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SUPPLY CHAIN LOGISTICS MANAGEMENT

Fifth Edition

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Supply Chain Logistics Management

Fifth Edition

Donald J. Bowersox
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SUPPLY CHAIN LOGISTICS MANAGEMENT, FIFTH EDITION

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This book is dedicated to the memory of Dr. Donald J. Bowersox, visionary, mentor, and friend and one of the founders of the academic disciplines of logistics and supply chain management. Don passed away as the fourth edition was being completed, but his legacy lives on in this fifth edition. Don's legacy will live on through the many contributions to the theory and practice of logistics and supply chain management that will continue through his family, students, and colleagues.

The authors would also like to recognize their families for their encouragement and patience because they ultimately pay the dearest price.

About the Authors

Donald J. Bowersox (1932–2011) is the former University Professor and Dean Emeritus at Michigan State University. He received his Ph.D. at Michigan State and worked with industry throughout this career. He is the author of numerous articles in publications such as the *Harvard Business Review, Journal of Marketing, Journal of Business Logistics,* and *Supply Chain Management Review*. Bowersox was the co-author of what is widely recognized as the first Supply Chain academic text: *Physical Distribution Management–Logistics Problems of The Firm,* first published in 1961. He is the co-author of *Start Pulling Your Chain: Leading Responsive Supply Chain Transformation,* published in 2008. Throughout this career, Bowersox led a number of industry-supported research studies investigating the best practices of Logisticians in North America and around the world. Bowersox is recognized by many as the "Grandfather of Supply Chain" and was recognized by the Council of Supply Chain Management (CSCMP) receiving both the Distinguished Service Award (1966) and in 2011, after his death, with the renaming of the annual Doctoral Symposium in his honor as the Donald J. Bowersox Doctoral Symposium. Don's memory and many accomplishments are cherished and live on in his family, friends, and industry peers.

David J. Closs is the John H. McConnell Chaired Professor of Business Administration and former Chairperson in the Department of Supply Chain Management at Michigan State University. He received his Ph.D. in marketing and logistics from Michigan State. Dr. Closs is the author and coauthor of many publications in journals, proceedings, and industry reports. He was also a principal researcher for *World Class Logistics: The Challenge of Managing Continuous Change* and *21st Century Logistics: Making Supply Chain Integration a Reality.* Dr. Closs is a frequent speaker at industry and academic conferences and presenter at executive education programs. Dr. Closs formerly served as the editor of the *Journal of Business Logistics.*

M. Bixby Cooper is an Associate Professor emeritus in the Department of Supply Chain Management at Michigan State University. He is coauthor of three texts on distribution and logistics, including *World Class Logistics: The Challenge of Managing Continuous Change* and *Strategic Marketing Channel Management.* He is also coauthor of *Managing Operations Across the Supply Chain* published by McGraw-Hill. He served for four years on the Executive Board of the International Customer Service Association as head of the Research and Education Committee.

John C. Bowersox is the Director–Inbound Transportation for True Value Company. He is a graduate of Michigan State University. John is currently responsible for the Strategic and Operational oversight of True Value's Global Inbound Logistics program. Prior to joining True Value, John worked for the Kohler Co., where he held positions in Operations, Customer Service, Logistics, and Strategic Purchasing within the company's Kitchen and Bath Americas as well as Ann Sacks Tile & Stone operating divisions. Mr. Bowersox, in conjunction with his brother Ed and late father Donald, was the recipient of the DSC Movers and Thinkers Award for Innovation in Supply Chain Management. He is an active member of the Council of Supply Chain Management Professionals (CSCMP), a charter member of the Young Professionals Committee, and prior member of the Board of Directors. A close follower of academic and industry research, he is a frequent contributor at industry conferences.

Preface

Over the last eight decades, the discipline of business logistics has advanced from the warehouse floor and transportation dock to the boardroom of leading global enterprises. We have had the opportunity to be actively involved in this evolution through research, education, and advising. *Supply Chain Logistics Management* encompasses the development and fundamentals of the logistics discipline within a supply chain framework. It also presents our vision of the future for business logistics and supply chain management and their role in enterprise competitiveness.

Although individually and collectively the four authors have written extensively on various aspects of logistics and supply chain management, the decision to initially write and subsequently revise *Supply Chain Logistics Management* represents the synthesis of many years of research, augmenting and, in many ways, supplanting earlier works of the authors published by McGraw-Hill. The union of ideas presented in this text provides an integrated supply chain framework for the study of logistics, serves to expand the treatment of supply chain management by placing it firmly in the context of integrated business strategy, and highlights the increasing importance of logistics in the supply chains supporting a global economy.

Logistics includes all the activities required to move product and information to, from, and between partners in a supply chain. The supply chain provides the framework for businesses and their suppliers to jointly deliver goods, services, and information efficiently, effectively, relevantly, and in a sustainable manner to consumers. *Supply Chain Logistics Management* presents the mission, business processes, and strategies needed to achieve integrated logistical management. We hope the text achieves three fundamental objectives: (1) presents a comprehensive description of existing logistical practices in a global economy, (2) describes ways and means to apply logistics principles to achieve competitive advantage, and (3) provides a conceptual approach for integrating logistics as a core competency within enterprise supply chain strategy.

This edition has benefited greatly from thoughtful suggestions from students, colleagues, and reviewers. We note several changes and additions to this new edition:

- Incorporated a section in Chapter **1** that discusses the broad application of logistics and supply chain management to include other applications beyond movement of goods.
- Incorporated considerations for value chain management in the text.
- Reviewed supply chain information technology in Chapter 2 to provide a broad perspective and then again reviewed the relevant technologies in the application chapters.
- Discussed regarding how consumer and technology disrupters will impact logistics and supply chain management.
- Condensed discussion of procurement and manufacturing into one chapter focusing on strategy and interfaces with logistics.
- Incorporated forecasting and planning into a single chapter focuses on integrated operations planning.
- Included updated materials regarding transportation pricing; negotiation; regulation; and modern trends, challenges, and opportunities.
- Synthesized the discussion of handling and packaging with warehousing.
- Expanded the global strategy and operations chapter to include discussion of compliance.

- Expanded the discussion of supply chain network design to include principles that can be applied in nontraditional settings and the major drivers in supply chain design.
- Discussed the future trends in logistics and supply chain management in the final chapter.

Over the past 53 years, the business executives who have attended the annual Michigan State University Logistics Management Executive Development Seminar have been exposed to the basic concepts presented in the text and have given freely of their time and experience. We also acknowledge the long-standing support to Michigan State Department of Supply Chain Management, through the funding of the endowed chairs, provided by the late John H. McConnell, founder of Worthington Industries, and Rob Thull, who is the primary donor for the Bowersox-Thull Chair in Logistics and Supply Chain Management.

The number of individuals involved in teaching logistics around the world expands daily. To this group in general, and in particular to our colleagues at Michigan State University, whose advice and assistance made it possible to complete and enhance this text, we express our sincere appreciation.

Teachers receive continuous inspiration from students over the years, and in many ways the day of judgment in an academic career comes in the seminar or classroom. We have been fortunate to have the counsel of many outstanding young scholars who currently are making substantial impact on the academic and business worlds. In particular, we appreciate the input of students who have used this text in manuscript form and made suggestions for improvement. We also acknowledge the contributions of Drs. Judith Whipple, Stan Griffis, Yem Bolumole, and Thomas Goldsby, who contributed extensively in case and concept development.

We would like to thank the following instructors for their thoughtful contributions to the previous edition review: Gurkan Akalin, Joe T. Felan, EunSu Lee, Penina Orenstein, Thomas Passero, James L. Patterson, Frank R. Scheer, and George Young.

We wish to acknowledge the contributions of Felicia Kramer and Pamela Kingsbury, for manuscript preparation on several earlier versions of this text, and Cheryl Lundeen, who prepared many drafts of the manuscripts. Without Felicia, Pam, and Cheryl, this long-published text in its many variations would not be a reality.

With so much able assistance, it is difficult to offer excuses for any shortcomings that might appear. Any faults are solely our responsibility.

David J. Closs

M. Bixby Cooper

John C. Bowersox

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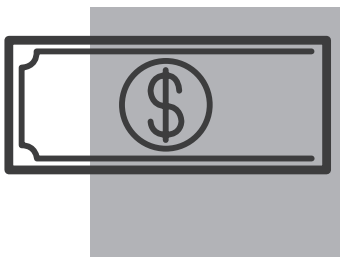

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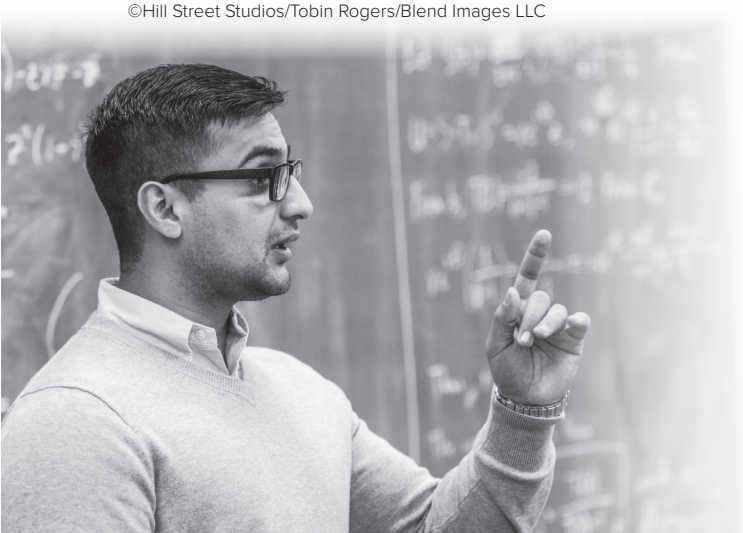

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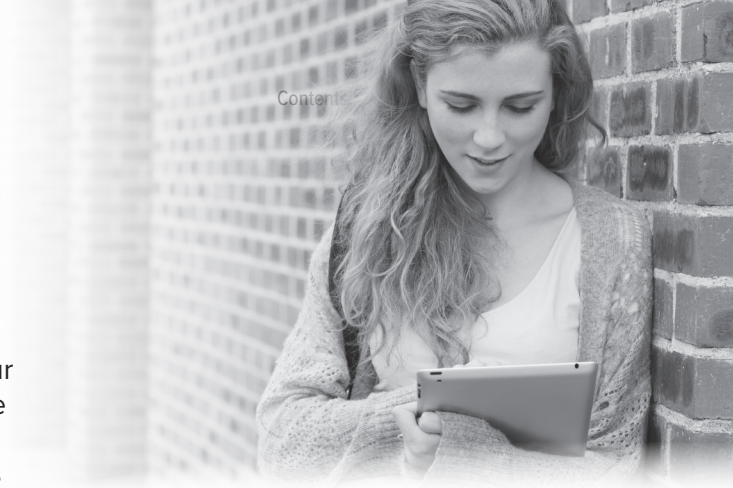

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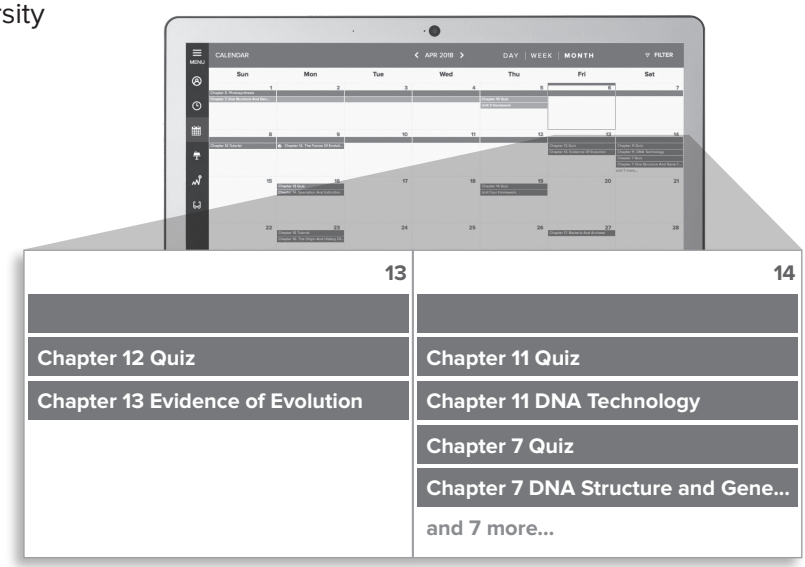

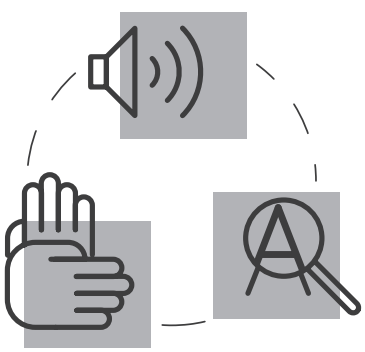

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Brief Contents

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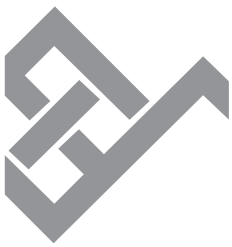
PART 1



Supply Chain Logistics Management

Part 1 establishes the strategic importance of logistics to achieving business success by creating value throughout domestic and global supply chains. Chapter 1 describes the current business attention to logistics, supply chain, and value chain management. The supply chain provides the structure within which logistical strategies are developed and executed. Chapter 1 discusses the firm's shift from supply chain to value chain. Chapter 2 introduces a framework for supply chain information systems. The information system framework is introduced early in the text because these applications provide the information storage and data communication that facilitate all logistics and supply chain planning and operations. Logistics, the primary focus of this text, is introduced in Chapter 3. The concept of integrated logistics is developed by discussing how specific work tasks combine to support customer relationship management, purchasing, management, and integrated operations planning. Chapter 4 describes the importance of customer relationship management to successful logistics. The value created by logistics can serve as a facilitator of customer success. One of the key challenges for integrated supply chain management is cross-functional and cross-enterprise collaboration.

CHAPTER 1

21st-Century Supply Chains

Chapter Outline

As recently as the 1990s, the average time required for a firm to process and deliver merchandise to a customer from warehouse inventory ranged from 15 to 30 days, sometimes even longer. The typical order-to-delivery process involved order creation and transfer, which was usually via telephone, fax, electronic data interchange (EDI), or mail; followed by order processing, which involved the use of manual or computer systems, credit authorization, and order assignment to a warehouse for processing; followed by shipment to a customer. When everything went as planned, the average time for a customer to receive items ordered was lengthy.

When something went wrong, as it often did, such as inventory out-of-stock, a lost or misplaced work order, or a misdirected shipment, total time to service customers escalated rapidly.

To support this lengthy and unpredictable time to market, it became common practice to accumulate inventory. For example, duplicate inventories were typically stocked by multiple supply chain channel members. Despite such extensive inventory, out-of-stocks and delayed deliveries were common due, in part, to the large number of product and process variations.

These accepted business practices of the 20th century, as well as the distribution channel structure used to complete delivery, evolved from years of experience dating from the industrial revolution. Such long-standing business practices remained in place and unchallenged because no clearly superior alternative existed. The traditional distribution process was designed to overcome challenges and achieve benefits that long ago ceased to be important. The industrialized world is no longer characterized by scarcity. Consumer affluence and desire for wide choice of products and services continue to grow. Production productivity and capacity have grown substantially due to new digital and processing technologies. In fact, today's consumers want a wide range of product and source options they can configure to their unique specifications. Given the rapid growth of information technology and the accessibility of the Internet, consumer desires have shifted from passive acceptance to active involvement in the design and delivery of specific products and services. Transportation capacity and operational performance have increasingly become more economical and reliable. Today's transportation is supported by sophisticated information systems that facilitate predictable and precise delivery. The capability to continuously track shipments and receive near instant notification of delayed delivery is common practice.

In this initial chapter, the supply chain management business model and value proposition are introduced as a growing strategic commitment of contemporary firms. The chapter reviews the development of the supply chain revolution in business practice that has resulted in a generalized supply chain model. Next, the supply chain concept is presented in a strategic framework. The chapter then examines integrative management, responsiveness, and globalization as forces driving the emergence of supply chain logic. The overall objective of Chapter 1 is to position the logistical challenges of supporting a 21st-century supply chain strategy. The supply chain is positioned as the strategic framework within which logistical requirements are identified and related operations managed.

The Supply Chain Revolution

What managers are experiencing today can be described as the **supply chain revolution** and a related **logistical renaissance**. These two massive shifts in expectation and practice concerning best-practice performance of business operations are highly interrelated. However, supply chain and logistics are significantly different aspects of contemporary management.

The fundamental focus of this text is integrated logistics management. However, to study logistics, a reader must have a basic understanding of supply chain management. Supply chain strategy establishes the operating framework within which logistics is performed. As will be reviewed shortly, dramatic change continues to evolve in supply chain practice. Accordingly, logistics best practice, as described in this text, is presented as a work in progress, subject to continuous change based on the evolving nature of supply chain structure and strategy. Chapter 2, Supply Chain Information Technology, overviews the technology used to support supply chain planning and execution. Chapter 3, Logistics, examines the renaissance taking place in logistics best practice and sets the stage for chapters that follow.

At first glance, supply chain management may appear to be a vague concept. A great deal has been written on the subject without much concern for basic definition, structure,

or common vocabulary. Confusion exists concerning the appropriate scope of what constitutes a supply chain, to what extent it involves integration with other companies as contrasted to integrating a firm's internal operations, and how to best implement a strategy concerning competitive practices and legal constraints. For most managers, the supply chain concept has intrinsic appeal because it envisions new business arrangements offering the potential to improve competitiveness. The concept also implies a highly effective network of business relationships that serve to improve efficiency by eliminating duplicate and nonproductive work. Understanding more specifically what constitutes the supply chain revolution starts with a review of traditional distribution channel practice.

To overcome challenges of commercial trading, firms developed business relationships with other product and service firms to jointly perform essential activities. Such acknowledged dependency is necessary to achieve benefits of specialization. Managers, following the early years of the industrial revolution, began to strategically plan core competency, specialization, and economy of scale. The result was realization that working closely with other businesses was essential for continued success. This understanding that no firm could be totally self-sufficient contrasted to some earlier notions of vertical integration.[1] Acknowledged dependence between business firms created the study of what became known as **distribution** or **marketing channels**.

Because of the high visibility of different types of businesses, the early study of channel arrangements was characterized by classification based on specific roles performed during the distribution process. For example, a firm may have been created to perform the value-added services called wholesaling. Firms doing business with a wholesaler had expectations concerning what services they would receive and the compensation they would be expected to pay. In-depth study of specific activities quickly identified the necessity for leadership, a degree of commitment to cooperation among all channel members, and means to resolve conflict. Scholars who conduct research in channel structure and strategy developed typologies to classify observable practice ranging from a single transaction to highly formalized continuous business relationships.

The bonding feature of channel integration was a rather vague concept that all involved would enjoy benefits as a result of collaboration. However, primarily due to a lack of high-quality information, the overall channel structure was postured on an adversarial foundation. When push came to shove, each firm in the channel would first and foremost focus on achieving its individual goals. Thus, in final analysis, channel dynamics were more often than not characterized by a dog-eat-dog competitive environment.

During the last decade of the 20th century, channel strategy and structure began to shift radically. Traditional distribution channel arrangements moved toward more integration and collaboration. Prior to reviewing the generalized supply chain model, it is important to understand why integration creates value.

Why Integration Creates Value

To explain the basic benefits and challenges of integrated management, it is useful to point out that customers have at least three perspectives of value.

The traditional perspective is **economic value**. Economic value builds on economy of scale in operations as the source of efficiency. Economy of scale seeks to fully utilize fixed assets to achieve the lowest, total landed cost. The focus of economic value is efficiency of product/service creation. Economic value is all about doing things as inexpensively as possible. The customer take-away of economic value is **quality at a low price**.

[1] Henry Ford, *Today and Tomorrow* (New York: Doubleday, Page, and Company, 1926). Reprinted by Productivity Press (Portland, OR, 1988).

TABLE 1.1
Integrative Management Value Proposition

Economic Value	Market Value	Relevancy Value
• Lowest total cost	• Attractive assortment	• Customization
• Economy-of-scale efficiency	• Economy-of-scope effectiveness	• Segmental diversity
• Product/service creation	• Product/service presentation	• Product/service positioning
Procurement/Manufacturing Strategy	**Market/Distribution Strategy**	**Supply Chain Strategy**

A second value perspective is **market value**. Market value is about presenting an attractive assortment of products at the right time and place to realize effectiveness. Market value focuses on achieving economy of scope in product/service presentation. The creation of multimerchant shopping malls, large-scale mass-merchandising retail stores, and multivendor Internet fulfillment operations are all initiatives to achieve **market value**. The customer's take-away in terms of market value is **convenient product/service assortment and choice**.

Realization of both economic and market value is important to customers. However, increasingly firms are recognizing that business success also depends upon a third perspective of value, referred to as **relevancy value**. Relevancy value involves customization of value-adding services, over and above basic product characteristics and physical location, that make a real difference to customers. Relevancy value means the right products and services, as reflected by market value, at the right price, as reflected by economic value, modified, sequenced, synchronized, and positioned in a manner that creates customer-specific value. In a consumer context, for example, relevancy means transforming ingredients into ready-to-eat meals. In general merchandise retailing, relevancy means transforming products into fashionable apparel. In manufacturing and assembly, relevancy is achieved by integrating specific components into products to increase functionality desired by a specific customer. The customer's take-away in terms of relevancy is a unique product/service bundle.

The simultaneous achievement of economic value, market value, and relevancy value requires total integration of the overall business process and is known as the integrative management value proposition, as illustrated in Table 1.1.

Generalized Supply Chain Model and Supply Chain Applications

The general concept of an integrated supply chain is often illustrated by a line diagram that links participating firms into a coordinated competitive unit. Figure 1.1 illustrates a generalized model adapted from the supply chain management program at Michigan State University.

The context of an integrated supply chain is multifirm collaboration within a framework of key resource flows and constraints. Within this context, supply chain structure and strategy results from efforts to operationally align an enterprise with customers as well as the supporting distributor and supplier networks to gain competitive advantage. Business operations are ideally integrated from initial material purchase to delivery of finished products and services to customers.[2]

Value results from the synergy among firms constituting a supply chain as a result of five critical flows: information, product, service, financial, and knowledge (see the bidirectional

[2] Customers are defined as destination points in a supply chain. Customers either consume a product or use it as an integral part or component of an additional process or product. The essential point is that the original product loses its unique configuration when consumed. Business entities that purchase products from manufacturers for resale, for example, wholesalers and retailers, are referred to as *intermediate customers*.

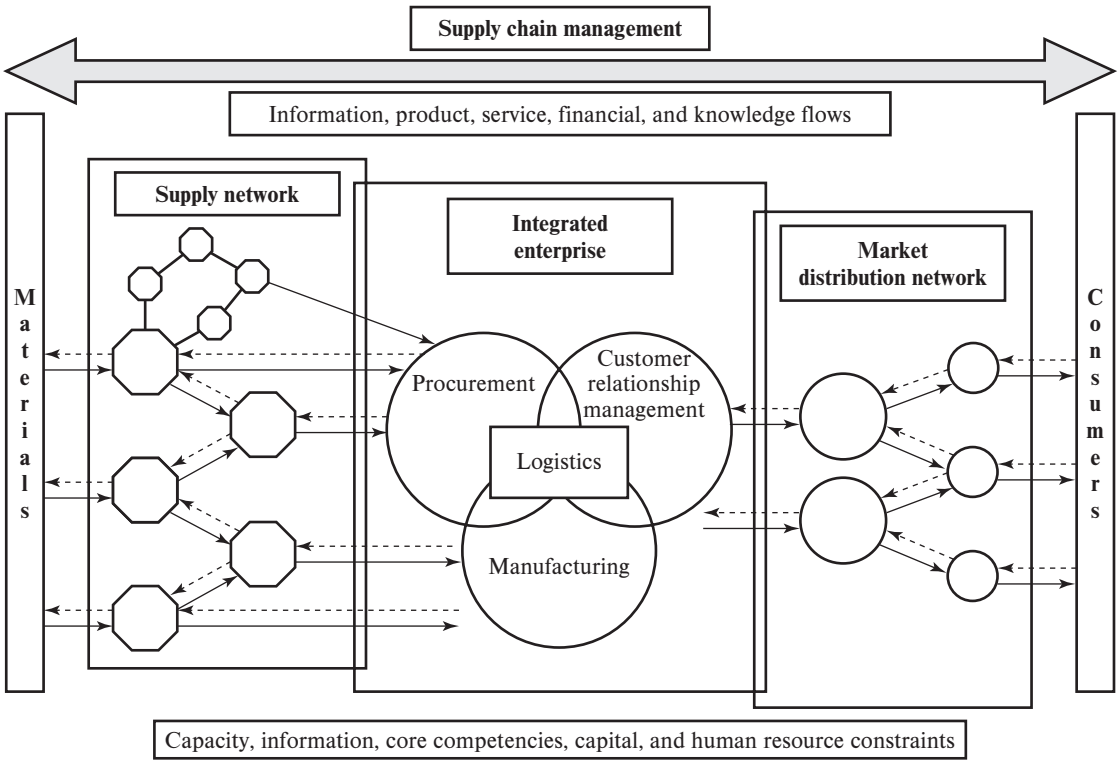


FIGURE 1.1 The Integrated Supply Chain Framework

arrow at the top of the Figure 1.1). Logistics is the primary conduit of product and service flow within a supply chain arrangement. Each firm engaged in a supply chain is involved in performing some aspects of overall logistics. Achievement of logistical integration and efficiency across the supply chain is the focus of this text. The generalized supply chain arrangement illustrated in Figure 1.1 logically and logistically links a firm and its distributor and supplier network to customers. The message conveyed by the figure is that the integrated value-creation process must be aligned and managed from material procurement to end-customer product/service delivery in order to achieve effectiveness, efficiency, relevancy, and sustainability.

The integrated supply chain perspective shifts traditional channel arrangements from loosely linked groups of independent businesses that buy and sell inventory to each other toward a managerially coordinated initiative to increase market impact, overall efficiency, continuous improvement, and competitiveness. In practice, many complexities serve to cloud the simplicity of illustrating supply chains as directional line diagrams. For example, many individual firms simultaneously participate in multiple and competitive supply chains. To the degree that a supply chain becomes the basic unit of competition, firms participating in multiple arrangements may confront loyalty issues related to confidentiality and potential conflict of interest.

Another factor that serves to add complexity to understanding supply chain structure is the high degree of mobility and change observable in typical arrangements. It's interesting to observe the fluidity of supply chains as firms enter and exit without any apparent loss of essential connectivity. For example, a firm and/or service supplier may be actively engaged in a supply chain structure during selected times, such as a peak selling season, and not during the balance of a year. During the 2017 Christmas season, Amazon added 100,000 jobs to accommodate seasonal demand to demonstrate the need for flexibility. Most of these positions are at fulfillment centers (distribution centers) and consolidation points.

Generalized Supply Chain Model

While the typical supply chain is focused on a manufacturer with the support of suppliers, distributors, retailers, and supply chain service providers, there are a number of nontraditional environments where supply chain principles can be effectively applied. Table 1.2 lists and describes some of these nontraditional applications.

Supply Chain Applications	Description
Product supply chain	The product supply chain is the traditional model involving suppliers, manufacturers, distributors, and retailers for consumer products. This is the primary focus of many supply chain classes and texts.
Promotional supply chain	Promotional supply chains are for items that are being heavily promoted such as end-aisle tasting displays in wholesale clubs. The major challenge is that all items related to the promotion (product, utensils, cooking materials, and display materials) must be assembled in the cart and delivered to the store to meet the weekend display schedule.
Bulk material supply chain	Bulk material supply chains are designed to move bulk products such as grains, metals, and chemicals. In many cases, these materials are relatively low value so all movement and handling in the supply chain must take advantage of significant economies of scale and often specialized vehicles.
Talent supply chain	Talent supply chains apply supply chain principles to talent management where individual talent represents the products that are moved through the supply chain with the value-added process being training and education.
Business-to-consumer (B2C) supply chain	Business-to-consumer supply chains represent the increasing volume of product that is sold online from manufacturers or distributors directly to consumers.
Recycling supply chain	Recycling supply chains are responsible for handling product returns for recycling of products, components, reprocessing, and packaging.
Resource supply chain	Resource supply chains are designed to provide facility resources for information-based supply chains such as server farms for cloud or social media applications. This includes the purchasing and sequencing of land, regulatory approvals, utilities, and equipment to provide the technology services.
Construction supply chain	Construction supply chains provide and sequence the equipment and the building supplies for construction.
Recovery supply chain	Recovery supply chains are employed to recover material that has reached its useful life in the field. A recovery supply chain is useful following military, construction, mining, or drilling operations.
Humanitarian supply chain	Humanitarian supply chains provide post-event support for disaster recovery. This includes bringing in equipment for recovery, food and medical care items, and commodities to support reconstruction.
Global supply chain	Global supply chains source and deliver from multiple regions around the world. While most supply chains include global aspects, it is important to consider specific global characteristics such as demand variation, distance, and documentation.
Durables supply chain	Durables supply chains are designed to facilitate the handling and delivery of heavy equipment such as agricultural, construction, or military equipment. The major differentiator for durables supply chains is specialized transportation equipment due to infrastructure restrictions.
Agricultural commodity supply chain	Agricultural commodity supply chains move agricultural product from the farm to the commodity elevator or the processing plant. In most cases, the challenge is to move this bulk product economically and in a way that the farmer can still make money even when the price is set by the buyer. In other words, if the farmer is too far from the buyer, there will be no market for those products.
Innovative supply chain	An innovative supply chain is one that must rapidly introduce new product to the market. This is typically a responsive supply chain that is defined to bring new product variations to market or to have souvenirs such as for movies, athletic events, or customized product introductions available when the event is taking place (e.g., concerts, movies, openings, etc.)
Military supply chain	Military supply chains are designed to support military operations. Specialized requirements include the ability to provide supply chains for a range of products (food, medical, equipment, and ammunitions) in demanding environments (desert, jungle, and supporting combat operations).
Clinical trials supply chain	Clinical trials supply chains are designed to support the very precise demands for completing pharmaceutical clinical trials. Clinical trials are very demanding due to the need for precise controls of dosages, ingredient combinations, and drug combinations.

TABLE 1.2 Supply Chain Applications

Although many believe that supply chain principles and practices are only relevant for major manufacturing firms, Table 1.2 demonstrates that the principles can be applied in many other scenarios and environments. It is important for supply chain professionals to understand the environments that supply chain principles can be applied to.

Supply Chain Definitions and Activities

Due to the many views and perspectives of supply chain, there are varying definitions that include different institutions, processes, and activities. As such, there is no common definition. There is not even a common set of processes or activities that should be included.

However, it is important that this text establish a foundation by providing both a definition and a strategic context. In terms of scope, **supply chain management** is a set of processes to effectively and efficiently integrate suppliers, manufacturers, distribution centers, distributors, and retailers so that products are produced and distributed at the right quantities, to the right locations, and at the right time to minimize system-side costs while achieving the consumer's desired value proposition.

What began during the last decade of the 20th century and will continue to unfold well into the 21st century is what is being increasingly characterized as the **information-based** or **digital supply chain**. In the information or digital age, the reality of connectivity among collaborating business organizations continues to drive a new order of relationships called supply chain management. Managers are increasingly improving and integrating traditional marketing, manufacturing, purchasing, and logistics practices. In light of this information-based evolution, supply chain management's definition is expanded: It is a coordinated, cross-functional strategy, involving both internal and external partners, that utilizes process and information to improve operating efficiency and leverage strategic positioning. Supply chain strategy applies the functions and processes to effectively and efficiently integrate suppliers, manufacturers, distribution networks, and channels as well as final consumers, ensuring the firm's value proposition is achieved while minimizing total system cost.

Logistics management is the process and activities that create value focused on the design and administration of a system to control the timing and geographical positioning of raw material, work-in-process, and finished inventory at the lowest total cost. **Logistics** is the combination of a firm's order management, inventory, transportation, and warehousing management activities as integrated throughout a facility network. **Integrated logistics** serves to link and synchronize the overall supply chain as a continuous process and is essential to achieve the desired outcomes of the firm's value proposition.

While there are other definitions that come from different perspectives (Institute of Supply Management, APICS, and Council of Supply Chain Management Professionals), there are common themes that suggest a common framework. These definitions emphasize key concepts, including effective and efficient flow, cross-functional collaboration, collaborative institutional partners, achieving the consumer's value proposition, and minimizing systemwide cost. Effective and efficient flow emphasizes the need for a firm to work collaboratively with other supply chain partners to deliver the product to the consumer at a minimum cost. The cross-functional collaboration requires that the firm's internal functions, particularly those involved in supply chain, work together to minimize waste and duplication of time and resources. Achieving the consumer's value proposition means that the supply chain can deliver the product or solution in a form that can meet the unique consumer requirements. Finally, deliver at minimum cost means that the firm and its collaborative partners try to deliver the product or solution to the consumer while minimizing the total end-to-end cost for all activities occurring in the supply chain.

Integrative Management and Supply Chain Processes

Across all aspects of business operations, attention is focused on achieving improved integrative management. The challenge to achieving integrated management results from the long-standing tradition of performing and measuring work on a functional basis. Since the industrial revolution, achieving best practice has focused managerial attention on functional specialization.[3] The prevailing belief was the better the performance of a specific function, the greater the efficiency of the overall process. For well over a century, this fundamental commitment to functional efficiency has driven best practice in organization structure, performance measurement, and accountability.

In terms of management, firms have traditionally been structured into departments to facilitate work focus, routinization, standardization, and control. Accounting practices were developed to measure departmental performance. Most performance measurement focused on individual functions. Two examples of common functional measurement are the cost per unit to manufacture and the cost per hundredweight to transport. Cross-functional measurements and allocations were typically limited to costs common to all functional areas of work, such as overhead, labor, utilities, insurance, interest, and so on.

Excellence in supply chain performance requires the simultaneous achievement of eight key processes. Table 1.3 identifies the eight key processes and provides a brief description of each. Although these integrative processes are not the exclusive domain of supply chain logistics, some critical elements of each are integral to a firm achieving high-performance operational success. Therefore, supply chain structure, strategy, and continuous operational execution must be focused on achieving and continuously improving these essential eight processes. Simultaneous operational achievement of these eight processes forms the essence of achieving both operational integration and performance excellence.

[3] Frederick W. Taylor, *Scientific Management* (New York: W. W. Norton, 1967).

TABLE 1.3
Eight Supply Chain Integrative Processes

Process	Description
Demand planning responsiveness	The assessment of demand and strategic design to achieve maximum responsiveness to customer requirements.
Customer relationship collaboration	The development and administration of relationships with customers to facilitate strategic information sharing, joint planning, and integrated operations.
Order fulfillment/service delivery	The ability to execute superior and sustainable order-to-delivery performance and related essential services.
Product/service development launch	The participation in product service development and lean launch.
Manufacturing customization	The support of manufacturing strategy and facilitation of postponement throughout the supply chain.
Supplier relationship collaboration	The development and administration of relationships with suppliers to facilitate strategic information sharing, joint planning, and integrated operations.
Life cycle support	The repair and support of products during their life cycle, including warranty, maintenance, and repair.
Reverse logistics	The return and disposition of inventories in a cost-effective and secure manner.