



# INDUSTRY 4.0 AND ITS IMPACT ON INDIAN ECONOMY

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## ABSTRACT

*At present, developed economies like Germany, Japan, the USA, and Singapore have embraced Industry 4.0 to increase their manufacturing competitiveness. At present, India lags behind its global peers in Industry 4.0 adoption. However it has been started to implement these technologies into its industrial process and it also has created lots of positive impacts also. From the beginning of civilization, human beings have tried to increase their capacity and power. At first they were using equipment made of wood or rocks but with the advancement of science they explored modern and efficient equipment, and this process is going on. Machines are one of the inventions of humans. Use of machines was the cause of first industrial revolution. It was termed as a revolution because it not only increased production but also brought significant social and economic changes. For example, in 1790s the French revolution took place, which coined new ideas like Equality, Liberty and Brotherhood, the first industrial revolution, which came to pass a few years after the French revolution, infused those ideas. It means industrial revolutions have a huge impact on our society, not only society but it also affects the world economy. With this backdrop the present paper has made attempt to explain the impact of industry 4.0 on Indian industry*

**KEY WORDS:** Industry 4.0; Manufacturing Sector; Indian Economy; Economic Growth; Industrial Development

## INTRODUCTION

From the beginning of civilization, human beings have tried to increase their capacity and power. At first, they were using equipment made of wood or rocks but with the advancement of science they explored modern and efficient equipment, and this process is going on. Machines are one of the inventions of humans. Use of machines was the cause of first industrial revolution. It was termed as a revolution because it not only increased production but also brought significant social and economic changes. For example, in 1790s the French revolution took place, which coined new ideas like “Equality, Liberty and Brotherhood”; the first industrial revolution, which came to pass a few years after the French revolution, infused those ideas. It means industrial revolutions have a huge impact on our society, not only society but it also affects the world economy.

Today, technology has advanced and we are moving towards the Fourth industrial revolution. New technical breakthroughs like Artificial Intelligence, Internet of things, Big Data etc. will change the entire scenario of current industry. Industry 4.0 is going to change the way we work, the way we live, the way we think and the way we relate things with other. One of the major components of industry 4.0 is Artificial Intelligence (AI). It enables machines to think, learn and in decision making also. It is expected that AI will make a revolutionary change in space industry as well. In the near future, robots will be sent to space instead of a man and hence will provide new breakthroughs in space science. Not only the space industry but every sector from agriculture to healthcare and education is going to be benefited by AI. On the one hand, AI will be used to tackle challenging problems like security, fighting terrorism, surveillance, traffic control etc and on the other hand, it will bring dynamic changes in banking, airlines, medical technology and education system. By the use of nanotechnology, we can conduct critical cancer operations also.

In future normal class rooms are going to be replaced by smart classrooms which will ensure better learning for students. Although now this technology is less affordable, it is expected that it will be cheaper with the advancement of technology. Not only this, AI and machine learning these skills will be installed in future generation syllabus because learning about these is very essential for the next generation. There is also a negative side of this technological advancement. Studies say that robots will turn humans lazy. Although human life will be longer due to advancements in healthcare, it is also true that humans will become less fit and lazier. In such a situation, those who use technology properly to maintain a healthy life will be more benefited than others. Human life costs a lot. That’s why in the future generation armed forces we may find robot soldiers. But for countries like India where 10 lakh people are employed in armed forces, this will create a major unemployment situation. Also imagine if countries will start using robots to fulfill their expansionist policy then it will be a major threat to world peace and may cause a third world war.



### **Industry 4.0 Technologies and their Industrial Applications**

Internet of things (IOT) is another technical breakthrough where machines can communicate with each other. IOT with the AI combination will transfer factories into smart factories, cities into smart cities, cars into smart cars and homes into smart homes. If so happens, then it will reduce human efforts to a minimum. Big data analytics is another crucial component of Industry 4.0. It is basically developed to gather information and data of consumers so that producers can manufacture proper items and services for them. In today's digital world, data is very important for us. Just imagine, if this huge data is processed properly then we will witness magical changes around us. We will get proper on-time services, hence it will save both money and time. Actually, Big Data will completely transform the governance system. It will make it more transparent and efficient. Policy implementation is a major headache for governments. It is expected that Big Data with AI will work to simplify this problem. The government will be able to reach every needy person and no one will be excluded from justice. It means Big Data ensures inclusive socio-economic development in the future.

### **Industry 4.0 Technologies and Data Privacy**

According to the UN, privacy is one of the human fundamental rights. Can we ensure privacy while installing this technology? Is Industry 4.0 going to ruin our fundamental rights? Actually, when we are considering Big Data we are considering data of millions of TB. In such huge amount of data, personal data doesn't matter much. But this data can be used to influence people politically and may hamper democratic processes also. This data, if not properly guarded, may cause civil wars or riots. So this is going to be a big challenge in the future. Industrial revolution puts a big impact on world economy and changes its basic structure. For example, the first industrial revolution transformed the agrarian economy into the manufacturing economy; the second industrial revolution reshaped it into the service-based economy and during the IT revolution the world's economy became a knowledge-based economy. But in this advancement, if one had to sustain he/she has to learn new skills and techniques. For example, when tractors and electric pumps were introduced in the farming sector, only those farmers could sustain well who trained themselves in accordance with modern technology and the rest failed.

### **Impact of Industry 4.0 Technologies on Human and the Workforce**

A huge question arises when we think about artificially intelligent machines: "Will there be any job left for humans?" Actually, jobs are not dying but they are evolving. It is obvious that Industry 4.0 will replace some jobs, but is also creating new jobs like big data analytics, VR designer, blockchain auditor, social media reporter, drone operator space visit guide and many more. It is expected that high-skilled and low skill jobs will stay as before, but middle-tier jobs will be replaced by AI robots. This is known as job polarisation in the economic terms. If workers want to sustain then they have to learn new technological skills. Researchers of Oxford University have found that jobs which are related to manual dexterity, high cognitive skills and social skills are difficult to be computerized, and workers should focus on developing these skills. Doctors are going to be replaced by AI robots in future but if a doctor is trained with hospitality skills and caretaking skills, then he/she will be preferable over a robot-doctor. It means jobs are going to be knowledge-centric and talent centric. A construction worker has to learn something about electronics apart from construction skills if he/she wants to build an automated smart home where sensors are used. Hospitality, condolence, politeness these are some qualities which should be learned as these will value add our character.

In the recent times, human race are heading towards a Gig economy. Gig means not continuous. It is predicted that normal continuous jobs will be reduced and these will be replaced by contractual jobs. If there will be no permanent jobs then there will be no paid holidays and no insurance schemes and also no fixed income. It may create unemployment like situation but I think gradually it will become part of our habit. So the beginning period is going to be tough and it is also expected that the revolution may slow down the world economy for a small period. So we should get ready for it. It is often observed "lack of reciprocity between technology and skill results in social inequality". Those who learn new skills time to time and update their work with new technology will succeed and for the rest, fourth industrial revolution will be a big challenge. Actually, it depends on you whether Industry 4.0 will be a boon or a curse.

### **Economic Benefits Provided by Industry 4.0 Technologies**

Industry 4.0 technologies will help in the economic regeneration by 2025 enabling enterprises to revamp India's financial status in the post-COVID era besides acting as game-changers. The role of corporations through AI is going to be key for the comeback of the Indian economy post-pandemic. New-age technologies such as block chain, big data analytics, Internet of things (IoT), advanced manufacturing, quantum computing and AI are set to give India a possibility to engrave itself a striking uniqueness as an "International nucleus" in the near future. As AI functions for "digital inclusion" in India, it is expected to have a ripple impact on economic prosperity and growth. Analysts foresee that AI can help add up nearly \$957 billion to the Indian economy by 2035 and by 2025, AI can add over \$500 billion and nearly 20 million jobs to the Indian economy. The Indian government is also in the process of implementing a robust legal framework governing the data of the country apart from constructing a data-driven society through AI that presents endless prospects to empower people, enhance society and also boost the ease of doing business. India through its AI strategy, constituting an extensive pool of AI workforce and an emerging startup ecosystem, has a remarkable chance



to be a prominent contributor to AI-driven resolutions that can further transform agriculture, healthcare, manufacturing, education and skilling thereby impacting the economy positively to a considerable extent. The adoption of AI in various sectors of the economy is seen to have produced favorable returns by lessening time and risk.

### **Government Initiatives to Speed up the Implementation of Industry 4.0**

Recently, the Ministry of Commerce and Industry has set up a Taskforce on AI to kick-start the usage of AI for the country's economic shift. Nonetheless, AI adoption has remained at a developing stage. Therefore, the Indian government should consider establishing a separate "Industry 4.0 Ministry" for coordinating all new age technology related activities. For instance, the United Arab Emirates (UAE) in 2017 became the first nation in the world to create the post of Minister of State for AI. Today, governments globally are also taking measures to be part of the AI-led digital economy, which is assessed to contribute roughly \$15.7 trillion to the global economy by 2030. Considering India's present situation, the country is on the verge of a massive opportunity for both economic advancement and gain in the common well being of its citizens. "Inclusive economic growth" can make India the best playground for creating world-class and state of the art technology solutions. For this, the government through its annual budget must consider allocating more for Research and Development (R&D) in various sectors and also establish R&D departments in various educational institutions and universities across the country. India through General-purpose technologies (GPTs) can also influence the whole economy where GPTs have the possibility to drastically transform societies through their effect on the already existing economic and social arrangements.

### **Growth Potential of Industry 4.0 in Indian Economy**

The adoption of AI is not confined to businesses alone, while economies have also shifted their emphasis on creating their AI capacities as a tool to boost growth where developed nations are already in the race and India as an aspiring future superpower is set to enter the AI race. Amidst the accelerated adoption of AI-based technologies, India seems to stand at the ridge of Industry 4.0. Therefore, it would be a convenient shifting for India to create its AI abilities despite the transnational digital divide broadening even more. From the first industrial revolution until the rise in the IT revolution, the world has stood to benefit more and as per experts, AI like any other new technology in the past will produce more jobs than it destroys. Still, it is seen that the "Initial adoption of technology" has barriers for developing economies where restricted access to Industry 4.0 can broaden the income inequality, and the transformation stage of adoption is presumably to replace some jobs before it produces more jobs. While the influence of AI on the gross domestic product (GDP) and productivity is impressive, studies have also demonstrated the harmful effect of AI on employment. McKinsey Global Institute indicated that intelligent mechanisms and robots could eliminate nearly 30 per cent of the global human labor by 2030. Also, with the rise in unemployment, this transformation could become quite difficult though in the past, new technologies have demonstrated to be worthwhile in the long-term, the short-term failures cannot be justified. Nevertheless, India still lags on essential indicators of AI development despite possessing increased levels of entrepreneurship, robust corporations and a skilled pool. Therefore for the betterment of the essential AI indicators a balanced approach, innovative local solutions and top-down policy making should be put forth. Also, the enhanced role of government along with the private sector will be instrumental in directing AI to create equitable development. Furthermore, the continued innovations and collaborations by Public-Private Participation (PPP) are necessary to lessen the cost of modern technologies, which can help the larger population thereby driving the "digital revolution". However, India should also mainly consider improving its "hardware sector" to help redress bottlenecks since the country still lags behind which is vital for the Indian economy.

### **CONCLUSION**

As India is expected to have the world's youngest population by 2030, the country will account for nearly 30 per cent of the global workforce. Therefore, AI in this way can dramatically boost the productivity of the average worker to match the level of today's top performers. There is also a further need to promote "Scientific temperament" amongst the people in the country about the new age technologies besides taking the ethics and security of Industry 4.0 into consideration. In this context, the "National strategy for AI" in India has recently recommended establishing ethics councils for sector-specific concerning privacy, security, and ethics. Industry 4.0 can also help the country to achieve the Sustainable Development Goals (SDGs) that can drive the Indian economy further. Henceforth the Indian economy and society in the long run is definitely poised for a sea change and the valiant dream to make India a \$5 trillion economy by 2025 can be accomplished through the adoption of Industry 4.0.

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