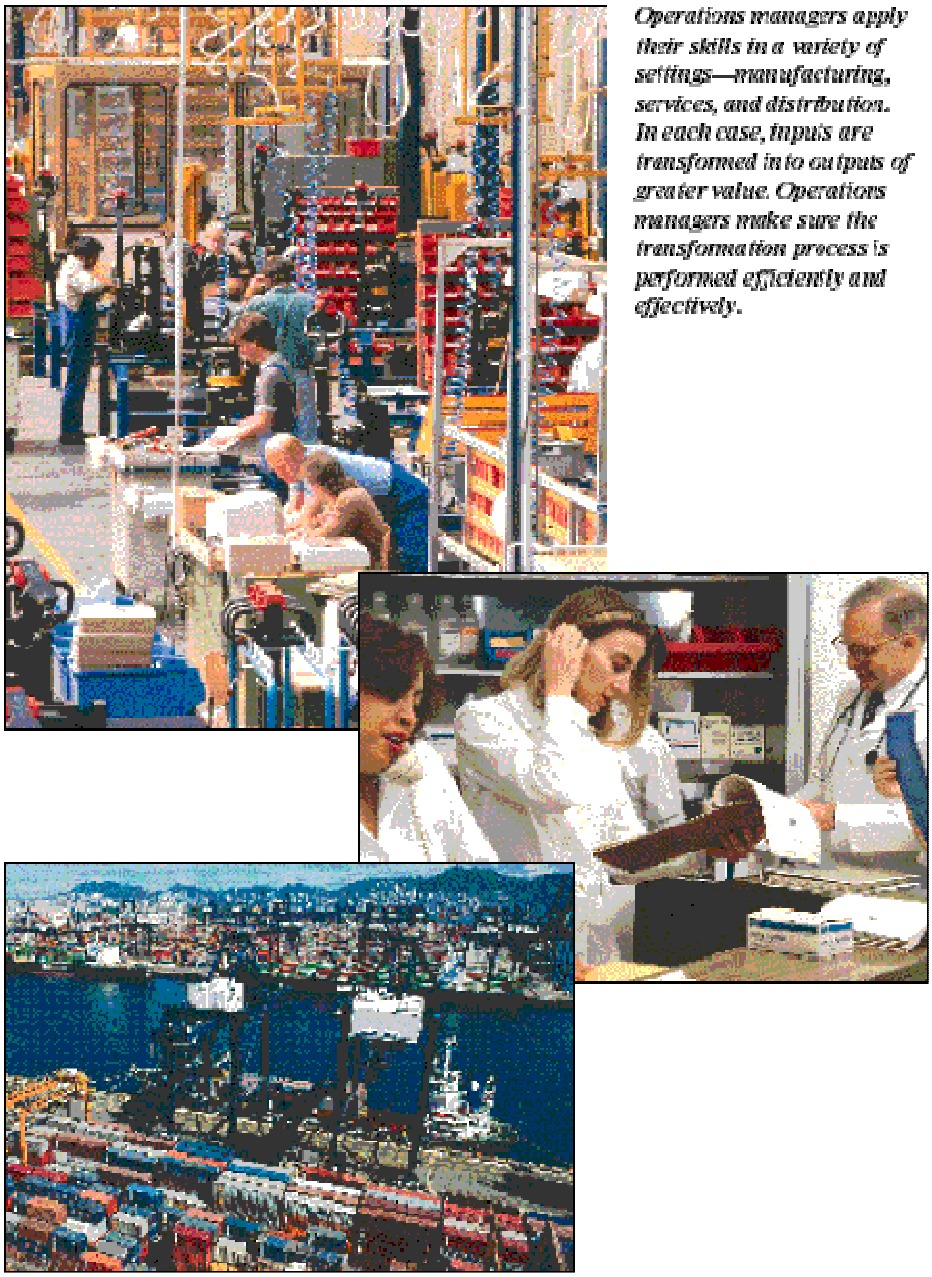
Chapter 1

Just What Do Operations Managers Do?

Operations managers are *the improvement people,* the realistic, hard-nosed, make-it-work, get-it-done people. They perform a variety of tasks in many different types of businesses and organizations. Let's meet Rebecca Oesterle, production manager for Eveready Battery Company; Claire Thielen, management engineer for Memorial Hospitals Association; and Ada Liu, division manager for Li & Fung trading company.

Rebecca Oesterle began her career at Eveready analyzing and coordinating quality and productivity improvements for the production process. She later served as third-shift supervisor, planner and scheduler of miniature battery production and project leader for the movement of assembly operations to Mexico and the $8 million expansion of air cell production. Now she manages the entire production process at the Maryville alkaline plant, coordinating the work of 13 supervisors and more than 500 production workers. Rebecca gets the product out the door for Eveready.



Operations managers apply their skills in a variety of settings—manufacturing, services, and distribution. In each case, inputs are transformed into outputs of greater value. Operations managers make sure the transformation process is performed efficiently and effectively.

Claire Thielen facilitates continuous quality improvement projects and analyzes methods and systems for a large medical center. Her projects include determining staffing patterns and workflow for computerized booking systems; consolidating policies, procedures, and practices for the merger of two hospitals; analyzing demand for 911 services; designing clinical studies of new medication effectiveness; and conducting training sessions on process mapping and analysis. Claire ensures a smooth flow of operations for Memorial Hospitals.

Ada Liu coordinates global production and distribution for one of Li & Fung's major clients, Gymboree. Her 40-person staff in Hong Kong includes merchandising, raw material purchasing, quality assurance, technical support, and shipping. She has dedicated sourcing teams in China, the Philippines, and Indonesia, and employees or contractors in 26 other countries. For an order of 10,000 garments, Ada might decide to buy yarn from a Korean producer, have it woven and dyed in Taiwan, and then shipped to Thailand for production, along with zippers and buttons made by a Japanese firm in China. For quicker delivery, the order may be divided across five factories in Thailand. Five weeks after receipt of the order,

10,000 identical garments arrive in Gymboree stores across the U.S. and Europe. Ada is the supply chain expert for Gymboree.

Sources: Adapted from Joan Magretta, "Fast, Global, and Entrepreneurial: Supply Chain Management, Hong Kong Style," *Harvard Business Review* (September-October 1998): 103-114; Katherine Aldred, "IE Makes a Difference One Person at a Time," *IIE Solutions* (April 1998): 14-15; Katherine Aldred, "IE Gets Charge Out of Battery Production," *IIE Solutions* (July 1998): 16-17.

Operations management designs and operates productive systems--systems for getting work done. The food you eat, the movies you watch, the stores in which you shop, and this book you are reading are provided to you by the people in operations. Operations managers are found in banks, hospitals, factories, and government. They design systems, ensure quality, produce products, and deliver services. They work with customers and suppliers, the latest technology, and global partners. They solve problems, reengineer processes, innovate, and integrate. Operations is more than planning and controlling; it's doing. Whether it's superior quality, speed-to-market, customization, or low cost, excellence in operations is critical to a firm's success.

Operations is often defined as a transformation process. As shown in Figure 1.1, inputs (such as material, machines, labor, management, and capital) are transformed into outputs (goods and services). Requirements and feedback from customers are used to adjust factors in the transformation process, which may in turn alter inputs. In operations management, we try to ensure that the transformation process is performed efficiently and that the output is of greater *value* than the sum of the inputs. Thus, the role of operations is to create value. The transformation process itself can be viewed as a series of activities along a *value chain* extending from supplier to customer. Any activities that do not add value are superfluous and should be eliminated.

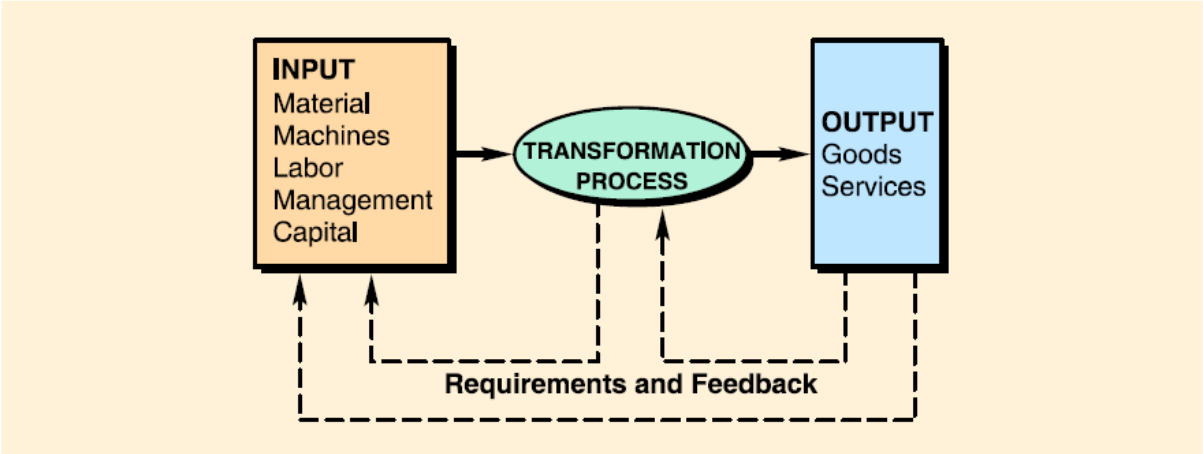


FIGURE 1.1 Operations as a Transformation Process

The input-transformation-output process is characteristic of a wide variety of operating systems. In an automobile factory, sheet steel is formed into different shapes, painted and finished, and then assembled with thousands of component parts to produce a working automobile. In an aluminum factory, various grades of bauxite are mixed, heated, and cast into ingots of different sizes. In a hospital, patients are helped to become healthier individuals

through special care, meals, medication, lab work, and surgical procedures. Obviously, "operations" can take many different forms. The transformation process can be

physical,	as in manufacturing operations;
locational,	as in transportation or warehouse operations;
exchange,	as in retail operations;
physiological,	as in health care;
psychological,	as in entertainment; or
informational,	as in communications.

The Operations Function

Activities in operations management (OM) include organizing work, selecting processes, arranging layouts, locating facilities, designing jobs, measuring performance, controlling quality, scheduling work, managing inventory, and planning production. Operations managers deal with people, technology, and deadlines. These managers need good technical, conceptual, and behavioral skills. Their activities are closely intertwined with other functional areas of a firm.

As shown in Figure 1.2, the three primary functions of a firm are marketing, finance, and operations. *Marketing* establishes the demand for goods or services, *finance* provides the capital, and *operations* actually makes the goods or provides the service. Of the three functions, operations typically employs the greatest number of people and requires the largest investment in assets. For these reasons, management of the operations function has often been viewed as an opportunity to improve a firm's efficiency and reduce costs. But operations can also be an avenue to increase sales, gain market share, and eliminate the competition!

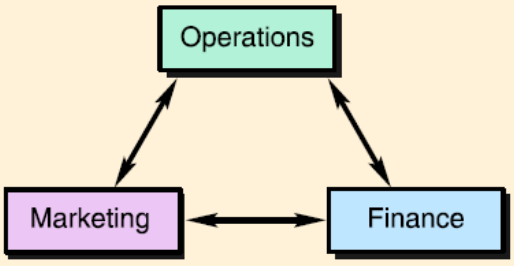


FIGURE 1.2 Operations as One of the Three Basic Functions of a Firm

Operations can also be viewed as the *technical core* of an organization as depicted in Figure 1.3. In this scenario, the organization exists to produce goods and services for its customers. Therefore, operations is the central function or "hub" of the organization in contact with every other functional area. For example, operations interacts with *marketing* to receive estimates of customer demand and customer feedback on problems; with *finance* for capital investments, budgets, and stockholder requirements; with *personnel* to train, hire, and fire workers; and with *purchasing* to order needed materials for production.

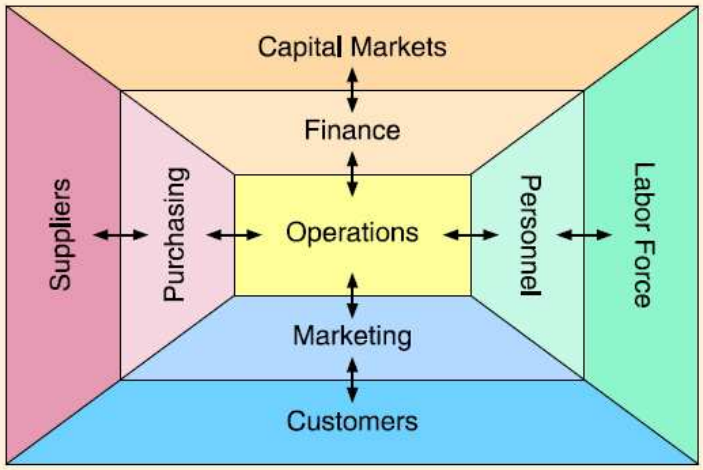
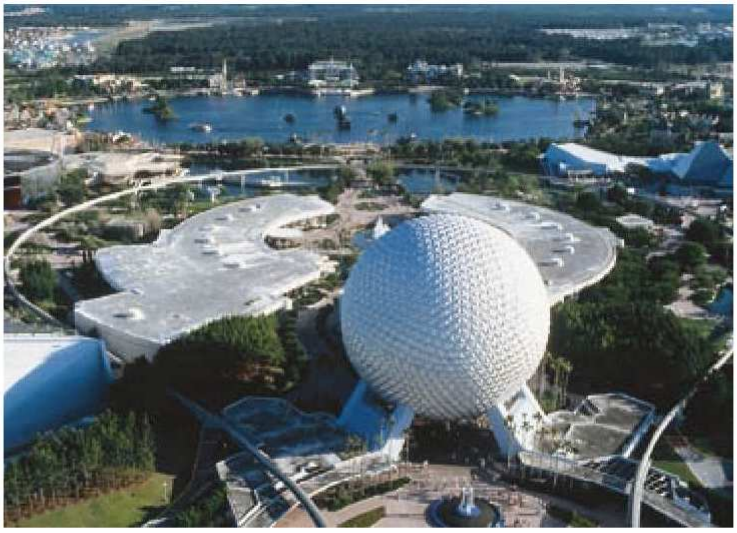


FIGURE 1.3 Operations as the Technical Core



Operating a large amusement park, such as Disney's Epcot Center, is every bit as complicated as manufacturing an aircraft carrier. Thousands of activities must be coordinated on a daily basis. Equipment must be well-maintained, workers well-trained, and shelves well-stocked, while keeping costs down. On top of this, services typically deal with more customers (each with their own service expectations) more frequently than manufacturers, and handle more unexpected occurrences. Maybe that's why GM, Xerox, IBM, and other manufacturers routinely benchmark Disney operations.

As a field of study, operations brings together many disciplines and provides an integrated view of business organizations. To understand better the role of operations and the operations manager, let's examine some historical events in OM.

Pause and Reflect

1-1. What constitutes "operations" at (a) a bank, (b) a retail store, (c) a hospital, (d) a cable TV company?

***1-2.** Find an interesting web site related to the operations function in a firm with which you are familiar. Use e-mail to submit the URL and a paragraph describing what you found at the site to your instructor.

These exercises require a direct link to a specific Web site. Click **Internet Exercises for the list of internet links for these exercises.*

A Brief History of Operations Management

Although history is full of amazing production feats--the pyramids of Egypt, the Great Wall of China, the roads and aqueducts of Rome--the widespread production of consumer goods--and thus, operations management--did not begin until the Industrial Revolution in the 1700s. Prior to that time, skilled craftspersons and their apprentices fashioned goods for individual customers from studios in their own homes. Every piece was unique, hand-fitted, and made entirely by one person, a process known as craft production. Although **craft production** still exists today, the availability of coal, iron ore and steam power set into motion a series of industrial inventions that revolutionized the way work was performed. Great mechanically powered machines replaced the laborer as the primary factor of production and brought workers to a central location to perform tasks under the direction of an "overseer" in a place called a "factory." The revolution first took hold in textile mills, grain mills, metalworking, and machine-making facilities.

Around the same time, Adam Smith's *Wealth of Nations* (1776) proposed the *division of labor,* in which the production process was broken down into a series of small tasks, each performed by a different worker. The specialization of the worker on limited, repetitive tasks allowed him or her to become very proficient at those tasks and further encouraged the development of specialized machinery.

The introduction of *interchangeable parts* by Eli Whitney (1790s) allowed the manufacture of firearms, clocks, watches, sewing machines, and other goods to shift from customized one-at-a-time production to volume production of standardized parts. This meant the factory needed a system of measurements and inspection, a standard method of production, and supervisors to check the quality of the worker's production.

Advances in technology continued through the 1800s. Cost accounting and other control systems were developed, but management theory and practice were virtually nonexistent.

In the early 1900s an enterprising laborer (and later chief engineer) at Midvale Steel Works named Frederick W. Taylor approached the management of work as a science. Based on observation, measurement, and analysis, he identified the best method for performing each job. Once determined, the methods were standardized for all workers, and economic incentives were established to encourage workers to follow the standards. Taylor's philosophy became known as *scientific management.* His ideas were embraced and extended by efficiency experts Frank and Lillian Gilbreth and Henry Gantt, among others. One of Taylor's biggest advocates was Henry Ford.

Henry Ford applied scientific management to the production of the Model T in 1913 and reduced the time required to assemble a car from a high of 728 hours to 1-1/2 hours. A Model T chassis moved slowly down a conveyor belt with six workers walking along beside it, picking up parts from carefully spaced piles on the floor and fitting them to the chassis.[1] The

short assembly time per car allowed the Model T to be produced in high volumes, or "en masse," yielding the name **mass production.**

American manufacturers became adept at mass production over the next fifty years and easily dominated manufacturing worldwide. The human relations movement of the 1930s, led by Elton Mayo and the Hawthorne studies, introduced the idea that worker motivation, as well as the technical aspects of work, affected productivity. Theories of motivation were developed by Herzberg, Maslow, McGregor, and others. Quantitative models and techniques spawned by the operations research groups of World War II continued to develop and were applied successfully to manufacturing and services. Computers and automation led still another upsurge in technological advancements applied to operations. These events are summarized in Table 1.1.

TABLE 1.1 Some Historical Events in Operations Management

Era	*Events/Concepts*	*Dates*	*Originator*
Industrial Revolution	Steam engine	1769	James Watt
	Division of labor	1776	Adam Smith
	Interchangeable parts	1790	Eli Whitney
Scientific Management	Principles of scientific management	1911	Frederick W. Taylor
	Time and motion studies	1911	Frank and Lillian Gilbreth
	Activity scheduling chart	1912	Henry Gantt
	Moving assembly line	1913	Henry Ford
Human Relations	Hawthorne studies	1930	Elton Mayo
	Motivation theories	1940's	Abraham Maslow
		1950's	Frederick Herzberg
		1960's	Douglas McGregor
Management Science	Linear programming	1947	George Dantzig
	Digital computer	1951	Remington Rand
	Simulation, waiting line theory, decision theory, PERT/CPM	1950's	Operations research groups
	MRP	1960's	Joseph Orlicky, IBM
Quality Revolution	JIT (just-in-time)	1970's	Taiichi Ohno (Toyota)
	TQM (total quality management)	1980's	W. Edwards Deming, Joseph Juran
	Strategy and operations	1990's	Wickham Skinner, Robert Hayes
	Business process reengineering		Michael Hammer, James Champy
Information Age	EDI, EFT	1970's	Numerous individuals and companies
	CIM (computer-integrated manufacturing), personal computers	1980's	
	Internet, World Wide Web	1990	Tim Berners-Lee
Globalization	Worldwide markets and operations	1990's	Numerous companies and nations
	Supply Chain Management		
	Electronic commerce		
	Mass customization		

From the Industrial Revolution through the 1960s, the United States was the world's greatest producer of goods and services, as well as the major source of managerial and technical expertise. Looking back, 1960 was probably the peak for American manufacturing. From then on, industry by industry, U.S. manufacturing superiority was challenged by lower costs and higher quality from foreign manufacturers, led by Japan.

In the 1970s, U.S. productivity rose an average of only 1.3 percent per year, and in the 1980s, barely 0.2 percent (with many years negative), while foreign competitors boasted annual increases of 4 percent and 5 percent. Several studies published during those years confirmed what the consumer already knew--U.S.-made products of that era were inferior and could not compete on the world market. Table 1.2 compares the product performance of U.S. versus

Japanese automobiles, semiconductors, air conditioners, and color televisions of the 1970s and 1980s.

TABLE 1.2 A Comparison of American and Japanese Products in the 1970s and 1980s

Quality of Automobiles	*TGWs (things gone wrong) in First Eight Months per 100 cars*	
Chrysler	285	
GM	256	
Ford	214	
Japanese (avg.)	132	
Toyota	55	
Quality of Semiconductors	*U.S. Companies*	*Japanese Companies*
Defective on delivery	16%	0%
Failure after 1,000 hours	14%	1%
Quality of Room Air Conditioners	*U.S. Companies*	*Japanese Companies*
Fabrication defects	4.4%	<0.1%
Assembly line defects	63.5%	0.9%
Service calls	10.5%	0.6%
Warranty cost (as % of sales)	2.2%	0.6%
Quality of Color TVs	*U.S. Companies*	*Japanese Companies*
Assembly line defects per set	1.4	0.01
Service calls per set	1.0	0.09

SOURCES: National Academy of Engineering, *The Competitive Status of the U.S. Auto Industry* (Washington, D.C.: National Academy Press, 1982): 90-108; A. L. Robinson, "Perilous Times for U.S. Microcircuit Makers," *Science* (May 9, 1980): 582–86; D. Garvin, "Quality on the Line," *Harvard Business Review* (September–October 1983): 64–75; I. Magaziner and R. Reich, *Minding America's Business* (New York: Harcourt Brace Jovanovich, 1982): 176; M. Porter, *Cases in Competitive Strategy* (New York: Free Press, 1983): 511.

Early rationalizations that the Japanese success in manufacturing was a cultural phenomenon were disproved by the successes of Japanese-owned plants in the United States, such as the Matsushita purchase of a failing Quasar television plant in Chicago from Motorola. Part of the purchase contract specified that Matsushita had to retain the entire hourly work force of 1,000 persons. After only two years, with the identical workers, half the management staff, and little or no capital investment, Matsushita doubled production, cut assembly repairs from 130 percent to 6 percent, and reduced warranty costs from $16 million a year to $2 million a year. You can bet Motorola took notice. (Today Motorola is one of the success stories of American manufacturing.)

How did this come about? How did a country that dominated manufacturing for most of the twentieth century suddenly become no good at it? Quite simply, U.S. companies weren't paying attention. They thought mass production had solved the "problem" of production, so they delegated the function of manufacturing to technical specialists (usually engineers) who ignored changes in the consumer environment and the strategic importance of operations. Decisions were made based on short-term financial goals rather than long-term strategic initiatives.

In the 1980s, as a competitive response to comparable but cheaper products from foreign manufacturers, Motorola began assembling products offshore in Singapore, Puerto Rico, and the South Pacific. Production costs were lower, but the speed of production was insufficient to meet customer demands. Motorola decided to change manufacturing strategies and create a state-of-the-art production facility onshore for its paging products. Within eighteen months of the decision, the so-called Bandit project (because it borrowed the best technology) successfully completed the design of a new production system that was fast and cost competitive. The photo above shows part of the carefully designed assembly line. Pagers that used to take three weeks to manufacture took two hours on the new line. Further improvements reduced the lead time for customized pagers to less than ninety minutes from order placement to order shipment. It is no surprise that Motorola currently dominates the pager market.

Mass production can produce large volumes of goods quickly, but it cannot adapt very well to changes in demand. Today's consumer market is characterized by product proliferation, shortened product life cycles, shortened product development times, changes in technology, more customized products, and segmented markets. Mass production does not "fit" that type of environment. Using a concept known as just-in-time, Japanese manufacturers changed the rules of production from mass production to *lean production.* Lean production prizes flexibility (rather than efficiency) and quality (rather than quantity). The *total quality* fervor has since spread across the globe and is the focus of operations in many successful global enterprises.

The emphasis on quality and the *strategic importance* of operations is especially important today as continuing advances in information technology have further increased competition and customer expectations. Technology, together with changing political and economic conditions, have prompted an era of industrial *globalization* in which companies compete worldwide for both market access and production resources. Although both products and services are becoming more customized in wider global markets, services, in many cases, are the key to competitiveness.

Let's examine globalization, services, and competitiveness from an operations perspective.

Pause and Reflect

1-3. Briefly describe how operations have been affected as we have moved from the Industrial Revolution to the current era of globalization.

1-4. Why did the United States experience competitive problems in the 1970s and 1980s?

[1]David Halberstam, *The Reckoning* (New York: William Morrow, 1986), pp. 79-81.

Globalization

Companies "go global" to take advantage of favorable costs (usually labor rates) in foreign countries and to access foreign markets. Figure 1.4 shows the hourly wage rates in U.S. dollars for production workers in six countries from 1975 to 1996. U.S. labor rates have remained remarkably stable, while the labor rates of Japan, Germany, and the European Union have increased. Currently, wage rates are 10 percent higher in Japan and 60 percent higher in Germany than in the United States. Labor rates in Mexico and in the newly industrialized economies (NIEs) of Asia remained at low levels--$1.50 an hour in Mexico and $.48 an hour in Sri Lanka, for example. This data certainly supports the trend toward foreign investments in Mexico and the Pacific Rim.

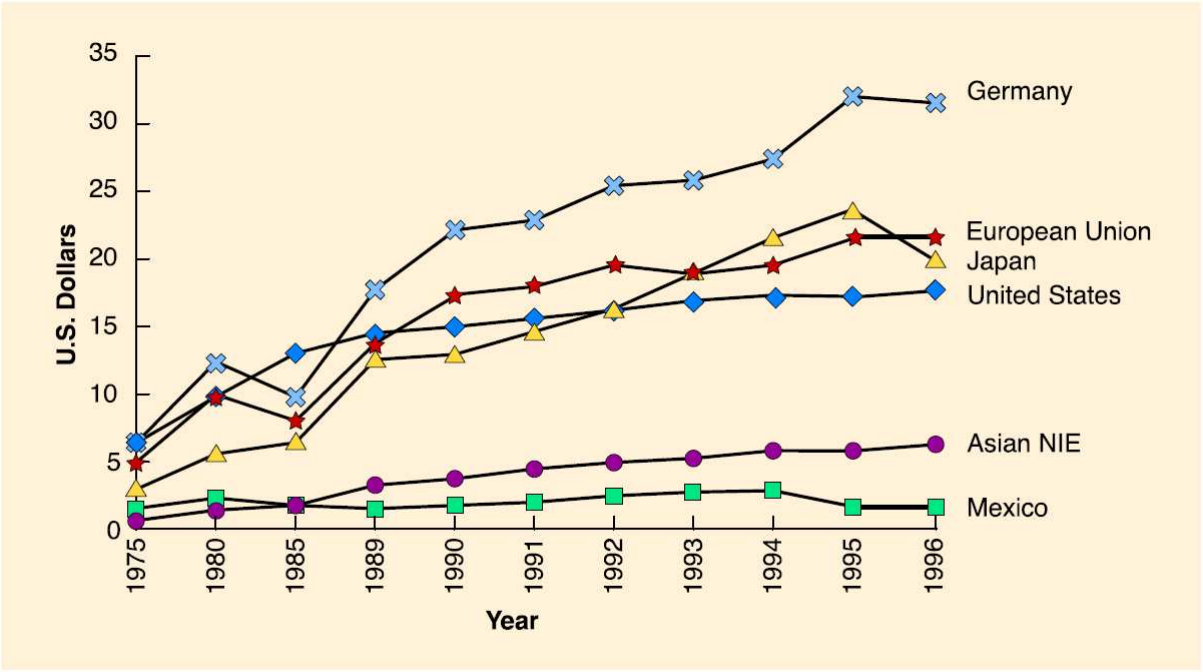


FIGURE 1.4 A Comparison of Hourly Wage Rates

Source: U.S. Department of Labor, *Bureau of Labor Statistics*, Foreign Labor Statistics (February 9, 1998).

Ironically, more than 60 percent of American manufacturing investment has occurred in countries with labor rates comparable to U.S. labor rates. Companies today may be more interested in accessing new customers, technologies, and skills, rather than capitalizing on cheap labor. New automotive plants in Thailand and Brazil, for example, produce cars to meet demand in those markets rather than for export home.

Falling trade barriers and advances in information technology fuel the trend toward globalization. More countries than ever before have opened their borders to trade and investment. Over the past decade international trade has increased twice as fast as global output (see Figure 1.5). Fourteen major trade agreements were enacted in the 1990s. Figure 1.6 shows their effect on U.S. imports and exports. The creation of the World Trade Organization (WTO) in the 1990s brought tariffs on manufactured goods down to 4 percent

for most industrialized countries, opened up the heavily protected industries of agriculture, textiles, and telecommunications, and extended the scope of international trade rules to cover services, as well as goods.

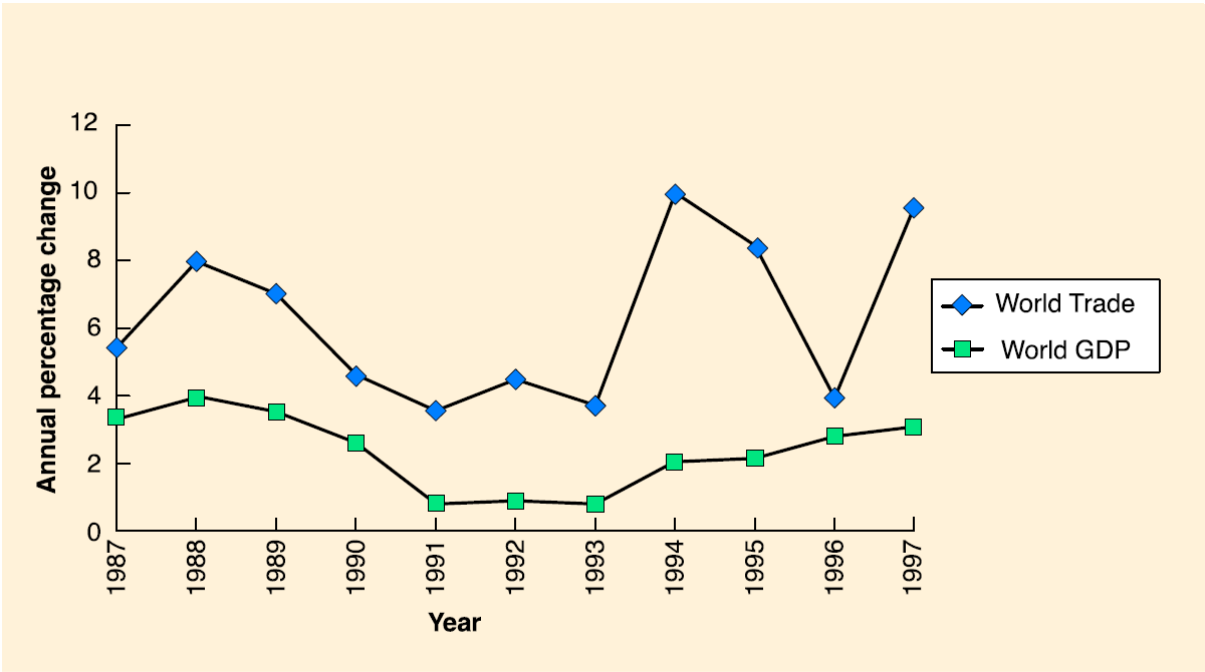


FIGURE 1.5 Growth in Volume of World Trade as Compared to World GDP

Source: "World Trade Growth Accelerated in 1997 Despite Turmoil in Asian Financial Markets." (3-19-98). http://www.wto.org/wto/intltrad/internat.htm

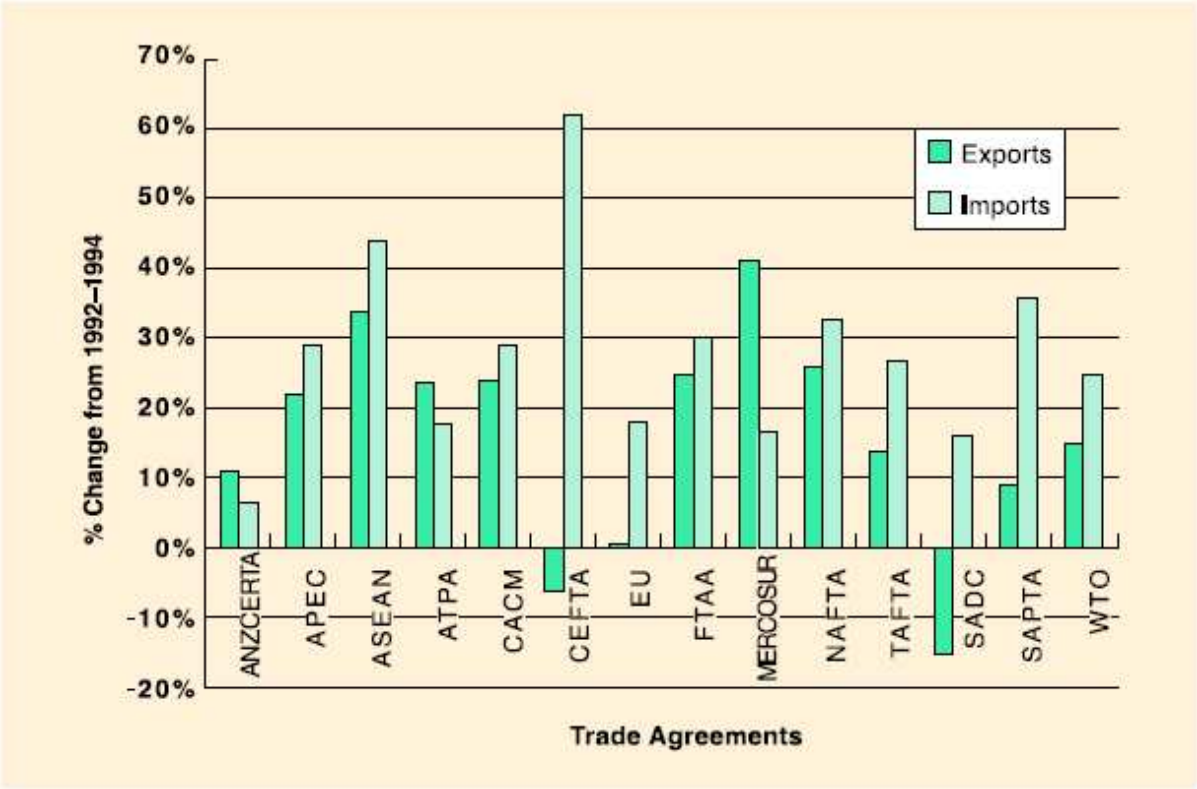


FIGURE 1.6 The Impact of Trade Agreements on U.S. Imports and Exports

Source: U.S. Bureau of Census, Merchandise Trade Series, as given in Justin Zubrod and Mary Beth Barron, "Trade Pacts Fuel a Transformation in the Rules of Global Logistics," *Transportation and Distribution* (April 1996): 62. *Note:* ANZCERTA—Australia New Zealand Closer Economic Relations Trade Agreement; APEC—Asian Pacific Economic Cooperation; ASEAN—Association of Southeast Asian Nations; ATPA—Andean Trade Preference Act; CACM—Central America Common Market; CEFTA—Central Europe Free Trade Agreement; EU—European Union; FTAA—Free Trade Area of the Americas; MERCOSUR—Mercado Commun del Sur (Latin American trade treaties); NAFTA—North American Free Trade Agreement; TAFTA—TransAtlantic Free Trade Area; SADC—Southern African Development Community; SAPTA—South Asian Area Preferential Trading Agreement; WTO—World Trade Organization

American products and services are produced, as well as consumed, in every part of the globe. Whirlpool makes the majority of its products in Mexico and Europe, General Electric is the biggest private-sector employer in Singapore, and half of IBM's workforce is located outside of the United States. Table 1.3 (on page 14 of your textbook) reveals the degree of foreign assets, sales, and employment of selected multinational corporations. Notice that only three of the top ten multinational corporations are based in the United States.

The expanding economies of East Asia, Latin America, and Eastern Europe constitute the major growth opportunities in international trade. Competition in those markets is fierce, and local production helps solidify trade. In 1995, nearly 60 percent of large capital investments in new facilities ($200 million or more each) took place in the Asia-Pacific region.[2]

THE COMPETITIVE EDGE

Whirlpool's Global Strategy

Whirlpool's globalization strategy has doubled revenues and transformed it from a

sleepy Rust Belt manufacturer into an aggressive international competitor. Faced with a maturing home market, Whirlpool decided to enter foreign markets rather than diversify into furniture or garden products. Now Whirlpool makes appliances in 12 countries and sells them in 140. Thirty-eight percent of its revenue comes from abroad. Whirlpool is number one in North and Latin America, and trails only Electrolux and Bosch-Siemens in Europe. Its 1 percent market share in Asia is the largest of any Western appliance maker.

But start-up costs have been high and demand in Europe weak. Whirlpool's profit margins are down from 8 percent to 5 percent, and its stock price is lower than three years ago. Four joint ventures with the Chinese in one year may have been too much. Will Whirlpool's strategy succeed? Only time will tell. Maytag sold its European operations at a loss of $135 million, and its stock rose 20 percent.

Source: Bill Vlasic and Zachary Schiller, "Did Whirlpool Spin too Far too Fast?" *Business Week* (June 24, 1996): 133-36.

The most active companies worldwide in terms of international expansion are General Motors, Ford, General Electric, Motorola, and Daimler-Chrysler, which, in one year, built twenty-three new facilities in the Asia-Pacific region and eleven in Europe. Automobile plants were opened in Brazil, Romania, China, Spain, France, Thailand, and Vietnam. Semiconductor and microprocessor plants sprang up in England, Ireland, Israel, Japan, China, Taiwan, and Indonesia. The toy, watch, and garment industries of Hong Kong migrated to China, as did Taiwanese Nike and Adidas production, and Korean electronics. Tiny Singapore gained "developed economy" status with $4.8 billion in manufacturing investments.

The arrival of the global marketplace has dramatically increased international trade and the logistics operations to support it. Shown here is Singapore's global port where 16 million containers are processed annually from ship to rail car or tractor trailer for distribution. Its geographic location, highly skilled workforce, advanced telecommunications systems, and excellent financial services make Singapore an ideal hub for international business.

Inexpensive and efficient telecommunications networks, from Internet to wireless to satellites, allow firms to locate different parts of their production process in different countries while maintaining close contact. The dramatic decrease in cost and increase in capacity has produced global supply chains that truly reach around the world. With the Internet, producers and consumers no longer need to be face-to-face. Distance becomes irrelevant. Developing software, selling airline tickets, obtaining medical advice, even attending college can be handled online. Markets are more transparent as buyers and sellers can comparison shop worldwide. Trade barriers are harder to erect when transactions can take place electronically. Electronic commerce, expected to reach $3 trillion by 2005, has spurred more international trade and increased foreign investment.

Despite the benefits of increased foreign trade and investment, globalization is not without risk. For example, rapid economic growth in Asia has stretched its transportation infrastructure to the limit. Bottlenecks in ports, road, and rail delay products from reaching their market. The markets themselves are highly fragmented with distinct languages, customs, trade barriers, and levels of development. In addition, distribution channels within regions are unorganized and inefficient. That means operations must be customized to each country and logistics carefully planned. In Latin America and the Eastern European countries, stability of the governments and poor economic conditions continue to inhibit increased trade and localized operations. The economic crises of Europe (1992-1993), Mexico (1994-1995), and Southeast Asia (1997-2000) significantly affected investments, production, and markets worldwide.

Pause and Reflect

***1-5.** Choose three trade agreements from those listed in Figure 1.5 (ANZERTA, APEC, ASEAN, ATPA, CACM, CEFTA, EU, FTAA, MERCOSUR, NAFTA, TAFTA, SADC, SAPTA, WTO). Write a short paper describing the treaties, which countries they involve, how

long they have been in effect, and if they've been renegotiated recently. (You can search for information on the web using each treaty's acronym.)

***1-6.** Describe the global activities of Hewlett-Packard, General Electric, Motorola and IBM. How many foreign plants do they have? Where are they located? How much of their business is foreign? Are any global strategies evident?

***1-7.** Examine the climate for foreign investments in Europe, South America, and the Pacific Rim. What are the advantages of locating a production facility in each area?

These exercises require a direct link to a specific Web site. Click **Internet Exercises for the list of internet links for these exercises.*

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[2]The data in this section come from Audrey Pennington, "Global Facilities Go Gangbusters," *Site Selection* 41, no. 1 (February 1996): 156-59.

Services

In the United States and other highly industrialized nations, the economy has shifted away from manufacturing toward service industries. Nearly 80 percent of workers worldwide are employed in services. Services account for 75 percent of the gross domestic product (GDP) for the United States, and service jobs are expected to provide virtually the entire net gain in U.S. employment over the next decade. The expansion in service jobs is primarily in high-tech firms, too, in contrast to the predominantly low-pay, low-skilled service jobs of the past. U.S. service exports more than doubled from 1988 to 1998, providing a healthy trade surplus and helping to reduce the overall trade deficit. The foreign market for services, exceeding $1.2 trillion in 1996, has tremendous potential barely tapped by U.S. firms.

Six of the top ten firms on Fortune's Global 500 list are services and eight of the top ten largest employers are service firms. As services have grown in the worldwide economy, the distinction between service operations and manufacturing operations has become increasingly blurred. The preparation of hamburgers at McDonald's and the processing of packages at Federal Express look remarkably like assembly work in a factory. For machine tool and heavy equipment manufacturers, the installation and servicing of the equipment yields far greater returns than its physical manufacture. IBM markets itself as a provider of computer solutions, rather than a manufacturer of computers.

Lands' End, headquartered in Dodgeville, Wisconsin, is the largest specialty catalogue company in the United States. The company's products include casual and tailored clothing for men, women, and children, shoes and accessories, soft luggage, and items for bed and bath. Fast, efficient operations allows Lands' End to offer convenient at-home shopping of quality merchandise at competitive prices. We'll examine operations management at Lands' End throughout this text.

It is apparent that manufacturing and service operations go hand-in-hand. Manufacturing companies cannot function without the support of services such as accounting, personnel, advertising, transportation, financial and legal; and many services would not exist if the goods they support were not produced. Television repair shops would be obsolete without televisions, and televisions would be no good without broadcasting services! In this text, we provide plentiful examples of both service and manufacturing operations, recognizing their common and unique concerns.

Pause and Reflect

***1-8.** Access the Department of Commerce's site on International Trade in Services. Name the top five service exports. How does the export of services compare to the export of goods? To what country are most services exported? Comment on the balance of trade in services.

These exercises require a direct link to a specific Web site. Click **Internet Exercises for the list of internet links for these exercises.*

Competitiveness

A global marketplace for both products and services means more customers and more intense competition. Competitiveness can be viewed from a national, industry, or firm perspective.

In the broadest terms, we speak of competitiveness in reference to other *countries* rather than to other companies. That's because competitiveness affects the economic success of a nation and the quality of life for its citizens. **Competitiveness** is "the degree to which a nation, can, under demanding and rapidly changing market conditions, produce goods and services that

meet the test of international markets while simultaneously maintaining or expanding the real incomes of its citizens."[3] We measure a nation's competitiveness by its gross domestic product (GDP), import/export ratio, and increases in productivity.

Productivity as a Measure of Competitiveness

Productivity, the most common measure of competitiveness, is calculated by dividing units of output by units of input.

$$\text{Productivity} = \frac{\text{output}}{\text{input}}$$

The predominant input in productivity calculations is *labor hours.* According to the Bureau of Labor Statistics, even though labor is the only factor of production explicitly considered, comparisons of productivity *over time* implicitly reflect the joint effects of many other factors, including technology, capital investment, capacity utilization, energy use, and managerial skills. Thus, productivity statistics provided in government reports typically measure *changes in productivity* from month to month, quarter to quarter, year to year, or over a number of years.

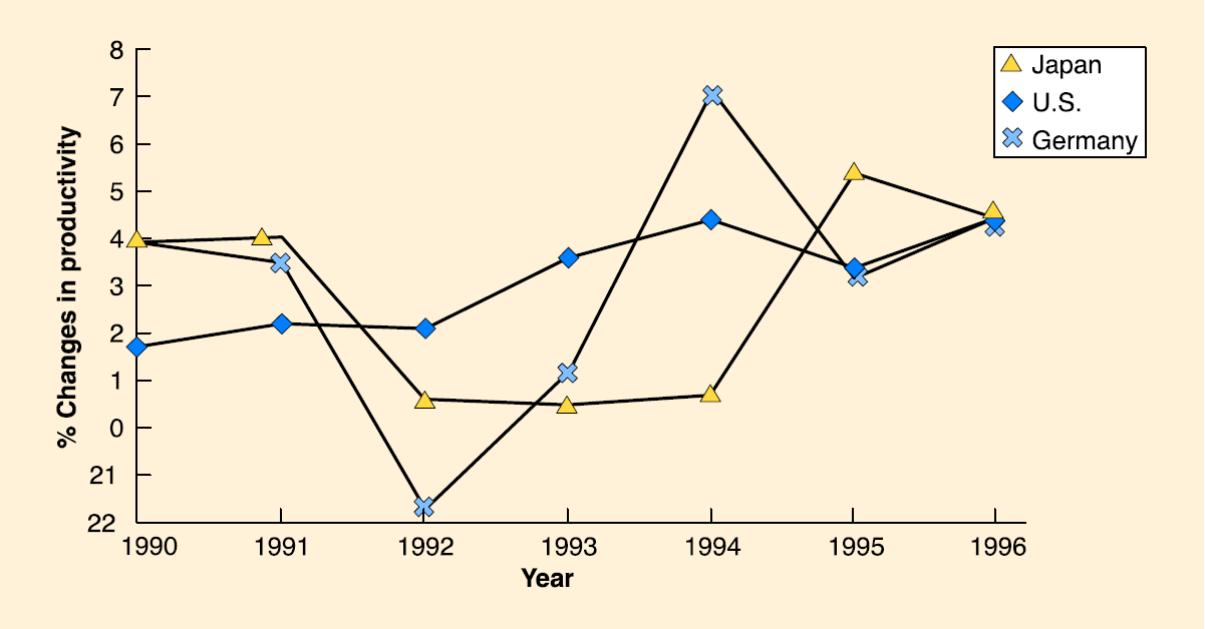

FIGURE 1.7 Productivity in the 1990s

Figure 1.7 shows annual percent changes in productivity from 1990 to 1996 for the United States, Germany, and Japan. Although productivity varied widely in the first half of the 1990s, by 1996 the three countries had virtually identical rates of productivity growth. Upon further examination of the input and output data provided in Figure 1.8, however, we can see that the manner in which each country increased productivity differed significantly. Japan increased productivity solely by using its existing inputs more efficiently to produce greater output. The United States achieved the same effect by producing more output with a slight decrease in input. Germany did not increase output or input--rather, a slight decrease in output was offset by a dramatic decrease in input. Figure 1.8 also shows changes in input and output for France, Italy, Sweden, the United Kingdom, and Canada.

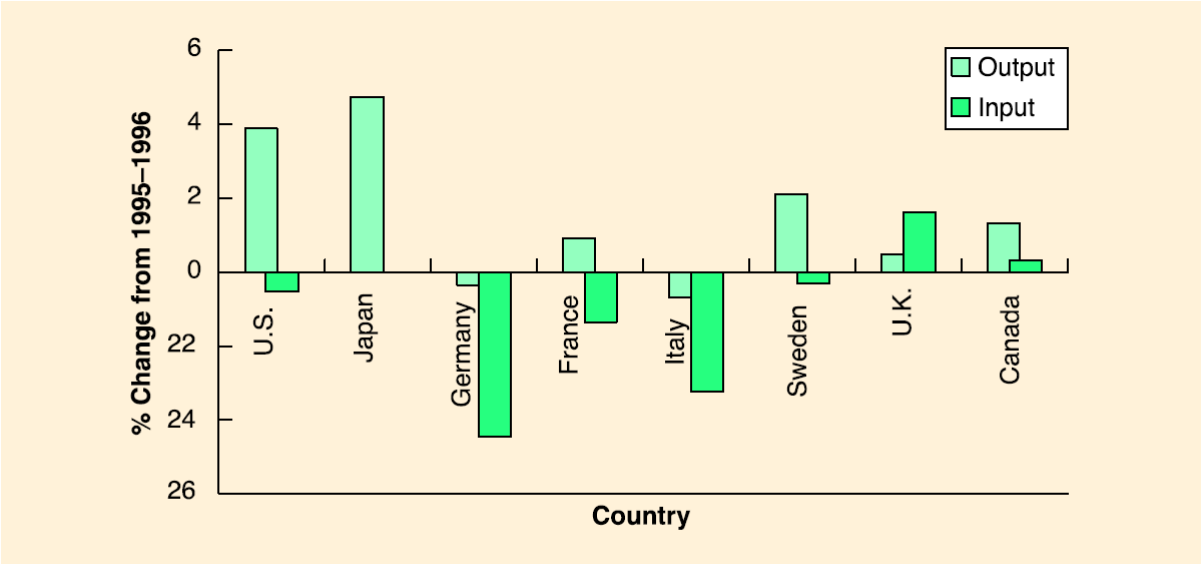

FIGURE 1.8 Changes in Input and Output

Source: U.S. Department of Labor, Bureau of Labaor Statistics, *Foreign Labor Statistics* (2-9-98).

Pause and Reflect

1-9. Examine Figure 1.8. How did productivity change for France, Italy, Sweden, the United Kingdom, and Canada?

***1-10.** Investigate the role of government in improving industrial competitiveness. Begin with the U.S. Council on Competitiveness and United Kingdom's Study of Manufacturing and Business Processes. What is the state of industrial competitiveness in each country? What are the panel's concerns? Their recommendations? Find a similar site for at least one other country and compare their priorities and initiatives.

These exercises require a direct link to a specific Web site. Click **Internet Exercises for the list of internet links for these exercises.*

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[3]*Report of the President's Commission on Industrial Competitiveness,* chaired by John A. Young, President and CEO, Hewlett-Packard, 1985.

Competitive Industries

Competition within industries is more intense when the firms are relatively equal in size and resources, products and services are standardized, and industry growth is either slow (so that one company gains at the expense of another) or exponential (so that gaining a foothold in the market is a strategic imperative). Industry competitiveness can be measured by the number of major players in the industry, average market share, and average profit margin. Probably the most competitive industry worldwide is pharmaceuticals, in which the largest manufacturer holds a mere 4.7 percent market share. Price wars, relentless advertising (such as nightly phone calls from long-distance carriers), frequency of new product or service introductions,

and purchasing incentives (extended warranties, financial packages, switching bonuses, and so on) provide additional evidence of competition within industries.

In some industries, competition is limited because it is difficult for new firms to enter the industry. Many of the **barriers to entry**[4]--economies of scale, capital requirements, access to supply and distribution channels, and learning curves--are operations oriented. Let's explore them in more detail.

1. *Economies of scale.* In many industries, as the number of units produced increases, the cost of producing each individual unit decreases, which is known as **economies of scale.** New companies entering such an industry may not have the demand to support large volumes of production, and thus, their unit cost would be higher.
2. *Capital investment.* Large initial investments in facilities, equipment, and training may be required to become a "player" in some industries. For example, opening a new hospital requires an enormous investment in facilities, equipment, and professional personnel; in contrast, a day-care center may operate out of an existing home with only minimal equipment, training, and licensing requirements.
3. *Access to supply and distribution channels.* Existing firms within an industry have established supply and distribution channels that may be difficult for new firms to replicate. Examples: Toys 'R Us dominates its suppliers. Wal-Mart's information and distribution systems provide a strong competitive advantage. VISA will not allow its member banks to do business with American Express.
4. *Learning curves.* Lack of experience can be a barrier to entry in an industry with significant learning curves. For example, U.S. firms dominate the aerospace industry because of their experience and expertise in airplane design and construction. However, this may not always be the case, as component manufacturers in Korea and Japan are gaining valuable experience as suppliers to aerospace firms. Shipbuilders claim a 10 percent learning curve (and corresponding cost advantage) for each similar vessel built. Hospitals performing heart transplants exhibit an amazing 79 percent learning curve.[5]

Pause and Reflect

***1-11.** Examine this year's Global 500 by industry. Which industries are the most competitive? Which industries are the least competitive? Are some industries dominated by certain countries? Which industries are the most profitable?

1-12. Explore the emergence of high-tech industries and the changing rules of competition. How does e-commerce affect competitiveness?

1-13. Discuss four common barriers that firms may experience as they try to enter a new industry.

1-14. Choose an industry on which you will be the class "expert" for the duration of this course. Write an initial profile of major players, customers, structure, and competitive issues.

These exercises require a direct link to a specific Web site. Click **Internet Exercises for the list of internet links for these exercises.*

[4]These are adapted from Michael Porter, *Competitive Advantage* (New York: Free Press, 1985).

[5]David Smith and Jan Larson, "The Impact of Learning on Cost: The Case of Heart Transplantation," *Hospital and Health Services Administration* (Spring 1989): 85-97. Learning curves are discussed in more detail in Chapter 8.

Competitive Firms

Measures of a firm's competitiveness include market share, earnings per share, revenue growth, and profit margins. A firm is competitive if it performs *at least as well* as its rivals. However, being as good (or as bad) as the competition is not an inspiring goal. It puts the firm in a defensive stance and ensures second-rate status.

THE COMPETITIVE EDGE

FedEx Uses Technology Wisely

Service companies seldom come to mind as examples of high-tech operations, but Federal Express was built on advanced technology. Its hub-and-spokes transportation system has been copied by every major airline in the world. Manufacturers often benchmark against FedEx's specially designed package-sortation system that processes 1 million packages in less than three hours. FedEx also has one of the most sophisticated computer information systems in the world. The COSMOS network can receive information from transfer terminals in delivery vans and in customer facilities and from hand-held computers called SuperTrackers. Employees use the information to track customer orders, adjust delivery routes, determine load factors and docking sequences for aircraft, schedule maintenance activities, and maintain a sufficient inventory of service parts.

Customers can access much of this information electronically over the Internet. They can also print mailing labels, schedule pickups, and follow every move their package makes from pickup to delivery. FedEx even designs and operates inventory management systems, distribution centers, and specialized Web pages that link its customers' customers directly to FedEx pickups and deliveries. Clearly, FedEx's use of technology has given the company a competitive edge.

Federal Express began operations in 1973 with a fleet of eight small aircraft. Five years later, the company employed 10,000 people to handle 35,000 daily deliveries. Today, more than 90,000 FedEx employees process 1.5 million shipments daily, all of which must be tracked, sorted, and delivered in a short amount of time. The SuperTracker, shown here, is a hand-held computer used for scanning a shipment's bar code every time a package changes hands between pickup and delivery. It provides valuable input data for locating the root causes of problems and calculating the company's twelve component Service Quality Indicator (SQI).

Leading the competition--breaking new ground--is more difficult and risky than being a follower, but it is also more exciting, more energizing, and more instructive. That's why in this text we provide examples of firms that consistently go beyond the competition--with a competitive edge. Look for application boxes in each chapter and learn how a variety of organizations have found **The Competitive Edge!**

Pause and Reflect

1-15. How is competitiveness measured for a country? An industry? A firm?

Issues and Trends in Operations

Operations is a field that is rapidly changing and growing in importance. Current issues and future trends in operations include:

1. *Intense competition.* The intensity of worldwide competition continues to increase. Global restructuring, the emergence of newly industrialized economies, and the Internet have opened new markets worldwide. As world markets grow, so do potential customers, as well as the number and quality of competitors.
2. *Global markets, global sourcing, and global financing.* Few companies are able to survive by competing in the domestic market alone. Companies need to learn about foreign societies, understand foreign customers, build networks, and forge

partnerships. Production takes place wherever in the world it can be done the cheapest, access to capital markets is worldwide, and the global supply chain reaches around the world.

3. *Importance of strategy.* Companies need long-term global strategies to survive in the marketplace. Vertically integrated partnerships, partnerships with other companies in the same industry, partnerships with educational institutions, and partnerships with government are needed to strengthen competitive positions. A new type of capitalism based on strategic alliances and cooperative specialization within industries may become a necessity.
4. *Product variety and mass customization.* An increasing variety of products and services will be offered, in many cases, customized for individuals. This means the expected life of products will continue to decrease, and product and service innovations will hit the market at an increasing rate.
5. *More services.* Eighty percent of jobs in the United States are provided by the service sector. Many corporations we think of as successful manufacturing firms, such as GM, GE, IBM, and Westinghouse, actually generate more than half of their income from services. For both manufacturing and service firms, *customer service* is a competitive battleground that will continue to intensify.
6. *Emphasis on quality.* The quality of products and services continues to improve as customer expectations of quality grow. Zero defects will be the norm. Quality that delights the customer and provides a competitive advantage will be the goal.
7. *Flexibility.* The most successful production systems are the most flexible, measured by the ability to adjust to changes in product design, changes in product mix, changes in the volume of demand, and changes in process technology.
8. *Advances in technology.* Information technology, electronic commerce, and telecommunications will continue to advance at a rapid rate. Advanced materials (metal-based composites, polymer-based composites, and high-tech ceramics), smart materials, advanced machining (EDM, lasers, electron beams, plasma flame cutting, flexible tooling and fixturing), intelligent sensors, smart robots, biotechnology, digital imaging, artificial intelligence, superconductors and supercomputing will dramatically change how products and services are designed and how firms compete.
9. *Worker involvement.* The empowerment of the workforce has had a significant impact on operations in the 1990s. This trend will continue in the future as the ability to create, absorb, and utilize *knowledge* holds the key to success. Countries that perform the best in the world market will have the best research and development (R&D), the best education system, the brightest people, and the savvy to use those assets to their fullest.
10. *Environment and ethical concerns.* Companies and industries increasingly consider the environmental impact of the design, manufacture, distribution, use, and disposal of their products and services. The impetus for environmental responsibility may shift from government regulations to customer requirements. As companies compete and produce across national borders, corporate ethics and social responsibility will be dictated more by customer expectations and corporate culture than by legalities in the host country.

THE COMPETITIVE EDGE

Malden Mills' Greatest Asset--Its People

A five-alarm fire destroys your textile factory in Massachusetts where costs are high. Do you retire and pocket the insurance money? Do you use the opportunity to relocate to the Sunbelt or overseas? Not if you're Aaron Feuerstein, the 70-year-old owner of Malden Mills. You rebuild on the same site, and you pay full wages to your 1,000 employees until production can be restarted--that's a $15 million payout for months of idle labor. Crazy, you say? Feuerstein calls it good business.

"Why would I chase cheap labor [or alienate my workers] when I might run the risk of losing the advantage I've got, which is superior quality?" says Feuerstein. The key to continued success is to create unsurpassed *value* "with superior products, service, teamwork, productivity and cooperation with the buyer." To do that, you need capable, experienced textile designers, engineers, and workers.

It's Malden's workers that give the company its competitive edge. Employee retention at Malden Mills is above 95 percent--so is customer retention. The correlation between loyal customers and loyal employees is no coincidence. In the 1980s, when the market for its major product--artificial furs--collapsed, it was employees in R&D and production who saved the company by inventing a new fabric called *Polartec.* L. L. Bean, Lands' End, Patagonia, North Face, and Eddie Bauer buy as much of the fabric as Malden can supply.

At the European trade show one year after the fire, Malden introduced a new line of fabric based on Polartec--for upholstery. Maybe those workers weren't complete couch potatoes after all.

Source: Thomas Teal, "Not a Fool, Not a Saint," *Fortune* (November 11, 1996): 201-4.

Pause and Reflect

***1-16.** Look for articles related to operations management in Fortune, Business Week, or CNN. How do they relate to the trends in operations discussed in the chapter?

***1-17.** Operations management is one of the most popular courses at Harvard Business School. From the days of Wickham Skinner, Harvard has been known for its operations expertise. Link to the Technology and Operations Management unit at Harvard. Read and summarize one of the working papers of the faculty.

1-18. List several issues and trends in operations for the future. What actions do you recommend to prepare for the future challenges?

These exercises require a direct link to a specific Web site. Click **Internet Exercises for the list of internet links for these exercises.*

Primary Topics in Operations Management

There are many issues, concepts, and techniques associated with the field of operations management (OM). This text is designed as an introductory survey course in OM that covers many different topics. In the following sections, we provide a brief overview of the primary topics in operations management. They are presented in the order in which operational decisions are made within a firm. It is not a coincidence that the chapters in this text are organized in a similar fashion.

Deploying Strategy

Strategy is only as good as the results it produces. Good results require that the corporation vision and strategic plan be converted into a series of consistent, achievable action plans to be deployed throughout the organization. Operations strategy must be consistent with corporate strategy and may provide the distinctive competence on which a firm competes. This topic appears in the text as *operations strategy.*

Assuring Quality

Quality drives operational decisions. The level of quality a company seeks to achieve is a strategic decision that eventually determines how a product is made or a service is delivered. Designing products and services, designing and planning the production process, locating and developing the production facility, designing jobs and work activities, and planning and scheduling the flow of products throughout the system are all areas of operations management that are increasingly dominated by quality. For this reason, the first two topics presented after the initial discussion of strategy are *quality management* and *statistical quality control.*

Designing Products and Services

The traditional starting point in the production process is designing the product or service. Decisions related to design include converting customer requirements to product or service characteristics, determining the desired level of quality, selecting materials, and evaluating the resulting production costs. This topic is covered in the text as *product and service design.*

Planning the Production Process

Once the product or service has been designed, the physical process that will produce the product or deliver the service must be constructed. Plans are developed for acquiring materials, determining the types of job skills, equipment, and technology required, and managing the process. This topic is referred to as *process planning, analysis, and reengineering.*

Laying Out the Facility

The production process that has been designed must be physically housed in a facility and laid out in an effective manner so that the product can be produced or service delivered as efficiently as possible. Decision making focuses on how to arrange different parts of the production or delivery process in the facility in order to ensure a smooth flow and minimal cycle time. The title of this area of operations management is *facility layout.*

Designing Jobs and Work

A primary component of the production process is the work performed by people, alone, together, or with machines and equipment. *Human resources management* is the area of OM concerned with making sure that jobs meet the requirements of the production process in the most efficient and effective manner possible.

Managing the Supply Chain

Once the production process and facility have been designed, decisions must be made regarding where to locate the facility in relation to customers and suppliers and how to manage the supply chain. A *supply chain* encompasses all the facilities, functions, and activities involved in producing and delivering a product or service, from the suppliers (and their suppliers) to the customer (and their customers).

Forecasting Demand for Products and Services

Once the physical facility and production process are in place to produce a product or deliver a service, a host of planning decisions are required to determine how much to produce and when to produce it. These decisions are based on customer demand. *Forecasting* involves using a number of different methods and quantitative techniques to provide accurate estimates of demand, which are subsequently used to make production decisions.

Production Planning and Scheduling

Once management has determined how much product or service is needed to meet the demand, production schedules that involve a myriad of decisions are developed. These decisions include how much material or how many parts to order, when material or parts should be ordered, how many workers to hire, and how these workers should be scheduled on jobs and machines. Decisions must also be made to ensure the amount of inventory available at each stage of the production process is sufficient to avoid unnecessary delays, and the amount of final inventory is sufficient to meet customer demand. For service operations, the number of servers required to serve customers in a timely manner must be established. Production planning represents a major area of decision making in operations management and includes the topics of *capacity and aggregate production planning, inventory management, material requirements planning, scheduling, just-in-time systems, service improvement,* and *project planning.*

Pause and Reflect

1-19. What activities are involved in the operations function? Which activities are related to your major? What would you be especially interested in learning in this course?

Organization and Purpose of This Book

In organizing this text, we envisioned three phases to the learning process: understanding the strategic importance of productive systems, designing productive systems, and operating productive systems. The chapters included in each phase are outlined in Table 1.4.

TABLE 1.4 Organization of Text

The Strategy of Productive Systems	*Designing Productive Systems*	*Operating Productive Systems*
1 Introduction to Operations and Competitiveness	5 Product and Service Design	10 Forecasting
2 Operations Strategy	6 Process Planning, Analysis, and Reengineering	11 Capacity Planning and Aggregate Production Planning
3 Quality Management	7 Facility Layout	12 Inventory Management
4 Statistical Quality Control	8 Human Resources in Operations Management	13 Material Requirements Planning
	9 Supply Chain Management	14 Scheduling
		15 Just-In-Time Systems
		16 Waiting Line Models for Service Improvement
		17 Project Management

Chapters 1 through 4 introduce the concepts and skills needed throughout the course and relate them to the competitive *strategy* of the firm. Chapters 5 through 9 relate to the *design* of productive systems, and Chapters 10 through 17 relate primarily to the *operation* of productive systems.

The purpose of this text is threefold:

1. *To gain an appreciation of the strategic importance of operations and how operations can provide a competitive advantage in the marketplace.* Regardless of your major or career aspiration, as a business student, you will need to understand the basic issues, capabilities, and limitations of the operations function. Especially relevant are issues related to quality, strategy, and competitiveness.
2. *To understand the relationship between operations and other business functions, such as marketing, finance, accounting, and human resources.* By the conclusion of this course, you should be able to describe the impact of operations on other functions within a firm as well as on the competitive position of the firm.
3. *To develop a working knowledge of the concepts and methods related to designing and managing operations.* From this course, you will gain the ability to conceptualize how systems are interrelated, to organize activities effectively, to analyze processes critically, to make decisions based on data, and to push for continual improvement.

Pause and Reflect

***1-20.** Three professional societies related to operations management are the Production and Operations Management Society (POMS), the European Operations Management Association (EUROMA), and the Service Operations Management Association (SOMA). Explore each site. What types of topics are discussed? What did you find especially interesting?

These exercises require a direct link to a specific Web site. Click **Internet Exercises for the list of internet links for these exercises.*

Summary

Operations can be viewed as a transformation process that converts inputs into outputs of greater value. Operations is also a basic function of a firm and the technical core of an organization. Operations management involves deploying strategy, assuring quality, designing products and services, planning the production process, laying out the facility, designing jobs and work, managing the supply chain, forecasting demand for products and services, and production planning and scheduling.

From the Industrial Revolution through the 1960s, the United States was the world's greatest producer of goods and services as well as the major source of managerial and technical expertise. In the 1970s and 1980s, America experienced competitive problems due to strategic weaknesses and inattentiveness to operations. Today, while no single country dominates the global marketplace, the United States does compete successfully, and operations plays a major role in maintaining competitiveness.

Current issues and trends in operations include intense competition in global markets; an emphasis on strategy, quality, and flexibility; advances in technology and worker involvement; more services and product variety; and environmental and ethical concerns.

Case Problems

CASE PROBLEM 1.1

What Does It Take to Compete?

Rubatex Corporation manufactures rubber and foam products for a variety of products, including artificial turf, hosing and insulation, hockey helmet liners, scuba diving suits, Thighmasters, sports sandals, and mouse pads. The company was purchased last year by an investment firm called American Industrial Partners (AIP) that has so far earned only a 1 percent return on its investment. Obviously, the company is having problems. Its sales are up but earnings down. In the first three months of this year, the company lost $2 million on $68 million in sales. Understandably, AIP wants to know why and is demanding aggressive action.

Employees at the Bedford, Virginia, plant say they know something's wrong. The plant is hot and dirty and crumbling, and they are working harder to produce items of poorer quality. Fewer than seven out of ten orders are shipped on time, and 2 percent of sales are returned as defective. Built in 1924, the plant sprawls over 14 buildings, with only the offices and lunchroom air conditioned. Equipment is old and outdated, much of it purchased in the 1940s.

The 800 to 2,000 workers at the Bedford plant are paid an average of $11.50 an hour, far above the minimum wage average for the area. In the mill room, workers get a twenty-minute lunch break and two ten-minute breaks each eight-hour shift. They spend their day lifting and loading heavy bags of compounds into mixers and working with rubber stock that can reach temperatures of 300 degrees or more. At the end of the day, workers leave covered with chemical dust from the mixing compounds. The company says exposure to the chemical poses no cancer or health risks. The workers aren't so sure.

Recently, in an effort to increase productivity, workers in the mill area were asked to increase the amount of rubber made in a single batch and decrease the bake time. Batches that used to take thirty minutes to cook were scheduled for fifteen minutes, and fifteen-minute batches were reduced to twelve minutes or less. Paradoxically, even though the workers were running about a third more batches than before, they produced less usable rubber.

Labor-management relations are not good. Management says it pays the workers well and expects top-notch performance. If productivity does not increase soon, AIP will be forced to lay off about a third of the Rubatex workforce and may eventually close down the Bedford plant. Cost estimates to update the plant exceed $6 million. AIP does not want to authorize additional investment in plant and equipment until worker commitment to improved productivity is assured. Rubatex management vows to engineer a turnaround. They have set goals for the plant to increase sales by 30 percent.

What should Rubatex do to remain competitive?

Source: Material for this case was taken from Jeff Sturgeon, "Rubatex Building Road to Recovery," and Richard Foster, "Old Plant Takes Toll on Workers, Morale," *Roanoke Times and World News* (July 21, 1996).

CASE PROBLEM 1.2

Value-Added Operations at Lands' End

Lands' End, headquartered in Dodgeville, Wisconsin, is the largest specialty catalog company in the United States. The company's products include casual and tailored clothing for men, women, and children, shoes and accessories, soft luggage, and items for bed and bath. Fast, efficient operations allows Lands' End to offer convenient at-home shopping of quality merchandise at competitive prices.

Lands' End catalogs are known for descriptive product narratives that tell customers everything they could want to know about a garment and its construction. The company's toll-free phone lines for sales and customer service are open twenty-four hours a day, 364 days a year. More than 1,000 phone lines handle about 50,000 calls each day--almost 100,000 calls daily in the weeks prior to Christmas. Eighty-five percent of all orders are placed by phone.

In-stock orders leave Lands' End's Dodgeville distribution center (a structure the size of sixteen football fields) the day after they are received. Standard delivery is two business days

anywhere within the continental United States. Lands' End works directly with some of the best fabric mills and manufacturers in the world. Garments are produced to Lands' End's own quality specifications, not to less stringent industry-wide specifications. In addition to its booming U.S. business, the company now does business in 75 countries, with facilities or special licensing agreements in Canada, the United Kingdom, Japan, and Germany. The Land's End philosophy is outlined in its "Principles of Doing Business."

Principle 1: We do everything we can to make our products better. We improve material, and add back features and construction details that others have taken out over the years. We never reduce the quality of a product to make it cheaper.

Principle 2: We price our products fairly and honestly. We do not, have not, and will not participate in the common retailing practice of inflating mark-ups to set up a future phony "sale."

Principle 3: We accept any return, for any reason, at any time. Our products are guaranteed. No fine print. No arguments. We mean exactly what we say: GUARANTEED, PERIOD.

Principle 4: We ship items in stock the day after we receive the order. At the height of the last Christmas season, the longest time an order was in the house was 36 hours, excepting monograms, which took another 12 hours.

Principle 5: We believe that what is best for our customer is best for all of us. Everyone here understands that concept. Our sales and service people are trained to know our products and to be friendly and helpful. They are urged to take all the time necessary to take care of you. We even pay for your call, for whatever reason you call.

Principle 6: We are able to sell at lower prices because we have eliminated middlemen; because we don't buy branded merchandise with high protected mark-ups; and because we have placed our contracts with manufacturers who have proved that they are cost conscious and efficient.

Principle 7: We are able to sell at lower prices because we operate efficiently. Our people are hard-working, intelligent, and share in the success of the company.

Principle 8: We are able to sell at lower prices because we support no fancy emporiums with their high overhead. Our main location is in the middle of a 40-acre cornfield in rural Wisconsin.

1. Think about the operations function at Lands' End. What is involved in the transformation process? How does the company "add value" for its customers?
2. Examine Lands' End's eight principles for doing business. What image is the company trying to portray? What specific activities support the image?
3. Gather information on Lands' End's competitors, L. L. Bean and Eddie Bauer. Are there any obvious differences in their competitive strategies? Describe the global activities of each company.

Source: Prentice-Hall. "A Brief History of Lands' End." *On Location at Lands' End Video Series.* Video 4.1.

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