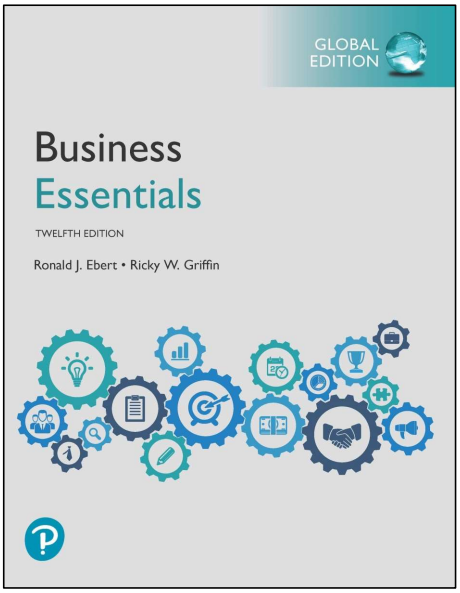
Business Essentials

Twelfth Edition, Global Edition



Chapter 7

Operations Management and Quality

Pearson

If this PowerPoint presentation contains mathematical equations, you may need to check that your computer has the following installed:
1) MathType Plugin
2) Math Player (free versions available)
3) NVDA Reader (free versions available)

What Does Operations Mean Today? (1 of 2)

- **Operations (Production)**
  - All the activities involved in making products — goods and services — for customers

Pearson

The term operations (or production) refers to all the activities involved in making products—goods and services—for customers.

What Does Operations Mean Today? (2 of 2)

Service Operations (Service Production)

- activities producing intangible and tangible products, such as entertainment, transportation, and education

Goods Operations (Goods Production)

- activities producing tangible products, such as radios, newspapers, buses, and textbooks

Service operations (or service production) companies provide intangible and tangible service products, such as entertainment, transportation, education, and communications. Firms that make only tangible products—radios, cell phones, buses, textbooks—are engaged in activities for goods operations (or goods production).

Growth in the Goods Sectors

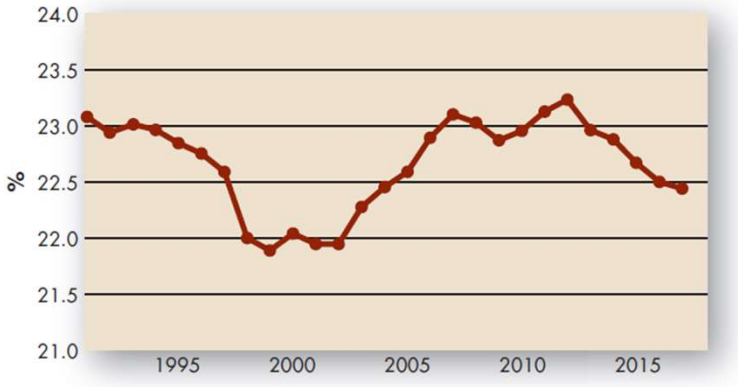


FIGURE 7.1 Global Employment in Goods Sectors
Source: https://data.worldbank.org/indicator/SL.SRV. EMPL.ZS, accessed November 28, 2018.

Pearson

As you can see from Figure 7.1, employment has risen significantly in the service sector and has leveled off at just 11 to 12 percent in goods-producing industries for years 2004 through 2016. Much of this growth comes from e-commerce, business services, health care, amusement and recreation, and education.

Growth in the Services Sectors

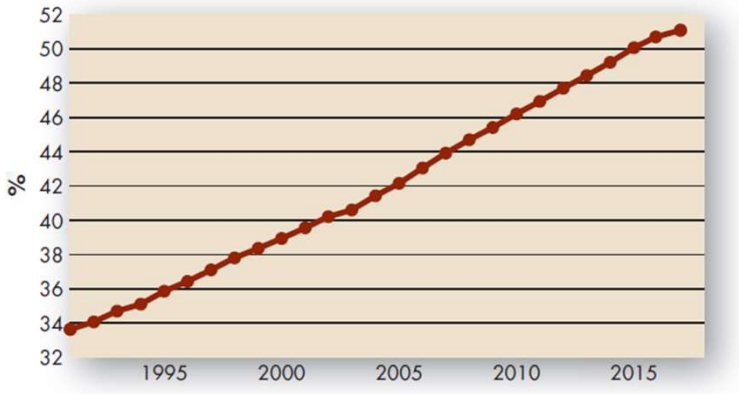


FIGURE 7.2 Global Employment in Services Sectors
Source: https://data.worldbank.org/indicator/SL.SRV.EMPL.ZS, accessed November 28, 2018.

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GDP from Goods

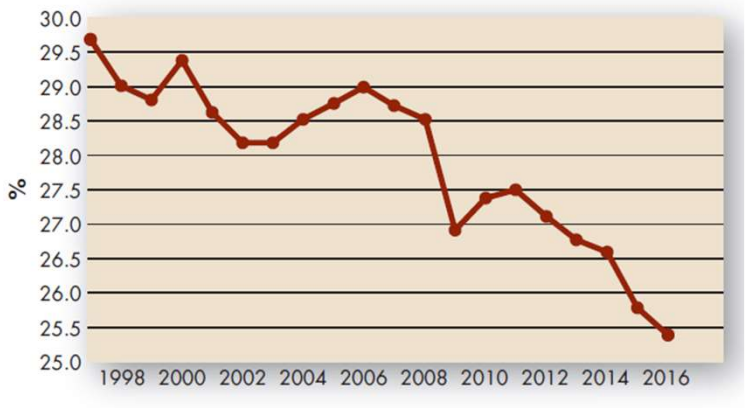

FIGURE 7.3 Global GDP from Goods
Source: https://data.worldbank.org/indicator/NV.IND.TOTL.ZS?end=2017&start=1997, accessed November 28, 2018.

Pearson

As Figure 7.2 shows, the service sector's greater percentage of GDP has hovered above 65 percent in recent years. At the same time, the smaller 11 percent of the workforce in goods-producing jobs produced 32 percent of national income.

GDP from Services

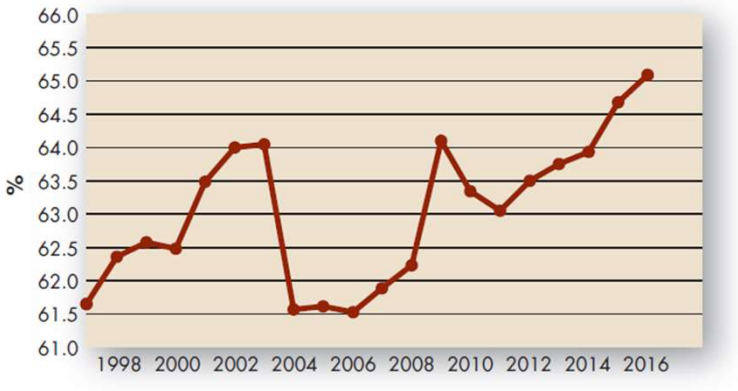

FIGURE 7.4 Global GDP from Services
Source: https://data.worldbank.org/indicator/NV.SRV.TOTL.ZS?end=2017&start=1997, accessed November 28, 2018.

As Figure 7.2 shows, the service sector's greater percentage of GDP has hovered above 65 percent in recent years. At the same time, the smaller 11 percent of the workforce in goods-producing jobs produced 32 percent of national income.

Creating Value Through Operations

Utility

– product's ability to satisfy a human want or need

= adding *value* in terms of:

- **Form**
  - – Transforming raw materials into finished goods
- **Time**
  - – Available when consumers want them
- **Place**
  - – Available where it is more convenient for consumers

• Production makes products available: By converting raw materials and human skills into finished goods and services, production creates *form utility*, as when Regal Cinemas combines building materials, theater seats, and projection equipment to create entertainment.
• When a theater offers midday, afternoon, and evening shows seven days a week, it creates *time utility*; that is, it adds customer value by making products available when consumers want them.
• When a theater offers a choice of 15 movies, all under one roof at a popular location, it creates *place utility*: it makes products available where they are convenient for consumers.

Creating Value Through Operations

Operations (Production) Management

– systematic direction and control of the activities that transform resources into finished products that create value for and provide benefits to customers

Operations (Production) Managers

– managers responsible for ensuring that operations activities create value and provide benefits to customers

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What is the difference between service operations and good operations?

The term operations (or production) refers to all the activities involved in making products—goods and services—for customers.

Differences between Service and Goods Manufacturing Operations

- Nature of the product: Finished goods vs. met needs / possessions serviced
- The intangible and unstorable nature of some services
- The customer's presence in the process / interaction
- Service quality considerations

Pearson

There are several obvious differences between service and manufacturing operations. Four aspects of service operations can make service production more complicated than simple goods production:

(1) interacting with customers

(2) the intangible and unstorable nature of some services

(3) the customer's presence in the process

(4) service quality considerations.

The Resource Transformation Process

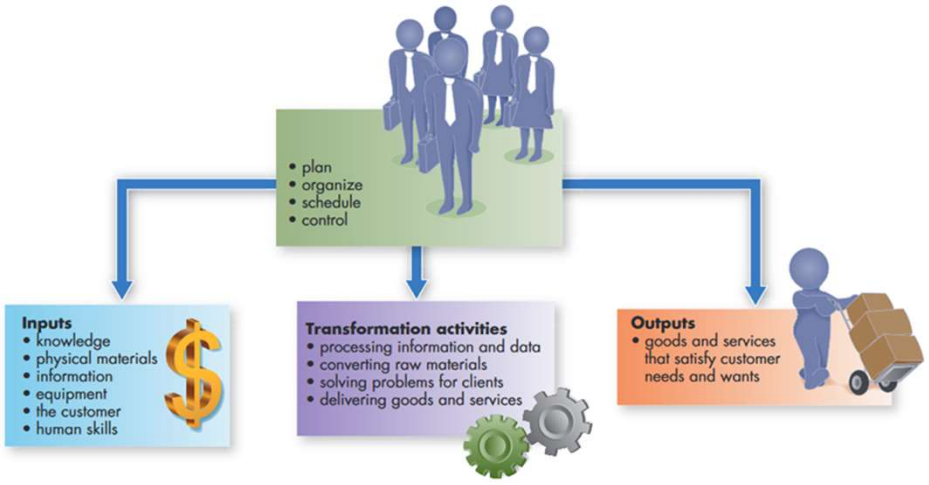

FIGURE 7.5 The Resource Transformation Process

Pearson

As Figure 7.3 shows, operations managers draw up plans to transform resources into products.

First, they bring together basic resources: knowledge, physical materials, information, equipment, the customer, and human skills.

Then, they put them to effective use in a facility where the service is provided or the physical good is produced. As demand for a product increases, operations managers schedule and control work to produce the required amount.

Finally, they control costs, quality levels, inventory, and facilities and equipment. In some businesses, often in small startup firms such as sole proprietorships, the operations manager is one person.

Operations Processes

Operations Process

- set of methods and technologies used to produce a good or a service

Make-to-Order Operations

- activities for one-of-a-kind or custom-made production

Make-to-Stock Operations

- activities for producing standardized products for mass consumption

Pearson

An operations process is a set of methods and technologies used to produce a good or a service. Banks, for example, use two processes—document shredding and data encryption—to protect confidential information.

Clothing, such as evening gowns, is available either off-the-shelf in department stores or custom-made at a designer or tailor shop. The designer or tailor's make-to-order operations respond to one-of-a-kind gown requirements, including unique patterns, materials, sizes, and shapes, depending on customers' characteristics. Make-to-stock operations, in contrast, produce standard gowns in large quantities to be stocked on store shelves or in displays for mass consumption.

Service Production Processes: Extent of Customer Contact

Low-Contact System

– level of customer contact in which the customer need not be part of the system to receive the service

High-Contact System

– level of customer contact in which the customer is part of the system during service delivery

Pearson

Low-Contact Systems Consider the postal delivery operations at your local U.S. post office. Postal employees gather mail, sort it, and send it on its delivery journey to addressees. This operation is a low-contact system: Customers are not in contact with the post office while the service is performed. They receive the service— mail sent and mail received—without setting foot in the processing center.

High-Contact Systems Think about your local public transit system. The service is transportation; when you purchase transportation, you board a bus or train. For example, the Bay Area Rapid Transit (BART) system, which connects San Francisco with outlying suburbs is, like all public transit systems, a high-contact system.

Operations Capabilities serve the Business Strategy

Operations Capability (Production Capability)

- What kind of production will the company have?
- special ability that production does especially well to outperform the competition

Excellent firms learn, over time, how to achieve more than just one competence

Business Strategies That Win Customers for Four Companies

Table 7.1 Business Strategies that Win Customers for Four Companies

Company	Strategy for Attracting Customers	What the Company Does to Implement Its Strategy
Toyota	Quality	Cars perform reliably, have an appealing fit and finish, and consistently meet or exceed customer expectations at a competitive price
Save-A-Lot	Low cost	Foods and everyday items offered at savings up to 40 percent less than conventional food chains
3M	Flexibility	Innovation, with more than 55,000 products in a constantly changing line of convenience items for home and office
FedEx	Dependability	Every delivery is fast and on time, as promised

Operations Capabilities and Characteristics for Four Companies (1 of 2)

Table 7.2 Operations Capabilities and Characteristics for Four Companies

Operations Capability	Key Operations Characteristics
Quality (Toyota)	• High-quality standards for materials suppliers • Just-in-time materials flow for lean manufacturing • Specialized, automated equipment for consistent product buildup • Operations personnel are experts on continuous improvement of product, work methods, and materials
Low Cost (Save-A-Lot)	• Avoids excessive overhead and costly inventory (no floral departments, sushi bars, or banks that drive up costs) • Limited assortment of products, staples, in one size only for low-cost restocking, lower inventories, and less paperwork • Many locations; small stores—less than half the size of conventional grocery stores—for low construction and maintenance costs • Reduces labor and shelving costs by receiving and selling merchandise out of custom shipping cartons

Operations Capabilities and Characteristics for Four Companies (2 of 2)

Table 7.2 *Continued*

Operations Capability	Key Operations Characteristics
Flexibility (3M)	• Maintains some excess (expensive) production capacity available for fast startup on new products • Adaptable equipment and facilities for production changeovers from old to new products • Hires operations personnel who thrive on change • Many medium- to small-sized manufacturing facilities in diverse locations, which enhances creativity
Dependability (FedEx)	• Customer automation: uses electronic and online communications tools with customers to shorten shipping time • Wireless information system for package scanning by courier, updating of package movement, and package tracking by customer • Maintains a company air force, global weather forecasting center, and ground transportation for pickup and delivery, with backup vehicles for emergencies • The 25 automated regional distribution hubs process 3.5 million packages per day for next-day deliveries

Operations Planning and Control

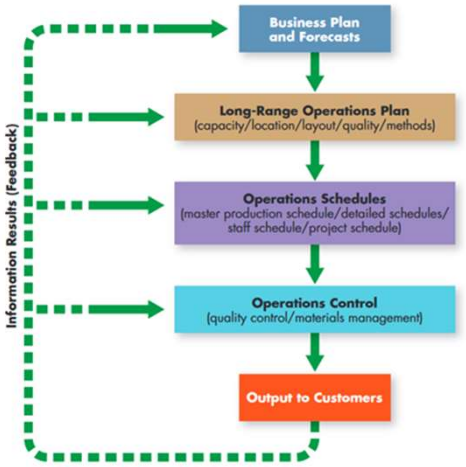

FIGURE 7.8 Operations Planning and Control

Pearson

Let's turn now to a discussion of production activities and resources that are considered in every business organization. Like all good managers, we start with planning. Managers from many departments contribute to decisions about operations. As Figure 7.4 shows, however, no matter how many decision makers are involved, the process is a logical sequence of decisions.

Major factors considered in Operations Planning (1 of 2)

Capacity Planning

– determining the amount of a product that a company can produce under normal conditions

Location Planning

– determining where production will happen based on *costs* and *flexibility*

Layout Planning

– planning for the layout of machinery, equipment, and supplies

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

Layout Planning (1 of 2)

Process Layout (Custom-Product Layout)

- physical arrangement of production activities that groups equipment and people according to function

Product Layout (Same-Steps Layout)

- physical arrangement of production steps designed to make one type of product in a fixed sequence of activities according to its production requirements

In a process layout (also called custom-product layout), which is well suited to *make-to-order shops* (or *job shops*) specializing in custom work, equipment and people are grouped according to function. FedEx Office stores (formerly Kinko's Copy Centers), for example, use custom-products layouts to accommodate a variety of custom jobs.

Layout Planning (2 of 2)

Assembly Line Layout

- a same-steps layout in which a product moves step by step through a plant on conveyor belts or other equipment until it is completed

Fixed-Position Layout

- labor, equipment, materials, and other resources are brought to the geographic location where all production work is done

Pearson

A product layout (also called a same-steps layout or assembly line layout) is set up to provide one type of service or make one type of product in a fixed sequence of production steps. All units go through the same set of steps.

Process Layout for a Service Provider

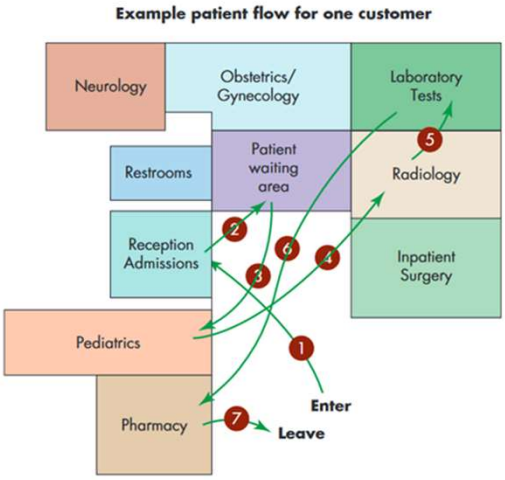

FIGURE 7.7 Process Layout for a Service Provider—a Medical Clinic

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Figure 7.5 shows the process layout of a service provider—a medical clinic. The path taken through the facility reflects the unique treatments for one patient's visit.

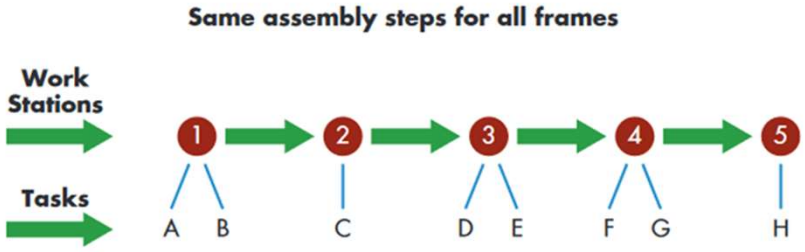
Product Layout for a Service

FIGURE 7.8 Product Layout for a Service—Automated Car Wash

Pearson

Figure 7.6 shows the product layout of a service provider—a medical clinic. The path taken through the facility reflects the unique treatments for one patient's visit.

Product Layout for Goods Production



A: Assemble window frame
B: Install frame latch
C: Install rubber molding
D: Insert frame screws
E: Cover frame screws
F: Install frame handle
G: Install glass pane
H: Pack window unit

FIGURE 7.9 Product Layout for Goods Production—Storm Window Assembly

Figure 7.7 is a goods-producer assembling parts needed to make storm windows.

Quality Planning

Quality

- combination of “characteristics of a product or service that bear on its ability to satisfy stated or implied needs”

Performance

- dimension of quality that refers to how well a product does what it is supposed to do

Consistency

- dimension of quality that refers to sameness of product quality from unit to unit

Methods Planning

Improving process flow

- Sequence of activities
- Movement of materials
- Work performed at each stage

Improving customer service

- Each stage should be considered

Flowchart of Traditional Guest Checkout

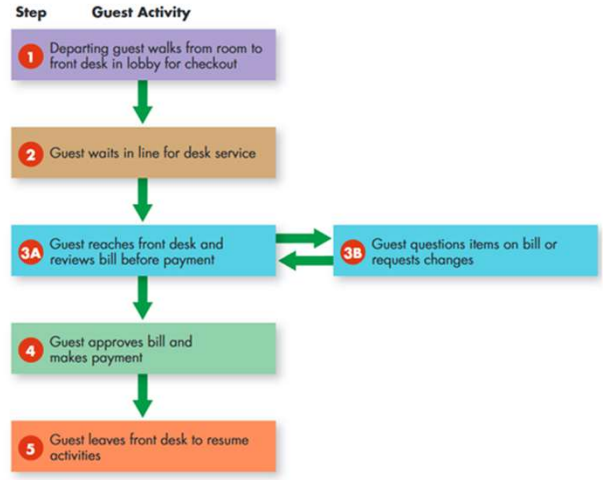


FIGURE 7.10 Flowchart of Traditional Guest Checkout

Pearson

Consider, for example, the traditional checkout method at hotels. The process flowchart in Figure 7.8 shows five stages of customer activities.

Operations Scheduling (1 of 2)

Master schedule

- "the game plan" for upcoming production
- Which products will be produced and when

Detailed schedules

- show day-to-day activities that will occur in production
- Start and stop times for assigned jobs at each workstation

Example of Partial Master Operations Schedule

Figure 7.9 Example of Partial Master Operations Schedule

Coil # (Product)	8/4/19	8/11/19	8/18/19	...	11/3/19	11/10/19
TC016	1,500	2,500			2,100	600
TC032	900		2,700		3,000	
TR020	300		2,600			1,600

Food Retailer's Partial Operations Schedule

KEY RESOURCES	Quarter/Year	1/2019	2/2019	3/2019	4/2019	1/2020	2/2020	3/2020	4/2020
	Number of Stores	17	17	18	19	20	20	21	22
	Staffing Level (no. of Employees)	1,360	1,360	1,530	1,615	1,700	1,700	1,653	1,827
	Fresh Vegetables (tons)	204	204	192	228	240	240	230	260
	Canned Goods (case loads)	73,950	77,350	80,100	80,100	83,000	84,500	88,600	90,200
	Fresh Meats Etc.	–	–	–	–	–	–	–	–
	–								
	–								
	–								

FIGURE 7.12 Food Retailer's Partial Operations Schedule

Operations Scheduling (2 of 2)

Staff schedules

– identify who and how many employees will be working, and when

Project schedules

– provide coordination for completing large-scale projects

Scheduling is useful for employee staffing in service companies, too, including restaurants, hotels, and transportation and landscaping companies. Staff schedules, in general, specify assigned working times in upcoming days.

Project Scheduling

Gantt Chart

- production schedule that breaks down large projects into steps to be performed and specifies the time required to perform each step

PERT Chart

- production schedule specifying the sequence of activities, time requirements, and critical path for performing the steps in a project

Pearson

A Gantt chart breaks down large projects into steps to be performed and specifies the time required to perform each one. The project manager lists all activities needed to complete the work, estimates the time required for each step, records the progress on the chart, and checks the progress against the time scale on the chart to keep the project moving on schedule.

Gantt Chart

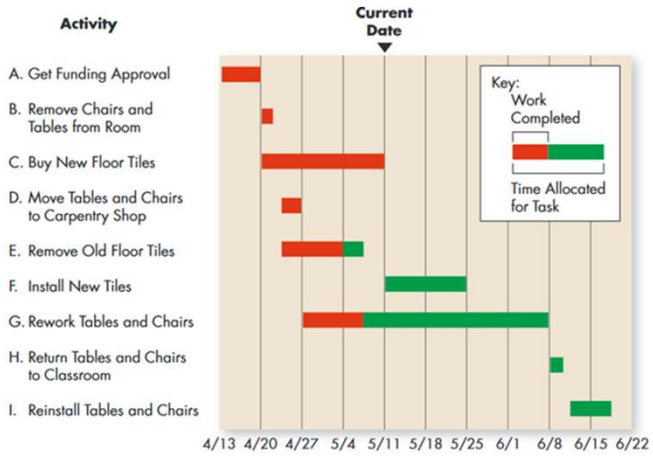


FIGURE 7.13 Gantt Chart

Figure 7.11 shows a Gantt chart for the renovation of a college classroom. It shows progress to date and schedules for remaining work and that some steps can be performed at the same time (e.g., step D can be performed during the same time as steps C and E), but others cannot (e.g., step A must be completed before any of the others can begin). Step E is behind schedule; it should have been completed before the current date.

PERT Chart

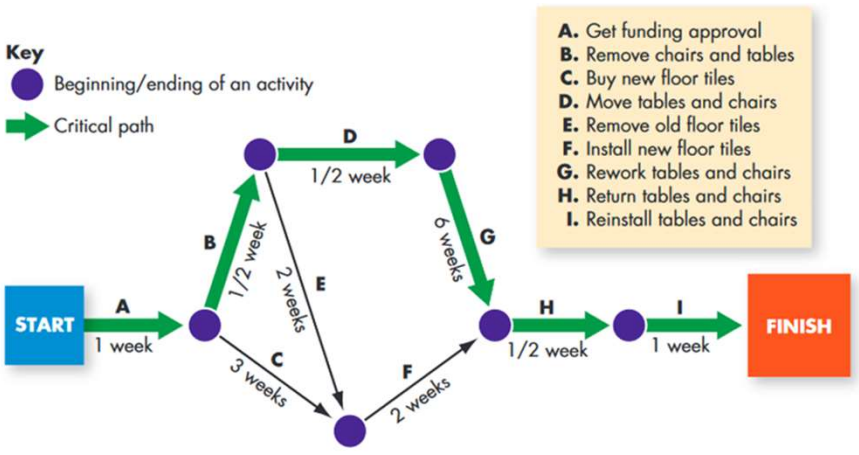


FIGURE 7.14 PERT Chart

Figure 7.12 shows a PERT chart for renovating the college classroom. The project's nine activities and the times required to complete them are identified. Each activity is represented by an arrow. The arrows are positioned to show the required sequence for performing the activities.

Materials Management (1 of 2)

Materials management

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

Most of us have difficulty keeping track of personal items now and then—clothes, books, cell phones, and so on. Imagine keeping track of thousands, or even millions, of things at any one time. That's the challenge in materials management, the process by which managers plan, organize, and control the flow of materials from sources of supply through distribution of finished goods. For manufacturing firms, typical materials costs make up 50 to 75 percent of total product costs.

Materials Management Activities for Physical Goods (1 of 2)

Supplier Selection

– process of finding and choosing suppliers from whom to buy

Purchasing

– acquisition of the materials and services that a firm needs to produce its products

Supplier selection is the process of finding and choosing suppliers of services and materials. This step includes evaluating potential suppliers, negotiating terms of service, and maintaining positive buyer–seller relationships.

Purchasing is the acquisition of all the raw materials and services that a company needs to produce its products. Most large firms have purchasing departments to buy proper services and materials in the amounts needed.

Materials Management Activities for Physical Goods (2 of 2)

Transportation

– activities in transporting resources to the producer and finished goods to customers

Warehousing

– storage of incoming materials for production and finished goods for distribution to customers

Inventory Control

– process of receiving, storing, handling, and counting of all raw materials, partly finished goods, and finished goods

Transportation is the means of transporting resources to the producer and finished goods to customers.

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. It ensures that enough materials inventories are available to meet production schedules, while at the same time avoiding expensive excess inventories.

Materials Management (2 of 2)

Lean Production System

- production system designed for smooth production flows that avoid inefficiencies, eliminate unnecessary inventories, and continuously improve production processes

Just-in-Time (JIT) Production

- type of lean production system that brings together all materials at the precise time they are required at each production stage

Managers must take timing into consideration when managing materials, as well. Pioneered by Toyota, 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. All resources flow continuously—from arrival as raw materials to final assembly and shipment of finished products.

Operations Control

Operations Control

- process of monitoring production performance by comparing results with plans and taking corrective action when needed

Follow-Up

- operations control activity for ensuring that production decisions are being implemented

Quality Control

Quality Control

– action of ensuring that operations produce products that meet specific quality standards

Pearson

Quality control is taking action to ensure that operations produce goods or services that meet specific quality standards. Consider, for example, service operations in which customer satisfaction depends largely on the employees who provide the service. By monitoring services, managers and other employees can detect mistakes and make corrections.

The Quality-Productivity Connection

Productivity

- the amount of output produced compared with the amount of resources used to produce that output

It's no secret that *quality* and *productivity* are watchwords in today's competitive environment. Companies are not only measuring productivity and insisting on improvements; they also are requiring that quality brings greater satisfaction to customers, improves sales, and boosts profits.

Productivity is a measure of economic performance: It compares how much we produce with the resources we use to produce it. The formula is fairly simple. The more services and goods we can produce while using fewer resources, the more productivity grows and the more everyone—the economy, businesses, and workers—benefits.

Managing for Quality

Total Quality Management (TQM)

- all activities involved in getting high-quality goods and services into the marketplace
- Includes all parts of the business
  - Customers
  - Suppliers
  - employees

Cost of poor quality

Source of unsatisfactory quality

Assigning responsibility

Pearson

Total quality management (TQM) includes all the activities necessary for getting high-quality goods and services into the marketplace. TQM begins with leadership and a desire for continuously improving both processes and products. It must consider all aspects of a business, including customers, suppliers, and employees. To marshal the interests of all these stakeholders, TQM first evaluates the costs of poor quality. TQM then identifies the sources causing unsatisfactory quality, assigns responsibility for corrections, and ensures that those who are responsible take steps for improving quality.

The backbone of TQM, however, and its biggest challenge, is motivating all employees and the company's suppliers to achieve quality goals. Leaders of the quality movement use various methods and resources to foster a quality focus, such as training, verbal encouragement, teamwork, and tying compensation to work quality. When those efforts succeed, employees and suppliers will ultimately accept quality ownership, the idea that quality belongs to each person who creates it while performing a job.

Managing for Quality

Quality Ownership

- principle of total quality management that holds that quality belongs to each person who creates it while performing a job

Pearson

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Tools for Total Quality Management (1 of 3)

Statistical Analysis

Satisfaction Surveys

Competitive Product Analysis

- process by which a company analyzes a competitor's products to identify desirable improvements

Value-Added Analysis

- process of evaluating all work activities, materials flows, and paperwork to determine the value that they add for customers

Pearson

Hundreds of tools have proven useful for quality improvement, ranging from statistical analysis of product 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.

Value-added analysis refers to the evaluation of all work activities, materials flows, and paperwork to determine the value that they add for customers. It often reveals wasteful or unnecessary activities that can be eliminated without jeopardizing customer service.

Tools for Total Quality Management (2 of 3)

Quality Improvement Team

- TQM tool in which collaborative groups of employees from various work areas work together to improve quality by solving common shared production problems

ISO 9000

- program certifying that a factory, laboratory, or office has met the quality management standards set by the International Organization for Standardization

Companies throughout the world have adopted quality improvement teams, which are patterned after the successful Japanese concept of *quality circles*, collaborative groups of employees from various work areas who meet regularly to define, analyze, and solve common production problems. The teams' goal is to improve both their own work methods and the products they make. Quality improvement teams organize their own work, select leaders, and address problems in the workplace.

ISO 9000 is a certification program attesting that a factory, a laboratory, or an office has met the rigorous quality management requirements set by the International Organization for Standardization (ISO). Today, more than 160 countries have adopted ISO 9000 as a national standard. Nearly 1 million certificates have been issued to organizations worldwide meeting the ISO standards.

Tools for Total Quality Management (3 of 3)

ISO 14000

- certification program attesting to the fact that a factory, laboratory, or office has improved its environmental performance

Business Process Reengineering

- rethinking and radical redesign of business processes to improve performance, quality, and productivity

The ISO 14000 program certifies improvements in environmental performance by requiring a firm to develop an *environmental management system*: a plan documenting how the company has acted to improve its performance in using resources (such as raw materials) and in managing pollution. A company must not only identify hazardous wastes that it expects to create, but it must also stipulate plans for treatment and disposal.

Business process reengineering focuses on improving a business process—rethinking each of its steps by starting from scratch. *Reengineering* is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements as measured by cost, quality, service, and speed.

Supply Chain (Value Chain)

flow of information, materials, and services that starts with raw-materials suppliers and continues adding value through other stages in the network of firms until the product reaches the end customer

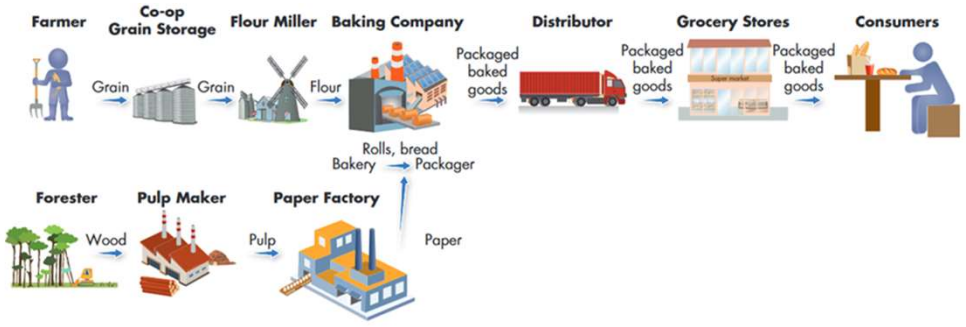

FIGURE 7.15 Supply Chain for Baked Goods

Figure 7.13 shows the chain of activities for supplying baked goods to consumers. Each stage adds value for the final customer.

Adding Value Through Supply Chains

Supply Chain Management (SCM)

- principle of looking at the supply chain as a whole to improve the overall flow through the system

Reengineering Supply Chains for Better Results

- Lower costs, faster service, coordination of information and material flow

The term *supply chain* refers to the group of companies and stream of activities that work together to create a product. 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 adding value through other stages in the network of firms until the product reaches the end customer.

Supply chain management (SCM) looks at the chain as a whole to improve the overall flow through a system composed of companies working together. Because customers ultimately get better value, supply chain management gains competitive advantage for each of the chain's members.

Outsourcing and Global Supply Chains

Outsourcing

- replacing internal processes by paying suppliers and distributors to perform business processes or to provide needed materials or services

Outsourcing is the strategy of paying suppliers and distributors to perform certain business processes or to provide needed materials or services. The decision to outsource expands supply chains. The movement of manufacturing and service operations from the United States to countries such as China, Mexico, and India has reduced U.S. employment in traditional jobs. It has also created new operations jobs for SCM.