Where Is Industry Distributed?

- The Industrial Revolution
- Industrial Regions

The modern concept of industry—meaning the manufacturing of goods in a factory—originated in northern England and southern Scotland during the second half of the eighteenth century. From there, industry diffused to Europe and to North America in the nineteenth century and to other regions in the twentieth century.

The Industrial Revolution

The Industrial Revolution was a series of improvements in industrial technology that transformed the process of manufacturing goods. Prior to the Industrial Revolution, industry was geographically dispersed across the landscape. People made household tools and agricultural equipment in their own homes or obtained them in the local village. Home-based manufacturing was known as the cottage industry system.

The catalyst of the Industrial Revolution was technology, with several inventions transforming the way in which goods were manufactured, beginning with the steam engine, an example of which is shown in Figure 11-1. The revolution in industrial technology created an unprecedented expansion in productivity, resulting in substantially higher standards of living. In Chapter 2, the Industrial Revolution was cited as a principal cause of population growth in stage 2 of the demographic transition.

The term Industrial Revolution is somewhat misleading:
- The transformation was far more than industrial; it resulted in new social, economic, and political inventions, not just industrial ones.
- The changes involved a gradual diffusion of new ideas and techniques over decades rather than an instantaneous revolution.

Nonetheless, the term is commonly used to define the process that began in the United Kingdom in the late 1700s. Among the first industries impacted by the Industrial Revolution were:

- Iron. The first industry to benefit from Watt’s steam engine was the iron tool industry. The usefulness of iron had been known for centuries, but it was difficult to produce because ovens had to be constantly heated, something the steam engine could do.
- Coal. Wood, the main energy source prior to the Industrial Revolution, was becoming scarce in England because it was in heavy demand for construction of ships, buildings, and furniture, as well as for heat. Manufacturers turned to coal, which was then plentiful in England. It became the principal source of energy to operate the ovens and the steam engines.
- Transportation. First canals and then railroads enabled factories to attract large numbers of workers, bring in bulky raw materials such as iron ore and coal, and ship finished goods to consumers (Figure 11-2).
- Textiles. Textile production was transformed from a dispersed cottage industry to a concentrated factory system during the late eighteenth century. In 1768, Richard Arkwright, a barber and wigmaker in Preston, England, invented machines to untangle cotton prior to spinning. Too large to fit inside a cottage, spinning frames were placed inside factories near sources of rapidly flowing water, which supplied the power.
- Chemicals. The chemical industry was created to bleach and dye cloth. In 1746, John Roebuck and Samuel Garbett established a factory to bleach cotton with sulfuric acid obtained from burning coal. When combined with various metals, sulfuric acid produced another acid called vitriol, which was useful for dying clothing.
- Food processing. In 1810, French confectioner Nicolas Appert started canning food in glass bottles sterilized in boiling water. Canned food was essential to feed the factory workers who no longer lived on farms.

![First railway opened by 1826 1856 1836 1876 1846 After 1876 Rail lines constructed by 1848](attachment:image.png)

**FIGURE 11-2 DIFFUSION OF THE INDUSTRIAL REVOLUTION** The construction of railroads in the United Kingdom and on the European continent reflects the diffusion of the Industrial Revolution. Europe’s political problems impeded the diffusion of the railroad. Cooperation among small neighboring states was essential to build an efficient rail network and to raise money for constructing and operating the system. Because such cooperation could not be attained, railroads in some parts of Europe were delayed 50 years after their debut in Britain.
Industrial Regions

Learning Outcome 11.1.1
Describe the locations of the principal industrial regions.

Industry is concentrated in three of the nine world regions discussed in Chapter 9: Europe (Figure 11-3), North America (Figure 11-4), and East Asia (Figure 11-5). Each of the three regions accounts for roughly one-fourth of the world’s total industrial output. Outside these three regions, the leading industrial producers are Brazil and India.

EUROPE’S INDUSTRIAL AREAS

Major industrial areas in Europe include:

- The United Kingdom dominated world production of steel and textiles during the nineteenth century. These industries have declined, but the country has attracted international investment through new high-tech industries that serve the European market.

- The Rhine-Ruhr Valley has a concentration of iron and steel manufacturing because of proximity to large coalfields. Rotterdam, the world’s largest port, lies at the mouth of several branches of the Rhine River as it flows into the North Sea.

- The Mid-Rhine is Europe’s most centrally located industrial area. Frankfurt is a financial and commercial center and the hub of Germany’s transport network. Stuttgart specializes in high-value goods that require skilled labor. Mannheim, an inland port along the Rhine, has a large chemical industry that manufactures synthetic fibers, dyes, and pharmaceuticals.

- The Po Basin has attracted textiles and other industries because of two key assets, compared to Europe’s other industrial regions: numerous workers willing to accept lower wages and inexpensive hydroelectricity from the nearby Alps.

- Northeastern Spain was Europe’s fastest-growing manufacturing area during the late twentieth century. Spain’s leading industrial area, Catalonia, centered on the city of Barcelona, is the center of Spain’s textile industry and the country’s largest motor-vehicle plant.

- Moscow is Russia’s oldest industrial region, centered around the country’s capital and largest city.

- St. Petersburg, Russia’s second-largest city, specializes in shipbuilding and other industries serving Russia’s navy and ports in the Baltic Sea.

- The Urals, contain the world’s most varied collection of minerals. Proximity to these minerals has attracted iron and steel, chemicals, machinery, and metal fabricating plants.

- Volga is the region containing Russia’s largest petroleum and natural gas fields. To the northeast, the Ural mountain range contains more than 1,000 types of minerals, the most varied collection found in any mining region in the world.

- Kuznetsk is Russia’s most important manufacturing district east of the Ural Mountains, with the country’s largest reserves of coal and an abundant supply of iron ore.

- Donetsk, in Eastern Ukraine, has one of the world’s largest coal reserves.

- Silesia, Europe’s most rapidly growing industrial area, takes advantage of a skilled but low-paid workforce and proximity to wealthy markets in Western Europe.

NORTH AMERICA’S INDUSTRIAL AREAS

Major industrial areas in North America include:

- New England was a cotton textile center in the early nineteenth century. Cotton was imported from southern states, and finished cotton products were shipped to Europe.

- The Middle Atlantic is the largest U.S. market, so the region attracts industries that need proximity to a large number of consumers and depend on foreign trade through one of this region’s large ports.

- The Mohawk Valley, a linear industrial belt in upper New York State, takes advantage of inexpensive electricity generated at nearby Niagara Falls.

- Pittsburgh–Lake Erie was the leading steel-producing area in the nineteenth century because of its proximity to Appalachian coal and iron ore.
Chapter 11: Industry and Manufacturing

FIGURE 11-4 NORTH AMERICA'S INDUSTRIAL AREAS
Industry arrived a bit later in North America than in Europe, but it grew much faster in the nineteenth century. North America's manufacturing was traditionally highly concentrated in the northeastern United States and southeastern Canada. In recent years, manufacturing has relocated to the South, lured by lower wages and legislation that has made it difficult for unions to organize factory workers.

ASIA'S INDUSTRIAL AREAS
Major industrial areas in Asia include:

- **Japan** became an industrial power in the 1950s and 1960s, initially by producing goods that could be sold in large quantity at cut-rate prices to consumers in other countries. Manufacturing is concentrated in the central region, between Tokyo and Nagasaki.

- **China** has the world's largest supply of low-cost labor and is the world's largest market for many consumer products. Manufacturers cluster in three areas along the east coast: near Guangdong and Hong Kong, in the Yangtze River valley between Shanghai and Wuhan, and along the Gulf of Bo Hai, from Tianjin and Beijing to Shenyang.

- **South Korea** followed Japan's lead in focusing on export-oriented manufacturers. The country is a leading producer of ocean-going ships. Manufacturing is centered along the rim of the country between the capital and largest city Seoul and Busan, the largest port.

CHECK-IN: KEY ISSUE 1

**Where Is Industry Distributed?**

- The Industrial Revolution was a series of improvements that transformed manufacturing. Most of the improvements occurred first in the United Kingdom.

- The world's three principal industrial regions are Europe, North America, and East Asia.