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Procter & Gamble Remakes Its Global Supply Chains

opening case

Procter & Gamble (P&G) is the world's leading manufacturer of consumer products. P&G, founded in 1837 by British American William Procter and Irish American James Gamble, is headquartered in Cincinnati in the United States, and the company has now been built into a $65 billion conglomerate. Within its portfolio, P&G has 21 billion-dollar brands (e.g., Bounty, Crest, Tide), operates 130 plants staffed by 95,000 people, has some 70,000 suppliers around the world, and sells its products in more than 180 countries. By all accounts, P&G has been a giant multinational corporation for more than a century and will continue to be highly influential in consumer products for years to come.

At the same time, very few industries are as competitive as consumer packaged goods. Just think about the options that you now have compared with five years ago. In most cases, we as customers have numerous more options in every consumer packaged-goods category than we did then. The global marketplace has a lot to do with this competitive environment. Fragmentation and specialization in consumer products from more companies have resulted in more products and more places from which to buy. The infrastructure for developing products, entering markets, and maintaining customer relationships is more robust than ever, resulting in small- and medium-sized enterprises (SMEs) being competitive with companies like P&G (which they could not have competed with just a few years ago).

This market competitiveness has led companies like P&G to constantly assess the efficiencies and effectiveness of their production, operations, and global supply chains. For a long-standing industry titan like P&G, this increasingly competitive global environment—see the figures in Chapter 1 that show the drastically increased international trade in the last 20 years—has led to a newfound sense of urgency for P&G to get closer to both its customers and suppliers to maximize diminishing margins while selling products at a competitive price. This is not an easy task since margins in the consumer packaged goods market are already very tight. That led P&G to evaluate and ultimately remake their global supply chains.

P&G's goal is to replenish at least 80 percent of the retail orders the company receives in less than a day. To be able to do this, P&G redesigned its distribution network. The company has improved transparency throughout the end-to-end supply chain, developed even stronger partnerships with its suppliers, and focused on maximizing synergy throughout the production cycle. Given this focus on synergy and supplier partnerships, P&G now develops global strategic supply chain plans jointly with (at least) its core suppliers. This is not to say that all 70,000 suppliers working with P&G are involved but the so-called "strategic suppliers" are very much entrenched in working together with P&G.

P&G's 70,000 suppliers include chemical companies (e.g., Dow Chemicals, DuPont) that supply raw materials for cleaning supplies; packaging companies (e.g., Diamond Packaging, Van Genechten Packaging)

continued

that supply packaging materials for the company's products; and indirect spend providers (e.g., Jones Lang Lasalle) that deliver services such as warehouse maintenance and janitorial services. With the number and breadth of suppliers, P&G continuously focuses on maintaining a strong supplier relations program. Guiding its supplier relations program, P&G has a set of core principles: (1) Best Total Value, (2) Honest, Ethical, and Fair Dealings, (3) Externally Linked Supply Solutions, (4) Competition and Collaboration, and (5) Supplier Incumbency.

P&G appears to be in the forefront of continually evaluating and, when needed, remaking its global supply chains to maintain the titan position in the consumer packaged goods industry. Despite this success at being able to remake itself so far, one can wonder if P&G, at some point, will run into difficulties competing with companies like Alibaba and Amazon. Or, will Alibaba and Amazon simply continue to sell P&G's products (instead of starting to market their own). Alternatively, will companies like P&G be able to use their sophisticated global supply chains to expand into new territories similar to what Alibaba and Amazon did not too long ago? ●

Sources: "Technology Has Upended the World's Advertising Giants," *The Economist*, March 28, 2018; Demitrios Kalogeropoulo, "Will 2018 Be Procter & Gamble's Best Year Yet?" *The Motley Fool*, November 12, 2017; and Matt Gunn, "How Supply Chain Transformation Saved P&G $1.2 Billion," *GT Nexus Commerce Network*, April 29, 2015.

Introduction

As trade barriers fall and global markets develop, many firms increasingly confront a set of interrelated issues. First, where in the world should production activities be located? Should they be concentrated in a single country, or should they be dispersed around the globe, matching the type of activity with country differences in factor costs, tariff barriers, political risks, and the like to minimize costs and maximize value added? Single-country strategies may be efficient operationally but often become ineffective strategically. For example, what if the company focused all of its attention on one country for production and that country became politically or economically unstable? Some redundancy is usually the best approach in both global production and supply chain management practices, and such redundancy often demands that a company spreads its production and supply chains across countries.

Second, what should be the long-term strategic role of foreign production sites? Should the firm abandon a foreign site if factor costs change, moving production to another more favorable location, or is there value to maintaining an operation at a given location even if underlying economic conditions change? Value can come from cost inefficiencies. Moving factory locations from one country to another solely due to cost considerations is usually not a strategic move. Successful companies typically evaluate cost considerations along with quality, flexibility, and time issues. At the same time, cost is one of the most important considerations and serves as the starting point for discussion of making a strategic move from one country to a more advantageous production home.

Third, should the firm own foreign production activities, or is it better to outsource those activities to independent vendors? Outsourcing means less control, but it can be cost-efficient. Fourth, how should a globally dispersed supply chain be managed, and what is the role of information technology in the management of global logistics, purchasing (sourcing), and operations? Fifth, similar to issues of production, should the company manage global supply chains itself, or should it outsource

Which Career Would You Choose in Global Supply Chain Management?

With increased outsourcing and overseas production sites and customers, supply chain management is a growing field. The Council of Supply Chain Management Professionals (CSCMP), a professional association with more than 9,000 members worldwide, says the industry offers a promising outlook. What's more, potential employers are everywhere: manufacturers and distributors; government agencies; consulting firms; the transport industry; universities and colleges; service firms such as banks, hospitals, and hotels; and third-party logistics providers. The basic career options in global supply chains include its main functions of logistics, purchasing (sourcing), production and operations management, and marketing channels. Which functional area would you choose if you decided to get a job in supply chain management and why? For more information about the organization and careers in this field, visit the CSCMP website at www.cscmp.org and its Career Center, http://careers.cscmp.org.

the management to enterprises that specialize in this activity? There are myriad options for supply chain management by third parties. Few companies want to manage the full supply chain from raw material to delivering the product to the end-customer. The question, though, is what portion of the supply chain should be managed by third parties and what portion should be managed by the company itself.

As illustrated by the examples of P&G (opening case) and Alibaba (closing case), as well as illustrations in the Management Focus boxes in the chapter (describing global supply chain issues at IKEA and Amazon), companies also need to be very careful when deciding on supply chain partners globally, and they need to think about the *total costs* of their supply chains. A total cost focus of a global supply chain ensures that the goal is not to strive for the lowest cost possible at each stage of the supply chain (each node in the chain) but, instead, strive for the lowest total cost to the customer—and, by extension, greatest value—at the end of the product supply chain. This means that all aspects of cost—including integration and coordination of companies in the supply chain—have been incorporated in addition to the cost of raw material, component parts, and assembly worldwide. And these cost issues, as they relate to global logistics and global purchasing—both considered supply chains functions in a company—have been strategically and tactically addressed.

Strategy, Production, and Supply Chain Management

LO 15-1
Explain why global production and supply chain management decisions are of central importance to many global companies.

Chapter 12 introduced the concept of the value chain and discussed a number of value creation activities, including production, marketing, logistics, R&D, human resources, and information systems. This chapter focuses on two of these value creation activities—**production** and **supply chain management**—and attempts to clarify how they might be performed internationally to (1) lower the costs of value creation and (2) add value by better serving customer needs. Production is sometimes also referred to as manufacturing or operations when discussed in relation to global supply chains. We also discuss the contributions of information technology to these activities, which has become particularly important in a globally integrated world. The remaining chapters in this text look at other value creation activities in the international context (marketing, R&D, and human resource management).

production
Activities involved in creating a product.

supply chain management
The integration and coordination of logistics, purchasing, operations, and market channel activities from raw material to the end-customer.

In Chapter 12, we stated that production is concerned with the creation of a good or service. We used the term *production* to denote both service and manufacturing activities because either a service or a physical product can be produced. Although in this chapter we focus more on the production of physical goods, we should not forget that the term can also be applied to services. This has become more evident in recent years, with the continued pattern among U.S. firms to outsource the "production" of certain service activities to developing nations where labor costs are lower (e.g., the trend among many U.S. companies to outsource customer care services to places such as India, where English is widely spoken and labor costs are much lower). Supply

Did You Know?
Did you know global supply chains are not just about transportation?

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Outsourcing

This chapter tackles a number of issues related to production, make-or-buy decisions, sourcing, and logistics. Outsourcing is one of the most commonly discussed topics in news media and on the Internet related to production and supply chains. In effect, the word *outsourcing* sometimes even creates an "us against them" mentality (i.e., should the company outsource production or other activities to entities outside its country borders, or should it use only domestic operations?). Often, the answer is more of a political issue than a strategic resource issue. To stay competitive, companies typically opt for the best value to infuse into their supply chains. The "Outsourcing" section on globalEDGE™ ensures that you have an updated set of data and knowledge on outsourcing (globaledge.msu.edu/global-resources/outsourcing). For example, did you know that there is an International Association of Outsourcing Professionals? Do you know what it does, its goals, and how many members it has worldwide?

chain management is the integration and coordination of logistics, purchasing, operations, and market channel activities from raw material to the end-customer. Production and supply chain management are closely linked because a firm's ability to perform its production activities efficiently depends on a timely supply of high-quality material and information inputs, for which **purchasing** and **logistics** are critical functions. Purchasing represents the part of the supply chain that involves worldwide buying of raw material, component parts, and products used in manufacturing of the company's products and services. Logistics is the part of the supply chain that plans, implements, and controls the effective flows and inventory of raw material, component parts, and products used in manufacturing.

purchasing
The part of the supply chain that includes the worldwide buying of raw material, component parts, and products used in manufacturing of the company's products and services.

logistics
The part of the supply chain that plans, implements, and controls the effective flows and inventory of raw material, component parts, and products used in manufacturing.

The production and supply chain management functions (purchasing, logistics) of an international firm have a number of important strategic objectives.[1] One is to ensure that the total cost of moving from raw materials to finished goods is as low as possible for the value provided to the end-customer. Dispersing production activities to various locations around the globe where each activity can be performed most efficiently can lower the total costs. Costs can also be cut by managing the global supply chain efficiently to better match supply and demand. This involves both coordination and integration of the supply chain functions *inside* a global company (e.g., purchasing, logistics, production and operations management) and across the independent organizations (e.g., suppliers) involved in the chain. For example, efficient logistics practices reduce the amount of inventory in the system, increase inventory turnover, and facilitate the appropriate transportation modes being used. Maximizing purchasing operations enhances the order fulfillment and delivery, outsourcing initiatives, and supplier selections. Efficient operations ensure that the right location of production is made, establishes which production priorities should be stressed, and facilitates a high-quality outcome of the supply chain.

Another strategic objective shared by production and supply chain management is to increase product (or service) quality by establishing process-based quality standards and eliminating defective raw material, component parts, and products from the manufacturing process and the supply chain.[2] In this context, *quality* means *reliability*, implying that ultimately the finished product has no defects and performs well. These quality assurances should be embedded in both the **upstream** and **downstream** portions of the global supply chain. The upstream supply chain includes all of the organizations (e.g., suppliers) and resources that are involved in the portion of the supply chain from raw materials to the production facility (this is sometimes also called the inbound supply chain). The downstream supply chain includes all of the organizations (e.g., wholesaler, retailer) that are involved in the portion of the supply chain from the production facility to the end-customer (this is also sometimes called the outbound supply chain). Through the upstream and downstream chains, the objectives of reducing costs and increasing quality are not independent of each other. As illustrated in Figure 15.1, the firm that improves its quality control will also reduce its costs of value creation. Improved quality control reduces costs by

upstream supply chain
The portion of the supply chain from raw materials to the production facility.

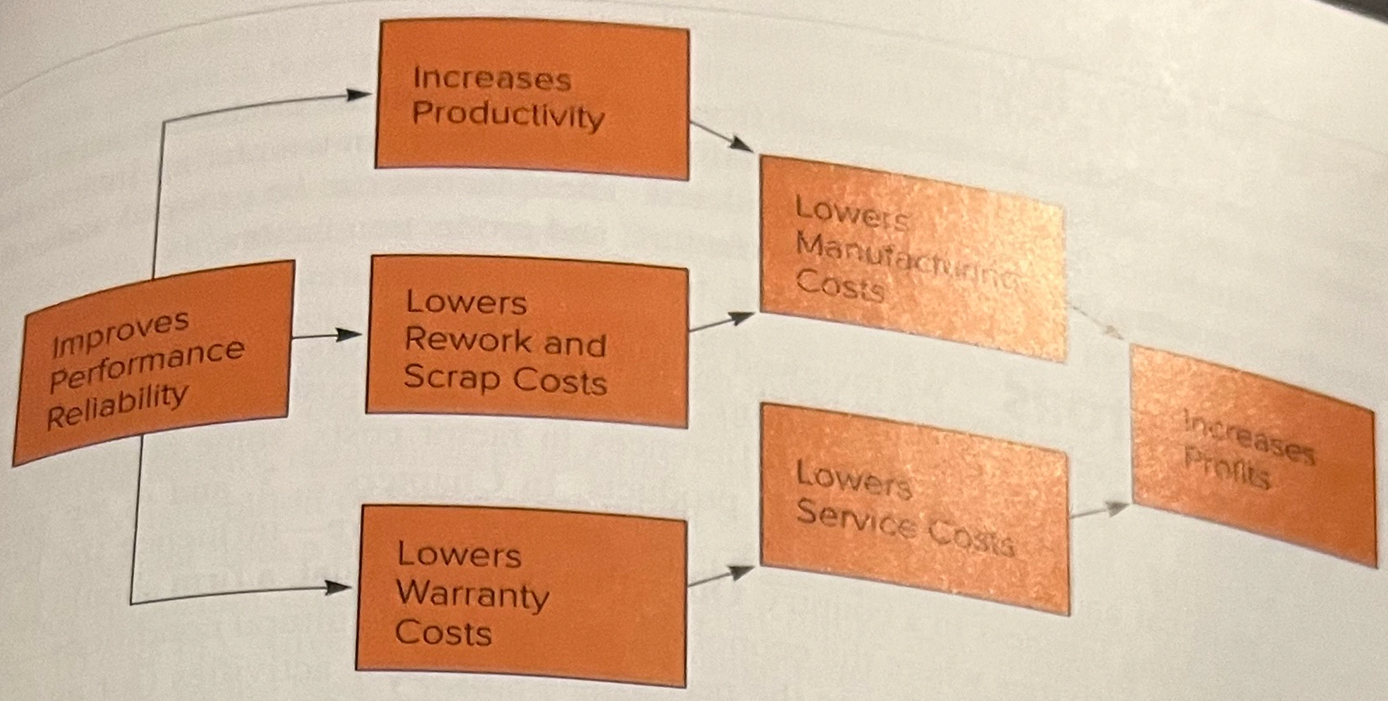
downstream supply chain
The portion of the supply chain from the production facility to the end-customer.

- Increasing productivity because time is not wasted producing poor-quality products that cannot be sold, leading to a direct reduction in unit costs.
- Lowering rework and scrap costs associated with defective products.
- Reducing the warranty costs and time associated with fixing defective products.

The effect is to lower the total costs of value creation by reducing both production and after-sales service costs. This creates an increased overall reliability in global production and supply chain management.

The principal tool that most managers now use to increase the reliability of their product offering is the Six Sigma quality improvement methodology. Six Sigma is a direct descendant of the **total quality management (TQM)** philosophy that was widely adopted, first by Japanese companies and then American companies, during the 1980s and early 1990s.[3] The TQM philosophy was developed by a number of American consultants such as W. Edwards Deming, Joseph Juran, and A. V. Feigenbaum.[4] Deming identified a number of steps that should be part of any TQM program. He argued that management should embrace the philosophy that mistakes, defects, and poor-quality materials are not acceptable and should be eliminated. Deming suggested that the quality of supervision should be improved by allowing more time for supervisors to work with employees and by providing them with the tools they need to do the job. Deming also recommended that management should create an environment

total quality management (TQM)
Management philosophy that takes as its central focus the need to improve the quality of a company's products and services.



15.1 FIGURE
The relationship between quality and costs.
Source: David A. Garvin, "What Does Product Quality Really Mean?" Sloan Management Review, Fall 1984, pp. 25–43.

in which employees will not fear reporting problems or recommending improvements. He believed that work standards should not only be defined as numbers or quotas, but also include some notion of quality to promote the production of defect-free output. Deming argued that management has the responsibility to train employees in new skills to keep pace with changes in the workplace. In addition, he believed that achieving better quality requires the commitment of everyone in the company.

Six Sigma

Statistically based methodology for improving product quality.

Six Sigma, the modern successor to TQM, is a statistically based philosophy that aims to reduce defects, boost productivity, eliminate waste, and cut costs throughout a company. Six Sigma programs have been adopted by several major corporations, such as Motorola, General Electric, and Honeywell. Sigma comes from the Greek letter that statisticians use to represent a standard deviation from a mean; the higher the number of "sigmas," the smaller the number of errors. At six sigmas, a production process would be 99.99966 percent accurate, creating just 3.4 defects per million units. While it is almost impossible for a company to achieve such perfection, Six Sigma quality is a goal to strive toward. The Six Sigma program is particularly informative in structuring global processes that multinational corporations can follow in quality and productivity initiatives. As such, increasingly companies are adopting Six Sigma programs to try to boost their product quality and productivity.[5]

ISO 9000

Certification process that requires certain quality standards that must be met.

The growth of international standards has also focused greater attention on the importance of product quality. In Europe, for example, the European Union requires that the quality of a firm's manufacturing processes and products be certified under a quality standard known as **ISO 9000** before the firm is allowed access to the EU marketplace. Although the ISO 9000 certification process has proved to be somewhat bureaucratic and costly for many firms, it does focus management attention on the need to improve the quality of products and processes.[6]

In addition to lowering costs and improving quality, two other objectives have particular importance in international businesses. First, production and supply chain functions must be able to accommodate demands for local responsiveness. As we saw in Chapter 12, demands for local responsiveness arise from national differences in consumer tastes and preferences, infrastructure, distribution channels, and host-government demands. Demands for local responsiveness create pressures to decentralize production activities to the major national or regional markets in which the firm does business or to implement flexible manufacturing processes that enable the firm to customize the product coming out of a factory according to the market in which it is to be sold.

Second, production and supply chain management must be able to respond quickly to shifts in customer demand. In recent years, time-based competition has grown more important.[7] When consumer demand is prone to large and unpredictable shifts, the firm that can adapt most quickly to these shifts will gain an advantage.[8] As we shall see, both production and supply chain management play critical roles here.

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LO 15-2

Explain how country differences, production technology, and production factors all affect the choice of where to locate production activities.

Where to Produce

An essential decision facing an international firm is where to locate its production activities to best minimize costs and improve product quality. For the firm contemplating international production, a number of factors must be considered. These factors can be grouped under three broad headings: country factors, technological factors, and production factors.[9]

COUNTRY FACTORS

We reviewed country-specific factors in some detail earlier in the book. Political and economic systems, culture, and relative factor costs differ from country to country. In Chapter 6, we saw that due to differences in factor costs, some countries have a comparative advantage for producing certain products. In Chapters 2, 3, and 4, we saw how differences in political and economic systems—and national culture—influence the benefits, costs, and risks of doing business in a country. Other things being equal, a firm should locate its various manufacturing activities where the economic, political, and cultural conditions—including relative factor costs—are conducive to the performance of those activities (for an example, see the accompanying Management Focus, which looks at the IKEA production in China). In Chapter 12, we referred to the benefits derived from such a strategy as location economies. We argued that one result of the strategy is the creation of a global web of value creation activities.

Also important in some industries is the presence of global concentrations of activities at certain locations. In Chapter 8, we discussed the role of location externalities in influencing foreign direct investment decisions. Externalities include the presence of an appropriately skilled labor pool and supporting industries.[10] Such externalities can play an important role in deciding where to locate production activities. For example, because of a cluster of semiconductor manufacturing plants in Taiwan, a pool of labor with experience in the semiconductor business has developed. In addition, the plants have attracted a number of supporting industries, such as the manufacturers of semiconductor capital equipment and silicon, which have established facilities in Taiwan to be near their customers. This implies that there are real benefits to locating in Taiwan, as opposed to another location that lacks such externalities. Other things being equal,

management FOCUS

IKEA Production in China

Founded in Sweden in 1943 by 17-year-old Ingvar Kamprad, IKEA is the largest furniture retailer in the world. We covered some of the global strategy of IKEA in the opening case to Chapter 13. As we have mentioned, the IKEA name comes from its founder, Ingvar Kamprad—an acronym of the founder's initials from his first and last names (**I**ngvar **K**amprad) along with the first initials of the farm where he grew up (**E**lmtaryd) and his hometown in Sweden (**A**gunnaryd).

Beyond its founding in Sweden and its current headquarters in Delft, The Netherlands, IKEA presents an amazing global supply chain story and production apparatus. IKEA is a multinational corporation where most of the company's operations, management of the more than 350 stores in 46 countries, and design and manufacturing of furniture are run by a trust, INGKA Holding. It is the trust that is headquartered in Delft, Holland. Most of the furniture designs of IKEA products are still made in Sweden, but the manufacturing of that furniture—or, really, the pieces that customers buy to put together into furniture—has been outsourced to China and other Asian countries.

Considering that IKEA produces an assortment of some 12,000 furniture and related products, production capabilities and capacities are at a premium for IKEA to sustain its market leadership in the world. To start, IKEA has a clear vision for the products that it designs and produces. The company's idea is to provide well-designed, functional home furnishings at prices so low that as many people around the world as possible will be able to afford them. Importantly, the critical functions to make this happen, such as global supply chains and global inventory management, work in concert to support IKEA's distinctive value proposition.

The Sweden-based home furnishing giant opened its first wholly owned manufacturing facility in China on August 28, 2013. In a local move, the factory supports the rapid expansion in Asia and, especially, in China (the facility is located in Nantong, Jiangsu province). As the largest sourcing country for IKEA, China accounts for more than 20 percent of its global procurement, with about 300 local Chinese suppliers. The factory is also not far from IKEA's two biggest warehouses, which are located in Shanghai.

Sources: Lindsey Rupp, "Ikea, Dollar General CEOs Lobby Republicans in Tax Showdown," *Bloomberg Businessweek*, March 7, 2017; D. L. Yohn, "How IKEA Designs Its Brand Success," *Forbes*, June 10, 2015; J. Kane, "The 21 Emotional Stages of Shopping at IKEA, From Optimism to Total Defeat," *The Huffington Post*, May 6, 2015; J. Leland, "How the Disposable Sofa Conquered America," *The New York Times Magazine*, October 5, 2005, p. 45; "The Secret of IKEA's Success," *The Economist*, February 24, 2011; B. Torekull, *Leading by Design: The IKEA Story* (New York: HarperCollins, 1998); and P. M. Miller, "IKEA with Chinese Characteristics," *Chinese Business Review*, July–August 2004, pp. 36–69.

the externalities make Taiwan an attractive location for semiconductor manufacturing facilities. The same process is now under way in two Indian cities, Hyderabad and Bangalore, where both Western and Indian information technology companies have established operations. For example, locals refer to a section of Hyderabad as "Cyberabad," where Microsoft, IBM, Infosys, and Qualcomm (among others) have major facilities.

Of course, other things are not equal. Differences in relative factor costs, political economy, culture, and location externalities are important, but other factors also loom large. Formal and informal trade barriers obviously influence location decisions (see Chapter 7), as do transportation costs and rules and regulations regarding foreign direct investment (see Chapter 8). For example, although relative factor costs may make a country look attractive as a location for performing a manufacturing activity, regulations prohibiting foreign direct investment may eliminate this option. Similarly, a consideration of factor costs might suggest that a firm should source production of a certain component from a particular country, but trade barriers could make this uneconomical.

Another important country factor is expected future movements in its exchange rate (see Chapters 10 and 11). Adverse changes in exchange rates can quickly alter a country's attractiveness as a manufacturing base. Currency appreciation can transform a low-cost location into a high-cost location. Many Japanese corporations had to grapple with this problem during the 1990s and early 2000s. The relatively low value of the yen on foreign exchange markets between 1950 and 1980 helped strengthen Japan's position as a low-cost location for manufacturing. More recently, however, the yen's steady appreciation against the dollar increased the dollar cost of products exported from Japan, making Japan less attractive as a manufacturing location. In response, many Japanese firms moved their manufacturing offshore to lower-cost locations in East Asia.

TECHNOLOGICAL FACTORS

The type of technology a firm uses to perform specific manufacturing activities can be pivotal in location decisions. For example, because of technological constraints, in some cases it is necessary to perform certain manufacturing activities in only one location and serve the world market from there. In other cases, the technology may make it feasible to perform an activity in multiple locations. Three characteristics of a manufacturing technology are of interest here: the level of fixed costs, the minimum efficient scale, and the flexibility of the technology.

Fixed Costs

As noted in Chapter 12, in some cases the fixed costs of setting up a production plant are so high that a firm must serve the world market from a single location or from very few locations. For example, it now costs up to $5 billion to set up a state-of-the-art plant to manufacture semiconductor chips. Given this, other things being equal, serving the world market from a single plant sited at a single (optimal) location can make sense.

Conversely, a relatively low level of fixed costs can make it economical to perform a particular activity in several locations at once. This allows the firm to better accommodate demands for local responsiveness. Manufacturing in multiple locations may also help the firm avoid becoming too dependent on one location. Being too dependent on one location is particularly risky in a world of floating exchange rates. Many firms disperse their manufacturing plants to different locations as a "real hedge" against potentially adverse moves in currencies.

Minimum Efficient Scale

The concept of economies of scale tells us that as plant output expands, unit costs decrease. The reasons include the greater utilization of capital equipment and the productivity gains that come with specialization of employees within the plant.[11] However, beyond a certain level of output, few additional scale economies are available. Thus, the "unit cost curve" declines with output until a certain output level is reached, at which point further increases in output realize little reduction in unit costs. The level of output at which most plant-level scale economies are exhausted is referred to as the **minimum efficient scale** of output. This is the scale of output a plant must operate to realize all major plant-level scale economies (see Figure 15.2).

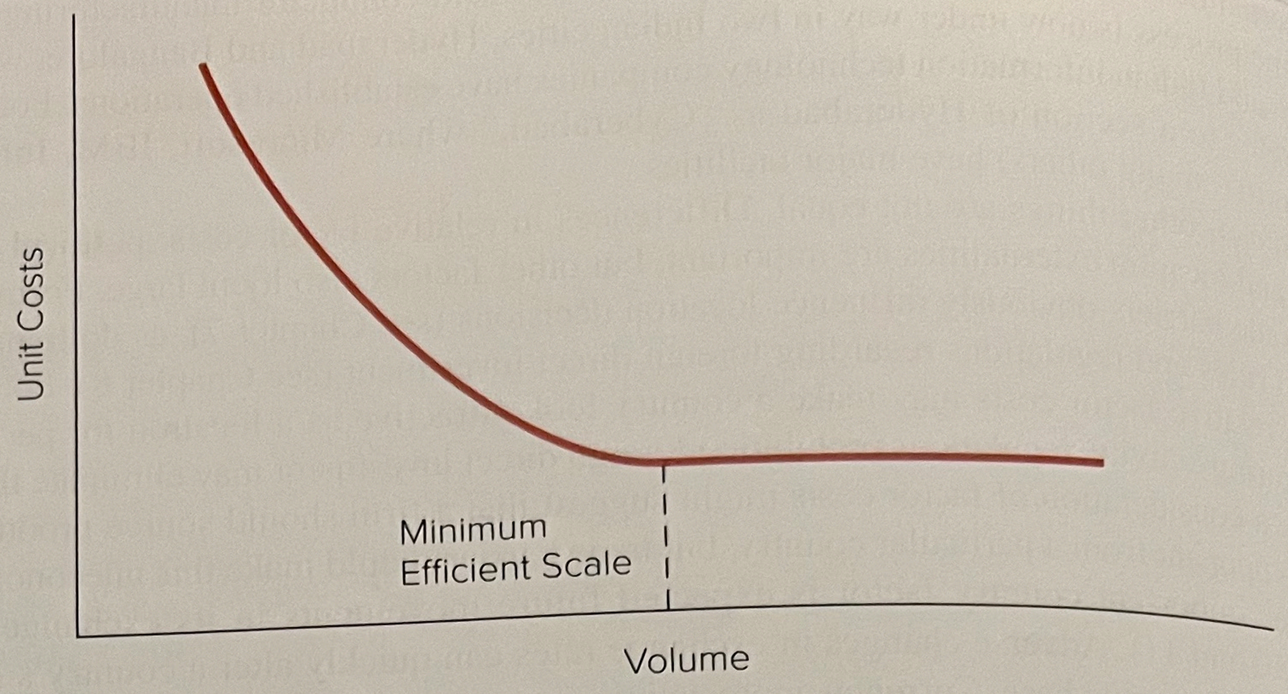
minimum efficient scale
The level of output at which most plant-level scale economies are exhausted.

The implications of this concept are as follows: The larger the minimum efficient scale of a plant relative to total global demand, the greater the argument for centralizing production in a single location or a limited number of locations. Alternatively, when the minimum efficient scale

15.2 FIGURE

Typical unit cost curve.

Source: C. W. L. Hill and G. T. M. Hult, Global Business Today *(New York: McGraw-Hill Education, 2018).*



of production is low relative to global demand, it may be economical to manufacture a product at several locations. For example, the minimum efficient scale for a plant to manufacture personal computers is about 250,000 units a year, while the total global demand exceeds 35 million units a year. The low level of minimum efficient scale in relation to total global demand makes it economically feasible for companies such as Dell and Lenovo to assemble PCs in multiple locations.

As in the case of low fixed costs, the advantages of a low minimum efficient scale include allowing the firm to accommodate demands for local responsiveness or to hedge against currency risk by manufacturing the same product in several locations.

Flexible Manufacturing and Mass Customization

Central to the concept of economies of scale is the idea that the best way to achieve high efficiency, and hence low unit costs, is through the mass production of a standardized output. The trade-off implicit in this idea is between unit costs and product variety. Producing greater product variety from a factory implies shorter production runs, which in turn implies an inability to realize economies of scale. That is, wide product variety makes it difficult for a company to increase its production efficiency and thus reduce its unit costs. According to this logic, the way to increase efficiency and drive down unit costs is to limit product variety and produce a standardized product in large volumes.

flexible manufacturing technology
Manufacturing technology designed to improve job scheduling, reduce setup time, and improve quality control.

lean production
See flexible manufacturing technology.

This view of production efficiency has been challenged by the rise of flexible manufacturing technologies. The term **flexible manufacturing technology**—or **lean production**, as it is often called—covers a range of manufacturing technologies designed to (1) reduce setup times for complex equipment, (2) increase the utilization of individual machines through better scheduling, and (3) improve quality control at all stages of the manufacturing process.[12] Flexible manufacturing technologies allow the company to produce a wider variety of end products at a unit cost that at one time could be achieved only through the mass production of a standardized output. Research suggests the adoption of flexible manufacturing technologies may actually increase efficiency and lower unit costs relative to what can be achieved by the mass production of a standardized output while enabling the company to customize its product offering to a much greater extent than was once thought possible. The term **mass customization** has been coined to describe the ability of companies to use flexible manufacturing technology to reconcile two goals that were once thought to be incompatible: low cost and product customization.[13] Flexible manufacturing technologies vary in their sophistication and complexity.

mass customization
The production of a variety of end products at a unit cost that could once be achieved only through mass production of a standardized output.

One of the most famous examples of a flexible manufacturing technology, Toyota's production system, has been credited with making Toyota the most efficient auto company in the world. (Despite Toyota's recent problems with sudden uncontrolled acceleration, the company continues to be an efficient producer of high-quality automobiles, according to J.D. Power, which produces an annual quality survey. Toyota's Lexus models continue to top J.D. Power's quality rankings.[14]) Toyota's flexible manufacturing system was developed by one of the company's

engineers, Taiichi Ohno. After working at Toyota for five years and visiting Ford's U.S. plants, Ohno became convinced that the mass production philosophy for making cars was flawed. He saw numerous problems with mass production.

First, long production runs created massive inventories that had to be stored in large warehouses. This was expensive, both because of the cost of warehousing and because inventories tied up capital in unproductive uses. Second, if the initial machine settings were wrong, long production runs resulted in the production of a large number of defects (i.e., waste). Third, the mass production system was unable to accommodate consumer preferences for product diversity.

In response, Ohno looked for ways to make shorter production runs economical. He developed a number of techniques designed to reduce setup times for production equipment (a major source of fixed costs). By using a system of levers and pulleys, he reduced the time required to change dies on stamping equipment from a full day in 1950 to three minutes by 1971. This made small production runs economical, which allowed Toyota to respond better to consumer demands for product diversity. Small production runs also eliminated the need to hold large inventories, thereby reducing warehousing costs. Plus, small product runs and the lack of inventory meant that defective parts were produced only in small numbers and entered the assembly process immediately. This reduced waste and helped trace defects back to their source to fix the problem. In sum, these innovations enabled Toyota to produce a more diverse product range at a lower unit cost than was possible with conventional mass production.[15]

Flexible machine cells are another common flexible manufacturing technology. A flexible machine cell is a grouping of various types of machinery, a common materials handler, and a centralized cell controller (computer). Each cell normally contains four to six machines capable of performing a variety of operations. The typical cell is dedicated to the production of a family of parts or products. The settings on machines are computer controlled, which allows each cell to switch quickly between the production of different parts or products.

flexible machine cells
Flexible manufacturing technology in which a grouping of various machine types, a common materials handler, and a centralized cell controller produce a family of products.

Improved capacity utilization and reductions in work in progress (i.e., stockpiles of partly finished products) and in waste are major efficiency benefits of flexible machine cells. Improved capacity utilization arises from the reduction in setup times and from the computer-controlled coordination of production flow between machines, which eliminates bottlenecks. The tight coordination between machines also reduces work-in-progress inventory. Reductions in waste are due to the ability of computer-controlled machinery to identify ways to transform inputs into outputs while producing a minimum of unusable waste material. While freestanding machines might be in use 50 percent of the time, the same machines when grouped into a cell can be used more than 80 percent of the time and produce the same end product with half the waste. This increases efficiency and results in lower costs.

The effects of installing flexible manufacturing technology on a company's cost structure can be dramatic. The Ford Motor Company has been introducing flexible manufacturing technologies into its automotive plants around the world. These new technologies should allow Ford to produce multiple models from the same line and to switch production from one model to another much more quickly than in the past, allowing Ford to take $2 billion out of its cost structure.[16]

Besides improving efficiency and lowering costs, flexible manufacturing technologies enable companies to customize products to the demands of small consumer groups—at a cost that at one time could be achieved only by mass-producing a standardized output. Thus, the technologies help a company achieve mass customization, which increases its customer responsiveness. Most important for international business, flexible manufacturing technologies can help a firm customize products for different national markets. The importance of this advantage cannot be overstated. When flexible manufacturing technologies are available, a firm can manufacture products customized to various national markets at a single factory sited at the optimal location. And it can do this

Should Nestlé Continue to Invest Heavily in Turkey?

According to Nestlé Turkey's CEO Hans Ulrich Mayer, Turkey has been a great place to invest. "Turkey has been the recipient of several Nestlé investments many times greater than we invest in other markets," reported Mayer. Nestlé has invested about $500 million in Turkey over the last four years, and following its successful breakfast cereal investment, the company intends to go on investing because of the strong Turkish economy compared to other European economies. Nestlé products sold in Turkey, ranging from pet food to chocolates, are manufactured in Turkey and also exported to North Africa and the Middle East. Given the political situation in Turkey, should Nestlé continue to establish increased production (i.e., expand its production facility) in delivering to North Africa and the Middle East, or should it establish production elsewhere?

Source: *Invest in Turkey*. www.spotblue.co.uk.

without absorbing a significant cost penalty. Thus, firms no longer need to establish manufacturing facilities in each major national market to provide products that satisfy specific consumer tastes and preferences, part of the rationale for a localization strategy (Chapter 12).

PRODUCTION FACTORS

Several production factors feature prominently into the reasons why production facilities are located and used in a certain way worldwide. They include (1) product features, (2) locating production facilities, and (3) strategic roles for production facilities.

Product Features

Two product features affect location decisions. The first is the product's *value-to-weight* ratio because of its influence on transportation costs. Many electronic components and pharmaceuticals have high value-to-weight ratios; they are expensive, and they do not weigh very much. Thus, even if they are shipped halfway around the world, their transportation costs account for a very small percentage of total costs. Given this, other things being equal, there is great pressure to produce these products in the optimal location and to serve the world market from there. The opposite holds for products with low value-to-weight ratios. Refined sugar, certain bulk chemicals, paint, and petroleum products all have low value-to-weight ratios; they are relatively inexpensive products that weigh a lot. Accordingly, when they are shipped long distances, transportation costs account for a large percentage of total costs. Thus, other things being equal, there is great pressure to make these products in multiple locations close to major markets to reduce transportation costs.

The other product feature that can influence location decisions is whether the product serves universal needs, needs that are the same all over the world. Examples include many industrial products (e.g., industrial electronics, steel, bulk chemicals) and modern consumer products (e.g., Apple's iPhone or iPad, Amazon's Kindle, Lenovo's ThinkPad, Sony's Cyber-shot camera, Microsoft's Xbox). Because there are few national differences in consumer taste and preference for such products, the need for local responsiveness is reduced. This increases the attractiveness of concentrating production at an optimal location.

Locating Production Facilities

LO 15-3
Recognize how the role of foreign subsidiaries in production can be enhanced over time as they accumulate knowledge.

There are two basic strategies for locating production facilities: (1) concentrating them in a centralized location and serving the world market from there or (2) decentralizing them in various regional or national locations that are close to major markets. The appropriate strategic choice is determined by the various country-specific, technological, and product factors discussed in this section and summarized in Table 15.1.

As can be seen, concentration of production makes most sense when

- Differences among countries in factor costs, political economy, and culture have a substantial impact on the costs of manufacturing in various countries.
- Trade barriers are low.
- Externalities arising from the concentration of like enterprises favor certain locations.
- Important exchange rates are expected to remain relatively stable.
- The production technology has high fixed costs and high minimum efficient scale relative to global demand or flexible manufacturing technology exists.
- The product's value-to-weight ratio is high.
- The product serves universal needs.

Alternatively, decentralization of production is appropriate when

- Differences among countries in factor costs, political economy, and culture do not have a substantial impact on the costs of manufacturing in various countries.
- Trade barriers are high.
- Location externalities are not important.
- Volatility in important exchange rates is expected.
- The production technology has low fixed costs and low minimum efficient scale, and flexible manufacturing technology is not available.
- The product's value-to-weight ratio is low.
- The product does not serve universal needs (i.e., significant differences in consumer tastes and preferences exist among nations).

Country Factors
Differences in political economy
Differences in culture
Differences in factor costs
Trade barriers
Location externalities
Exchange rates

Technological Factors
Fixed costs
Minimum efficient scale
Flexible manufacturing technology

Product Factors
Value-to-weight ratio
Serves universal needs

In practice, location decisi
in factor costs, technological
while a combination of trade b
tion. This seems to be the case
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Strategic Roles for Pr

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server factory, (4) contributor

An **offshore factory** is one
or finished goods at a lower c
shore factory, investments in
minimum to achieve greater c

	Concentrated Production Favored	Decentralized Production Favored
Country Factors		
Differences in political economy	Substantial	Few
Differences in culture	Substantial	Few
Differences in factor costs	Substantial	Few
Trade barriers	Few	Substantial
Location externalities	Important in industry	Not important in industry
Exchange rates	Stable	Volatile
Technological Factors		
Fixed costs	High	Low
Minimum efficient scale	High	Low
Flexible manufacturing technology	Available	Not available
Product Factors		
Value-to-weight ratio	High	Low
Serves universal needs	Yes	No

15.1 TABLE
Location Strategy and Production

In practice, location decisions are seldom clear-cut. For example, it is not unusual for differences in factor costs, technological factors, and product factors to point toward concentrated production, while a combination of trade barriers and volatile exchange rates points toward decentralized production. This seems to be the case in the world automobile industry. Although the availability of flexible manufacturing and cars' relatively high value-to-weight ratios suggest concentrated manufacturing, the combination of formal and informal trade barriers and the uncertainties of the world's current floating exchange rate regime (see Chapter 10) have inhibited firms' ability to pursue this strategy. For these reasons, several automobile companies have established "top-to-bottom" manufacturing operations in three major regional markets: Asia, North America, and Western Europe.

Strategic Roles for Production Facilities

The growth of global production among multinational companies has been tremendous over the past two decades, outdoing the growth of home country production by more than 10-fold.[17] In essence, since the early 1990s, multinationals have opted to set up production facilities outside their home country 10 times for every 1 time they have opted to create such facilities at home. There is a clear strategic rational for this; multinationals are trying to capture the gains associated with a dispersed global production system. This trend is expected to continue going forward. Thus, managers need to be ready to make the decision to open up a new production facility outside of their home base and decide where to locate the facility.

When making these decisions, managers need to think about the strategic role assigned to a foreign factory. A major consideration here is the importance of **global learning**—the idea that valuable knowledge does not reside just in a firm's domestic operations; it may also be found in its foreign subsidiaries. Foreign factories that upgrade their capabilities over time are creating valuable knowledge that might benefit the whole corporation. Foreign factories can have one of a number of strategic roles or designations, including (1) offshore factory, (2) source factory, (3) server factory, (4) contributor factory, (5) outpost factory, and (6) lead factory.[18]

An **offshore factory** is one that is developed and set up mainly for producing component parts or finished goods at a lower cost than producing them at home or in any other market. At an offshore factory, investments in technology and managerial resources should ideally be kept to a minimum to achieve greater cost-efficiencies. Basically, the best offshore factory should involve

global learning
The flow of skills and product offerings from foreign subsidiary to home country and from foreign subsidiary to foreign subsidiary.

offshore factory
A factory that is developed and set up mainly for producing component parts or finished goods at a lower cost than producing them at home or in any other market.

minimal everything—from engineering to development to engaging with suppliers to negotiating prices to any form of strategic decisions being made at that facility. In reality, we expect at least some strategic decisions to include input from the offshore factory personnel.

source factory
A factory whose primary purpose is also to drive down costs in the global supply chain.

The primary purpose of a **source factory** is also to drive down costs in the global supply chain. The main difference between a source factory and an offshore factory is the strategic role of the factory, which is more significant for a source factory than for an offshore factory. Managers of a source factory have more of a say in certain decisions, such as purchasing raw materials and component parts used in the production at the source factory. They also have strategic input into production planning, process changes, logistics issues, product customization, and implementation of newer designs when needed. Centrally, a source factory is at the top of the standards in the global supply chain, and these factories are used and treated just like any factory in the global firm's home country. This also means that source factories should be located where production costs are low, where infrastructure is well developed, and where it is relatively easy to find a knowledgeable and skilled workforce to make the products.

server factory
A factory linked into the global supply chain for a global firm to supply specific country or regional markets around the globe.

A **server factory** is linked into the global supply chain for a global firm to supply specific country or regional markets around the globe. This type of factory—often with the same standards as the top factories in the global firm's system—is set up to overcome intangible and tangible barriers in the global marketplace. For example, a server factory may be intended to overcome tariff barriers, reduce taxes, and reinvest money made in the region. Another obvious reason for a server factory is to reduce or eliminate costly global supply chain operations that would be needed if the factory were located much farther away from the end customers. Managers at a server factory typically have more authority to make minor customizations to please their customers, but they still do not have much more input than managers in an offshore factory relative to the home country factories of the same global firm.

contributor factory
A factory that serves a specific country or world region.

A **contributor factory** also serves a specific country or world region. The main difference between a contributor factory and a server factory is that a contributor factory has responsibilities for product and process engineering and development. This type of factory also has much more of a choice in terms of which suppliers to use for raw materials and component parts. In fact, a contributor factory often competes with the global firm's home factories for testing new ideas and products. A contributor factory has its own infrastructure when it comes to development, engineering, and production. This means that a contributor factory is very much stand-alone in terms of what it can do and how it contributes to the global firm's supply chain efforts.

outpost factory
A factory that can be viewed as an intelligence-gathering unit.

An **outpost factory** can be viewed as an intelligence-gathering unit. This means that an outpost factory is often placed near a competitor's headquarters or main operations, near the most demanding customers, or near key suppliers of unique and critically important parts. An outpost factory also has a function to fill in production; it often operates as a server and/or offshore factory as well. The outpost factory can be very much connected to the idea of selecting countries for operations based on the countries' strategic importance rather than on the production logic of a location. Maintaining and potentially even enhancing the position of the global firm in strategic countries is sometimes viewed as a practical factor. For example, the fact that Nokia has its headquarters in Finland may result in another mobile phone manufacturer locating some operations in Finland, even though the country market is rather small (about 5.5 million people).

lead factory
A factory that is intended to create new processes, products, and technologies that can be used throughout the global firm in all parts of the world.

A **lead factory** is intended to create new processes, products, and technologies that can be used throughout the global firm in all parts of the world. This is where cutting-edge production should take place or at least be tested for implementation in other parts of the firm's production network. Given the lead factory's prominent role in setting a high bar for how the global firm wants to provide products to customers, we also expect that it will be located in an area where highly skilled employees can be found (or where they want to locate). A lead factory scenario also implies that managers and employees at the site have a direct connection to and say in which suppliers to use, what designs to implement, and other issues that are of critical importance to the core competencies of the global firm.

THE HIDDEN COSTS OF FOREIGN LOCATIONS

There may be some "hidden costs" to basing production in a foreign location. Numerous anecdotes suggest that high employee turnover, shoddy workmanship, poor product quality, and low productivity are significant issues in some outsourcing locations.[19]

Microsoft, for example, established a major facility in Hyderabad, India, for four very good reasons: (1) The wage rate of software programmers in India is one-third of that in the United

States; (2) India has an excellent higher education system that graduates many computer science majors every year; (3) there was already a high concentration of information technology companies and workers in Hyderabad; and (4) many of Microsoft's highly skilled Indian employees, after spending years in the United States, wanted to return home, and Microsoft saw the Hyderabad facility as a way of holding on to this valuable human capital.

However, the company found that the turnover rate among its Indian employees is higher than in the United States. Demand for software programmers in India is high, and many employees are prone to switch jobs to get better pay. Although Microsoft has tried to limit turnover by offering good benefits and long-term incentive pay, such as stock grants to high performers who stay with the company, many of the Indians who were hired locally apparently place little value on long-term incentives and prefer higher current pay. High employee turnover, of course, has a negative impact on productivity. One Microsoft manager in India noted that 40 percent of his core team had left within the past 12 months, making it very difficult to stay on track with development projects.[20]

Microsoft is not alone in experiencing this problem. The manager of an electronics company that outsourced the manufacture of wireless headsets to China noted that after four years of frustrations with late deliveries and poor quality, his company decided to move production *back* to the United States. In his words: "On the face of it, labor costs seemed so much lower in China that the decision to move production there was a very easy one. In retrospect, I wish we had looked much closer at productivity and workmanship. We have actually lost market share because of this decision."[21] Another example of efficiency and effectiveness issues is highlighted in the accompanying Management Focus, which looks at Amazon and its world-leading global supply chains.

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management FOCUS

Amazon's Global Supply Chains

Amazon.com Inc.—typically referred to as just Amazon—has ranked among the top companies for years in the "Gartner Global Supply Chain Top 25" ranking. Other regular entries among the companies with the best global supply chains include Unilever, McDonald's, and Intel. Amazon is passing through about $160 billion in sales via its global supply chains and partnerships annually, a staggering amount given that the company seldom takes possession in any true sense of the products that it channels to customers from various companies.

Amazon is based in Seattle, Washington. It has now become the largest online retailer in the United States, surpassing Walmart as the most valuable retailer by market capitalization (but Walmart's revenue is still gigantic at about $500 billion annually). Amazon started in 1994 as an online bookstore but has diversified to a variety of products, including music downloads, furniture, food, and almost all consumer electronics. These days, customers can seemingly buy anything they need via the Amazon platform. In the United States alone, roughly 150 million customers per month visit Amazon.com. But this massive availability of products also puts a strain on Amazon's global supply chains.

As customers, we have come to expect that Amazon will deliver whatever we buy in the shortest cycle time possible, often no more than two days, especially if a customer is signed up for Amazon Prime. The Amazon Prime service includes free two-day shipping (on many products), video streaming, music, photos, and the Kindle lending library for an annual fee (currently $99 per year or $12.99 per month). All these services are welcomed by customers, but the free two-day shipping is really what drives the Amazon Prime service.

The free two-day shipping (and a myriad of other shipping alternatives for a fee) requires Amazon to leverage its inventory management practices, global supply chains, and technology to cost effectively reach customers. Delivery speed and efficiency require Amazon to have strategically located fulfillment centers worldwide that can be used by select vendors on the Amazon platform. This includes strict requirements for packaging, labeling, and shipment. Amazon stores these vendors' products in bulk or in individual "pickable" locations.

So far, in addition to the United States, Amazon has retail websites for Australia, Brazil, Canada, China, France, Germany, India, Italy, Japan, Mexico, the Netherlands, Spain, the United Kingdom, and Ireland. And, the Amazon Prime service places great strain on Amazon's supply chains where it is available in its worldwide locations (e.g., Canada, France, Germany, Italy, Japan, and the United Kingdom).

In addition, Amazon's customer service centers span some 15 countries worldwide. Plus, the company operates retail websites for international brands such as Sears Canada, Bebe Stores, Marks & Spencer, Mothercare, and Lacoste. This means that Amazon is benefiting from both its global supply chains for delivery of vendors' products and its service as a technology supply chain vendor to businesses.

Another interesting development—or, at least, idea at this stage—is the speculation that Amazon is thinking about launching a global shipping and logistics operation that can compete with United Parcel Service (UPS) and FedEx. Of course, Chief Financial Officer (CFO) Brian Olsavsky downplayed Amazon's ambitions on this front. He said that Amazon was just looking to supplement its delivery partners—not replace them—during the very busy peak periods like the holiday seasons.

Sources: Todd Bishop, "Amazon Sales Rises 22% to $43.7B, Profit Beats Expectations But Stock Slips on Revenue Miss," *GeekWire*, February 2, 2017; Spencer Soper, "Amazon Building Global Delivery Business to Take On Alibaba," *Bloomberg Technology*, February 9, 2016; V. Walt, "How Jeff Bezos Aims to Conquer the Next Trillion-dollar Market," *Fortune*, January 1, 2016; B. Stone, "The Secrets of Bezos: How Amazon Became the Everything Store," *Bloomberg Business*, October 10, 2013; and A. Cuthbertson, "Amazon Buries Zombie Apocalypse Clause in Terms of Service," *Newsweek*, February 11, 2016.

LO 15-4

Identify the factors that influence a firm's decision of whether to source supplies from within the company or from foreign suppliers.

Make-or-Buy Decisions

make-or-buy decision
The strategic decision concerning whether to produce an item in-house ("make") or purchase it from an outside supplier ("buy").

The **make-or-buy decision** for a global firm is the strategic decision concerning whether to produce an item in-house ("make") or purchase it from an outside supplier ("buy"). Make-or-buy decisions are made at both the strategic and operational levels, with the strategic level being focused on the long term and the operational level being more focused on the short term. In some ways, the make-or-buy decision is also the starting point for operations' influence on global supply chains. That is, someone in the chain—within one firm—has to take the lead in deciding whether the global firm should make the product in-house or buy it from an external supplier. If the decision is to make it in-house, there are certain implications for that firm's global supply chains (e.g., where to purchase raw materials and component parts). If the decision is to buy the product, that decision also has certain implications (e.g., quality control and competitive priorities management).

A number of things are involved in determining which decision is the correct one for a particular global firm in a particular situation. At a broad level, issues of product success, specialized knowledge, and strategic fit can lead to the make (produce) decision. For example, if the item or part is critical to the success of the product, including perceptions among primary stakeholders, such a scenario skews the decision in favor of make. Another reason for a make decision is that the item or part requires specialized design or production skills and/or equipment and reliable alternatives are very scarce. Strategic fit is also important. If the item or part strategically fits within the firm's current and/or planned core competencies, then it should be a make decision for the global firm.

However, these are strategic decisions at a general level. In reality, the make-or-buy decision is often based largely on two critical factors: cost and production capacity. Cost issues include such things as acquiring raw materials, component parts, and any other inputs into the process, along with the costs of finishing the product. The production capacity is really presented as an opportunity cost. That is, does the firm have the capacity to produce the product at a cost that is at least no higher than the cost of buying it from an external supplier? And if the product is made in-house, what opportunity cost would be incurred as a result (e.g., what product or item was the firm unable to produce because of limited production capacity)? Unfortunately, many, and perhaps most, global companies think that cost and production capacity are the only factors playing into the make-or-buy decision. This is simply not true!

Cost and production capacity are just the two main drivers behind make-or-buy choices made by global companies when they engage in global supply chains. The decision of whether to buy or make a product is a much more complex and research-intensive process than the typical global firm may expect. For example, how many times have we heard, "Let's move our production to China because we can get the same quality for a dime-on-the-dollar cost, and that will free up production capacity that we can use to focus on other products"? Of course, dime-on-the-dollar cost is not the sole relevant factor because we have to take into account the costs of quality control measures that have to be instituted, raw materials that have to be purchased far away from home, foreign entry requirements, multiple-party contracts, management responsibilities for the outsourced production operations, and so on. Ultimately, we are unlikely to end up with a dime-on-the-dollar cost. But where do we end up and how do we get there? In other words, what are the core elements that we should be evaluating when we are determining whether the correct decision is to make or to buy?

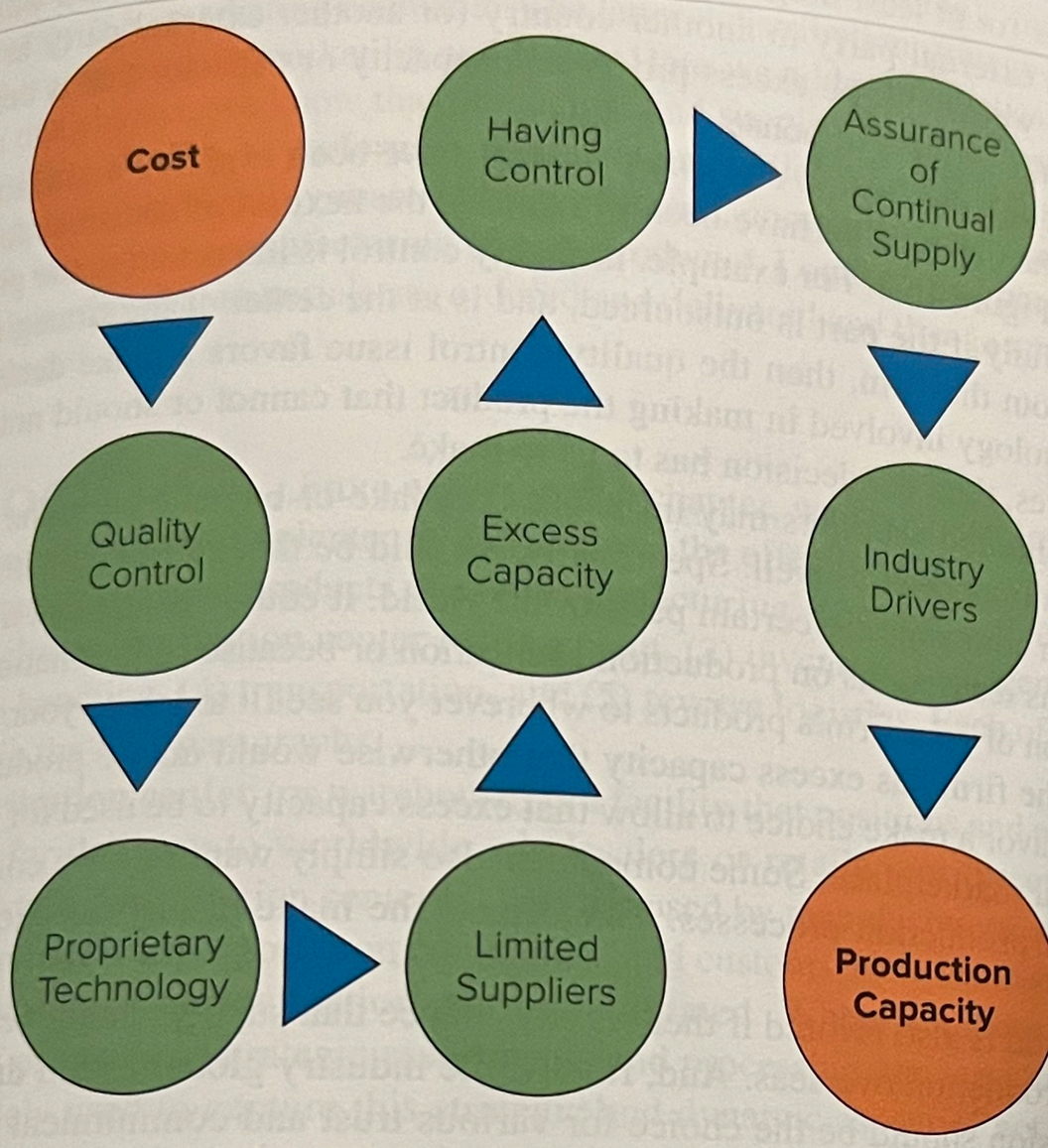
To facilitate your understanding of the make-or-buy decision, we have captured the dynamics of this choice in two graphics that illustrate either operationally favoring a make

Do You Expect a Trend in Bringing Jobs Back from Overseas?

The United States may be on the verge of bringing back manufacturing jobs from China. Outsourcing manufacturing to China is not as cheap as it used to be. Many companies, especially in the auto and furniture industries, moved plants overseas once China opened its doors to free trade and foreign investment in the last few decades. Labor was cheaper for American companies—less than $1 per hour by some estimates at the time. Today, labor costs in China have risen dramatically, and shipping and fuel costs have skyrocketed. As China's economy has expanded and as China has built new factories all across the country, the demand for workers has risen. As a result, wages are up as new companies compete to hire the best workers. Experts note that the fears that U.S. manufacturing is in decline are overstated and that the United States is still a manufacturing giant. China and the United States each account for about 20 percent of global manufacturing value added. The U.S. share of about 20 percent of global manufacturing value added "has declined only slightly over the past three decades," according to the Boston Consulting Group. With all this in mind, do you expect more and more outsourced jobs to be "insourced" in the future?

Source: "Made in America Again," Boston Consulting Group, 2012, www.bcg.com/documents/file84471.pdf

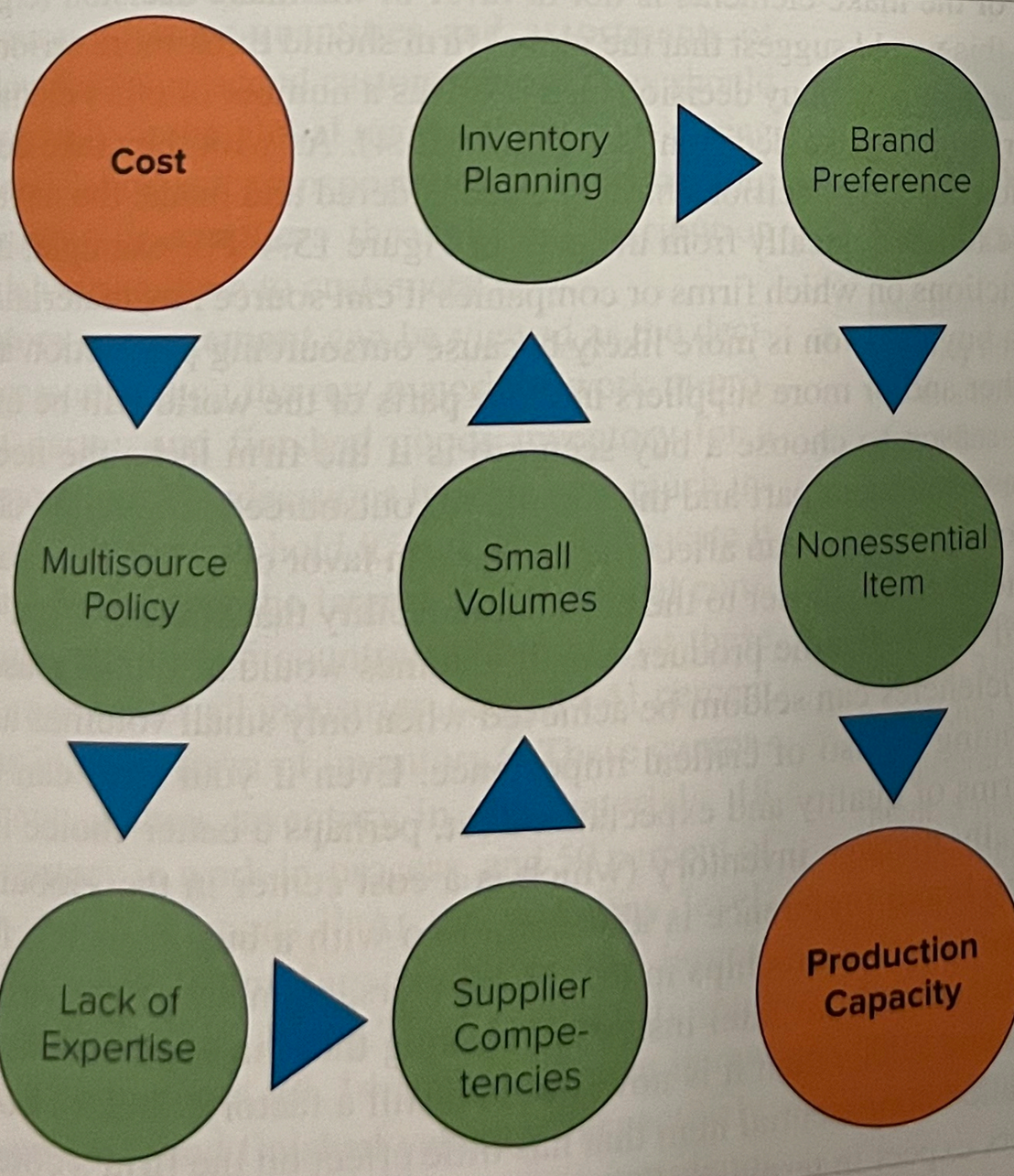
decision or operationally favoring a buy decision (see Figures 15.3 and 15.4). As shown in the figures, the core elements in both cases are cost and production capacity. However, the other elements differ for each of the decisions and influence the choice differently. This means that we need to evaluate each decision separately, not jointly. In fact, through this process, we may end up thinking that both a make decision and a buy decision would be acceptable and strategically



15.3 FIGURE

Operationally favoring a make decision.

Source: C. W. L. Hill and G. T. M. Hult, Global Business Today (New York: McGraw-Hill Education, 2018).



15.4 FIGURE

Operationally favoring a buy decision.

Source: C. W. L. Hill and G. T. M. Hult, Global Business Today (New York: McGraw-Hill Education, 2018).

logical for our firm. Keep in mind that this simply means that we have a choice; if both choices seem positive for your firm, choose the best one—the one that is the best strategic fit with the least opportunity cost.

The elements that favor a make decision—beyond the core elements of cost and production capacity—include quality control, proprietary technology, having control, excess capacity, limited suppliers, assurance of continual supply, and industry drivers (see Figure 15.3). So, the starting point is lower (or at least no greater) cost than what we can expect when we outsource the production to an external party in another country (or another external party in general). The limitation is that we must have excess production capacity or capacity that is best used by our firm for making the product in-house.

After the cost and production capacity decisions have been explored and made (really, after the cost and production hurdles have been overcome), the next set of decisions follows logically from the path in Figure 15.3. For example, if quality control is important to the global firm, cannot be relied on fully if the part is outsourced, and is at the center of the strategic core that customers expect from the firm, then the quality control issue favors a make decision. If there is proprietary technology involved in making the product that cannot or should not be shared with outsourcing parties, then the decision has to be to make.

The idea that limited suppliers may influence the make-or-buy choice in the direction of the make selection is important as well. Specifically, it could be that some suppliers do not want to work with certain companies in certain parts of the world. It could also be that a supplier cannot, because of various restrictions on production or location or because of international barriers, follow the production of your firm's products to wherever you see fit to locate your production lines.

Naturally, if the firm has excess capacity that otherwise would not be productively used, the decision should favor a make choice to allow that excess capacity to be used for the benefit of the firm in the global marketplace. Some companies also simply want to have control over certain elements of their production processes. This affects the make-or-buy decision in favor of the make choice.

A make decision is also favored if there is any chance that supply cannot be guaranteed if the firm moves its production overseas. And, finally, the industry globalization drivers may dictate that a make decision should be the choice for various trust and commitment reasons involving your industry and the marketplace that you engage with in order to find success.

Now, some of these elements that favor make can probably influence a buy decision as well. Naturally, if one of the make elements is not in favor of the make decision (e.g., if there is no excess capacity), this would suggest that the global firm should think more seriously about a buy decision. However, again, the buy decision also involves a number of other elements that are not necessarily factors in the make decision (see Figure 15.4). As with the make decision, after the cost and production capacity decisions have been considered and made, the next set of decisions for the buy choice follow logically from the path in Figure 15.4. For example, if the global firm has minimal restrictions on which firms or companies it can source raw materials and component parts from, then a buy decision is more likely because outsourcing production also increases the likelihood that other and/or more suppliers in those parts of the world will be used.

Another good reason to choose a buy scenario is if the firm lacks the needed expertise to make a product or component part and the supplier or outsourced production choice has that expertise. Supplier competencies can affect the decision in favor of a buy choice as well, especially if those competencies reside closer to the production facility that you buy from than the ones that will be available if you make the product. Small volumes would also be a reason favoring a buy decision; cost-efficiencies can seldom be achieved when only small volumes are produced.

Inventory planning is also of critical importance. Even if your firm can make the product equally well in terms of quality and expectations set, perhaps a better choice is to buy simply in order to strategically manage inventory (which is a cost center in the global supply chain). In certain cases, even brand preference is a reason to go with a buy decision; for example, many computer users favor Intel microchips in their computers, so many of the large computer manufacturers opt to buy chips from Intel instead of making them in-house for that reason (this was truer in the 1990s and 2000s than it is now, but it is still a factor). And, of course, if the item to be made is a so-called nonessential item that has little effect on the firm's core competencies and what the customers expect in terms of uniqueness, this is a factor in favor of a buy decision.

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Global Supply C

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GLOBAL LOGIS

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Global Supply Chain Functions

LO 15-5
Understand the functions of logistics and purchasing (sourcing) within global supply chains.

To this point in the chapter, we have emphasized global production, a component of the operations management of a supply chain. Issues such as where to produce, the strategic role of a foreign production site, and the make-or-buy decisions are the core aspects of global production. In addition to global production, three additional supply chain functions need to be developed in concert with global production. They are logistics, purchasing (sourcing), and the company's distribution strategy (i.e., marketing channels). The latter—distribution strategy—is addressed in Chapter 16, where we discuss marketing and R&D. Here we address logistics and purchasing. From earlier in this chapter, we know that production and supply chain management are closely linked because a firm's ability to perform its production activities depends on information inputs and a timely supply of high-quality material (raw material, component parts, and even finished products that are used in the manufacturing of new products). Logistics and purchasing are critical functions in ensuring that materials are ordered and delivered and that an appropriate level of inventory is managed.

GLOBAL LOGISTICS From earlier in this chapter, we know that logistics is the part of the supply chain that plans, implements, and controls the effective flows and inventory of raw material, component parts, and products used in manufacturing. The core activities performed in logistics are (1) global distribution center management, (2) inventory management, (3) packaging and materials handling, (4) transportation, and (5) reverse logistics. Each of these core logistics is described in the next paragraphs.

A **global distribution center** (or warehouse) is a facility that positions and allows customization of products for delivery to worldwide wholesalers or retailers or directly to consumers anywhere in the world. Distribution centers (DCs) are used by manufacturers, importers, exporters, wholesalers, retailers, transportation companies, and customs agencies to store products and provide a location where customization can be facilitated. When warehousing shifted from passive storage of products to strategic assortments and processing, the term *distribution center* became more widely used to capture this strategic and dynamic aspect of not only storing, but also of adding value to products that are being warehoused or staged. A DC is at the center of the global supply chain; specifically, the order-processing part of the order-fulfillment process. DCs are the foundation of a global supply network because they allow either a single location or satellite warehouses to store quantities and assortments of products and allow for value-added customization. They should be located strategically in the global marketplace, considering the aggregate total labor and transportation cost of moving products from plants or suppliers through the distribution center and then delivering them to customers.

global distribution center
A facility that positions and allows customization of products for delivery to worldwide wholesalers or retailers or directly to consumers anywhere in the world; also called a global distribution warehouse.

Global inventory management can be viewed as the decision-making process regarding the raw materials, work-in-process (component parts), and finished goods inventory for a multinational corporation. The decisions include how much inventory to hold, in what form to hold it, and where to locate it in the supply chain. Examining the largest 20,910 global companies with headquarters in 105 countries, we find that these companies, on average across all industries, carry 14.41 percent of their total assets in some form of inventory.[22] These companies have 32 percent of their inventory in raw materials, 18 percent of their inventory in work-in-process, and 50 percent of their inventory in finished goods.[23] At the company level, Toyota (www.toyota.com) from Japan, one of the largest automobile firms in the world, has 8.71 percent of its total assets in inventory, with a mix of 26, 14, and 60 percent in raw materials, work-in-process, and finished vehicles, respectively. Another example is Sinopec (www.sinopec.com), a petroleum

global inventory management
The decision-making process regarding the raw materials, work-in-process (component parts), and finished goods inventory for a multinational corporation.

How Much Relationship Building Do You Want to Do?

Like manufacturers, professional service firms have also been learning how to better manage their delivery on a global basis. For example, some global services firms are dealing with other global firms in a new way, using one supplier for all their service-related needs around the world. The traditional approach involved the development of market-specific relationships, so the same multinational client would have a number of individual service relationships, one in each major market for each company division. Under a global account management approach, one relationship has a global span—and one contract. Such supply chain practices allow for more effective relationship management, a better sense of what the client needs, more product extension opportunities, and better pricing and economies. But global account management also takes time, energy, and resources. How many "global accounts" do you think would be ideal for a global company? What is the minimum and the maximum number of global account relationships a large multinational corporation should have (e.g., Microsoft)?

firm and the largest firm in China. Sinopec has 21 percent of its total assets in inventory, with a mix of 37, 43, and 20 percent in raw materials and component parts, work-in-process, and finished goods, respectively. Note that Sinopec maintains a much higher percentage of its inventories in work-in-process and a much lower percentage in finished goods than Toyota does. This suggests that petroleum firms want more flexibility in deciding exactly how to formulate the finished product. The company's global inventory strategy must effectively trade off the service and economic benefits of making products in large quantities and positioning them near customers against the risk of having too much stock or the wrong items.

packaging
The container that holds the product itself. It can be divided into primary, secondary, and transit packaging.

Packaging comes in all shapes, sizes, forms, and uses. It can be divided into three different types: primary, secondary, and transit. *Primary packaging* holds the product itself. These are the packages brought home from the store, usually a retailer, by the end-consumer. *Secondary packaging* (sometimes called case-lot packaging) is designed to contain several primary packages. Bulk buying or warehouse store customers may take secondary packages home (e.g., from Sam's Club), but this is not the typical mode for retailers. Retailers can also use secondary packaging as an aid when stocking shelves in the store. *Transit packaging* comes into use when a number of primary and secondary packages are assembled on a pallet or unit load for transportation. Unit-load packaging—through palletizing, shrink-wrapping, or containerization—is the outer packaging envelope that allows for easier handling or product transfer among international suppliers, manufacturers, distribution centers, retailers, and any other intermediaries in the global supply chain.

Regardless of where the product is in the global supply chain, packaging is intended to achieve a set of multilayered functions. These can be grouped into (1) perform, (2) protect, and (3) inform.[24] *Perform* refers to (1) the ability of the product in the package to handle being transported between nodes in the global supply chain, (2) the ability of the product to be stored for typical lengths of time for a particular product category, and (3) the package providing the convenience expected by both the supply chain partners and the end-customers. *Protect* refers to the package's ability to (1) contain the products properly, (2) preserve the products to maintain their freshness or newness, and (3) provide the necessary security and safety to ensure that the products reach their end destination in their intended shape. *Inform* refers to the package's inclusion of (1) logical and sufficient instructions for the use of the products inside the package, including specific requirements to satisfy local regulations; (2) a statement of a compelling product guarantee; and (3) information about service for the product if and when it is needed.

transportation
The movement of inventory through the supply chain.

Transportation refers to the movement of raw material, component parts, and finished goods throughout the global supply chain. It typically represents the largest percentage of any logistics budget and an even greater percentage for global companies because of the distances involved. Global supply chains are directly or indirectly responsible for transporting raw materials from their suppliers to the production facilities, work-in-process, and finished goods inventories between plants and distribution centers, and finished goods from distribution centers to customers. The primary drivers of transportation rates and the resulting aggregate cost are distance, transport mode (ocean, air, or land), size of the load, load characteristics, and oil prices. As would be expected, longer distances require more fuel and more time from vehicle operators, so transport rates increase with distance. Transport mode influences rates because of the different technologies involved. Ocean is the least expensive because of the size of the vehicles used and the low friction of water. Land is the next least expensive, with rail being less expensive than motor carriers. Air is the most expensive because there is a substantial charge for defying gravity. Transportation rates are heavily influenced by economies of scale, so larger shipments are typically relatively less expensive than smaller shipments. The characteristics of the shipment also influence transportation rates through such factors as product density, value, perishability, the potential for damage, and other such factors. Finally, oil prices have a major impact on transportation rates because anywhere from 10 to 40 percent of most carrier costs, depending on the mode, are related to fuel.

reverse logistics
The process of moving inventory from the point of consumption to the point of origin in supply chains for the purpose of recapturing value or proper disposal.

Reverse logistics is the process of planning, implementing, and controlling the efficient, cost-effective flow of raw materials, in-process inventory, finished goods, and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal. The ultimate goal is to optimize the after-market activity or make it more efficient, thus saving money and environmental resources. Reverse logistics is critically important in global supply chains. For example, product returns cost manufacturers and retailers more than

$100 billion per year in the United States, or an average of 3.8 percent in lost profits.[25] Overall, manufacturers spend about 9 to 14 percent of their sales revenue on returns. Even more staggering, each year, consumers in America return more than the GDP of two-thirds of the nations in the world. Just these sample numbers suggest that reverse logistics is an incredibly important part of the global supply chain.

GLOBAL PURCHASING As we defined it earlier in this chapter, purchasing represents the part of the supply chain that involves worldwide buying of raw material, component parts, and products used in the manufacturing of the company's products and services. The core activities performed in purchasing include development of an appropriate strategy for global purchasing and selecting the type of purchasing strategy best suited for the company.

There are five strategic levels—from domestic to international to global—that can be undertaken by a global company.[26] Level I is simply companies engaging in domestic purchasing activities only. Often, these companies stay close to their home base in their domestic market when purchasing raw materials, component parts, and the like for their operations (e.g., a Michigan firm purchasing raw materials, such as cherries, from another Michigan firm). Levels II and III are both considered "international purchasing," but of various degrees and forms. Companies that are at level II engage in international purchasing activities only as needed. This means that their approach to international purchasing is often reactive and uncoordinated among the buying locations within the firm and/or across the various units that make up the firm, such as strategic business units and functional units. Companies at level III engage in international purchasing activities as part of the firm's overall supply chain management strategy. At the level III stage, companies begin to recognize that a well-formulated and well-executed worldwide international purchasing strategy can be very effective in elevating the firm's competitive edge in the marketplace. Levels IV and V both involve "global purchasing" to various degrees. Level IV refers to global purchasing activities that are integrated across worldwide locations. This involves integration and coordination of purchasing strategies across the firm's buying locations worldwide. With level IV, we are now dealing with a sophisticated form of worldwide purchasing. Level V involves engaging in global purchasing activities that are integrated across worldwide locations and functional groups. Broadly, this means that the firm integrates and coordinates the purchasing of common items, purchasing processes, and supplier selection efforts globally, for example.

Beyond the domestic, international, and global purchasing strategies in levels I through V, purchasing includes a number of basic choices that companies make in deciding how to engage with markets.[27] The starting point is a choice of internal purchasing versus external purchasing—in other words, "how to purchase." We find that roughly 35 percent of the purchasing in global companies today is internal (i.e., from sources within their own company), with 65 percent being classified as external (i.e., from sources outside their company). The next decision, in both internal and external purchasing, is to figure out "where to purchase" (domestically or globally). This takes us ultimately to the "types of purchasing" (where and how) and the four choices for purchasing strategy: domestic internal purchasing, global internal purchasing, domestic external purchasing, and global external purchasing.

The types of purchasing activities and strategies just discussed come with a set of generic options for the "international arena." But we all know that outsourcing and offshoring, along with many by-products and other similar yet quite different options, exist in the purchasing world today. At this stage of the text, we feel it is important to go over the outsourcing-related terms and options that companies have, especially the following terms that are often confusing to understand, develop strategy around, and implement: outsourcing, insourcing, offshoring, offshore outsourcing, nearshoring, and co-sourcing (see Table 15.2).

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Managing a Global Supply Chain

LO 15-6

Describe what is required to efficiently manage a global supply chain.

The potential for reducing costs through more efficient supply chain management is enormous. For the typical manufacturing enterprise, material costs account for between 50 and 70 percent of revenues, depending on the industry. Even a small reduction in these costs can have a substantial impact on profitability. According to one estimate, for a firm with revenues of $1 million,

15.2 TABLE
Outsourcing Terms and Options

Outsourcing	A multinational corporation buys products or services from one of its suppliers that produces them somewhere else, whether domestically or globally. In that sense, it also refers to external purchasing in relation to purchasing strategy.
Insourcing	A multinational corporation decides to stop outsourcing products or services and instead starts to produce them internally; insourcing is the opposite of outsourcing. Thus it refers to internal purchasing in the context of purchasing strategy.
Offshoring	A multinational corporation buys products or services from one of its suppliers that produces them somewhere globally (outside the MNCs home country). Offshoring is thus a form of global external purchasing in terms of purchasing strategy.
Offshore outsourcing	A multinational corporation buys products or services from one of its suppliers in a country other than the one in which the product is manufactured or the service is developed. This again is a form of global external purchasing in terms of purchasing strategy.
Nearshoring	A multinational corporation transfers business or information technology processes to suppliers in a nearby country, often one that shares a border with the firm's own country. While nearshoring is not a purchasing activity per se, it involves facilitating global external purchasing.
Co-sourcing	A multinational corporation uses both its own employees from inside the firm and an external supplier to perform certain tasks, often in concert with each other. This applies to all four forms of purchasing strategy. It implies that the relationship between the firm and its supplier is rather strategic in nature—often, this involves the top suppliers in a particular product or component category.

a return on investment rate of 5 percent, and materials costs that are 50 percent of sales revenues, a $15,000 increase in total profits could be achieved either by increasing sales revenues 30 percent or by reducing materials costs by 3 percent.[28] In a saturated market, it would be much easier to reduce materials costs by 3 percent than to increase sales revenues by 30 percent. Thus, managing global supply chains is one of the strategically most important areas for a global company. Four main areas are of concern in managing a global supply chain, including the role of just-in-time inventory, the role of information technology, coordination in global supply chains, and interorganizational relationships in global supply chains.

ROLE OF JUST-IN-TIME INVENTORY

Pioneered by Japanese firms during that country's remarkable economic transformation during the 1960s and 1970s, just-in-time inventory systems now play a major role in most manufacturing firms. The basic philosophy behind **just-in-time (JIT)** inventory systems is to economize on inventory holding costs by having materials arrive at a manufacturing plant just in time to enter the production process and not before. The major cost savings comes from speeding up inventory turnover. This reduces inventory holding costs, such as warehousing and storage costs. It means the company can reduce the amount of working capital it needs to finance inventory, freeing capital for other uses and/or lowering the total capital requirements of the enterprise. Other things being equal, this will boost the company's profitability as measured by return on capital invested. It also means the company is less likely to have excess unsold inventory that it has to write off against earnings or price low to sell.

just in time (JIT)
Inventory logistics system designed to deliver parts to a production process as they are needed, not before.

In addition to the cost benefits, JIT systems can also help firms improve product quality. Under a JIT system, parts enter the manufacturing process immediately; they are not warehoused. This allows defective inputs to be spotted right away. The problem can then be traced to the supply source and fixed before more defective parts are produced. Under a more traditional

system, warehousing parts for weeks before they are used allows many defective parts to be produced before a problem is recognized.

The drawback of a JIT system is that it leaves a firm without a buffer stock of inventory. Although buffer stocks are expensive to store, they can help a firm respond quickly to increases in demand and tide a firm over shortages brought about by disruption among suppliers. Such a disruption occurred after the September 11, 2001, attacks on the World Trade Center and Pentagon, when the subsequent shutdown of international air travel and shipping left many firms that relied on globally dispersed suppliers and tightly managed "just-in-time" supply chains without a buffer stock of inventory. A less pronounced but similar situation occurred again in April 2003, when the outbreak of the pneumonia-like severe acute respiratory syndrom (SARS) virus in China resulted in the temporary shutdown of several plants operated by foreign companies and disrupted their global supply chains. Similarly, in late 2004, record imports into the United States left several major West Coast shipping ports clogged with too many ships from Asia that could not be unloaded fast enough, which disrupted the finely tuned supply chains of several major U.S. enterprises.[29]

There are ways of reducing the risks associated with a global supply chain that operates on just-in-time principles. To reduce the risks associated with depending on one supplier for an important input, some firms source these inputs from several suppliers located in different countries. While this does not help in the case of an event with global ramifications, such as September 11, 2001, it does help manage country-specific supply disruptions, which are more common. Strategically, all global companies need to build in some degree of redundancy in supply chains by having multiple options for suppliers.

ROLE OF INFORMATION TECHNOLOGY

Web- and cloud-based information systems play a crucial role in modern materials management. By tracking component parts as they make their way across the globe toward an assembly plant, information systems enable a firm to optimize its production scheduling according to when components are expected to arrive. By locating component parts in the supply chain precisely, good information systems allow the firm to accelerate production when needed by pulling key components out of the regular supply chain and having them flown to the manufacturing plant.

Firms now typically use some form of a supply chain information system to coordinate the flow of materials into manufacturing, through manufacturing, and out to customers. There are a variety of options for global supply chains. Electronic data interchange (EDI) refers to the electronic interchange of data between two or more companies. Enterprise resource planning (ERP) is a wide-ranging business planning and control system that includes supply chain-related subsystems (e.g., materials requirements planning, or MRP). Collaborative planning, forecasting, and replenishment (CPFR) was developed to fill the inter-organizational connections that ERP cannot fill. Vendor management of inventory (VMI) allows for a holistic overview of the supply chain with a single point of control for all inventory management. A warehouse management system (WMS) often operates in concert with ERP systems; for example, an ERP system defines material requirements, and these are transmitted to a distribution center for a WMS.

Before the emergence of the Internet as a major communication medium, firms and their suppliers normally had to purchase expensive proprietary software solutions to implement EDI systems. The ubiquity of the Internet and the availability of web- and cloud-based applications have made most of these proprietary solutions obsolete. Less expensive systems that are much easier to install and manage now dominate the market for global supply chain management software. These systems have transformed the management of globally dispersed supply chains, allowing even small firms to achieve a much better balance between supply and demand, thereby reducing the inventory in their systems and reaping the associated economic benefits. Importantly, with most firms now using these systems, those that do not will find themselves at a competitive disadvantage. This has implications for small and medium-sized companies that may not always have the resources to implement the most sophisticated supply chain information systems.

COORDINATION IN GLOBAL SUPPLY CHAINS

Consider how to turn an aircraft, and think in terms of coordination and leverage points. That is, aircraft are typically steered using an integrated system of ailerons on the wings and the rudder at the tail of the

global supply chain coordination
The shared decision-making opportunities and operational collaboration of key global supply chain activities.

aircraft. In comparison to the aircraft, the ailerons and the rudder seem very small. However, leverage allows the coordinated effort of the ailerons and the rudder to turn the aircraft. In other words, putting the right combination of a little leverage in the right places together with a coordinated effort leads to incredible maneuvering ability for the plane. Global supply chains are the same. Integration and coordination are critically important. **Global supply chain coordination** refers to shared decision-making opportunities and operational collaboration of key global supply chain activities.

Shared decision making—such as joint consideration of replenishment, inventory holding costs, collaborative planning, costs of different processes, the frequency of orders, batch size, and product development—creates a more integrated, coherent, efficient, and effective global supply chain. This includes shared decision making by supply chain members both inside an organization (e.g., logistics, purchasing, operations, and marketing channels employees) and across organizations (e.g., raw materials producers, transportation companies, manufacturers, wholesalers, retailers). *Shared* decision making is not *joint* decision making; it is decision making involving joint considerations. Shared decision making helps in resolving potential conflicts among global supply chain members and fosters a culture of coordination and integration. In most supply chains, certain parties are more influential, and shared decision making, at a minimum, should include the critically important chain members.

To achieve operational integration and collaboration within a global supply chain, six operational objectives should be addressed: responsiveness, variance reduction, inventory reduction, shipment consolidation, quality, and life-cycle support.[30] *Responsiveness* refers to a global firm's ability to satisfy customers' requirements across global supply chain functions in a timely manner. *Variance reduction* refers to integrating a control system across global supply chain functions to eliminate global supply chain disruptions. *Inventory reduction* refers to integrating an inventory system, controlling asset commitment, and turning velocity across global supply chain functions. *Shipment consolidation* refers to using various programs to combine small shipments and provide timely, consolidated movement. This includes multiunit coordination across global supply chain functions. *Quality* refers to integrating a system so that it achieves zero defects throughout global supply chains. Finally, *life-cycle support* refers to integrating the activities of reverse logistics, recycling, after-market service, product recall, and product disposal across global supply chain functions.

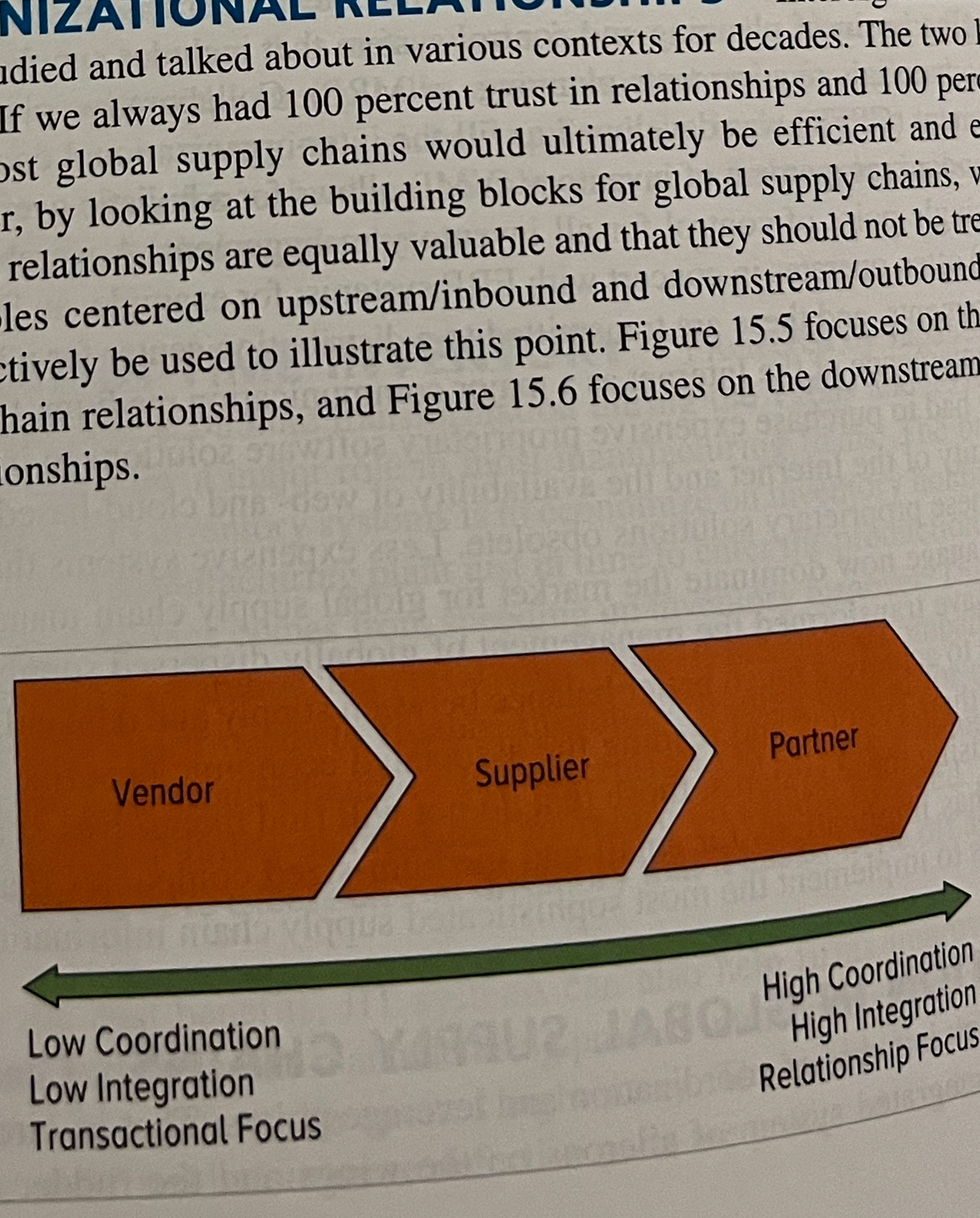
INTERORGANIZATIONAL RELATIONSHIPS

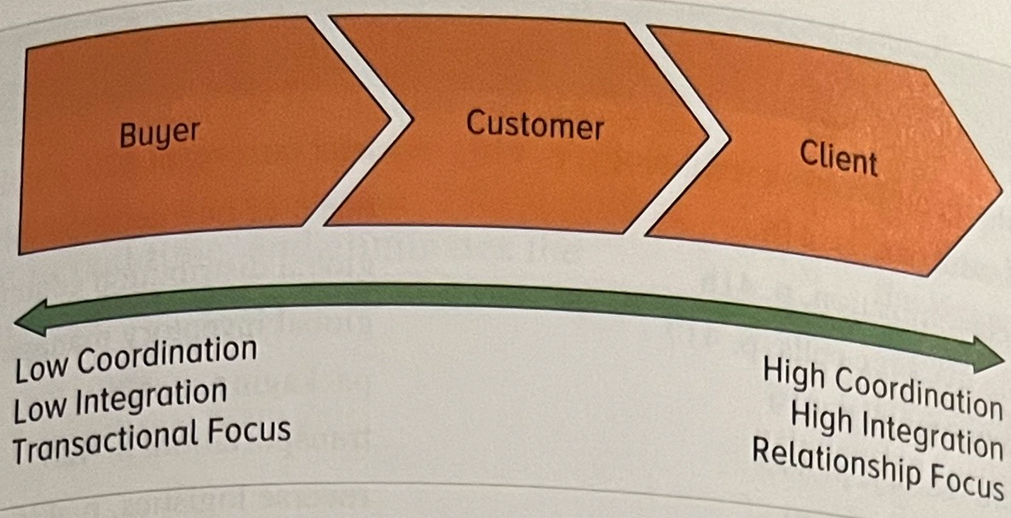
Interorganizational relationships have been studied and talked about in various contexts for decades. The two keys are trust and commitment. If we always had 100 percent trust in relationships and 100 percent commitment to them, most global supply chains would ultimately be efficient and effective. But we don't! However, by looking at the building blocks for global supply chains, we would also assume that not all relationships are equally valuable and that they should not be treated as if they were. Two examples centered on upstream/inbound and downstream/outbound supply chain activities can effectively be used to illustrate this point. Figure 15.5 focuses on the upstream (or inbound) supply chain relationships, and Figure 15.6 focuses on the downstream (or outbound) supply chain relationships.

15.5 FIGURE

Upstream/inbound relationships.

Source: C. W. L. Hill and G. T. M. Hult, Global Business Today *(New York: McGraw-Hill Education, 2018).*





15.6 FIGURE
Downstream/outbound relationships.
Source: C. W. L. Hill and G. T. M. Hult, Global Business Today (New York: McGraw-Hill Education, 2018).

For the upstream/inbound portion of the global supply chain, the three logical scenarios of interacting organizations are labeled as vendors, suppliers, and partners. Each scenario is based on the degree of coordination, integration, and transactional versus relationship emphasis that the firm should adopt in partnering with other entities in the global supply chain. For instance, a firm uses vendors to obtain raw materials and component parts through a transactional relationship that can change easily. A given firm may use suppliers to obtain raw materials and parts and maintain a relationship with those suppliers based on experience and performance. Another firm may engage with partners to obtain raw materials and parts, maintaining a relationship based on trust and commitment.

For the downstream/outbound portion of the global supply chain, the three logical scenarios of interacting organizations are labeled as buyers, customers, and clients. As with the upstream/inbound examples, each downstream/outbound scenario is based on the degree of coordination, integration, and transactional versus relationship focus that the firm should adopt in partnering with other entities in the global supply chain. One firm may sell products and parts to buyers through a transactional relationship that can change easily. Another firm may sell products and parts to customers and maintain a relationship that is based on experience and performance. Yet another firm may sell products and parts to clients and maintain a relationship that is based on trust and commitment.

Having reviewed the three scenarios for the upstream/inbound and downstream/outbound portions of the global supply chain, let's look at the emphasis a global company should place on the relationships with each entity: the benefits to be expected, favorable points of distinction, and resonating focus in the relationship.[31] First, however, some basics on value are appropriate. The value between nodes and actors in global supply chains is a function of the cost (money and nonmoney resources) given up in return for the quality (products, services, information, trust, and commitment) received. Basically, greater value is achieved if the quality is greater while the cost remains the same or is reduced or when the cost is reduced and the quality remains constant.

A global company should allocate 20 percent of its efforts to the vendor category, 30 percent to the supplier category, and 50 percent to the partner category in the upstream/inbound portion of the global supply chain. Likewise, a global company should allocate 20 percent of its efforts to the buyer category, 30 percent to the customer category, and 50 percent to the client category in the downstream/outbound portion of the chain. In the vendor (upstream) and buyer (downstream) portions of the supply chain, the benefits that can be expected include those typical of a transactional exchange (costs equal to quality for the goods bought but not necessarily the best goods in the marketplace). In the supplier (upstream) and customer (downstream) stages, the expectation is that the firm will receive all the favorable points that the raw materials, component parts, and/or products have relative to the next best alternative in the global marketplace. This takes into account the ideas that the costs are equal to quality for the goods bought and that the goods are among the best goods in the marketplace. Finally, in the partner (upstream) and client (downstream) portions of the supply chain, the benefits that the firm can expect to receive include the one or two points of difference for the raw materials, component parts, and/or products whose improvements will deliver the greatest value to the customer for the foreseeable future (quality greater than cost).

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