

11.6: Global Production and Supply-Chain Management

Learning Objectives

1. Understand the differences between outsourcing and offshoring.
2. Explain three strategies for locating production operations.
3. Know the value of supply-chain management.

Strategic Choices: Export, Local Assembly, and Local Production

When deciding where and how to produce products for international markets, companies typically have a choice of three strategies. The strategies vary in terms of levels of risk, cost, exposure to exchange-rate fluctuations, and leveraging of local capabilities. Companies need to tailor their strategy to fit their product and the country.

Manufacture in the United States and Then Export

The lowest-investment production strategy is to make the product at the company's existing manufacturing locations and then export them to the new market. Companies use this solution in situations where the total opportunity in the new market doesn't justify opening a plant. For example, EMC supplies its Asia-Pacific customers from plants in the United States and Ireland. This strategy does have several downsides. Specifically, the company faces higher shipping costs, importation delays, local import duties, risks due to exchange-rate fluctuations, and isolation from local knowledge.

Global Components with Local Assembly

The next level of strategy uses out-of-country suppliers but local assembly. Dell Latin America uses this approach. It buys high-tech computer components globally but performs customized assembly in Brazil. Being closer to the market improves Dell's sales, service, and customer knowledge.

Another example is Iams. Iams makes its proprietary pet food in the United States and ships it to other countries for packaging. This strategy lets Iams do some local customization and offer better customer response, while gaining tax or tariff incentives from local assembly.

Along with these advantages come increased supplier-coordination issues and concerns about supplier quality. In some cases, local assembly can harm the product, which leads back to the country-of-origin effect discussed in [Section 14.3](#). For example, some markets like Colombia don't want to buy Colombian-made goods. In those cases, local assembly can harm product sales.

Local Production

Finally, a company can go completely local, sourcing materials in the foreign country and manufacturing the product there. Nokia used this strategy in India. This strategy takes the greatest advantage of lower-cost labor, regional suppliers, and local knowledge. However, it involves high investment and depends heavily on the quality of local resources. It also exposes the company to political risks. However, going 100 percent local may work well in BRIC countries (i.e., Brazil, Russia, India, and China) for labor-intensive, low-value products. These types of products can tolerate the potentially lower levels of quality associated with local suppliers.

Companies that decide to build a local plant have to decide in which country to locate the plant. The criteria to consider are

- political stability,
- statutory/legal environments,
- infrastructure quality,
- foreign-investment incentives,
- local telecommunications and utility infrastructure,
- workforce quality,
- security and privacy,
- compensation costs,
- tax and regulatory costs, and
- communication costs.

Government Incentives

Countries sometimes offer special incentives to attract companies to their area. Malaysia, for example, set up the Multimedia Super Corridor that offers tax breaks, desirable facilities, and excellent infrastructure to foreign companies. Similarly, China has special economic zones (SEZs) that promote international high-quality standards in the Hainan Province, Shenzhen, Shantou, and elsewhere. While one component is a government initiative to set up SEZs or corridors that boast excellent communications infrastructure, other factors, such as uninterrupted power supply and connections to transportation infrastructure, play an important role as well. Even though the economic or political picture of a country may appear appealing, companies also need to understand public policy and the regulatory environment of the specific state or municipality in which they plan to set up operations, because laws on a local level may be different and may create roadblocks for new company operations.

Infrastructure Issues

Emerging-market countries are investing in new infrastructure to varying degrees. China is working hard to grow rail, road, and port infrastructure. In other countries, investment may be lagging. And in some cases, companies have been caught in the middle of governmental problems arising from dealing with officials who turn out to be corrupt.

Locating a plant in China means having to ship products from China. If a company's primary market is in the United States, China is halfway around the world. The company may save on labor, but there are other added costs—extra shipping costs as well as hidden costs of uncertainty. April Terrerri, "Supply Chain Trends to Watch," *World Trade*, July 2010, 16–21. If the company's products are en route and experience delays, for example, customers might experience a **stock-out**. A stock-out means that there is no more stock of the company's product. The product is unavailable to customers who want to buy it. To avoid stock-out situations, a company may decide to hold inventory close to its customers. Called **safety stock**, this inventory helps ensure that the company won't run out of products if there's a delay or crisis in a distant manufacturing region. The downsides of safety stock, however, include the increased costs of carrying that inventory, such as the investment in the products, taxes and insurance, and storage space. In addition, companies risk obsolescence of the products before they're sold.

It's important to note that China is far away only if the company's primary markets are outside Asia. The distance that truly matters is the distance to the company's markets. Companies that sell their products around the world may want to have production facilities around the world as well, so that their products are closer to customers—wherever those customers may be.

Did You Know?

Intel's Approach to Managing Risk in Global Production

If a company builds plants in different locations, the company may face the issue of differing quality among its plants. Intel, the world leader in the manufacturing, marketing, and sales of integrated circuits for computing and communications industries worldwide has faced this problem. Quality is a major issue when making these tiny, complex integrated-circuit chips. Intel's Atom chips, for example, are the size of a grain of rice. To ensure high quality at all of its plants worldwide, Intel devised a strategy called Copy Exact! Yossi Sheffi, *The Resilient Enterprise* (Cambridge, MA: MIT Press, 2005), 184. That is, Intel builds all of its semiconductor-fabrication plants (also known as "fabs") to the same exact specifications, creating interchangeable processes and interchangeable fabs throughout the company. Intel began the Copy Exact! strategy in the mid-1980s as a way to cope with the complexity of semiconductor manufacturing. Manufacturing integrated computer chips is highly delicate. The smallest variation in temperature, pressure, chemistry, or handling can mean the difference between producing a wafer that made up of hundreds of \$1,000 chips and producing a wafer that is a useless silicon disk. Once Intel has a new semiconductor-manufacturing process debugged at one facility, it copies that process—down to the lengths of the hoses on the vacuum pumps—to other Intel facilities. Intel has realized that this Copy Exact! strategy also provides flexibility in manufacturing. For example, Intel can transfer capacity back and forth between facilities to eliminate manufacturing bottlenecks. When the severe acute respiratory syndrome (SARS) flu epidemic hit Asia, for example, Intel simply transferred partially completed wafers from one plant to another for finishing.

The Copy Exact! strategy extends beyond semiconductor fabrication to include the assembly and test factories and the contractors that support building electronic boards, such as personal computer motherboards. "If something happens to that facility, we roll over to a subcontractor at another site that can pick up the same assembly test and make sure that we get the same product coming out and the same amounts for our shipping plans," said Intel's Steve Lund. Yossi Sheffi, *The Resilient Enterprise* (Cambridge, MA: MIT Press, 2005), 184. Copy Exact! even extends to Intel's information technology infrastructure. Identical software and hardware architecture support a range of activities, such as ordering and production planning, at eighteen manufacturing, testing, and assembly sites across three continents.

Outsourcing and Offshoring

Offshoring means setting up operations in a low-cost country for the purpose of hiring local workers at lower labor rates. Offshoring differs from outsourcing in that the firm retains control of the operations and directly hires the employees. In **outsourcing**, by contrast, the company delegates an entire process (such as accounts payable) to the outsource vendor. The vendor takes control of the operations and runs the operations as they see fit. The company pays the outsource vendor for the end result; how the vendor achieves those end results is up to the vendor.

Companies that choose to offshore face the same location-criteria factors as companies that make production-operation decisions.

The advantages of outsourcing include the following:

- Efficient processes (the outsourcer typically specializes in a particular process or set of processes, giving them high levels of expertise with that process)
- Access to specialized equipment that may be too expensive for a company to invest in unless that process is their chief business

India has long been a favorite location for outsourcing services, such as call centers and software testing, because of its English-speaking, highly educated workforce. The labor-rate ratio has been five to one, meaning that a company based in the United Kingdom, for example, could hire five Indian college graduates for the price of hiring one UK college graduate. Given the high demand for their labor, however, Indian employees' wages have begun to rise. Offshoring companies are now faced with a new challenge. The firms hire and train Indian employees only to see them leave in a year for a higher salary elsewhere. *Hub Potential Analysis Report 2007: Frost & Sullivan's 2007 Global Shared Services and Outsourcing (SSO) Study* (San Antonio, TX: Frost & Sullivan, 2007), accessed May 19, 2011, <http://www.frost.com/prod/servlet/cpo/106999825>. This wage inflation and high turnover in India has led some companies, like ABN AMRO Bank, to consider whether they should move offshoring operations to China, where wages are still low. The downside is that graduates in China aren't as knowledgeable about the financial industry, and language problems may be greater.

Diageo, the world's largest purveyor of spirits, used the following criteria when choosing an offshoring-services location. Burt Helm, "Diageo Targets the Home Bartender," *BusinessWeek*, July 6, 2009, 48. Diageo analyzed nineteen locations in fourteen countries, ultimately choosing Budapest, Hungary, as the location of its offshore shared-services operations. The primary criteria Diageo used were

- a low-cost base, both in terms of start-up and ongoing running costs;
- a favorable general business environment;
- the availability of suitable staff—particularly with regard to language skills;
- a high level of local and international accessibility with good transport links;
- the attractiveness for international staff; and
- a robust regulatory framework. Linda Pavey, "OTC Focus & Solutions," June 6, 2005, accessed August 6, 2010, www.ideaslab.info.

Companies save on labor costs when offshoring, but the "hidden costs" can be significant. These hidden costs include the costs of additional facilities, telecommunications, and technological infrastructure. Delays or problems with internal project coordination and the need for redundancy can add even more costs.

Did You Know?

Standard Chartered Bank Mitigated Risk by Duplicating Operations in Chennai and Kuala Lumpur

As you can imagine, banks are very concerned about security because of the highly confidential customer information they possess. Some banks try to mitigate the risks by setting up mirror sites. Standard Chartered Bank, for instance, chose Chennai in South India as the hub for its Scope International operations, but some of the tasks are also done in Kuala Lumpur in Malaysia: "Because we run the operations of 52 countries, we have to satisfy information security and business continuity issues in all locations," says Sreeram Iyer, Group Head, Global Shared Services Centers, Standard Chartered Scope International at the time of the decision. "Kuala Lumpur backs up the Chennai center and vice versa." Ranganath Iyengar, "Banks: Captive to Third Party Move?," *Global Services*, October 30, 2006, accessed November 25, 2010, www.globalservicesmedia.com/redesign/BPO/Market-Dynamics/Banks:-Captive-to-Third-Party-Move/23/28/0/general200705211425.

Supply-Chain Management

Supply-chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and logistics. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, supply-chain management integrates supply-and-demand management within and across companies. “CSCMP Supply Chain Management Definitions,” Council of Supply Chain Management Professionals, accessed August 7, 2010, cscmp.org/aboutcscmp/definitions.asp.

Activities in the supply chain include

- demand management (e.g., forecasting, pricing, and customer segmentation),
- procurement (e.g., purchasing, supplier selection, and supplier-base rationalization),
- inventory management (e.g., raw materials and finished goods),
- warehousing and material handling,
- production planning and control (e.g., aggregate planning, workforce scheduling, and factory operations),
- packaging (i.e., industrial and consumer),
- transportation management,
- order management,
- distribution network design (e.g., facility location and distribution strategy), and
- product-return management.

Cross-organizational teams across the supply chain can bring great perspective to the overall team process. Representatives from design, business, purchasing, manufacturing, equipment purchasing, planning, customer, logistics, information technology, and finance all bring their specialized knowledge to the benefit of the supply chain as a whole. C. J. Wehlage, “Supply Chain Transformation Leadership: Intel’s Low-Cost Supply Chain Model,” *AMR Research*, February 2, 2009, accessed August 4, 2010, www.amrresearch.com/content/View.aspx?compURI=tcn:7-39341.

Spotlight on International Strategy and Entrepreneurship

Entrepreneurial Innovation at P&G

In 2002, Procter & Gamble (P&G) created a test factory, called the Garage, in Vietnam to experiment with low-cost diaper manufacturing for emerging markets. This factory was different from P&G’s US-based factories because it didn’t use high-tech, automation-intensive manufacturing processes. Rather, P&G wanted a low-cost, low-tech solution. The factory helped P&G devise a new, low-cost approach to manufacturing in emerging-market countries. The strategy required finding local suppliers, some of whom wouldn’t have been acceptable for other P&G products but were suitable for this one. P&G formed a network of 150 low-cost machine builders who could supply manufacturing equipment to P&G’s Vietnam factory. This manufacturing equipment was appropriate for emerging-market sites and emerging-market prices. The equipment was not on par to P&G’s US-based manufacturing equipment, but P&G could use it in other countries and in other product lines. For example, P&G took the lessons and machine-building know-how it had learned from making low-cost diapers in Asia and applied it to reducing the costs of making feminine pads in Mexico. In transferring this know-how from one country to the next, P&G reduced the costs of its feminine pads in Mexico by 20 percent.

P&G has gone a step further and brought its results back home to the United States in two ways. First, thanks to the North American Free Trade Agreement (NAFTA), P&G can import its low-cost feminine pads from Mexico back into the United States. Second, P&G now sees an opportunity to give a second life to obsolete plants in the United States. The experience P&G has gained in emerging markets has taught the company that not every product in every market needs the latest and greatest approaches to manufacturing in order to be successful. P&G’s experience with its Vietnamese factory has given it a scalable approach, which has enabled P&G to make diapers and other similar personal-care products in many different emerging-market countries using widely available, low-cost manufacturing equipment.

KEY TAKEAWAYS

- There are several strategic choices available to companies when they decide how to produce their products for international markets. First, companies can manufacture their products in their home countries and export them. This strategy involves the least amount of change but has the downsides of higher supply-chain costs, potential delays, exchange-rate risks, and isolation from local knowledge.

- Second, a company can build components in one country and do local assembly in another. This strategy offers advantages of tax or tariff incentives but increases coordination costs and may bring unfavorable country-of-origin effects.
- Finally, a company can opt for local production. This decision requires a careful evaluation of the risks and rewards of production operations in that country, including assessing political risks, the skills of the local workforce, and the quality of the infrastructure.
- Some companies also choose to outsource or offshore their processes, either giving control to the outsource vendor for the process and paying for the results (i.e., outsourcing) or retaining control of the process while taking advantage of lower labor rates (i.e., offshoring).
- Supply-chain management is the coordination of a host of activities that can give a company a distinct competitive advantage. Cross-organizational teams are the best way to take advantage of the perspectives of each supply-chain function for the benefit of all.

EXERCISES

(AACSB: Reflective Thinking, Analytical Skills)

1. What processes does supply-chain management encompass?
2. If you were going to build a plant overseas, what factors would you take into account when making your location decisions?
3. What strategic choices do international companies have about where to locate production operations?
4. Describe strategies for mitigating some of the risks of overseas production.
5. What are some advantages and disadvantages of outsourcing?

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