

Site Factors

Learning Outcome 11.2.6

List the three types of site factors.

Firms take into consideration site factors as well as situation factors (see the Contemporary Geography Tools feature). Labor, capital, and land are the three traditional production factors that may vary among locations.

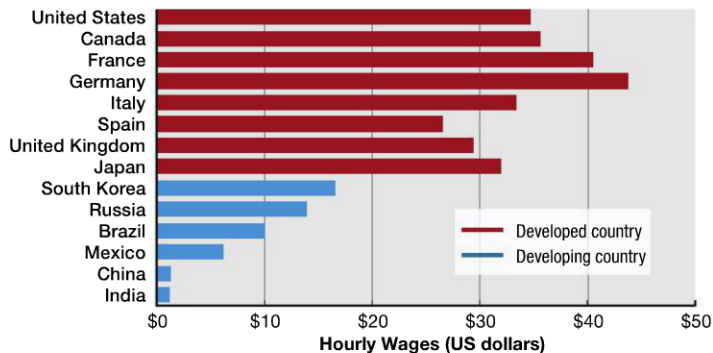
LABOR

The most important site factor on a global scale is labor. Minimizing labor costs is important for some industries, and the variation of labor costs around the world is large. Worldwide, around one-half billion workers are engaged in industry, according to the UN International Labor Organization (ILO). China has around one-fourth of the world's manufacturing workers, India around one-fifth, and all developed countries combined around one-fifth.

A **labor-intensive industry** is an industry in which wages and other compensation paid to employees constitute a high percentage of expenses. Labor constitutes an average of 11 percent of overall manufacturing costs in the United States, so a labor-intensive industry in the United States would have a much higher percentage than that. The reverse case, an industry with a much lower-than-average percentage of expenditures on labor, is considered capital intensive.

The average wage paid to manufacturing workers is approximately \$35 per hour in developed countries and exceeds \$40 per hour in parts of Europe (Figure 11-24). Health-care, retirement pensions, and other benefits add substantially to the compensation. In China and India, average wages are approximately \$1 per hour and include limited additional benefits. For some manufacturers—but not all—the difference between paying workers \$1 and \$35 per hour is critical.

▼ **FIGURE 11-24 LABOR AS A SITE FACTOR: MANUFACTURING WAGES** The chart shows average hourly wages for workers in manufacturing in the 14 countries with the largest industrial production in 2010.



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A labor-intensive industry is not the same as a high-wage industry. “Labor-intensive” is measured as a percentage, whereas “high-wage” is measured in dollars or other currencies. For example, motor-vehicle workers are paid much higher hourly wages than textile workers, yet the textile industry is labor intensive, and the auto industry is not. Although auto workers earn relatively high wages, most of the value of a car is accounted for by the parts and the machinery needed to put together the parts. On the other hand, labor accounts for a large percentage of the cost of producing a towel or shirt compared with materials and machinery.

Pause and Reflect 11.2.6

Labor accounts for around 5 percent of the cost of manufacturing a car. Does this mean that motor vehicle manufacturing is a labor-intensive industry? Explain.

CAPITAL

Manufacturers typically borrow capital—the funds to establish new factories or expand existing ones. The U.S. motor-vehicle industry concentrated in Michigan early in the twentieth century largely because that region's financial institutions were more willing than eastern banks to lend money to the industry's pioneers. The most important factor in the clustering of high-tech industries in California's Silicon Valley—even more important than proximity to skilled labor—was the availability of capital. Banks in Silicon Valley have long been willing to provide money for new software and communications firms, even though lenders elsewhere have hesitated. High-tech industries have been risky propositions—roughly two-thirds of them fail—but Silicon Valley financial institutions have continued to lend money to engineers who have good ideas so that they can buy the software, communications, and networks they need to get started (Figure 11-25). One-fourth of all capital in the United States is spent on new industries in Silicon Valley.

The ability to borrow money has become a critical factor in the distribution of industry in developing countries. Financial institutions in many developing countries are short of funds, so new industries must seek loans from banks in developed countries. But enterprises may not get loans if they are located in a country that is perceived to have an unstable political system, a high debt level, or ill-advised economic policies.

LAND

Land suitable for constructing a factory can be found in many places. If considered to encompass natural and human resources in addition to terra firma, “land” is a critical site factor.

Early factories located inside cities due to a combination of situation and site factors. A city



▲ FIGURE 11-25 CAPITAL AS A SITE FACTOR: SILICON VALLEY

A Google employee bicycles to work past the Green Android statue at Googleplex, Google's world headquarters in Mountain View, California, in the heart of Silicon Valley.

offered an attractive situation—proximity to a large local market and convenience in shipping to a national market by rail. A city also offered an attractive site—proximity to a large supply of labor as well as to sources of capital. The site factor that cities have always lacked is

abundant land. To get the necessary space in cities, early factories were typically multistory buildings. Raw materials were hoisted to the upper floors to make smaller parts, which were then sent downstairs on chutes and pulleys for final assembly and shipment. Water was stored in tanks on the roof.

Contemporary factories operate most efficiently when laid out in one-story buildings (see for example, Figure 11-20). Raw materials are typically delivered at one end and moved through the factory on conveyors or forklift trucks. Products are assembled in logical order and shipped out at the other end. The land needed to build one-story factories is now more likely to be available in suburban and rural locations. Also, land is much cheaper in suburban and rural locations than near the center of a city.

In addition to providing enough space for one-story buildings, locations outside cities are also attractive because they facilitate delivery of inputs and shipment of products. In the past, when most material moved in and out of a factory by rail, a central location was attractive because rail lines converged there. With trucks now responsible for transporting most inputs and products, proximity to major highways is more important for a factory. Especially attractive is the proximity to the junction of a long-distance route and the beltway, or ring road, that encircles most cities. Thus, factories cluster in industrial parks located near suburban highway junctions.

CONTEMPORARY GEOGRAPHIC TOOLS

Honda Selects a Factory Location

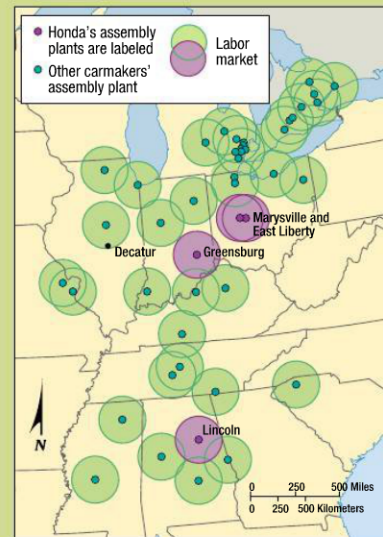
When Honda decided that it needed another assembly plant in the United States, it applied situation and site factors to select a location for the factory:

- **Situation factors were considered first:**
 - **Proximity to markets.** To minimize the cost of shipping vehicles, Honda looked for locations within auto alley (Figure 11-26).
 - **Proximity to inputs.** Honda's most important inputs, the engine and transmission, were to come from existing factories in western Ohio. That guided Honda to the portion of auto alley encompassing Illinois, Indiana, and Ohio.
- **Site factors helped Honda find specific locations within auto alley:**
 - **Land.** Honda wanted a large tract of land near at least one

interstate highway and a rail line.

- **Labor.** Honda needed a large labor supply within a one-hour commuting range, but it didn't want to compete for workers with existing assembly plants. That could lead to a shortage of skilled workers and push up wages. So Honda looked for areas outside the one-hour commuting range around existing assembly plants.

Honda's short list of locations included Decatur in eastern Illinois, Greensburg in southwestern Indiana, and unnamed communities in west-central Ohio. Honda considered Indiana the safest choice, because the governors of the other two states at the time were involved in financial scandals.



▲ FIGURE 11-26 HONDA PICKS AN ASSEMBLY PLANT SITE An assembly plant draws its workforce from within a radius of roughly one hour. New plants have been located outside the labor market areas of existing plants to minimize competition for workers.

TEXTILES AND APPAREL: CHANGING INPUTS

Learning Outcome 11.2.7

Explain the distribution of textile and apparel production.

Production of **textiles** (woven fabrics) and **apparel** (clothing) is a prominent example of an industry that generally requires less-skilled, low-cost workers. The textile and apparel industry accounts for 6 percent of the dollar value of world manufacturing but a much higher 14 percent of world manufacturing employment, an indicator that it is a labor-intensive industry. The percentage of the world's women employed in this type of manufacturing is even higher.

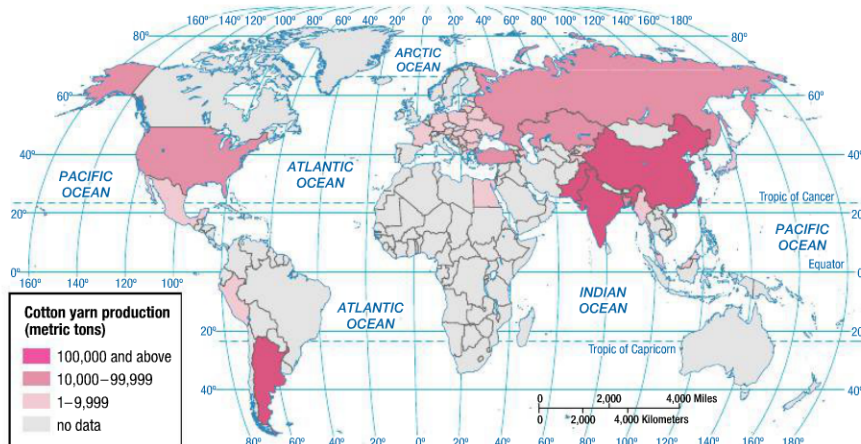
Textile and apparel production involves three principal steps:

- Spinning of fibers and other preparatory work to make yarn from natural or human-made materials
- Weaving or knitting of yarn into fabric (as well as finishing of fabric by bleaching or dyeing)
- Cutting and sewing of fabric for assembling into clothing and other products

Spinning, weaving, and sewing are all labor intensive compared to other industries, but the importance of labor varies somewhat among them. As a result, their global distributions are not identical because the three steps are not equally labor intensive.

SPINNING. Fibers can be spun from natural or synthetic elements. The principal natural fiber is cotton. Synthetics now account for three-fourths and natural fibers only one-fourth of world thread production. Because it is a labor-intensive industry, spinning is done primarily in low-wage countries (Figure 11-27). China produces two-thirds of the world's cotton thread.

▼ **FIGURE 11-27 COTTON SPINNING** Two-thirds of world cotton yarn is produced in China, including by this woman.



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TEXTILE AND APPAREL WEAVING. For thousands of years, fabric has been woven or laced together by hand on a loom, which is a frame on which two sets of threads are placed at right angles to each other. One set of threads, called the warp, is strung lengthwise. A second set of threads, called the weft, is carried in a shuttle that is inserted over and under the warp. Because the process of weaving by hand is physically hard work, weavers were traditionally men.

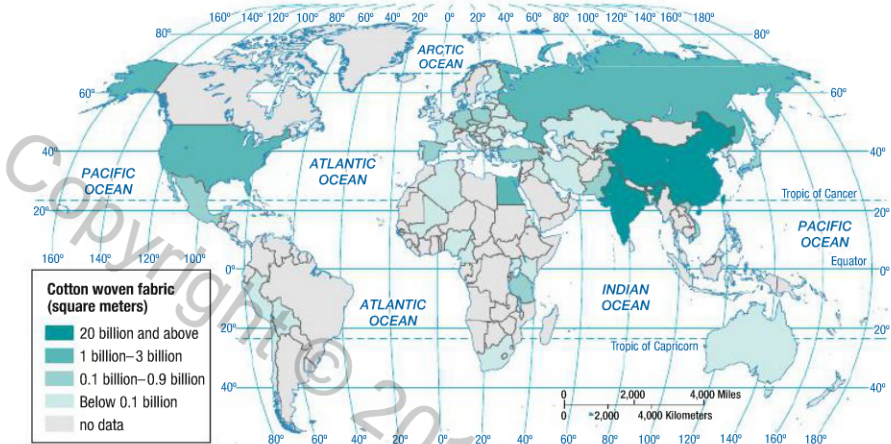
For mechanized weaving, labor constitutes a high percentage of the total production cost. Consequently, weaving is highly clustered in low-wage countries (Figure 11-28). Despite their remoteness from European and North American markets, China and India have become the dominant fabric producers because their lower labor costs offset the expense of shipping inputs and products long distances. China accounts for nearly 60 percent of the world's woven cotton fabric production and India another 30 percent.

TEXTILE AND APPAREL ASSEMBLY. Sewing is probably an even older human activity than spinning and weaving. Needles made from animal horns or bones date back tens of thousands of years, and iron needles date from the fourteenth century.

The first functional sewing machine was invented by French tailor Barthelemy Thimonnier in 1830. In 1841, Thimonnier installed 80 sewing machines in a factory in St.-Etienne, France, to sew uniforms for the French army. However, Parisian tailors, fearing that the machines would put them out of work, stormed the factory and destroyed the machines. Isaac Singer manufactured the first commercially successful sewing machine in the United States during the 1850s, but he was convicted of infringing a patent filed by Elias Howe in 1846.

Textiles are assembled into four main types of products: garments, carpets, home products such as bed linens and curtains, and industrial items such as headliners for inside motor vehicles. Developed countries play a larger role in





▲ **FIGURE 11-28 COTTON WEAVING** China and India together account for nearly 90 percent of the world's woven cotton production. In the image, cotton is being woven in China.

assembly than in spinning and weaving because most of the consumers of assembled products are located in developed countries (Figure 11-29). For example, two-thirds of the women's blouses sold worldwide in a year are sewn in developed countries.

Pause and Reflect 11.2.7

Check the labels on the clothes you are wearing. Where were they made?

CHECK-IN: KEY ISSUE 2

Why Are Situation and Site Factors Important?

- ✓ Situation factors involve transporting materials to and from a factory.
- ✓ Bulk-reducing industries are located near their sources of inputs.
- ✓ Bulk-gaining, single-market, and perishable industries locate near their markets.
- ✓ Site factors derive from distinctive features of a particular place, including labor, capital, and land.

▼ **FIGURE 11-29 DISTRIBUTION OF WOMEN'S BLOUSE PRODUCTION** The United States is the leading producer of women's blouses. These women are sewing blouses in China, which is the leading producer among developing countries.

