

SUPPLY CHAIN: A PERSPECTIVE FOR OPERATIONS MANAGEMENT



relationships



sustainability



global

1	Introduction to Managing Operations Across the Supply Chain	X	X	X
2	Operations and Supply Chain Strategy	X	X	X

What is *operations management*? Have you ever stopped to consider all of the specifics of how organizations (business and not-for-profit) deliver goods and services to their customers? Think of all the details that must be managed to develop product concepts, identify sources for raw materials, decide how products will be made and delivered, and establish how to serve customers. Operations management includes all of these types of decisions:

Operations management is the management of processes used to design, supply, produce, and deliver valuable goods and services to customers.

In Part 1, *Supply Chain: A Perspective for Operations Management*, we define the scope of operations

management, as well as its strategic role in businesses. **Chapter 1** explains what operations management is and why it is important for all managers (accounting, marketing, finance, and other managers) to understand the basics of this management discipline. **Chapter 1** also introduces an important perspective, the *supply chain*, as a way to think about how to coordinate operational activities across different organizations. **Chapter 2** describes how strategic choices in operations management relate to an organization's overall objectives and to choices made in marketing, finance, and other functional areas. In addition, **Chapter 2** explains how to increase competitiveness through effective operations and how to measure the effectiveness of operations activities.

1

Introduction to Managing Operations Across the Supply Chain

LEARNING OBJECTIVES *After studying this chapter, you should be able to:*

- L01-1** Explain what operations management is and why it is important.
- L01-2** Describe the major decisions that operations managers typically make.
- L01-3** Explain the role of processes and “process thinking” in operations management.
- L01-4** Explain what the supply chain is and what it means to view operations management using a “supply chain perspective.”
- L01-5** Identify the partners and functional groups that work together in operations management.
- L01-6** Define the planning activities associated with managing operations across the supply chain.



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Apple often receives praise for its user-friendly and aesthetically pleasing product designs. But a less well-known contributor to Apple's success is its prowess in managing operations across its supply chain. This is the world of manufacturing, procurement, and logistics in which the chief executive officer, Tim Cook, excelled, earning him the trust of Steve Jobs. Apple has built a closed ecosystem where it exerts control over nearly every piece of the supply chain, from design to retail store.

This operational edge is what enables Apple to handle massive product launches without having to maintain large, profit-sapping inventories. It has allowed a company often criticized for high prices to sell its iPad at a price that very few rivals can beat, while still earning a 25 percent margin on the device. Some of the basic elements of Apple's operational strategy include:

- Capitalize on volume. Because of its buying power, Apple gets big discounts on parts, manufacturing capacity, and air freight.
- Work closely with suppliers. Apple engineers sometimes spend months living out of hotel rooms in order to be close to suppliers and

manufacturers, helping to tweak the industrial processes and tools that translate prototypes into mass-produced devices.

- Focus on a few product lines, with little customization. Apple's unified strategy allows it to eliminate complexity and cost, while maximizing volume-based economies in its supply chain.
- Ensure supply availability and low prices. Apple makes big upfront payments to suppliers to lock in their capacity and to limit options for competitors.
- Keep a close eye on demand. By selling through its own retail stores, Apple can track demand by specific store and by the hour; then it adjusts sales forecasts and production plans daily to respond quickly to demand changes.

Apple designs cool products. But its enormous profit margins—two to four times the profit margins of most other hardware companies—come in large part from its priority and focus on operations management.

It Takes More than
Cool Products to Make
Apple Great

This book, *Managing Operations Across the Supply Chain*, will help you to study “operations management” using a “supply chain” perspective. This perspective means that we will examine operational activities that take place *within firms* as well those *that cross firms’ boundaries*, involving suppliers and customers of all types. This larger network of organizations makes up a firm’s *supply chain*.

The Apple story illustrates the value of this broad perspective of operations management. The combination of excellence in both internal product design operations and external supply chain operations management makes Apple a dominant player in its industry. Operations management by definition spans a large number of activities that take place both inside and outside the business firm.

A BROAD DEFINITION OF SUPPLY CHAIN OPERATIONS MANAGEMENT

operations management The management of processes used to design, supply, produce, and deliver valuable goods and services to customers.

Operations management is the management of processes used to design, supply, produce, and deliver valuable goods and services to customers.

Operations management includes the planning and execution of tasks that may be long-term (yearly) or short-term (daily) in nature. An operations manager interacts with managers in other business functions, both inside and outside the operations manager’s own company. Operations management thus spans the boundaries of any single firm, bringing together the activities of internal operations (i.e., internal to a given company) with the operations of customers, suppliers, and other partners around the world. Operations located around the globe are becoming more tightly interconnected all the time. The supply chain concept can be used to describe connections among business partners.

supply chain The global network of organizations and activities involved in designing, transforming, consuming, and disposing of goods and services.

A **supply chain** is the global network of organizations and activities involved in (1) designing a set of goods and services and their related processes, (2) transforming inputs into goods and services, (3) consuming these goods and services, and (4) disposing of these goods and services.

Think about all the different organizations located in different companies that are involved in converting raw materials into a delivered finished product. Dozens of organizations are involved in producing and delivering even a simple product like bottled water. Together, supply chain organizations perform all the value-creating activities required to innovate, plan, source, make, deliver, and return or dispose of a given set of products and services.¹ Other terms sometimes substituted for *supply chain* include *demand chain*, *extended enterprise*, *supply network*, or *supply web*. All of these terms reflect the idea that a supply chain involves connections and relationships among organizations that play various roles for a given set of products.

Operations management activities located throughout a supply chain create and enhance the value of goods and services by increasing their economic value (e.g., lowering delivered cost), functional value (e.g., improving product quality or convenience), and psychosocial value (e.g., improving product aesthetics and desirability). The following statements help define and describe operations management:

- Operations management is mainly concerned with how resources will be developed and used to accomplish business goals.
- Operations management is about designing, executing, and improving business processes.
- Operations management deals with processes that transform inputs, including materials, information, energy, money, and even people, into goods and services.
- Within a supply chain context, operations management brings together four major sets of players: the firm, customers, suppliers, and stakeholders.

LO1-1 Explain what operations management is and why it is important.

¹Supply Chain Council, *Integrated Supply Chain Performance Measurement: A Multi-Industry Consortium Recommendation*, Supply Chain Council Report #5566, p. 1.

- To be effective, operations management must be consistent with the strategic goals of the firm.
- Operations management is dynamic because of changes in customers' demands, resources, competition, and technologies.



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To work in this increasingly interconnected world, you will need to understand the foundational concepts, functional groups, and integrated activities involved in managing operations located across a supply chain. The Get Real box below describes why operations management is important to all of us.

Even if you do not pursue a career in operations management, it will be important for you to understand and appreciate the fundamental challenges associated with managing operations well. First, the decisions you make as a worker in marketing, finance, accounting, human resources, or other areas will have an impact on, and be impacted by, operations. For example, suppose that you work in a hotel where managers want to buy new kiosks that will allow guests to check themselves into the hotel. The effects of this decision extend beyond operational issues such as labor costs and efficiency. The decision will also have implications for the use of capital (a finance



Automated check-in kiosks at a hotel.

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GET REAL

Why You Need to Study Operations Management

Because it matters to people:

Operations management plays an important role in determining the quality of life for people around the world. New operational practices and technologies continue to radically improve the effectiveness of governments, not-for-profit institutions, and businesses. Operations management also directly impacts sustainability issues, including the environment, the fair treatment of people, and safety. In doing so, operations management affects social systems and cultural norms, as well as the basic economic prosperity of people everywhere. Consider how your own life is affected. The speed with which organizations provide services to you determines the amount of leisure time you have. In an emergency, the speed and efficiency of a relief organization might even save your life. The cost and quality of products you consume affects your disposable income, your health, even your outlook on life. You can probably think of a good service experience that put a smile on your face, or a bad one that ruined your day! As an operations manager, you may someday have the opportunity and responsibility to positively affect your organization's success. In doing so, you may also be improving the quality of life of the firm's employees, its customers, and even society as a whole.

Because it matters to organizations:

Every product or service offering is a promise of some kind of benefit for someone. Organizations are successful only when they can

consistently deliver upon the promises that they make. Operations management determines how well such promises are fulfilled. Research shows that operationally excellent organizations consistently outperform their rivals in financial and other terms. For example, a study² showed that companies possessing excellent supply chain operations outperformed their nearest competitors in the following ways:

- 50 percent higher net profit margins
- 20 percent lower sales, general & administration (SG&A) expenses
- 12 percent lower average inventories
- 30 percent less working capital expenses
- Twice the return on assets (ROA)
- Twice the return on equity (ROE)
- 44 percent higher economic value added
- Twice the returns on stock prices
- 2.4 times the risk-weighted stock returns
- 46 percent greater market-value-to-assets ratio

These differences in performance are truly stunning and highlight the important contributions that operations management makes to the financial well-being of a firm.

²M. L. Swink, R. Golecha, and T. Richardson, "Does Becoming a Top Supply Chain Company Really Pay Off? An Analysis of Top SCM Companies and Their Rivals," *Supply Chain Management Review*, March 2010, pp. 14–21.

concern), the type of service provided to customers (a marketing concern), and the training of employees (a human resource management concern). Managers of various functions cannot work in isolation if they hope to make decisions that are good for the overall success of the firm. Second, all activities, including marketing, finance, accounting, and so on, have operational elements to them. For example, think about the operational processes required to run a sales office. Managers in all functions need to understand the principles of operations management in order to keep their functional processes running effectively and efficiently.

L01-2 Describe the major decisions that operations managers typically make.

Important Decisions in Supply Chain Operations Management

What?

- What types of activities and what types of goods or services are to be delivered by the system?
- What product features do our intended customers care about?
- What activities and resources are needed, and how should they be developed, allocated, and controlled?

How?

- How is the good or service to be designed, made, and delivered?
- How much should our transformation process be able to deliver (and under what conditions)?
- How should we measure and assess performance?

When?

- When should products be made, activities be carried out, services be delivered, or capacities/facilities come on line?

Where and Who?

- Where should certain activities be done, and who should do them: suppliers, partners, or the firm?

Operations managers answer these questions by defining both the structural and infrastructural aspects of the operations management system. Structural decisions affect physical resources such as capacity, facilities, technology, and the supply chain network. Once made, decisions in these areas determine what the operations management system can and cannot do well. Altering these decisions often requires significant investments and lots of time—often years. Infrastructural decisions affect the workforce, production planning and control, process innovation, and organization. Decisions in these areas determine what is done, when it is done, and who does it. Decisions in all of these areas are interrelated, making operations management a complex and cross-functional activity.



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Differences in Goods and Services Operations

Operational activities exist in order to produce both tangible goods and intangible services. Books, cars, and televisions are all tangible goods. In contrast, services like health care, banking, and entertainment are largely experiential or informational. For example, at a hair salon, you *consume* the expertise and labor of the hair stylist as part of the experience of getting a haircut. The experiences and information you receive at school form a service called *education*. Table 1-1 summarizes some of the important differences between goods and services.

Some businesses are mostly about producing goods (e.g., production of gasoline), and some are mostly about delivering services (e.g., financial consulting). However, most businesses integrate a mix of goods-producing and service-producing operations activities.

TABLE 1-1 Characteristics of Goods and Services

Goods	Services
Tangible	Intangible
Can be inventoried	Cannot be inventoried
Little customer contact (consumption is often separate from production)	Extensive customer contact (simultaneous production and consumption)
Long lead times	Short lead times
Often capital-intensive	Often labor-intensive
Quality easily assessed	Quality more difficult to assess (more perceptual)
Material is transformed	Information or the customer is transformed

There are key structural differences in operational processes designed to provide mostly goods versus mostly services. Chapter 5 discusses these differences in depth, but we will highlight a few important ones here. First, goods can be produced in advance and stored in inventory until a customer buys or consumes them. Since services are intangible, they cannot be stored. The production and consumption of a service usually occur at the same time. While goods-manufacturing operations can use inventory to smooth out imbalances between production capacity and customer demand, a producer of services must maintain enough capacity to meet demand during peak periods; otherwise, it must postpone (backlog) the demand. For example, when you go into a restaurant during its busy time and the greeter asks you to wait in the lounge, you become part of a backlog of demand. Service operations managers often use reservation and appointment systems to help customers avoid long wait times.

In services, customers frequently can observe the operational processes directly. In fact, the customer may take part in producing and consuming the service at the same time (think of your roles as co-designer and quality inspector in getting a haircut). On the other hand, the production of goods may require little contact with the customer.

Finally, operations managers can easily establish measurable quality standards for tangible goods to evaluate whether they work adequately, how they appear, and so on. Quality control is more difficult for services, as it is not always easy to objectively measure a service product's attributes. Service operations managers often evaluate both methods of delivery and customer perceptions. For example, a quality control inspector for a movie theater might study how workers interact with customers as they sell tickets or food to customers. In addition, they may periodically survey customers to gauge their levels of satisfaction.

In reality, there are very few pure goods and pure services. Most manufactured products also include services. When you buy a new car, for example, you may also buy financing, maintenance, and repair services. Many service products also include tangible items. A hospital, for example, provides medicines and bandages along with intangible diagnostic and treatment services.

Because most firms deliver products that involve both goods and services, operations managers recognize the importance of delivering a **total product experience**. This term refers to all of the outputs of an operation, both goods and services, that are combined to define a customer's complete consumption experience. The experience includes all aspects of purchasing, consuming, and disposing of the product.

student activity

student

Think of the last time you visited an amusement park (like Disney World). How many different goods and services did you consume as part of your overall experience? How many of these products were "pure" goods and "pure" services? Which of these products was prepared before you ordered it (inventoried), versus being prepared at the very time that you ordered it?

total product experience All the goods and services that are combined to define a customer's complete consumption experience.

Processes and Process Thinking

process A system of activities that transforms inputs into valuable outputs.

L01-3 Explain the role of processes and “process thinking” in operations management.

Operations management is a *process*-oriented discipline. What, then, is a **process**? It is a system of activities that *transforms* inputs into valuable outputs. Processes use resources (workers, machines, money, and knowledge) to transform inputs (such as materials, energy, money, people, and data) into outputs (goods and services). For example, one uses a grill (a resource) and heat (an input) to convert a raw hamburger patty (an input) into a cooked hamburger (an output).

Processes can also transform information, or even people (customers), from one condition into another. In decision making, for example, managers transform data into actionable information and decisions. Think about how you are “transformed” by going to a movie—this is a process in which you are both an input and an output! Other processes transform things by transporting them from one location to another, or by storing them (e.g., a warehouse stores finished goods). Finally, some activities check or inspect work to make sure that it meets standards for quality, quantity, or timeliness.

Every organization can be described as a bundle of processes that connect different organizational groups. For example, companies use *design processes* to develop new goods and services and *strategic planning processes* to determine how the firm should compete. They use *production processes* to plan and execute the supply, manufacture, and delivery of goods and services to customers. Finally, companies use *evaluation processes* to measure and report how well they are meeting their goals or using their resources.

It is valuable to think about operations as *sets of processes and subprocesses* with many interrelationships and linkages. Consider the operations of an airport. There are flight-scheduling processes, ticketing processes, facilities-management processes, security processes, vendor-management processes, and on and on. The structure governing how these processes work together determines the ability of the airport to serve its customers.

We all have experienced organizations with complex, bureaucratic processes that seem incapable of providing a desired service in a timely manner. The design of a process should reflect what customers want. If customers want quick response, for example, then the process should be designed to be fast and flexible. In this case operations managers must identify and eliminate unnecessary or redundant steps, reduce distances between steps or activities, and diminish the time needed to complete each step. This connection between the process design and customers’ desires must be maintained. If customers’ desires change, then processes may also have to change.

An airport operation contains dozens of interrelated processes.

© Gary Conner/Getty Images



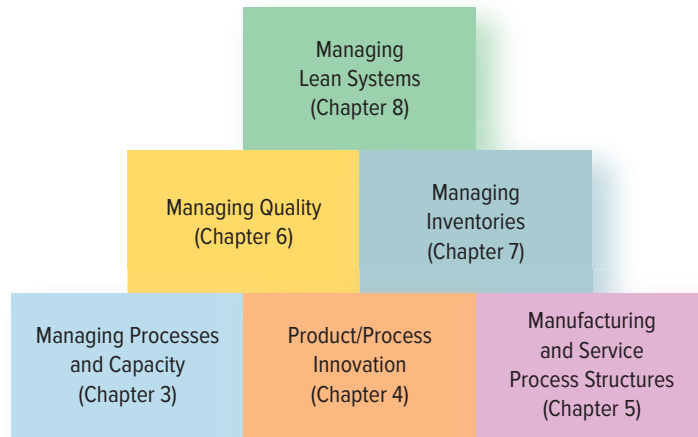


FIGURE 1-1
Foundational Concepts
in Supply Chain
Operations Management

Process thinking is so important that we have dedicated an entire section of this book to topics related to it. Figure 1-1 shows the conceptual building blocks of process thinking that are essential to the management of any operation. A separate chapter in this book addresses each building block. The bottom three blocks represent the foundational principles that describe how operational processes work, how product and process characteristics are intertwined, and how certain process structures are related to operational objectives. In order to make good decisions, operations managers need to understand the “physics” that govern processes, as well as understand how they relate to product design and development.

Building upon this foundational knowledge, operations managers can better understand how to make good decisions regarding product quality and the use of inventory (the second row of blocks in Figure 1-1). Product quality is a result of how people and technologies work together to execute processes. Inventory management can make processes more or less efficient, depending on whether the inventory is used wisely or unwisely.

The top block in Figure 1-1, “Managing Lean Systems,” represents the application of all the aforementioned process-related concepts in ways that maximize the overall productivity of the operation. A **lean operation** produces maximum levels of efficiency and effectiveness using a minimal amount of resources.

lean operation An operation that produces maximum levels of efficiency and effectiveness using a minimal amount of resources.

OPERATIONS MANAGEMENT YESTERDAY AND TODAY: GROWTH OF THE SUPPLY CHAIN MANAGEMENT PERSPECTIVE

Many of the formal practices and concepts of operations management have their origins in the Industrial Revolution, which took place in the latter half of the 18th century. As an activity, however, operations management is much older. Signs of organized operations have been found in all ancient civilizations including Greece, Rome, and Egypt. Building the great pyramids was undoubtedly accomplished by means of organized operations, even if we don’t know the exact nature of those operations.

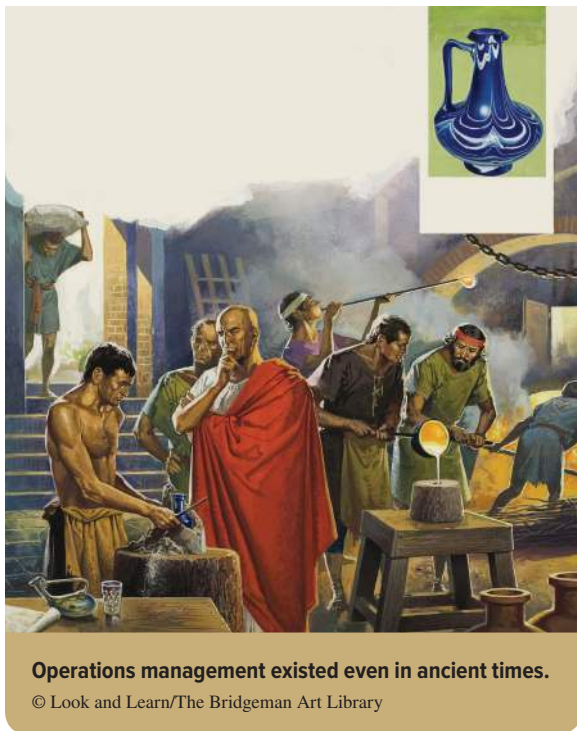
Table 1-2 provides a brief history of operations management. Since the Industrial Revolution, modern operations management has evolved at different rates throughout the world. In America, the early 20th century witnessed a huge growth in demand and the rise of mass production. The latter half of the century was marked by standardization of operations practices and by fierce global competition. Today, continued globalization, the Internet, and numerous other technologies are radically transforming business operations.

“Supply chain management” represents the latest technological shift in operations management. This now-dominant perspective is the result of certain forces in the marketplace, discussed below.

LO1-4 Explain what the supply chain is and what it means to view operations management using a “supply chain perspective.”

TABLE 1-2 A Brief History of Operations Management

Operations Era		Technological Advances	Operations Management Span of Focus
1800–1850	Technical Capitalists	Improved manufacturing technology; interchangeable parts; locating factories on waterways and in industrial centers; emerging transportation network	Internal production
1850–1890	Mass Production	Emergence of local factory; movement to urban areas; introduction of steam and electrical power; new machines; economies of scale	Internal production
1890–1920	Scientific Management	More systematic approaches to operations management; moving assembly line; beginnings of process thinking	Internal production
1920–1960	Demand Growth	Increased automation; introduction of computers and quantitative analysis	Internal production
1960–1980	Global Competition	Just-in-time systems; emergence of statistical process control; early outsourcing	Internal production
1980–2000	World-Class Manufacturing	Increased computerization and information systems; world-class practices and benchmarks; greater global sourcing and need for supply chain coordination	Production, design, supply
2000–Present	E-commerce	Internet; enhanced communications and transportation technologies; integrated management across functions, including goods and services operations	Global supply chain



Advances in Technology and Infrastructure

Advances in communications, computers, and transportation technologies have enabled extensive connectivity and the growth of supply chain partnerships. With easier information transactions, there is less of a need to include all operations at one location or within one organizational boundary. Constant information sharing between supply chain partners improves efficiencies in planning, in material movements, and in the transfers of funds.

At the same time, growing transportation technologies and infrastructures have made the shipping of goods and the transport of people faster, more reliable, and more economical than in decades past. Transportation infrastructure (airports, train tracks, shipping docks, and highways) continues to be built in developing countries. This growing infrastructure improves the reliability of deliveries to remote places, thus opening opportunities to work with new suppliers and serve new markets.

Reduction in Governmental Barriers to Trade



In recent years we have witnessed incredible changes in governments and social systems around the world. More and more nations have moved away from centrally controlled economies to pursue free market systems. Russia, India, and China represent a few important examples. These falling political barriers have opened up new opportunities to develop global supply chains. While these global supply chains can offer improved

product costs and quality, they can also be more complex and risky. Today, operations managers must often manage long pipelines of inventories that cross multiple country borders.

Focus on Core Capabilities

With new technologies and global sources of supply, firms are now able to focus attention on their core capabilities—that is, things they do well. A **core capability** is a unique set of skills that confers competitive advantages to a firm, because rival firms cannot easily duplicate them.

core capability A unique set of skills that confers competitive advantages to a firm, because rival firms cannot easily duplicate them.

A focus on core capabilities leads a firm to concentrate on those few skills and areas of knowledge that make the firm distinct and competitive. The firm would then likely outsource other, noncore activities to suppliers who have advantages due to better skills or higher scale of operations. For example, Honda was one of the first companies to outsource many non-core activities such as component manufacturing, logistics, and other services. This allowed Honda to concentrate on design and assembly of motors and engines, its core capabilities.

The result of the core capabilities approach is supply chains in which each of the partnering organizations focuses on what it does best. The overall effect is to produce greater product value through higher quality and greater efficiencies. However, it also makes supply chain partners more interdependent.



relationships

Collaborative Networks

As firms become more reliant on their suppliers, the greatest improvements in product value are usually achieved through better coordination with these partners. However, when firms concentrate only on their immediate relationships, they address only a small portion of the total opportunity to improve the overall effectiveness of the system. For example, uncertainties in the availability of raw materials at a *supplier's* supplier can severely limit a firm's ability to deliver products to its customers. Problems like this can be avoided when partners across a supply chain network share their plans and capabilities and work together to develop improvements. In addition, the creation of partnerships in integrated networks opens up opportunities to take advantage of complementary cost structures, the respective partners' technical expertise, market knowledge, and brand equities (reputations). By combining such assets, companies are able to make stronger product offerings together than they could individually.

VIEWING OPERATIONS MANAGEMENT FROM A SUPPLY CHAIN MANAGEMENT PERSPECTIVE

We began this chapter by noting that operations managers must coordinate a system of activities both inside and outside their firm's boundaries. The network of organizations that contains this system of activities is often referred to as a *supply chain*. So how then is “supply chain management” different from “operations management”?

Supply chain management is the design and execution of relationships and flows that connect the parties and processes across a supply chain. Recall that our definition of *operations management* is the management of processes used to design, supply, produce, and deliver valuable goods and services to customers.

supply chain management The design and execution of relationships and flows that connect the parties and processes across a supply chain.

As you can see, there is a substantial degree of overlap between the two definitions. Operations management focuses on managing *processes* (design, supply, production, delivery); supply chain management focuses on managing *relationships* and *flows* (flows of information, materials, energy, money, and people). Think of supply chain management as a way of viewing operations management. You can also think of the supply chain as a network of organizations in which operations activities are conducted.

L01-5 Identify the partners and functional groups that work together in operations management.

Operations Management Partners Across the Supply Chain

Operations managers interact with three important groups that are external to the firm: (1) customers, (2) suppliers, and (3) stakeholders. Figure 1-2 illustrates how operations management links internal operational processes with the operational processes of customers and suppliers. The figure also identifies some of the points of interaction between operational groups and other business functional groups within the firm.

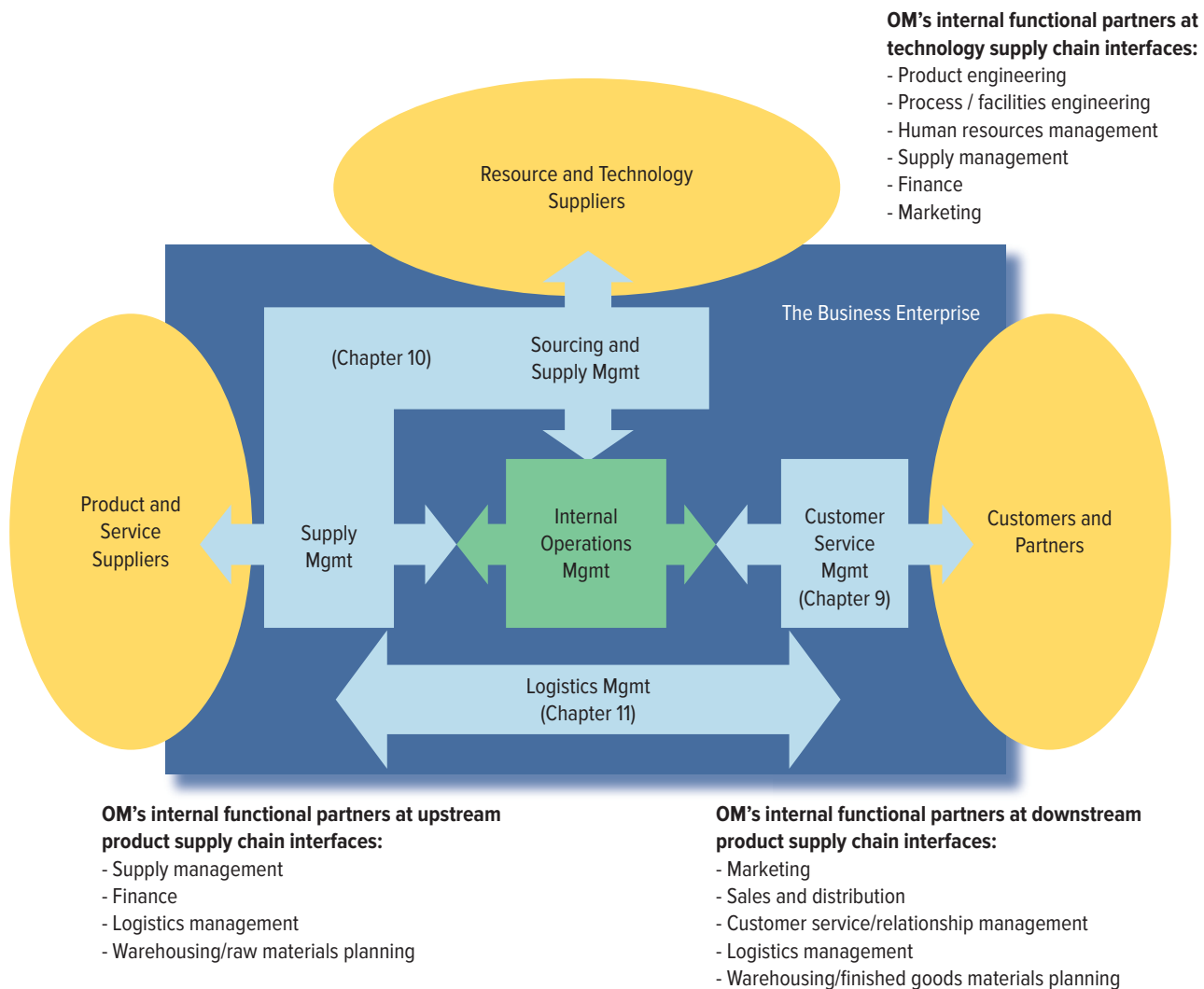
Customers

customers Parties that use or consume the products of operations management processes.

Customers include anyone (individuals or organizations) that uses or consumes the products of operations management processes. An organization cannot structure an effective or efficient operations management function unless it has clearly identified its customers. Types of customers include *internal* customers, *intermediate* customers, and *final* customers. For example, consider a car manufacturer. A company-owned distribution center might be considered an internal customer of the manufacturing group; a dealership is an intermediate customer; and people who buy the car and drive it off the dealer’s lot are the final customers, or consumers.

While each of these customer groups is important, it is beneficial for operations managers to identify *key customers*. Key customers have the greatest impact on product

FIGURE 1-2 Partners and Operations Functional Activities in the Supply Chain



designs, sales, and future growth opportunities. Often, but not always, the consumer is the key customer. For example, you are the consumer of this book, yet another customer (your professor) has had greater impact on the product design, sales, and growth opportunities for this product.

Suppliers

Figure 1-2 identifies important types of **suppliers** in the supply chain. Suppliers provide inputs to operational processes. The horizontal dimension of Figure 1-2 illustrates the flow of materials, information, and money related to the sourcing, making, and delivery of products. The vertical dimension of Figure 1-2 depicts suppliers of technologies and support services. From a single firm's perspective, there are multiple types of suppliers:

- *Upstream product suppliers* typically provide raw materials, components, and services directly related to manufacturing or service production processes.
- *Downstream product suppliers* typically provide enhancements to finished goods such as assembly, packaging, storage, and transportation services.
- *Resource and technology suppliers* provide equipment, labor, product and process designs, and other resources needed to support a firm's processes.
- *Aftermarket suppliers* provide product service and support such as maintenance, repair, disposal, or recycling.

Not shown in Figure 1-2 are a host of other suppliers who make up a part of the total supply chain, including suppliers of indirect goods and services such as mail delivery, health care benefits, cleaning services, and so on. Since suppliers provide so many of a firm's needed resources, technologies, raw materials, and services, the total portfolio of a firm's suppliers affects its success to a great extent.

Stakeholders

In addition to customers and suppliers, other groups of people also have an interest in the well-being (financial and otherwise) of an operation. **Stakeholders** include employees and unions, the local community, social groups (such as animals' rights or environmental concerns), government, and financial investors.

Why differentiate between customers, suppliers, and stakeholders? Stakeholders' demands often differ from the demands of customers or suppliers. For example, customers might care most about the price and quality of products, whereas some stakeholders might care most about environmental concerns. Like customers and suppliers, stakeholders can significantly affect how a firm operates.

Cross-Functional Relationships in Operations Management

We have already noted that operations managers must work closely with other functions in the firm. Managers making any operating decision should consider the decision's effects on other functions, including engineering, finance, marketing, human resources, and others. As shown in Figure 1-2, operations managers who work at the boundaries of the firm often work very closely with other functional groups. For example, an operations manager who works in supply management might work closely with finance managers to determine the most effective contract terms when purchasing equipment.

Some operations managers are primarily concerned with internal operations, such as manufacturing. These managers are always thinking about what operational capabilities are needed, and how to improve the cost, quality, and delivery of the products that the firm supplies to its customers. Other operations management groups work to integrate the internal operations of the firm with the external operations of supply chain partners. While Part 3 of this book specifically addresses these interfunctional relationships, we will provide a brief overview here.

suppliers Parties that provide inputs to operational processes.



relationships

stakeholders Groups of people who have a financial or other interest in the well-being of an operation.



sustainability



relationships



Flow of materials

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customer management The management of the customer interface, including all aspects of order processing and fulfillment.

supply management The identification, acquisition, positioning, and management of resources and capabilities that a firm needs to attain its strategic objectives.

logistics management Management of the movement and storage of materials at lowest cost while still meeting customers' requirements.

Managers in these functions are always thinking about ways to improve customer satisfaction in efficient ways.

Supply management is the management of processes used to identify, acquire, and administer inputs to the firm. Related functional groups are called by names such as *purchasing*, *sourcing*, and *procurement*. Managers in these functions are always thinking about insourcing and outsourcing opportunities and ways to improve supply transactions and relationships.

Logistics management is the management of the movement of materials and information within, into, and out of the firm. Logistics functions go by names including *transportation/traffic management*, *warehousing*, *materials managers*, and so on. Managers in these functions are always thinking about ways to optimize these flows through better scheduling and the use of alternative transportation, storage, and information technologies.

Functional Activities That Connect Operations Managers

As shown in Figure 1-2, customer management, supply management, and logistics management activities serve to connect operational managers as they manage flows of materials and information throughout their firm and, ultimately, throughout the entire supply chain. Processes within each of these functional areas may be independent or highly integrated, yet because of the divisional organizational structure that most firms use, most business managers tend to think of operations management in these functional terms. Chapters 9, 10, and 11 in this book discuss each of these functional activities, respectively.

Customer management is the management of the customer interface, including all aspects of order processing and fulfillment. Functional groups directly concerned with customer management have names such as *distribution*, *sales*, *order fulfillment*, and *customer service*.

An Example of Functional Relationships in a Supply Chain

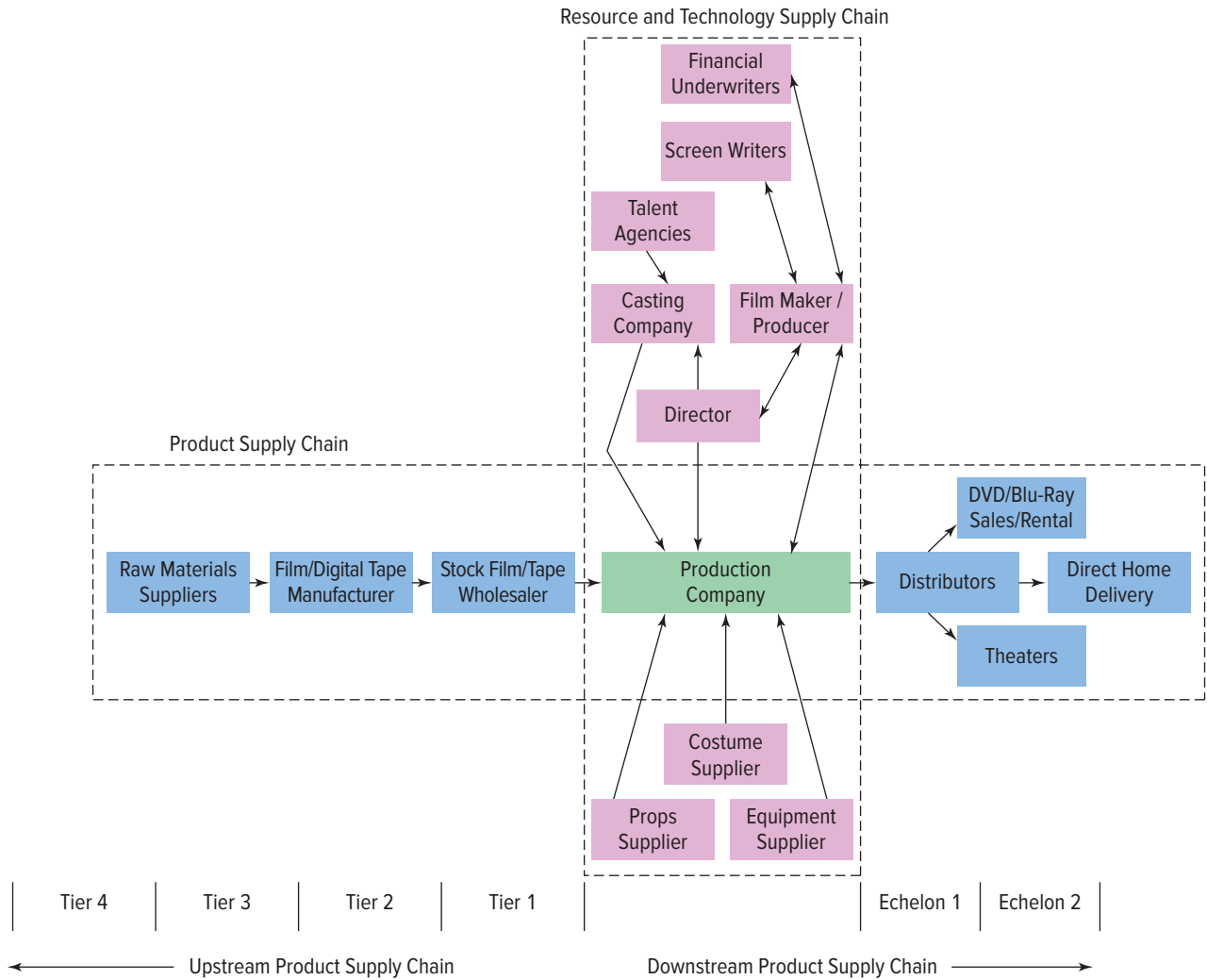
Actual supply chains usually involve many processes, including planning, sourcing, making, servicing, delivering, and so on. For example, consider the supply chain of a movie production company depicted in Figure 1-3. Boxes in the figure represent organizations or individuals; arrows represent flows of material, information, or people. To keep things simple, the figure shows only some of the major parties in the supply chain. You can probably easily think of other ones that are not included.

A movie production company's operations managers interact with many suppliers of goods and services that can be considered as either product-related or resource-related inputs. Accordingly, Figure 1-3 indicates stages of a product supply chain in the horizontal dimension, and stages of a resource/technology supply chain in the vertical dimension. Whether a supplier is a "product" supplier or a "resource" supplier is not always clear. Often, a single supplier may fit in both categories. For example, the director of a movie could be considered a resource in the sense that she brings creativity and knowledge to the movie-making process. At the same time, her time and effort are consumed by the process of making the movie, and these could be considered to be product inputs. Usually, a product supplier provides an input that is fully consumed in the creation of a product or becomes part of the product (e.g., energy, raw materials, components). On the other hand, a resource or technology supplier provides an input that can be used again and again to create multiple products (e.g., information, product and process specifications, equipment, worker skills).

In a supply chain, each upstream stage of supply is known as a **tier**. The tier number refers to how directly the supplier works with the firm. A *first-tier* supplier provides goods and services directly to the firm. For example, the stock film wholesaler is a first-tier supplier

tier An upstream stage of supply.

FIGURE 1-3 Partial Supply Chain Network for a Movie Production Company



to the movie production company. A *second-tier* supplier provides inputs to the first-tier supplier, and so on. Each tier of the upstream supply chain could involve multiple suppliers for the same items or services. Also, a single supplier might provide inputs for multiple tiers of the supply chain. For example, the director in Figure 1-3 provides inputs to both the casting company and the movie production company.

Downstream stages of the supply chain are made up of layers of partners and customers commonly referred to as **echelons**. A single echelon might contain partners in locations all over the world. For example, there are usually many distributors for a given movie. These distributors can be thought of as suppliers of distribution services to the movie production company. The downstream supply chain can also be broken into different channels of distribution; theaters, direct/home delivery, and retail DVD/Blu-Ray sales are three channels shown in Figure 1-3.

Many different types of operations managers are needed in a movie production company. Supply managers help to identify and negotiate contracts with supply sources such as casting companies, directors, producers, equipment suppliers, film suppliers and so on.

student activity

student

Find a description of digital moviemaking technology on the Internet. Which of the stages and organizations depicted in Figure 1-3 are likely to be most affected by a shift to a completely digital process? How will the structure of the overall supply chain be changed?

echelon A downstream stage of supply or consumption.

Internal production managers are needed to schedule all movie-making activities such as casting, shooting, and editing. Sales and distribution managers identify and negotiate terms with worldwide distributors of the film. Other logistics managers work out the means for transporting actors and crew and storing film and equipment throughout the various locations involved in making the film.

Similar roles are filled by operations managers at all kinds of firms. The following Get Real box provides some examples of operations management job descriptions for undergraduate and graduate students. Operations managers' responsibilities can be quite exciting, as they are absolutely integral to the success of any organization.

GET REAL

Jobs in Operations Management

The following job descriptions provide examples of typical responsibilities of operations managers located in internal operations, customer management, supply management, and logistics management functions.

Typical job titles: Customer Program Manager, Enterprise Integration Leader, Commodity Manager, Procurement Specialist, Senior Global Commodity Specialist, Strategic Sourcing Commodity Leader, Project Manager for Supply Chain Information Systems, Production Team Leader, Materials Planning Manager, Logistics Specialist.

Typical job responsibilities:

- Choosing and developing suppliers.
- Designing and implementing systems and processes for improving the customer interface, reducing transaction costs, reducing inventories, and improving service levels.
- Sourcing materials, components, technologies, and services.
- Monitoring and managing inventory at all steps of the supply chain.
- Managing logistics, warehouses, distribution inventories, and service parts.
- Managing internal operations or service functions.
- Managing quality and Six Sigma projects throughout the supply chain.
- Strategically analyzing the supply chain to increase revenues, improve service, reduce cost, and ultimately improve profit.

Excerpts from actual job descriptions:

At a computer manufacturer: As part of the Americas Services Logistics team, Supply Chain Consultants design, develop, and improve processes throughout the company's industry leading logistics network as well as manage projects across multinational teams for the Americas region. The Supply Chain Consultant works on developing new concepts and strategies for the company's third-party logistics providers (3PLs) that enable greater product availability at lower costs and greater customer satisfaction. In addition to partnering with 3PLs, Supply Chain Consultants work closely with the company's world-renowned Enterprise Command

Center in order to provide 24/7 critical logistics support and crisis resolution to millions of customers throughout the Americas. The general qualifications of a Supply Chain Consultant include:

- Strong analytical skills.
- Advanced verbal and written communication skills.
- Able to generate new and innovative solutions to complex problems.
- Strong knowledge of supply chain and service logistics concepts and practices, third-party logistics provider management experience preferred.
- Advanced understanding of processes and process improvement, Six Sigma experience preferred.
- Able to effectively negotiate with internal and external partners.
- Strong project management experience.
- Proven leadership skills.
- Unwavering customer focus.
- Bachelor's degree in Operations, Logistics, Engineering or Supply Chain Management with 3–4 years experience.

At a health care products company: Our Development Program in Operations is a fast-paced set of rotations that can turn you into a well-rounded, results-driven leader who is ready to move into a decision-making supervisory position. By gaining first-hand experience in our distribution centers and corporate/regional offices, you'll learn the necessary skills to manage our streamlined distribution process and help drive operational results and customer satisfaction. Our distribution centers across the country will offer you hands-on experience to help you develop your skills in project management, business process improvement, and labor management. We encourage and coach all participants to achieve outstanding results by giving them challenging and rewarding responsibilities. The Development Program in Operations lasts twenty-four months and offers rotations that concentrate on warehouse operations, inventory management, transportation, corporate operations and purchasing.

At a paper products company: Our co-op and internships will offer you a chance to explore the breadth of opportunities available

Continued

in the supply chain while working on real projects such as process improvements in flow planning for finished products, raw materials and finishing supplies, space utilization and optimization analysis, or warehouse operations systems analysis. You will be provided meaningful work experiences that contribute to the overall strategic business goals of the company. You'll be treated and respected as a valuable contributor and given your own responsibilities and accountabilities. Your intern experience will include performance evaluations that provide you with valuable professional feedback to gauge your strengths and measure areas of improvement.

At a not-for-profit organization: As director of donated goods operations you will help the organization provide people who have disabilities and other barriers to employment with opportunities to become independent, self-supporting citizens through training, work experience, and employment in the community. Position duties include:

- Develop short- and long-range plans for the donated goods operation to achieve service goals, budgeted revenue, and maximized contributed margin.
- Expand donated goods operation to new markets [and] new product lines [and] develop new sites and creative sales techniques to expand community and business donation base.
- Establish and monitor performance criteria for donated goods operation to enhance donated goods operations through increased efficiencies.
- Develop and manage inventory control system, a total quality improvement system, and e-commerce activities to assure customer satisfaction at all levels.
- Make recommendations to the President/CEO regarding the need for capital equipment additions or replacements.
- Contribute positively to the Executive Management Team. Promote positive image of the organization both internally and externally.
- Participate in and uphold the values and processes devoted to continuous quality improvement in all organizational operations.

You can find more operations management career information at:

www.careersinsupplychain.org
www.ism.ws/careercenter

The Changing Nature of Supply Chains

Supply chains are complex. Ultimately, all firms in an industry are connected to one another through links of sourcing, making, servicing, and delivery for different products in various markets. Adding to the complexity is the fact that the structures of supply chains are constantly changing in order to accommodate changes in the business environment. New suppliers emerge and old ones die out. Regulations, laws, and societal pressures change. Markets and technologies evolve. Consider, for example, the technological changes that are sweeping through the movie-making industry. One could argue that the resource-technology supply chain is really the most important one for movie-makers to manage. The importance of the upstream product supply chain, which provides the medium upon which the movie is delivered, is diminishing rapidly as digital movie production and distribution are rapidly replacing film-based media. In other businesses, where standardized products are produced many times over, the product supply chain plays a more prominent role in a company's strategy.

Most of us are aware of the increasing concerns of societies and governments over environmental issues such as pollution, global warming, and hazardous wastes. Expectations are also rising for business firms to behave in more socially responsible ways regarding their labor practices, involvement in communities, and promotion of the general welfare. These increasing pressures act as tremendously important drivers of change in supply chains today. For example, some operations managers who formerly procured supplies from far away sources are now sourcing them locally in order to reduce the carbon dioxide pollution created by transportation of goods over long distances. This is such an important topic that we have dedicated an entire chapter to it (Chapter 16: Sustainable Operations Management). Additionally, you will encounter numerous examples addressing these issues throughout the book.



sustainability

L01-6 Define the planning activities associated with managing operations across the supply chain.

strategic planning A type of planning that addresses long-term decisions that define the operations objectives and capabilities for the firm and its partners.

tactical planning A type of planning that addresses intermediate-term decisions to target aggregate product demands and to establish how operational capacities will be used to meet them.

operational planning A type of planning that establishes short-term priorities and schedules to guide operational resource allocations.

Levels of Operational Planning Across the Supply Chain

To keep up with changes in supply chains and the business environment, the functional groups in operations management must periodically work together to plan out their actions. These plans include forecasts and decisions about what the demands on the system will be, what resources and inputs will be needed, how to deploy those resources, and how to process those inputs.

Figure 1-4 shows the different levels and types of planning in operations management. Chapters in Parts 1 and 2 of this book address **strategic planning**, which includes high-level product and resource design decisions that define the overall operations objectives and capabilities for the firm and its partners. For example, strategic planning decisions would include what new products to develop, where to locate new plants, and what new technologies to buy. These types of decisions take a long time to implement, and the choices made put limits on the capacities and capabilities governing operational processes.

Chapters in Part 4 of this book address tactical and operational planning. These types of planning occur more frequently than strategic planning does. **Tactical planning**, such as sales and operations planning, seeks to identify and target customer demands for aggregate product families and to establish the inventory and capacity plans needed to satisfy these overall demands. At the **operational planning** level, inventory and requirements planning activities address demands, materials, and capacities at the individual product level. Tactical planning usually spans months, whereas operational planning usually addresses weeks or days of activity. The chapters in Part 4 in this book also discuss planning approaches and technologies used in tactical and operational planning.

HOW THIS BOOK IS STRUCTURED

Table 1-3 provides a content overview of this book, indicating the chapters in which critical operations management issues are addressed. Collectively, the five major parts of this book provide an introduction to the principles, programs, and practices of operations management:

FIGURE 1-4 Operations Management: Planning Activities Across the Supply Chain

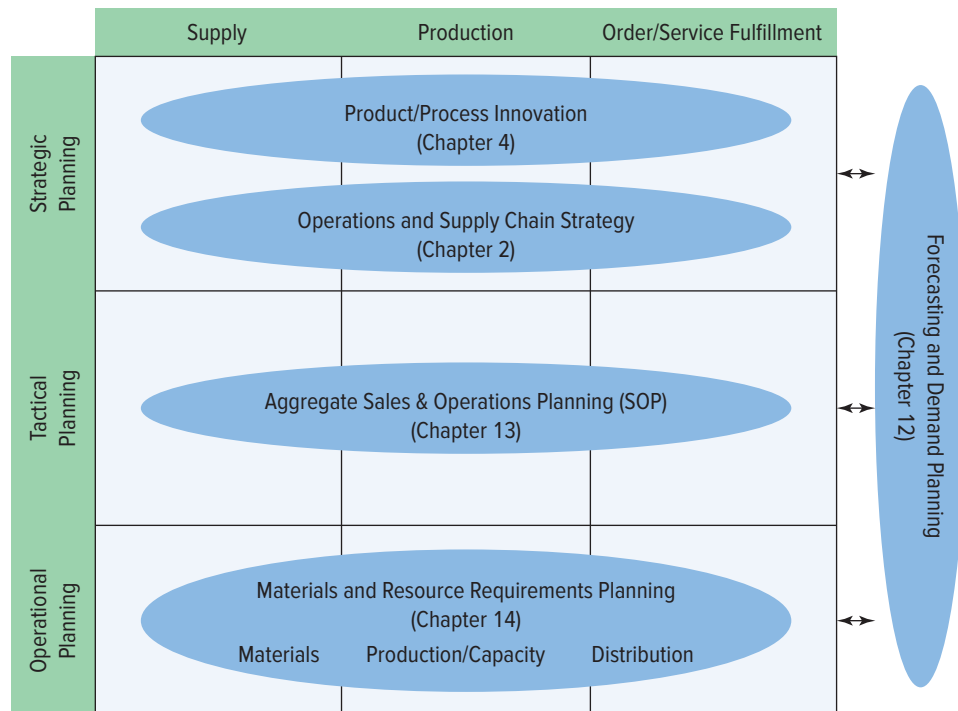
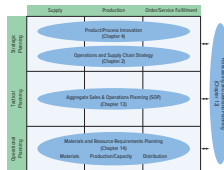


TABLE 1-3 A Content Map for This Book

Chapter	Relationships	Sustainability	Globalization
Part 1 Supply Chain: A Perspective for Operations Management			
1. Introduction to Managing Operations Across the Supply Chain	X	X	X
2. Operations and Supply Chain Strategy	X	X	X
Part 2 Foundations of Operations Management			
3. Managing Processes and Capacity	X	X	X
4. Product/Process Innovation	X	X	X
5. Manufacturing and Service Process Structures	X	X	X
6. Managing Quality	X	X	X
7. Managing Inventories	X	X	X
8. Lean Systems	X		X
Part 3 Integrating Relationships Across the Supply Chain			
9. Customer Service Management	X		
10. Sourcing and Supply Management	X	X	X
11. Logistics Management	X	X	X
Part 4 Planning for Integrated Operations Across the Supply Chain			
12. Demand Planning: Forecasting and Demand Management	X		X
13. Sales and Operations Planning	X		X
14. Materials and Resource Requirements Planning	X		X
Part 5 Managing Change in Supply Chain Operations			
15. Project Management	X	X	X
16. Sustainable Operations Management—Preparing for the Future	X	X	X



- Part 1 provides an overview of operations management as a field and describes its strategic role in a business from the perspective of supply chain management.
- Part 2 discusses foundational process-related concepts and principles that govern all operational processes.
- Part 3 deals with the primary functional relationships between internal operations management activities and other operational functions both inside and outside the firm.
- Part 4 discusses planning approaches and technologies used at different levels of operations decision making.
- Part 5 discusses how operations managers use projects, change programs, and technologies to shape the future of operations and supply chain management.

An overview and integration of the chapters contained in each part is provided at the beginning of each of the parts throughout this book.

CHAPTER SUMMARY

This chapter provides a broad overview and introduction to operations management. In discussing the scope and complexity of operations management, we have made the following points:

1. The goal of the modern firm is to develop and run an operations management system able to deliver superior product value to the firm's targeted consumers.
2. Operations management deals with the effective and efficient management of transformation processes. These processes include not only the making of products but also the design of products and related processes; sourcing of required materials and services; and delivery and management of relationships among customers, suppliers, and functions within the firm. As a system, operations management involves four major functional activities and their interactions: (1) customer relationships management, (2) internal operations (manufacturing and services) management, (3) supply management, and (4) logistics management.
3. The operations management system involves three major sets of partners outside the firm: (1) customers, (2) suppliers, and (3) stakeholders. Operations managers also work closely with other business functions within the firm.
4. The collective decisions made in areas of operations management determine the capabilities and success of the firm. In addition, the capabilities of a firm are heavily influenced by the capabilities of its suppliers.
5. For a number of reasons, the supply chain has grown to become a dominant way to look at operations management. Operations activities take place in various functional and geographic locations across a supply chain network. Whereas operations management is mainly about managing processes, supply chain management is mainly about managing flows and relationships.
6. Operations management is fundamentally dynamic; it is ever changing.

KEY TERMS

core capability	11	operations		supply chain	
customer management	14	management	4	management	11
customers	12	process	8	supply management	14
echelon	15	stakeholders	13	tactical planning	18
lean operation	9	strategic planning	18	tier	14
logistics management	14	suppliers	13	total product	
operational planning	18	supply chain	4	experience	7

DISCUSSION QUESTIONS

1. Review *Fortune* magazine's "Most Admired" American companies for 1959, 1979, 1999, and the most current year. (The issue normally appears in August each year.) Which companies have remained on the top throughout this period? Which ones have disappeared? What do you think led to the survival or demise of these companies?
2. Select two products that you have recently purchased; one should be a service and the other a manufactured good. Think about the process that you used to make the decision to purchase each item. What product characteristics were most important to you? What operational activities determine these characteristics?
3. What are the primary operations management decisions in each of the following corporations?
 - a. Marriott Hotels and Resorts.
 - b. A private golf and tennis club.
 - c. Ben & Jerry's.
 - d. ExxonMobil Corporation.
4. Consider the following processes that you frequently encounter as a college student:
 - a. Enrolling in classes.
 - b. Taking a class.
 - c. Buying a ticket for a play, concert, or basketball game.Describe each process and its inputs, activities, and outputs. What is being converted or transformed in each process? Who are the customers, suppliers, and stakeholders for each process?
5. Recall the last time you went to a fast-food restaurant such as McDonald's. Describe all of the goods and services that make up your *total product experience*.
6. The following firms have long been seen as having strong competitive advantages:
 - a. IBM
 - b. Coca-Cola
 - c. Xerox
 - d. WalmartRead about one of these companies. Also draw from your experience as a customer to identify that company's competitive advantage. Discuss how operations management relates to the company's competitive advantage.
7. Why should a firm consider the position of stakeholders when evaluating operational alternatives? Consider the role of government and its impact. (*Hint: Consider working conditions and pollution.*)
8. Most people have worked as "operations managers" at some time. Describe a job or experience that you had that involved the management of a process.

CASE

Business Textbook Supply Chain

Dave Eisenhart, senior editor for Mountain Publishing, Inc., looked out his window as he considered the operational implications of the changes he had just heard discussed in the company's annual strategic planning meeting. The future looked to be both exciting and scary. As an editor for Mountain's business textbook division, Dave had recently witnessed major changes in his primary market. First, the body of knowledge in business school curricula had exploded over the past decade. It was getting harder and harder to cover all the content that any professor might want in a single textbook, while keeping the size of the book manageable. Second, Dave had noted that more and more schools were moving to modular course structures, including many shorter courses, sometimes as short as a week long. Third, a growing number of students preferred to buy their books from sources other than traditional bookstores, such as Amazon.com and other online sources.

At the same time, new technologies were changing the way that textbook content could be produced and delivered. Print technologies were improving the speed and quality of printing, so that it was easy to envision a day when books could be printed one copy at a time, "on demand." Some companies had already started to offer custom published books for professors who wanted to combine chapters and cases from several different publishers into a single readings packet for their students. While the quality of these "books" (packets) did not match that of traditional hardbound texts, many professors and students valued the flexibility associated with this option.

Finally, the demand for e-books was growing rapidly. While the percentage of books purchased in electronic form was currently small, the potential seemed to be very large. In addition, e-books provided a platform for many new ancillary and "interactive" learning tools. For example students using an e-book could immediately link to other, external sources of related material (including videos and Internet links), access online learning and assessment tools, and be provided with navigation links throughout the

book. Dave thought about these possibilities, along with the implications that e-books would have for distribution, book re-use, revisions, and other existing strategies.

Dave began to think about the operational activities dispersed across Mountain's supply chain for textbooks. On the upstream (input) side, Mountain worked with authors (usually professors), text editors, graphic artists, commercial printers, and other suppliers to edit, design, and produce books. After typically large print runs (up to three years of forecasted demand) were produced, transportation suppliers delivered the books to Mountain's distribution centers located around the country. Orders from bookstores and online retailers were filled from these distribution centers. For traditional hardcopy textbooks, each of these players in the supply chain played a fairly clear role in creating value through the goods and services they provided. However, as Dave considered the market and technological changes currently under way, the operational value that each of these players provided became less clear.

Questions

1. Draw a diagram that illustrates the textbook supply chain from the publisher's point of view.
2. Who are the various customers for textbooks? What do these customers want in terms of goods and services related to textbooks? From the publisher's point of view, who is the *key* customer?
3. Who are the major players in the supply chain? What operational roles do they play in terms of creating value for the key customers?
4. Given the anticipated changes in the market and in product and process technologies, how do you envision each supply chain player's role changing in the future?
5. What advice would you give to Dave Eisenhart regarding long-term operational changes the firm should consider?