

LOCATION OF INDUSTRY

Agglomeration

Agglomeration is the centralization of features of an industry for the mutual benefit of the industry as a whole. The best way to think about agglomeration is to think of your local shopping mall. You go to the mall to purchase a new pair of jeans. While walking to the store to buy jeans, you see a shirt that you just have to get to go with your jeans. While walking out of the mall, you also purchase a new pair of shoes to go with the outfit. Your intention was to only buy jeans, but you leave with an entire outfit. The entire mall benefited from your intention to purchase the jeans. The stores are in competition with each other to a point, but they also help each other by drawing in more people, thereby increasing one another's customer bases.

The agglomeration principle worked for Detroit by creating a competent workforce for automotive plants. General Motors, Ford, and Daimler-Chrysler all benefited from being near each other. Secondary industries, attracted by the industrial hub, provided products and services to all three. The unions provided the quality labor that was essential in the production of cars. Tires were made in nearby Ohio and sent to Detroit. When companies locate themselves around these major industrial centers, their production costs actually decrease, because raw materials don't have to be shipped as far to the assembly plants.

Much of **manufacturing** or **warehouse location** is based on the principle of agglomeration. Industrial parks can provide companies with tax breaks to locate their industrial plants at that particular location. Shared services, such as the construction of railroad tracks for train transportation, can greatly reduce costs.

Cumulative causation is continued growth due to the positive aspects of the principle itself. For example, if agglomeration is successful, more agglomeration occurs. Cumulative causation transpired in Detroit around the automotive industry. Cumulative causation can also lead to a disadvantage from the same agglomeration principle. The **deglomeration** of an economy can occur when the market has become saturated with a particular industry. This creates too much competition, forcing some of the businesses within that industry either to relocate or close down.

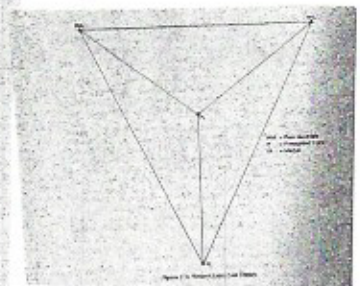
INDUSTRIAL REVOLUTION

The Industrial Revolution started in the mid-1600s and was an extension of the Enlightenment period in Europe. One major invention of the Industrial Revolution was the steam engine, which enabled farther and faster travel than ever before in human history. The steam engine could be used for trains as well as ships. As a result, both agricultural and industrial products had access to a bigger market, and more products needed to be manufactured to meet the demand. Mass production methods and technologies allowed industry to take advantage of the new business environment.

In contrast to today's mass production principles, much of industry was characterized by specialization prior to the Industrial Revolution. One person produced an entire product, using tedious methods and inefficient means. The Industrial Revolution, which began in England, allowed for more mechanization, speeding up the production process and allowing the quantity and sometimes the quality of the product to improve.

Weber's Least Cost Theory

One of the preeminent economic geographers is a man by the name of Alfred Weber. Weber was a German economist and socialist who in the 20th century developed a theory to try to describe the **industrial location** of certain industries.



Weber's theory, shown in Figure 7.1, became known as the least cost theory. His theory suggests that a company building an industrial plant needs to take into consideration the source of raw

materials and the market for the product. Thus, the weight of the raw materials and the finished product will determine the location of the production facility for that company.

The fundamental principle is triangular. The base of the triangle consists of the two raw materials necessary for the production of the product. If the product being produced is a **weight-gaining industry** (an industry where the finished product weighs more than the raw materials); then the industrial production point will need to be located closer to the market to minimize the transportation costs associated with a relatively heavy product (see Figure 7.2). If the industry is a **weight-reducing industry** (an industry where the raw materials weigh more than the finished product), the industrial production point will need to be located closer to the raw materials (see Figure 7.3).

Many of the resource-oriented industries are weight-reducing industries. The weight-reducing industries try to minimize the costs of hauling heavy materials, such as ore, long distances by placing their industrial production points closer to where the resources are located, such as mines.

The production of potato chips is an example of a weight-reducing industry. For our purposes here, let's assume that there are two primary raw materials, salt and potatoes, in the production of Geochips. Because the potatoes and the salt are heavier than the finished product, a bag of potato chips, the production point should be located closer to the potato farms and the salt plant.

A weight-gaining industry, on the other hand, adds to the weight of the raw materials in making the finished product. Automobiles are an example of a weight-gaining industry. The plastic, rubber, and engines all add to the overall weight of the finished product. Weight-gaining industries want their production points located closer to their markets so as to reduce the transportation costs of the heavy finished product.

An example of a weight-gaining industry using the same raw materials as Geochips would be French fries. In our production of Geofries, the raw materials are the same—salt and potatoes—but now the finished product must be frozen when shipped to market. Refrigeration, or the cooling or freezing of the product, adds to the cost of the transportation by increasing the product's weight as well as by increasing the energy needed for the actual refrigeration. Because the Geofries are a weight-gaining product, the manufacturer will want to move the production point closer to the market.

Another example of Weber's least cost theory is the fictional "brick bunny." The brick bunny is built with two primary products: bricks and feathers. Because the bricks weigh more than the feathers, the producer puts the production point closer to the bricks to minimize their transport cost. The production point is skewed toward the side of the triangle where the raw material that is the heaviest (bricks) comes from. This is shown in Figure 7.4.

The three primary factors that Weber included in his model were raw materials, labor, and transportation. The most expensive is labor; however, transportation is the easiest item of the three to control through the location of the new industrial facility. Still, all three factors are vital in determining the success of a business or industry.

For Weber's theory to work, he had to make some assumptions. The industrial production point must be located somewhere within the triangle. Otherwise, excessive transportation costs will make the product too expensive, and the consumer will be able to purchase the same product more cheaply from another manufacturer who is located within their triangle.

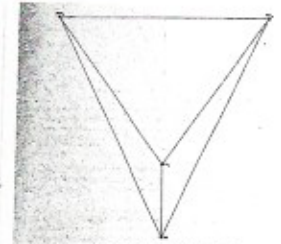


Figure 7.1 Weber's Least Cost Theory—Weight Gaining

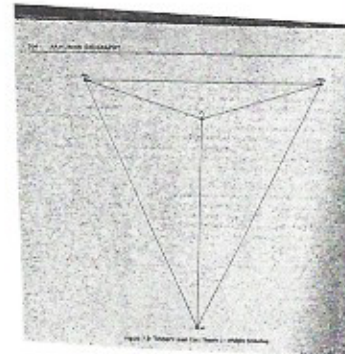


Figure 7.2 Weber's Least Cost Theory—Weight Reducing

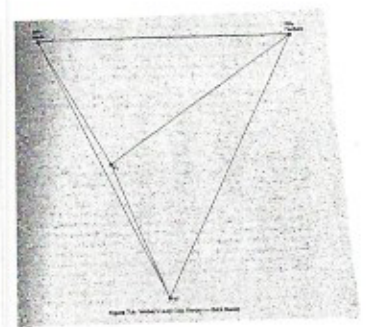


Figure 7.4 Weber's Least Cost Theory—Brick Bunny

Also, all parts of the triangle must be uniform in topography. Like von Thunen's agricultural land use model (also based on transportation), everything inside the triangle must have the same landscape characteristics so that transportation costs are the same everywhere in the triangle.

Another assumption is that the areas inside of the triangle have the same political, cultural, and economic values. Every person within the triangle must have the same opportunity to purchase the product and the same desire for it.

Weber also assumed that the availability of transportation is equal in all parts of the triangle. The items must be shipped via the shortest and/or cheapest available method.

Other important assumptions are that the minimum amount of raw materials needed to make the product is available and that a market is known to the producer when developing the product.

Yet another assumption is that labor is infinitely available to any production point located within the triangle. However, that labor force is immobile, unwilling to move with the industry if the industry relocates.

What happens when a variety of materials is needed for the production? Then the production point moves closer to the heaviest raw material to balance transportation costs.

Weber's theory can be used on different, typically macro-level scales, from national to state or city levels. Weber's assumptions suggest that all of the industry occurs within the same national boundaries. However, industrialization is becoming more global. With trade alliances, such as the North American Free Trade Agreement (NAFTA), the ability to produce goods in one country and sell them in another is becoming much more common.