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Industry 4.0 in India-A Study on Opportunities and Challenges

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Abstract

In current situation, all industries are trying to stretch their arms all over the globe to become a strong competitor in industrial world. Industry 4.0 involves a wide set of technologies that provides a good platform for innovation and creative solutions. In order to implement such condition, it requires the utilization of advanced prediction tools that involves the conversion of data into information in a systematic process to explain uncertainties. This technology is an opportunity to change the economic rules of the industry. As we know India is in its verge of development. It is very important to understand India's thrust towards "Make in India". Thus it is important for an India to adopt industry 4.0 technology and to get adapted to the same. This in turn contributes in the development of Indian economy. This paper addresses the impact of industry 4.0 technology in India.

Keywords: Industry 4.0, Internet of Things, Challenges, Opportunities.

Introduction

The phenomenon of Industry 4.0 was first mentioned in 2011 in Germany as a proposal for the development of a new concept of German economic policy based on high-tech The concept has launched the fourth technological revolution, which is based on the concepts and technologies that include cyber-physical systems, the Internet of things (IoT), and the Internet of services based on perpetual communication via Internet that allows a continuous interaction and exchange of information not only between humans (C2C) and human and machine (C2M) but also between the machines themselves. Along with the profit, industries also care about customer satisfaction, product quality and its customization and also cost of production. Thick digital transformation is on the way, behind the scenes of world's leading industries. They are intensifying their product portfolio with digital functionalities and also investing in data analytics to drive innovation and significant improvements in efficiency as a basement capability.

Objectives

1. To study the concept of industry 4.0 in India

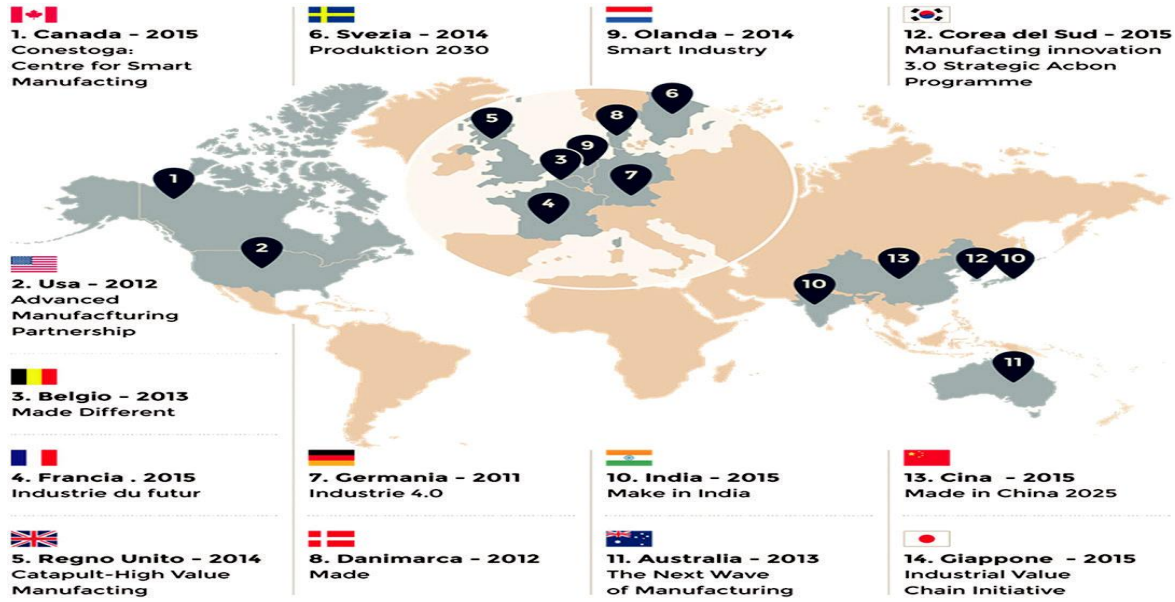
2. To study the opportunities of industry 4.0 in India
3. To study the challenges of industry 4.0 in India

Data Collection

The data of this paper is collected through Secondary data like from Journals, Articles, Magazines and Reference Books etc.

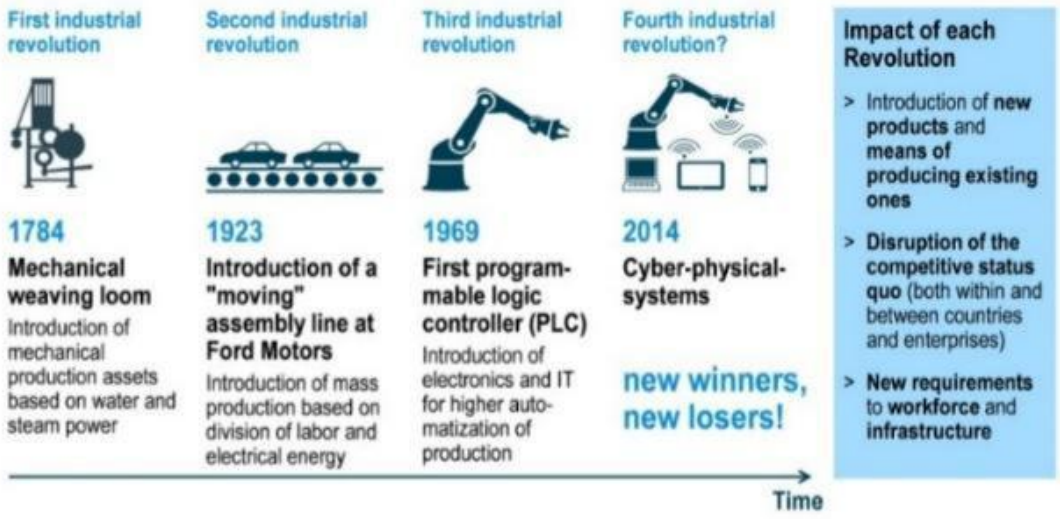
- **Origin Of Industry 4.0 Concept**

That the Industry 4.0 concept comes from Germany is not surprising, since Germany has one of the most competitive manufacturing industries in the world and is even a global leader in the sector of manufacturing equipment. Industry 4.0 is a strategic initiative of the German government that traditionally heavily supports development of the industrial sector. In this sense, Industry 4.0 can be seen also as an action to-wards sustaining Germany's position as one of the most influential countries in machinery and automotive manufacturing.



History

At Hanover fair conducted in January 2011, Germany government introduced a new concept as one of its "strategic initiatives" termed as the Industry 4.0 that is adopted as a part of the High Tech strategy 2020 action plan. Siegfried Dais of Robert Bosch GmbH and Henning Kagermann of acatech, the communication Promoter group of the Industry-Science research Alliance and a team co-chaired by other members explained and proposed this concept in January 2011. It is a vision, an idea which was firstly explained by industry 4.0 working group.



Industry 4.0 Key Technologies

Industry 4.0 brings together technology forces such as Internet of Things (IoT), cloud computing, big data analytics, additive manufacturing, Augmented Reality (AR), robotics, cyber security and Machine-to-Machine (M2M) communication. While some of these digital technologies are already in use in industrial applications, some others are still not ready for application at scale. Manufacturers need to carefully pick the right mix of technologies that would maximize returns on investment.

- **Internet of Things (IoT): IoT** enables real-time machine–machine interaction by connecting them over a network and help establish a connected value chain
- **Big Data Analytics:** Data analytic capabilities to support intelligent and real time decision making
- **Augmented Reality:** AR could enhance business operations by leveraging mathematical modeling, AI and virtual reality
- **Cyber Security:** Cyber security helps establish secured communication protocols to ensure data security
- **Cloud Computing:** Cloud computing offers a platform equipped with vast computational, storage and networking capabilities, which would facilitate the interaction amongst various technologies
- **Additive Manufacturing:** Additive manufacturing helps production in small-batches in a cost-and-time-effective way, by reducing the lead time from product designing to product release and improves customization.
- **Robotics:** Inter-connected robots to facilitate the automation of manufacturing processes, helping improve efficiency
- **M2M:** Machine-to-Machine involves the use of industrial instrumentation and sensors to record and communicate data directly with software.

Industry 4.0 - Current Status in India

Since 1970 Industries in India and all over the world have adapted automation and robotic technologies that are driven by electronics and information technology. Present technology consist the automation of isolated machines. General adoption of information and communication technology by manufacturing industry is now leading for deterrent approaches to production development and to the whole logistic chain. As we know increase in population is paving the way for increase in productivity and quality with limited time period. Globally, the Industry 4.0 market is expected to reach INR 13,90,647 crore by 2023.1 Countries such as the U.S., China, Japan and European nations like U.K., Ireland, Sweden and Austria all have started adopting Industry 4.0. In India, the sixth-largest manufacturing country, the manufacturing sector forms an integral part of the country's long-term vision as seen by the government's strong focus on the 'Make in India' campaign. The government aims to augment the share of manufacturing in GDP to 25 per cent from the current 17 per cent, by 2022. A number of initiatives and policy reforms, such as implementation of the GST (Goods and Services Tax) and easing FDI policy have been taken by the government.

At present, India lags its global peers in Industry 4.0 adoption. A significant portion of the Indian manufacturing sector is still in the post-electrification phase with use of technology limited to systems that function independently of each other. The integration of physical systems on cyber platforms, the basic premise of I4.0, is still at its infancy. Furthermore, the Micro, Small & Medium Enterprises (MSME) segment has very little access to automation technology due to the high cost barrier.

The current scenario of Industry 4.0 implication in India can be summoned by following way:

1. Non-awareness of the technology
2. Systematic approach towards modernization.
3. Non-Willingness to adopt the new technologies
4. Availability of Cheap labor initiates reluctance to adopt automation
5. Volume of products is not very high so as to adopt the automation increases ROI for the investments.
6. Non availability of skill set to adopt the Automation.

Impact of Industry 4.0

Internet and mobile phones as a new transforming technology succeeded because they were followed by a societal transformation and not because they were new. Internet as a technology did not invent Social networks, but social networks formulated thanks to the Internet, and also enabled it to develop further. In the same way rules of the industry players will be changed by bringing new functionalities through Industry 4.0. The development in different industries will proceed at different rates. In the same way India needs to take few steps to ensure a manufacturing success story in Industry 4.0

- **It has to Improve its Fledging Internet of Things (IoT) Industry**

As the growth of industry 4.0 is based on the growth of IOT market, it is necessary to work on seamless data integration. In order to create a smart Factory all heterogeneous devices have to be networked and connected together in the industrial automation system through IOT.

To Develop a Robust Data Security Environment

Practical application of smart factory is impossible without a robust security infrastructure. Security services industry has to be developed in order to manage advanced targeted cyber-security threats and attacks and also strict government rules and regulations are to be made for data security and protection

- **Skill Development:**

It is the right time for the India to improve its skill in some the areas in which it has not done well so far, like advanced automation, automation bionics, industrial ICT, cognitive robots and etc.., and also it has to take care of safety related abilities as Industry 4.0 involves Human machine cooperation and engagement. An instructive approach from corporations helps India in its preparation for leadership in Industry 4.0.

Opportunities

Opportunities are related to the new technologies integrated into the 4.0 systems. The fourth industrial revolution is characterized by the merger of digitization and automation to make the machines intelligent, interactive, and easy to use. These new technologies will have a huge impact on working patterns. There will be new types of robots that can interact with humans. This technology will complement human activity, in particular cognition, combined with other emerging technologies to give us completely new computer models.

Thus, NEW SKILLS are needed to bridge the gap between engineering and computer science, automatic learning, and artificial intelligence. Industry 4.0 must also be a suitable tool for eco-sustainable production. This is because industry will continue to depend on resources and energy, and each country will play in the production and supply of resources and energy. In order to combat climate change, China has promised to reduce the intensity.

Challenges

There are many challenges which have to be addressed in order to successful adoption of advanced technologies and realization of Industry 4.0 potential. Few key challenges are given below:

- Lack of a clear digital vision.

- Lack of data analytical capabilities fostering a strong digital culture Level of digitization.
- Data Security.
- The major risk with recording, storage and analysis of large volumes of customer data is the inappropriate use of said data.
- Lack of standardization.

Conclusion

Industry associations could take a lead in Industry 4.0 adoption in India. Overall, widespread adoption of Industry 4.0 would require collaborative efforts of industry associations. These associations can take initiatives to identify technological developments, find infrastructure and political needs, assess impact on sectors and plan a workforce up-skilling road map. The associations could also work closely with the government to facilitate faster adoption of I4.0 in India. Industry 4.0 adoptions could position India as the leader on the global manufacturing map. Demand and volume growth, driven by consumerism trend in India, would create jobs, which is expected to offset some of the job losses due to I4.0. Government can focus on improving the ease of doing business and attracting FDI investments in the space through policy reforms. Collaboration between countries, corporations as well as academia would catalyse Industry 4.0 adoption.

India is a population of 1.37 billion people and its resources are stretched to say the least. However, India has to rework the way it has historically dealt with issues; the world around it is changing. As we discussed earlier fourth industrial revolution is on its way to occupy the world and likely provides large opportunities. Through Industry 4.0 it is feasible to create prolonged ecosystem with qualified employees and to bear on India's edge in manufacturing and can orchestrate to large scale customization. By adopting Industry 4.0, we will have a major competitive advantage over global competitors in economy. But first and foremost we need to have the essence of speed in order to capture this opportunity and to achieve our goal.

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