

# [Scientific background behind the west’s leap in productivity essay sample](https://assignbuster.com/scientific-background-behind-the-wests-leap-in-productivity-essay-sample/)

The industrial revolution started in Britain in the early seventeenth century. With the Act of Union, England and Scotland were united and a sustained period of internal peace and free market was achieved. Britain had an established and reliable banking sector, a modernized legal system and means to enforce these laws, and a rapidly developing transportation system. In the late 1700s the manual labor based economy of Great Britain began to be replaced by the manufacturing of machinery. The mechanization of the textile industry, the scientific breakthroughs in iron-making techniques, the increased use of refined coal, and the introduction of steam power and its ability to power machinery combined with the introduction of new transportation methods led to the expansion of trade. These scientific breakthroughs laid behind the West’s leap in productivity.

The start of the industrial revolution in Britain lends itself to a very many array of factors. Britain was an island surrounded by water and its resources were much more limited than other parts of Europe. Namely, firewood was a necessity to warm homes in the winter. When firewood became a scarce commodity, coal was introduced as a valid replacement. England had plenty of coal deposits but the process was dangerous, labor intensive, and only the surface deposits were accessible. Mines flooded and horses on treadmills were used to power mine pumps. The power looms and spinning machines of the mills utilized water power but rivers would freeze in the winter and periods of drought would close the mills down.

According to Mack, P. (2005) between 1770 and 1850 the economy of England changed from mostly agricultural to mostly industrial. This was the result not of one key invention but of technological progress in different fields coming together. Its center is the development of factories (which hadn’t really existed before this time), but they couldn’t have developed without better transportation creating larger markets and better transportation couldn’t have existed without the growth of the iron industry, which couldn’t have grown without steam engines. Thomas Savery developed the first steam pumps for mines. Thomas Newcomen improved upon it with the ability to utilize atmospheric pressure for power but this was only ½% efficient.

James Watt invented a more efficient engine that delivered smoother power. The Watt engine quickly became a favorite because it used less coal to operate. Steam power technology began to make its appearance in locomotives in the 19th century. These locomotives were used in freight and passenger services. According to Cowen R. “ Every economic indicator suggests that the timber crisis was most acute in England from about 1570 to 1630. It is at this time that we see an unwilling but dramatic change to coal as the nation’s industrial fuel.” (Chapter 11)

Among the Western European countries in the 18th century, Britain was the ideal candidate for the industrial revolution because of the significant agricultural changes it underwent prior. The decline of feudalism and the guild system, the implementation of a free market, the abolishment of communal farming forcing farmers off their land and into the factories, and the new scientific approaches to farming set the groundwork for the industrial revolution. Britain’s infrastructure, such as laws and stable government, roads, ports, bridges, the Bank of England, the London stock exchange, and a government much like a democracy, combined with the groundwork of the agricultural revolution of Britain, played an important role in developing an industrialized nation.

Kreis, S. (2011), There is no denying the fact that the Industrial Revolution began in England sometime after the middle of the 18th century. England was the “ First Industrial Nation.” As one economic historian commented in the 1960s, it was England which first executed “ the takeoff into self-sustained growth.” And by 1850, England had become an economic titan. Its goal was to supply two-thirds of the globe with cotton spun, dyed, and woven in the industrial centers of northern England. England proudly proclaimed itself to be the “ Workshop of the World,” a position that country held until the end of the 19th century when Germany, Japan and United States overtook it.

The scientific background that lay behind the West’s leap in productivity was primarily textiles, steam power, iron founding, and it was aided by revolutions in transportation, agriculture, communications, and technology. Kreis, S. (2011), England faced increasing pressure to produce more manufactured goods due to the 18th century population explosion — England’s population nearly doubled over the course of the century. And the industry most important in the rise of England as an industrial nation was cotton textiles. No other industry can be said to have advanced so far so quickly. Although the putting-out system (cottage industry) was fairly well-developed across the Continent, it was fully developed in England. A merchant would deliver raw cotton at a household.

The cotton would be cleaned and then spun into yarn or thread. After a period of time, the merchant would return, pick up the yarn and drop off more raw cotton. The merchant would then take the spun yarn to another household where it was woven into cloth. The system worked fairly well except under the growing pressure of demand, the putting-out system could no longer keep up. With a constant shortage of thread, the textile industry was forced to improve cotton spinning techniques. James Hargreaves invented the cotton-spinning jenny around 1765 and Richard Arkwright invented the water frame around the same time. With these two inventions, cotton could be manufactured at ten times the amount just decades earlier. This surplus of cotton goods could now be sold at an affordable price for the social classes, providing millions with the ability to wear cotton undergarments. The next development in manufacturing cotton came by way of steam power.

Thomas Savery, Thomas Newcomen, and James Watt led the way in steam power. Watt’s engine could turn a shaft and drive the machinery needed to spin and weave cotton cloth. His engine was also coal fired and provided spinning factories with the ability to be located virtually anywhere. Kreis, S. (2011), Steam power also promoted important changes in other industries. The use of steam-driven bellows in blast furnaces helped ironmakers switch over from charcoal (limited in quantity) to coke, which is made from coal, in the smelting of pig iron. In the 1780s, Henry Cort (1740-1800) developed the puddling furnace, which allowed pig iron to be refined in turn with coke. Skilled ironworkers (“ puddlers”) could “ stir” molten pig iron in a large vat, raking off refined iron for further processing. Cort also developed steam-powered rolling mills, which were capable of producing finished iron in a variety of shapes and forms.

The industrial revolution transformed human life in the late eighteenth and early nineteenth centuries in Britain, the United States, and Western Europe. The industrial revolution got its start in the early seventeenth century in the United Kingdom. The mechanization of the textile industry, the scientific breakthroughs in iron-making techniques, the increased use of refined coal, and the introduction of steam power, combined with the introduction of new transportation methods leading to an expansion of trade were the scientific breakthroughs laid behind the West’s leap in productivity.