Chapter 7: Operations Management and Quality

Chapter Overview

All goods and services production systems have their own unique production processes. These processes provide utility by adding customer value. Companies with different business strategies are best served by having different operations capabilities. Even very similar and competing businesses can produce output and manage quality with completely different production systems.

This chapter is dedicated to the study of operations and quality within both the manufacturing and service sectors. It explains the meaning of the term *production* (or *operations*) and describes the three kinds of utility that operations processes provide. It explains how companies with different business strategies are best served by having different operations capabilities and identifies the major factors considered in operations planning.

The chapter also discusses the information contained in four kinds of operations schedules—the master operations schedule, detailed schedule, staff schedule, and project schedule—and identifies the activities involved in operations control. Finally, it looks at the activities and underlying objectives involved in total quality management and explains how a supply chain strategy differs from traditional strategies for coordinating operations among firms.

Learning Objectives

7-1. Explain the meaning of *operations* and discuss the growth in the services and goods sectors of the U.S. economy.

7-2. Identify the three kinds of utility created by operations and the characteristics that distinguish service operations from goods production.

7-3. Explain how companies with different business strategies are best served by having different operations capabilities.

7-4. Identify the major factors that are considered in operations planning.

7-5. Discuss the information contained in four kinds of operations schedules—the master operations schedule, detailed schedule, staff schedule, and project schedule.

7-6. Discuss the two key activities required for operations control.

7-7. Identify the activities and underlying objectives involved in total quality management.

7-8. Explain how a supply chain strategy differs from traditional strategies for coordinating operations among firms.

CHAPTER OUTLINE

Learning Objective 7-1:

Explain the meaning of operations and describe the three kinds of utility that operations processes help create.

What Does Operations Mean Today?

Service operations (or service production) provide tangible and intangible services; firms that only make tangible products are engaged in activities for goods operations (or goods production). The term operations (or production) refers to all the activities involved in making products—goods and services—for customers.

Growth in the Services and Goods Sectors

In the past the leading driver of the global economy was derived from the production of physical goods. This all began with the industrial revolution, which brought about a new era of greater volumes and efficiencies within the manufacturing sector, and acted as the main driver of the global economy until the mid-twentieth century. At this point the focus gradually started to shift, and the service economy began to take the burden of driving economic growth. As the importance and demand for services increased rapidly, so did the number of employees employed in the service sector and the percentage of gross domestic product (GDP) –the value of all goods and services produced by the economy, excluding foreign income. Services now accounts for approximately 70 percent of global GDP, and GDP from goods production now stands at approximately 30 percent.

Learning Objective 7-2:

Identify the characteristics that distinguish service operations from goods production.

Creating Value Through Operations

Both services and goods provide consumers with **utility,** which is the ability of a product to satisfy a human want or need, thus adding customer value—in terms of form, time, and place. *Form utility* is created merely through transforming raw materials into finished goods. *Time utility* is created when marketers make products available when consumers want them. *Place utility* is created when products are made available where they are convenient for consumers.

Operations (production) management is the systematic direction and control of the processes that transform resources into finished services and goods that create value for and provide benefits to customers. **Operations** (**production**) **managers** are responsible for ensuring that operations activities create value and provide benefits to customers.

A. Differences Between Service and Goods Manufacturing

Both service and manufacturing operations transform raw materials into finished products. In service operations, finished products are not things, but are people with needs met and possessions serviced. Four aspects of service operations can make such operations more

complicated than simple goods production:

1. **Interacting with Customers.** Manufacturing operations focus on physical goods, whereas service operations are a combination of goods and services.

2. **Services Can Be Intangible and Unstorable.** *Intangibility* refers to the untouchable value consumers receive in the form of pleasure, gratification, or a feeling of safety; *unstorability* refers to the idea that if a service isn't used when available, it's usually wasted.

3. **Customers' Presence in the Operations Process.** Service operations often acknowledge the customer as part of the service transaction itself, since service operations transform customers or their possessions.

4. **Intangibles Count for Service Quality.** Customers use different measures to judge services and goods because services include intangibles, not just physical objects. Quality of work and quality of service are not necessarily the same thing.

B. Operations Processes

An operations process is a set of methods and technologies used in the production of goods and services.

1. **Goods Production Processes: Make-to-Order versus Make-to-Stock Processes.** A make-to-order operation makes one-of-a-kind products, according to customer specifications. A make-to-stock operation produces standardized products in large quantities.

2. **Service Production Processes: Extent of Customer Contact.** In **high-contact systems,** such as a city metro system, the customer must be a part of the service. Managers must therefore be concerned with issues of cleanliness, punctuality, and usability of ticket kiosks. In **low-contact systems,** such as a mail sorting office, customers do not have to be present while the service transaction is being performed.

Learning Objective 7-3:

Explain how companies with different business strategies are best served by having different operations capabilities.

Business Strategy as the Driver of Operations

Companies go about selecting the kind of production that is best for their business based on the firm's larger business strategy. They aim to adopt the kind of production that achieves that strategy in the most efficient way possible.

A. The Many Faces of Production Operations

Every company identifies a strategy that it can use for winning customer orders; such strategies often include *quality, lower prices, flexibility,* and *dependability.*

1. **Business Strategy Determines Operations Capabilities. Operations capability** refers to the activity or process that production must do especially well to outperform the competition.

2. **Expanding into Additional Capabilities.** Over time, excellent firms learn how to achieve more than just one competence.

Learning Objective 7-4:

Identify the major factors that are considered in operations planning.

Operations Planning

Managers from many departments contribute to the firm's decisions about operations management; this is a process of logical steps upon which the success of the firm depends. The overall business plan provides guidance for long-term operations plans.

A. Capacity Planning

The amount of a product that a company can produce under normal working conditions is its **capacity**. A firm's capacity depends on how many people it employs and the number and size of its facilities. Operations wants to match capacity to demand.

B. Location Planning

Facility location affects production costs and flexibility. Depending on the site of its facility, a company may either be capable of producing a low-cost product or may find itself at a relative cost disadvantage. Goods production can be located where the economics work most favorably; services, though, must be located near customers.

C. Layout Planning

Layout, the physical location or floor plan, determines whether firms can respond quickly and efficiently to customer requests for additional or different products or find themselves unable to match competitors' speed and convenience.

1. **Process Layouts.** In a process layout, equipment and people are grouped according to function; this type of layout works especially well in *make-to-order* shops due to their flexibility advantage.

2. **Product Layouts.** In a product layout, one type of product is produced in a fixed sequence and is arranged according to its production requirements. It is efficient for large-volume, make-to-stock operations that mass-produce products quickly, often using an **assembly line.** While advantageous for large-volume production, a disadvantage is inflexibility when changes are required.

3. **Fixed-Position Layouts.** A fixed-position layout is necessary when, because of size, shape, or any other reason, managers cannot move the service to another production facility.

D. Quality Planning

Any complete operations plan must ensure that products are produced to meet the firm's and customers' standards of **quality—**the combination of characteristics of a product or service that bear on its ability to satisfy stated or implied needs. **Performance** refers to how well the product does what it is supposed to do; **consistency** refers to the sameness of product quality from unit to unit.

E. Methods Planning

In operations systems, *methods improvement* refers to methods implemented to reduce waste and inefficiency.

1. **Improving Process Flows.** A *process flowchart* is helpful in identifying the sequence of production activities, movements of materials, and work performed at each stage of the process.

2. **Improving Customer Service.** Customer service can be improved at various stages along the process flowchart.

Learning Objective 7-5:

Discuss the information contained in four kinds of operations schedules—the master operations schedule, detailed schedule, staff schedule, and project schedule.

Operations Scheduling

Operations scheduling involves developing timetables for acquiring the resources needed for production.

A. The Master Production Schedule

A top-level master production schedule shows which products will be produced and when, in upcoming time periods.

B. Detailed Schedules

A detailed schedule indicates daily work assignments with start and stop times for assigned jobs at each workstation.

C. Staff Schedules and Computer-Based Scheduling

Staff schedules specify assigned working times in upcoming days for each employee on each work shift, and considers employees' needs and the company's efficiency and costs, including the ebbs and flows of demand for production. *Computer-based scheduling* can handle multi-shift activities for many employees—both part-time and full-time—accommodating vacation times, holiday adjustments, and daily adjustments in staffing for unplanned absences.

D. Project Scheduling

1. **The Gantt Graphical Method:** Named after its developer, Henry Gantt, a **Gantt chart** breaks down large projects into steps to be performed and specifies the time required to perform each one.

2. **Project Scheduling with PERT charts** break down large projects into steps to be performed and specify the time required to perform each one; PERT also shows the necessary sequence among activities, from start to finish, and identifies the *critical path*, the most time-consuming set of activities, for completing the project.

Learning Objective 7-6:

Discuss the two key activities required for operations control.

Operations Control

Operations control requires managers to monitor performance by comparing results with detailed plans and schedules. If employees do not meet schedules or quality standards, managers can take corrective action. **Follow-up**, checking to ensure that production decisions are being implemented, is a key and ongoing facet of operations. Operations control includes *materials management* and *quality control*. Both activities ensure that schedules are met and products delivered, both in quantity and in quality.

A. Materials Management

Materials management is the process by which managers plan, organize, and control the flow of materials from sources of supply through distribution of finished goods.

1. Materials Management Activities for Physical Goods: Once a product has been designed, successful materials flows depend on five activities:

Supplier selection means finding and choosing suppliers of services and materials. **Purchasing (procurement)** is the acquisition of all the raw materials and services that a company needs to produce its products. **Transportation** is the means of transporting resources to the producer and finished goods to buyers. **Warehousing** is the storage of

both incoming materials for production and finished goods for distribution to customers. **Inventory control** includes the receiving, storing, handling, and counting of all raw materials, partly finished goods, and finished goods.

2. **Lean Production Systems: Just-in-Time Operations**
   Lean production systems are designed for smooth production flows that avoid inefficiencies, eliminate unnecessary inventories, and continuously improve production processes. **Just-in-time (JIT) production,** a type of lean system, brings together all needed materials at the precise moment they are required for each production stage, not before, thus, creating fast and efficient responses to customer orders.

3. **Inventory Management is Crucial for Producing Services**
   For many service firms, too, the materials stakes are high. The most important "inventory" used for many high-contact services is not physical goods but exists in the form of information about service product offerings, clients, their interests, needs, activities, and even their plans for interactions with other clients.

B. Quality Control

Quality control means taking action to ensure that operations produce products that meet specific quality standards.

Learning Objective 7-7:

Identify the activities and underlying objectives involved in total quality management.

Quality Improvement and Total Quality Management

It is not enough to control quality by inspecting products and monitoring service operations as they occur. Businesses must also consider building quality into products and services.

A. The Quality-Productivity Connection

It's no secret that *quality* and *productivity* are watchwords in today's competitive environment. Productivity is a measure of economic performance: It compares how much we produce with the resources we use to produce it. The more we can produce while using fewer resources, the more productivity grows and the more everyone benefits. Productivity refers both to the quantity and quality of what is produced.

B. Managing for Quality

Total Quality Management (TQM) includes all of the activities necessary for getting quality goods and services into the marketplace; this process involves all parts of the business, including customers, suppliers, and employees. To bring all the interests of the stakeholders together, TQM involves evaluating costs of poor quality, identifying the sources causing unsatisfactory quality, assigning responsibility for corrections, and ensuring that those responsible take steps for improving quality.

1. **The Cost of Poor Quality**
   Producers of goods and services suffer financial distress from poor-quality service or products.

2. **Quality Ownership: Taking Responsibility for Quality.** With TQM, employees and suppliers ultimately accept quality ownership—the idea that quality belongs to each person who creates it while performing a job.

C. Tools for TQM

Hundreds of tools have proven useful for quality improvement, ranging from statistical analysis of production data, to satisfaction surveys of customers, to **competitive product analysis**—a process by which a company analyzes a competitor's products to identify desirable improvements. Five of the most commonly used tools for TQM are:

1. **Value-Added Analysis.** Value-added analysis refers to the evaluation of all work activities, material flows, and paperwork to determine the value that they add for customers.

2. **Quality Improvement Teams.** Quality improvement teams are groups of employees from various work areas who meet regularly to define, analyze, and solve common production problems with the goal to improve both their own work methods and the products they make.

3. **Getting Closer to the Customer.** Customers are the driving force for all business activity; the most successful firms keep close to their customers and know what they want in the products they consume. Improvement projects are undertaken for both external and internal customers. Internal customers exist wherever one employee or activity relies on others in the firm.

4. **The ISO Series.** ISO 9000 is a certification program attesting that a firm or laboratory has met the quality-management requirements set by the International Organization for Standardization. The ISO 14000 program certifies improvements in environmental performance. It requires a firm to develop an *environmental management system:* a plan documenting how the company has acted to improve its performance in using resources and in managing pollution. The plan must not only identify hazardous wastes the firm expects to create, but also stipulate the plans for treatment and disposal of those wastes.

5. **Business Process Reengineering.** Business process reengineering focuses on productivity and quality and entails rethinking each step in a process by starting over from scratch. Reengineering involves the redesign of business processes to achieve improvements in cost, quality, service, and speed.

Learning Objective 7-8:

Explain how a supply chain strategy differs from traditional strategies for coordinating operations among firms.

Adding Value Through Supply Chains

A **supply chain** (or **value chain**) for any product is the flow of information, materials, and services that starts with raw-materials suppliers and continues through other stages in the network of firms until the product reaches the end customer.

A. The Supply Chain Strategy

Supply chain strategy is based on the idea that members of the chain, working as a coordinated unit, will gain competitive advantage.

1. **Supply Chain Management.** Supply chain management (SCM) looks at the supply chain as a whole in order to improve the overall flow through a system composed of companies working together. Each of the chain's members gains competitive advantage in this situation.

2. **Reengineering Supply Chains for Better Results.** The results often include lower costs, faster service, and the coordination of flows of information and materials.

B. Outsourcing and Global Supply Chains

Outsourcing is the strategy of paying suppliers and distributors to perform certain business processes or to provide needed materials or services. Global outsourcing creates new operations jobs for supply chain management and, sometimes, the need for more or different types of employee training.