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In Depth: Industrial Revolution 4.0

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The Fourth Industrial Revolution is a term that describes present technological age. **It is the fourth industrial era since the inception of the initial Industrial Revolution of the 18th century.** The key elements of the fourth revolution are the fusion of technologies ranging from the physical, digital to biological spheres.

Prime Minister gave an institutional shape to the expression by launching the Centre for Fourth Industrial Revolution in India.

It is an initiative of the World Economic Forum and, India becomes the fourth country to have such a centre after US, Japan, and China. The Fourth Industrial Revolution, in short, describes the huge changes brought about by smart technologies.

What is the Industrial Revolution?

The Industrial Revolution, which took place **from the 18th to 19th centuries, was a period during which predominantly agrarian, rural societies in Europe and America became industrial and urban.**

Prior to the Industrial Revolution, which began in Britain in the late 1700s, manufacturing was often done in people's homes, using hand tools or basic machines. However, these cottage industries were enormously labour intensive, with the merchants supplying the raw materials and collecting the finished goods later. The whole process was largely inefficient. The supply was erratic as the self-employed workers had to tend other works. Several key innovations changed all that. An example from the textile industry:-

- In 1764, **Englishman James Hargreaves built a machine called the Spinning Jenny** that enabled an individual to produce multiple spools of threads simultaneously. By the time of Hargreaves' death, there were over 20,000 Spinning Jennys in use across Britain.
- The spinning jenny was improved upon by English inventor **Samuel Compton's spinning mule.**
- Another key innovation in textiles, the power loom, which mechanized the process of weaving cloth, was developed in the 1780s by **English inventor Edmund Cartwright (1743-1823).**

Industrialization marked a shift to powered, special-purpose machinery, factories and mass production. The iron and textile industries became the mainstay of industrial revolution. From cooking appliances to ships, all had components of iron and steel. The process went in hyper drive with the advent of steam engine and ships.

The industrial revolution took place in the rest of Europe after Britain. It was mainly inspired by the growth of technology, prosperity, and power of Britain. The base of the industrial revolution was dependent on local resources, political will and the socio-economic condition of each individual European country.

The industrial revolution spread in all corners of the British Empire and took roots in the United States in the 1860s, after the American Civil War (1861-65). This part of the revolution is called the Second Industrial Revolution. This changed America from an agrarian society to an industrial one.

Some of the innovations of the first industrial revolution:-

- Steam engine
- Flying shuttle
- Spinning Jenny

- Cotton Gin
- Telegraph
- Cement
- Modern roads
- Bessemer process
- Power loom

The Evolution of the Industrial Revolution

- The First Industrial Revolution used water and steam power to mechanize production. It was the first instance where production shifted from cottage industry to large production houses or factories.
- The Second industrial revolution used electric power for mass production. That is, large scale machines were brought into the picture. Huge conveyor belts rolling products one after the other, automobiles and production of electricity, defined this phase.
- The discovery of computers laid the path for the third revolution.
- The third phase was the most important as the machines which previously were electrically driven became electronically driven, that is, it used electronics and information technology to automate production. This came around in the middle of the 20th century.
- It is seen that each revolution took about a hundred years to establish and then give way to the next revolution.
- Now a Fourth Industrial Revolution is building on the third revolution, that is, the digital revolution that has been occurring since the middle of the last century. It is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres.

What is the Fourth Industrial Revolution?

- Building on the foundation given by the third Industrial Revolution, the fourth Industrial Revolution is moving from an electronic based industry to a process which is the combination of human beings and electronics.
- It includes cyber-physical systems, the Internet of things, big data analytics, cloud computing, cognitive computing, artificial intelligence, 3-D printing, and autonomous vehicles etc.
- The best example would be processed artificial intelligence has broken the distinction between the Man, The Machine and Intelligence.

- **Impact of Industry 4.0**

- Services and business models improvement.
- Reliability and continuous productivity.
- IT security and better resource utilization.
- Machine safety and better working condition.

India and Industrial Revolution

- India was famous for her handicrafts from the pre-British times. In Mughal periods such as the variety of handicrafts that it became famous in the global market.
- However, the Industrial Revolution came late to India. This was mainly because of India's complicated political and economic relations with Britain.
- Impact of the revolution:-
 - India dominated the cotton textile market in the 18th century. It took a severe hit when the Industrial Revolution began in England around 1760s.
 - The use of steam power in British mills reduced the cost of cotton by 85 %.
 - In order to protect its domestic industry, it began to restrict textile imports from India. On the other hand, it started to import textiles to India.
 - British protectionist laws led to deindustrialization in India.
 - The new colonial law forced the farmers to grow cash crops like cotton instead of food crops, leading to famine and poverty.
- The third Industrial Revolution started in India in 1980s. Advancement in this phase encompasses the spread of personal computers, internet, and ICT.
- In India, the Industrial Revolution 4.0 is mainly based on Big Data and Artificial Intelligence.

How can Industrial Revolution 4.0 help India?

- It can play a major role in alleviating poverty.
- Better and low-cost health care can be achieved through the implementation of AI-driven diagnostics, personalized treatment, early identification of potential pandemics, and imaging diagnostics, among others.
- Enhancing farmer's income by providing them with the latest technologies, improvement in crop yield through real-time advisory, advanced detection of pest attacks, and prediction of crop prices to inform sowing practices.
- It will strengthen infrastructure and improve connectivity to the very last village.
- Artificial intelligence can be used to empower and enable specially-abled people.
- It will improve ease of living and ease of doing business using smart technologies.
- Recently, India has announced her drone policy, which will play an important role in security, traffic and mapping.