/or simulation modeling-based solution methodologies for a majority of the issues. The book introduces the basic concepts of reverse logistics and systematically analyzes the literature by classifying more than 400 published references into five major types of product returns. It then identifies the basic activities and scope of reverse logistics, examining its drivers and barriers as well as major issues and challenges. The chapters cover metrics for quantitatively comparing competing new-product designs for end-of-life disassembly on a reverse production line, how to use the theory of constraints thinking processes to determine the core problems in reverse logistics, and an integrated multi-criteria decision-making methodology using Taguchi loss functions AHP (Analytic Hierarchy Process) and fuzzy programming. They explore issues associated with remanufacturing and green and resilient supply chain management and propose system modeling based on graph theory and network flows application to analyze material resource flows in the life cycle of a product. Reverse supply chains is a new and fast growing area of research and only a handful of books are on the market, however those books discuss specific projects rather than provide a cohesive focus on the topics. This book will provide a foundation and understanding of the topic and also highlight how current issues can be approached in a decision-making situation—using the appropriate technique. With the rise of global competitiveness among industries, it has become increasingly vital to develop novel strategies to assist in optimizing value-chain networks, thus helping to secure economic success. By employing engineer-to-order practices, many enterprises have improved their manufacturing processes. *Supply Chain Strategies and the Engineer-to-Order Approach* evaluates innovative processes and original operational models, frameworks, and architectures in the topic areas of industrial engineering and management science. Featuring optimized enterprise chain management strategies and emergent research within the field, this book is an essential reference source for professional, academics, and researchers specializing in enterprise operations and engineer-to-order procedures.

"This book provides knowledge and insights on present and future AI applications in Operations Management presenting tools and decisions in terms of theoretical and empirical models, methods and proposed applications"--Provided by publisher.

Supply Chain Engineering Models and Applications CRC Press

The book explains how to emerge and grow as a supply chain leader and details supply chain and procurement processes and operational activities in real-work scenarios across multiple supply chain verticals. The book defines what

an entry-level supply chain professional must do to excel in various types of supply chain verticals such as IT, electronics manufacturing, pharmaceutical, retail, and consumer goods. Apart from helping professionals understand vertical specific nuances, this book helps them to set both short-term goals for annual performance review and longer-term career planning. In addition, for a mid- or senior-level supply chain professional, the book offers ideas on ways to launch initiatives and demonstrate leadership to foster career growth. It offers ideas about unlocking new values for the organization and creating a data-driven decision support platform to gain financial efficiency for better management of CapEx and OpEx spend, thus improving the bottom line. The book includes a tool kit which includes operational data models, financial models, and presentation templates for creating and socializing proposals intended for cross-functional teams and demonstrating supply chain leadership. The book is divided into four major parts. In Part I, the book starts with an overview of key concepts in a manufacturing supply chain and procurement organization. It describes current forms of modern global supply chain and corporate procurement organizations. The objective of Part II is to provide a framework for a self-directed supply chain manager to understand how a large organization evaluates the contribution of supply chain managers and where it expects them to create value. To foster career growth as a supply chain professional, the book identifies six key knowledge pillars for demonstrating supply chain mastery: Technical and market knowledge of the end product and its constituents. Knowledge of internal product development and sustaining processes and supporting consumption data. Health and market condition of the supplier. Ability to create value. Ability to build internal and external executive relationships with key influencers. Ability to obtain best cost without compromising on quality and lead time. Negotiating cost, sourcing material, and then the logistics of moving the raw material through multiple stages and finally finished materials across the globe are some of the key areas which need continuous improvement. As a sentinel of efficiency, removing any kind of wastage leads to immediate value creation and contributes to the margin by improving the bottom line. In Part III, the book reviews twelve such verticals namely printer, medical, IT, energy, automotive, cloud, dairy, data management, avionics, biotech, apparel and start up and the supply chain nuances through the lenses of the framework created in Part II. In Part IV, the book goes back to focus on the professional growth of an individual supply chain person in an industry agnostic way. It provides examples of financial and operational efficiencies that a supply chain professional can create.

Originally taught mainly in business schools, supply chain management has become a common elective and graduate course in engineering colleges. The increasing demand for engineers with supply chain knowledge has fed this shift. However, supply chain management textbooks that have a reasonable coverage of quantitative analysis techniques are few and

New technologies are revolutionising the way manufacturing and supply chain management are implemented. These changes are delivering manufacturing firms the competitive advantage of a highly flexible and responsive supply chain and manufacturing system to ensure that they meet the high expectations of their customers, who, in today's economy, demand absolutely the best service, price, delivery time and product quality. To make e-manufacturing and supply chain technologies effective, integration is needed between various, often disparate systems. To understand why this is such an issue, one needs to understand what the different systems or system components do, their objectives, their specific focus areas and how they interact with other systems. It is also required to understand how these systems evolved to their current state, as the concepts used during the early development of systems and technology tend to remain in place throughout the life-cycle of the systems/technology. This book explores various standards, concepts and techniques used over the years to model systems and hierarchies in order to understand where they fit into the organization and supply chain. It looks at the specific system components and the ways in which they can be designed and graphically depicted for easy understanding by both information technology (IT) and non-IT personnel. Without a good implementation philosophy, very few systems add any real benefit to an organization, and for this reason the ways in which systems are implemented and installation projects managed are also explored and recommendations are made as to possible methods that have proven successful in the past. The human factor and how that impacts on system success are also addressed, as is the motivation for system investment and subsequent benefit measurement processes. Finally, the vendor/user supply/demand within the e-manufacturing domain is explored and a method is put forward that enables the reduction of vendor bias during the vendor selection process. The objective of this book is to provide the reader with a good understanding regarding the four critical factors (business/physical processes, systems supporting the processes, company personnel and company/personal performance measures) that influence the success of any e-manufacturing implementation, and the synchronization required between these factors.

- Discover how to implement the flexible and responsive supply chain and manufacturing execution systems required for competitive and customer-focused manufacturing
- Build a working knowledge of the latest plant automation, manufacturing execution systems (MES) and supply chain management (SCM) design techniques
- Gain a fuller understanding of the four critical factors (business and physical processes, systems supporting the processes, company personnel, performance measurement) that influence the success of any e-manufacturing implementation, and how to evaluate and optimize all four factors

This work brings together some of the most up to date research in the application of operations research and mathematical modeling techniques to problems arising in supply chain management and e-Commerce. While research in the broad area of supply chain management encompasses a wide range of topics and methodologies, we believe this book

provides a good snapshot of current quantitative modeling approaches, issues, and trends within the field. Each chapter is a self-contained study of a timely and relevant research problem in supply chain management. The individual works place a heavy emphasis on the application of modeling techniques to real world management problems. In many instances, the actual results from applying these techniques in practice are highlighted. In addition, each chapter provides important managerial insights that apply to general supply chain management practice. The book is divided into three parts. The first part contains chapters that address the new and rapidly growing role of the internet and e-Commerce in supply chain management. Topics include e-Business applications and potentials; customer service issues in the presence of multiple sales channels, varying from purely Internet-based to traditional physical outlets; and risk management issues in e-Business in B2B markets.

The practice of supply chain management has become widespread in most industries. It is now included in the curriculum of many business schools in the United States and in many countries around the world. A number of professional associations, such as the American Production and Inventory Control Society and the Supply Chain Management Society, offer Reporting on cutting-edge research in production, distribution, and transportation, *The Supply Chain in Manufacturing, Distribution, and Transportation: Modeling, Optimization, and Applications* provides the understanding needed to tackle key problems within the supply chain. Viewing the supply chain as an integrated process with regard to tactical and operational planning, it details models to help you address the wide range of organizational issues that can adversely affect your supply chain. This compilation of scholarly research work from academia and industry considers high-level production schedules, product sourcing, network alignment, distribution center layouts, transportation operations with stochastic demand, inventory planning, and day-to-day operations planning. The book is divided into three sections: Industrial and Service Applications of the Supply Chain Analytic Probabilistic Models in Supply Chain Problems Optimization Models of Supply Chain Problems Because tactical and operational models rely on quality forecasts of demand, the text examines stochastic customer demand, coordination of supply chain functions, and solution algorithms. It reviews real-world business applications and case studies that illustrate the modeling solutions discussed.

This book presents the different models of supply chain performance evaluation for global supply chains. It describes why it is necessary to evaluate global performance both to assess the contribution of the supply chain to achieve the goals of creating value throughout the chain and also to meet customer requirements in terms of time, responsiveness and reliability. The author provides an understanding of how evaluation models are chosen according to criteria including the level of maturity of the organization, the level of decision-making and the level of value creation desired.

The book examines a relatively unexplored issue in supply chain risk management, which is how long companies specifically take to respond to catastrophic events of low probability but high impact. The book also looks at why such supply chain disruptions are

unavoidable, and consequently, all complex supply chains are inherently at risk. The book illustrates how companies can respond to supply chain disruptions with faster responses and in shorter lead-times to reduce impact. In reducing total response time, designing solutions, and deploying a recovery plan sooner after a disruption in anticipation of such events, companies reduce the impact of disruption risk. The book also explores the basics of multiple-criteria decision-making (MCDM) and analytic hierarchy process (AHP), and how they contribute to both the quality of the financial economic decision-making process and the quality of the resulting decisions. The book illustrates through cases in the construction sector how this industry has become more complex and riskier due to the diverse nature of activities among global companies.

The thoroughly revised and updated book, now in its second edition, continues to present a comprehensive view of the concepts and applications of various quantitative models used in the study of operations and supply chain management. It provides a complete account of location and layout models, production planning models, production control models, cycle inventory models, safety stock models and transportation models. A separate chapter on real-life situations provides the user with the knowledge of specific areas where the models have been applied in decision-making processes. The various techniques to solve operations and supply chain management problems are also discussed. The text is supported by a large number of illustrative examples, exercises and review questions to reinforce the students' understanding of the subject matter. Designed as a textbook for the students of mechanical and industrial engineering, the book would also be useful to postgraduate students of management. **NEW TO THE SECOND EDITION** • Two new chapters on 'Production Control—Additional Approaches' (Chapter 6) and 'Materials Planning and Lot Sizing' (Chapter 8) • Forecasting and Aggregate Planning are described in two separate chapters • Each chapter includes new sections, additional examples, illustrations, short questions and exercises • Provides solutions to the exercises

A guide to help readers meet the demands of an evolving competitive business environment, Modeling of Responsive Supply Chain outlines novel concepts and strategies for implementing a fully integrated system of business improvement methodologies. This self-contained reference covers various key aspects of supply chain management, which is crucial to boosting industrial growth in the face of expanding globalization in the manufacturing and transportation sectors. The book focuses on topics that could potentially improve the free flow of goods and services between nations by helping users assess the performance of logistic systems deployed to achieve this end. Chapters present a conventional and evolutionary approach to coordinating all elements of the supply chain to optimize an enterprise's competitive advantage. The authors explore different models associated with transportation, facility location, and assignments, as well as planning and scheduling. They also address diverse technologies, such as RFID tags used to monitor product flow within the supply chain network. This book addresses the importance of: Recognizing responsiveness as a metric of supply chain performance Domain interfaces for solving the optimization problem by making supply chains more responsive Coordination through contracts to enhance responsiveness System dynamics methodology to achieve responsiveness, as well as management principles, control theory, and computer simulation The use of different types

of technologies to build a better supply chain that achieves higher responsiveness Few, if any, single volumes provide the detailed explanation of practical and conceptual approaches found in this book. It covers the entire spectrum of topics and will be equally useful as a reference for scholars and graduate students and as a compendium for practitioners dealing with real-life problems in contemporary supply chain management.

This book addresses decision making in reverse logistics, which concerns the integration of used and obsolete products back into the supply chain as valuable resources. It covers a wide range of aspects, related to distribution, production and inventory management, and supply chain management. For each topic, it highlights key managerial issues in real-life examples and explains which quantitative models are available for addressing them. By treating a broad range of issues in a unified way, the book offers the reader a comprehensive view on the field of reverse logistics.

Comprehensively teaches the fundamentals of supply chain theory This book presents the methodology and foundations of supply chain management and also demonstrates how recent developments build upon classic models. The authors focus on strategic, tactical, and operational aspects of supply chain management and cover a broad range of topics from forecasting, inventory management, and facility location to transportation, process flexibility, and auctions. Key mathematical models for optimizing the design, operation, and evaluation of supply chains are presented as well as models currently emerging from the research frontier. Fundamentals of Supply Chain Theory, Second Edition contains new chapters on transportation (traveling salesman and vehicle routing problems), integrated supply chain models, and applications of supply chain theory. New sections have also been added throughout, on topics including machine learning models for forecasting, conic optimization for facility location, a multi-supplier model for supply uncertainty, and a game-theoretic analysis of auctions. The second edition also contains case studies for each chapter that illustrate the real-world implementation of the models presented. This edition also contains nearly 200 new homework problems, over 60 new worked examples, and over 140 new illustrative figures. Plentiful teaching supplements are available, including an Instructor's Manual and PowerPoint slides, as well as MATLAB programming assignments that require students to code algorithms in an effort to provide a deeper understanding of the material. Ideal as a textbook for upper-undergraduate and graduate-level courses in supply chain management in engineering and business schools, Fundamentals of Supply Chain Theory, Second Edition will also appeal to anyone interested in quantitative approaches for studying supply chains.

This open access book explores supply chains strategies to help companies face challenges such as societal emergency, digitalization, climate changes and scarcity of resources. The book identifies industrial scenarios for the next decade based on the analysis of trends at social, economic, environmental technological and political level, and examines how they may impact on supply chain processes and how to design next generation supply chains to answer these challenges. By mapping enabling technologies for supply chain innovation, the book proposes a roadmap for the full implementation of the supply chain strategies based on the integration of production and logistics processes. Case studies from process industry, discrete manufacturing, distribution and logistics, as well as ICT providers are provided, and policy recommendations are put forward to support

companies in this transformative process.

Many organizations find supply chain management an essential prerequisite to building a sustainable competitive edge for their services or products. While interest in SCM is enormous, lack of theoretical frameworks and real world applications often characterizes research in the field, and effective management of the supply chain remains elusive. Supply Chain Sustainability and Raw Material Management: Concepts and Processes is a comprehensive and up-to-date resource for operations researchers, management scientists, industrial engineers, and other business practitioners and specialists looking for systemic and advanced discussions of supply chain management. By presenting qualitative concepts, quantitative models, and case studies, this book is a coherent guide to creating long-term and sustainable performance for organizations who want to compete in the global market. Supply Chain Management (SCM) is a wide field in which several specialties are included. In general, operations and production management players use SCM to organize the problems and analyze the solution approaches. Due to these points, a reference which can encompass a range of problems and their modelling approaches is required. This book will contain three general sections of forward, reverse, intelligent, and uncertain problems. While the book provides different problems in the three commonly used categories in SCM, it is very helpful for the readers to find out, or adapt their own application studies to the ones given in the book and employ the corresponding modelling approach.

This handbook begins with the history of Supply Chain (SC) Engineering, it goes on to explain how the SC is connected today, and rounds out with future trends. The overall merit of the book is that it introduces a framework similar to sundial that allows an organization to determine where their company may fall on the SC Technology Scale. The book will describe those who are using more historic technologies, companies that are using current collaboration tools for connecting their SC to other global SCs, and the SCs that are moving more towards cutting edge technologies. This book will be a handbook for practitioners, a teaching resource for academics, and a guide for military contractors. Some figures in the eBook will be in color. Presents a decision model for choosing the best Supply Chain Engineering (SCE) strategies for Service and Manufacturing Operations with respect to Industrial Engineering and Operations Research techniques Offers an economic comparison model for evaluating SCE strategies for manufacturing outsourcing as opposed to keeping operations in-house Demonstrates how to integrate automation techniques such as RFID into planning and distribution operations Provides case studies of SC inventory reductions using automation from AIT and RFID research Covers planning and scheduling, as well as transportation and SC theory and problems

Supply Chain Engineering considers how modern production and operations management techniques can respond to the pressures of the competitive global marketplace. It presents a comprehensive analysis of concepts and models related to outsourcing, dynamic pricing, inventory management, RFID, and flexible and re-configurable manufacturing systems, as well as real-time assignment and scheduling processes. A significant part is also devoted to lean manufacturing, line balancing, facility layout and warehousing techniques. Explanations are based on examples and detailed algorithms while discarding complex and unnecessary theoretical minutiae. All examples have been carefully selected from an industrial application angle. This book is

written for students and professors in industrial and systems engineering, management science, operations management and business. It is also an informative reference for managers looking to improve the efficiency and effectiveness of their production systems.

The focus of Supply Chain Engineering is the engineering design and planning of supply chain systems. There exists a very large variety of supply chain system types, all with different goals, constraints, and decisions, but a systematic approach for the design and planning of any supply chain can be based on the principles and methods of system engineering. In this book, author Marc Goetschalckx presents material developed at the Georgia Tech Supply Chain and Logistics Institute, the largest supply chain and logistics research and education program in the world. 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 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, and the last section of the book is focused on supply chain systems that consider simultaneously procurement, production, and 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 typically described in appendices. This makes it possible to use an integrated, breath-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. End-of-chapter exercises are included throughout. This text is suitable for several target audiences. The first target is a course for upper-level undergraduate students on supply chains. The second target is the 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 program, and the final audience consists of students attending logistics or supply chain post-graduate or continuing education courses.

Computational Intelligence (CI) is a term corresponding to a new generation of algorithmic methodologies in artificial intelligence, which combines elements of learning, adaptation, evolution and approximate (fuzzy) reasoning to create programs that can be considered intelligent. Supply Chain Optimization, Design, and Management: Advances and Intelligent Methods presents computational intelligence methods for addressing supply chain issues. Emphasis is given to techniques that provide effective solutions to complex supply chain problems and exhibit superior performance to other methods of operations research.

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