

## **Industrial Revolution 4.0-“A Study of Indian Inc’s impacts over Industrial growth and Social transformation”**

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**ABSTRACT:** *Industrial performance bringing exponential shifts in economic and social dimensions around the world. Since from the inception of Industrial revolution during 18<sup>th</sup> century, everyone on the planet experiencing drastic changes in our regular life. Industrial deliverables impacting massively over economic development through invention and innovation embedded across product & services, which leads to shift in social perspective in terms of embracing and adopting impacts through, consumptions, spending patterns, living standards. This article is an attempt to showcase, as an emerging market, Indian companies [domestic and oversee] are catalyst in transforming towards nation sustainable economic growth and socio-culture shifts.*

**KEYWORDS:** *Industrial revolutions, Industrial deliverables, Emerging Markets, Economic growth.*

### **INTRODUCTION:**

The revolution in process of changes were not new to human kind, the revolution approach emerged in ancient eras, major transformations noticed, few were unnoticed. The human capability of exploring novel methods in approaching issues & problems results in revolution. The ability of human thought process regarding complexities and problems were radicle to accomplishing significant advancement, efficiency, effectiveness, streamlining the process and integrating methods. Similarly industrial revolution occurring in the same fashion, exploring the novel opportunities, enhancing functionality, simplifying the complex process & tasks by scientifically and technologically were key focus of industrial revolution. Science and technology playing a crucial role in transforming new way of life in any domain. We are majorly witnessing current industrial deliverables impacts and influencing in transforming every one’s life one and the other ways.

### **STUDY OBJECTIVE:**

1. To explore, the phases of industrial revelations around the world.
2. To analyse, the industrial 4.0 impacts over Economic & Socio-culture dimensions.
3. To measure, Industrial 4.0 holistic contribution towards sustainable performance.

### **METHODOLOGY:**

The study conducted to explore impacts of Industry revolution 4.0 on Indian economy and socio cultural dimensions in transforming industrial deliverable and way of life, the Information obtained from secondary sources such as newsletters, e-journals and other public domains.

### **INDUSTRIAL REVOLUTION JOURNEY:**

**The First Industrial Revolution began in the 18th century** through the use of steam power and mechanisation of production. What before produced threads on simple spinning wheels, the mechanised version achieved eight times the volume in the same time. Steam power was already known. The use of it for industrial purposes was the greatest breakthrough for increasing human productivity. Instead of weaving looms powered by muscle, steam-engines could be used for power. Developments such as the steamship or (some 100 years later) the steam-powered locomotive brought about further massive changes because humans and goods could move great distances in fewer hours. **The Second Industrial Revolution began in the 19th century** through the discovery of electricity and assembly line production. Henry Ford (1863-1947) took the idea of mass production from a slaughterhouse in Chicago: The pigs hung from conveyor belts and each butcher performed only a part of the task of butchering the animal. Henry Ford carried over these principles into

automobile production and drastically altered it in the process. While before one station assembled an entire automobile, now the vehicles were produced in partial steps on the conveyor belt - significantly faster and at lower cost. **The Third Industrial Revolution began in the '70s in the 20th century** through partial automation using memory-programmable controls and computers. Since the introduction of these technologies, we are now able to automate an entire production process - without human assistance. Known examples of this are robots that perform programmed sequences without human intervention. **We are currently implementing the Fourth Industrial Revolution.** This is characterised by the application of information and communication technologies to industry and is also known as "Industry 4.0". It builds on the developments of the Third Industrial Revolution. Production systems that already have computer technology are expanded by a network connection and have a digital twin on the Internet so to speak. These allow communication with other facilities and the output of information about themselves. This is the next step in production automation. The networking of all systems leads to "cyber-physical production systems" and therefore smart factories, in which production systems, components and people communicate via a network and production is nearly autonomous. When these enablers come together, Industry 4.0 has the potential to deliver some incredible advances in factory environments. Examples include machines which can predict failures and trigger maintenance processes autonomously or self-organized logistics which react to unexpected changes in production. And it has the power to change the way that people work. Industry 4.0 can pull individuals into smarter networks, with the potential of more efficient working. The digitalization of the manufacturing environment allows for more flexible methods of getting the right information to the right person at the right time. The increasing use of digital devices inside factories and out in the field means maintenance professionals can be provided with equipment documentation and service history in a timelier manner, and at the point of use. Maintenance professionals want to be solving problems, not wasting time trying to source the technical information that they need. In short, Industry 4.0 is a game-changer, across industrial settings. The digitalization of manufacturing will change the way that goods are made and distributed, and how products are serviced and refined. On that basis, it can truly lay claim to represent the beginning of the fourth industrial revolution.

#### **INDUSTRY 4.0 OUTCOMES:**

Industry 4.0 is ushered in new age of connected technologies and data-driven insights, and change the way we work and interact with each other. Innovative and advanced technologies, such as artificial intelligence (AI), mass automation, industrial communications, Big Data, robotics, and 3D printing are transforming the global manufacturing landscape. Industry 4.0 concentrates over end-to-end digitization of all physical assets and their integration into digital ecosystems. Advanced economies like Germany, Japan, the USA, and Singapore have embraced Industry 4.0 to increase their manufacturing competitiveness.

#### **Indian scenario of Industry 4.0**

In an Indian perspective, on how the Indian manufacturing and service Industries adapted so far and transforming impacts in terms of meeting industry standards and sociocultural aspects. Various studies conducted by the World Bank, Oxford University, etc. which indicates the relative global positioning of Indian Industry 4.0 reveal that, our county lagging in technology integration and adequate capital investment required. Despite of low automation and a young workforce, absolute job losses will be the second highest in the world due Industry 4.0 transformation. Thus, unless technology integration, India predicted to lag in productivity as is expected to be achieved through Industry 4.0. India may be adding 138 million new workers in its workforce in due course, which is likely the highest in the world, and it may be a challenge to step up its growth rate to compensate for both high job loss and high incremental workforce. If the country has to grow, it needs to invest heavily in adoption of new technology and reskilling/redeployment of a large share of its current workforce pool. As a matter of fact, Industry 4.0 is nascent phase comparatively thus government initiatives and targets play vital roles to leverage the opportunities. Indian government has set a target of increasing the contribution of manufacturing output to 25 percent of GDP by 2025, from about 17 percent currently. Adopting Industry 4.0 will be crucial to be able to achieve this. Notable progress highlighted from the sources, Government India **"Make in India"** initiative leveraging through Industry 4.0 in transiting the manufacturing sectors through new technology & operation which results in competitiveness, atmanirbhar and make our nation manufacture sector large contributors to GDP. Industry experts also projecting that, Indian

manufacturing & service industry vision 2030, factories set up closure to both worker and customer under ease of doing business concept, more importantly Indian production system will more focus on designed oriented to transit structural transformation.

### **Recent Development & Collaboration in Industry 4.0**

In the year 2018, the World Economic Forum setup its centre for the Fourth Industrial Revolution in India to work in collaboration with the GoI, which is one the significant move for industry 4.0 integration in Indian industry perspective. The National Institute for Transforming India (NITI) Aayog has been dedicated nodal agency to interact with the World Economic Forum for elaborating the new policy frameworks for emerging technologies. The GoI has already made the enabling policy framework and set up incentives for infrastructure development on a PPP (Public Private Partnership) model. Samarth Udyog Bharat 4.0 (Smart Advanced Manufacturing and Rapid Transformation Hubs) under the Department of Heavy Industries (Ministry of Heavy Industries & Public Enterprises) is the India's initiative to push for Industry 4.0 implementation with an aim to propagate technological solutions to Indian manufacturing units by 2025 through steps like awareness programme, training, demo centres etc. The industry, academia and international cooperation in the field of technologies related to Industry 4.0 is the policy formulated by the government. India's National Manufacturing Policy (NMP) has been propagating which aims at enhancing the share of manufacturing in GDP to 25% and Industry 4.0 is the only way ahead to achieve. Another significant move of Make In India initiatives gaining huge prominence in Cloud equipment of IT in manufacturing & production of cloud for industrial sectors which promoting innovation in software development & related application, which also enables start-ups and MSME to innovate and embrace the innovation. Manufacturing & Product cloud establishing strong position & scope driven by seamless communication and collaboration access the industrial ecosystem and stakeholders demand, this becomes a positive indicator to accomplish innovation and advance technology possible by investment focus and adoptions of Industry 4.0 framework.

FICCI-EFESO Consulting (India) agency has conducted a survey on manufacturing excellence launched in Q4-2020 on six variables pertain to Process – Human Dynamics – DigiTech, response received from 150 industry leaders & experts across India manufacturing sectors, the survey response reveals thriving mindset of embracing of Industry 4.0 framework towards transforming industrial operations as follows:

- 50% companies adopt either of structured operational excellence methodology such as TPM, TQM, WCM, etc.; while only 13% are leveraging digital technology to predict product, equipment, and process failures.
- 41% companies have adopted traditional Key Performance Indicators (KPIs) to ensure people work towards company objectives, while only 6% understand Key Activity Indicators (KAI).
- 5S practices are most prevalent across companies, yet only 30% use Anomaly Tagging – De-tagging, VSM and Poka-Yoke in their organizations.
- 51% companies feel that development of new skills is a major roadblock in their manufacturing excellence journey.
- 27% companies are using sensors for reliably collecting data from diverse sources; while 18% have all assets monitored in real-time with negligible delay.

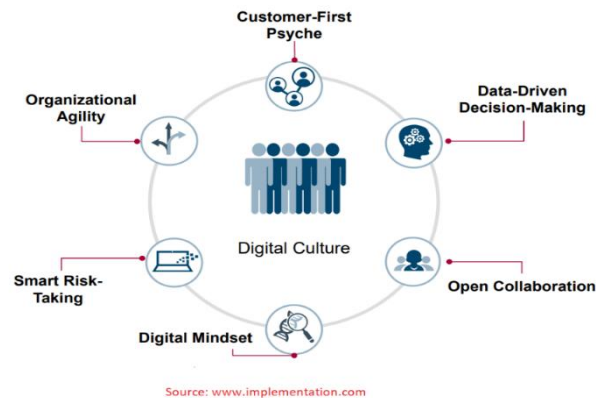
### **Industry 4.0-Socioculture Scenario:**

Industry 4.0 actions influencing a great impact over social culture factors which led drastic shifts in various domain we operate, also enable structural changes in practical implementation of idea and thoughts, Industry 4.0 establishing self-sustain value, behaviour and new skills in the workforce across the domains. This enables to companies to push for transforming industries by new innovation & edge in competitiveness. Industry 4.0, thriving to emphasis in develop digital culture is the novel way of transforming socio cultural aspects such as cross culture integration,

collaboration, reskilling and skill sharing in the work force allows companies enhance competitiveness in following ways.

- Increase the chances of sustained, post-transformation success
- Keep up with the speed of change from new disruptive technologies
- Attract and retain future talent.

Industry leaders and technology experts asserted that, transition of socio-culture perspective are highly imperative, since workforce values & embracing new skills allows practical implementation new possibilities thus experts suggest six pillars of people -culture dimensions underpinned the technological enterprises transformations.



**Organizational Agility**-The digital economy requires companies to adapt rapidly to market and industry changes. Removal of internal barriers and encouraging an iterative approach to change enhances organizational flexibility, allowing for a better response to emerging technologies and industry disruption.

**Smart Risk-Taking**-Smart risk-taking will unlock a company's innovative potential. By rewarding exploratory risk taking, learning, and positive change, a company can identify and apply automation, technology and analytics to new areas of the organization through its own workforce.

**Digital Mindset**-A company's digital environment must promote and reinforce digital technology, culture, skills, and talent. This dimension is the thread that holds everything together as it reinforces the importance of digital technologies and solutions in the future.

**Open Collaboration**-I4.0 solutions have impacts throughout the organization requiring cross-functional teams to work together seamlessly in an open, transparent culture. As new technology and applications impact jobs and responsibilities, collaboration must be supported by a clear unified organizational vision, and embedded in everyday practices.

**Data-Driven Decision Making**-At the heart of the digital transformation are data and applications that enable new levels of performance. Collecting well-structured accurate data, along with a strong core of business analytics to turn this data into useful information is a key to more fact-based decision making.

**Customer-First Psyche**- A customer perspective must be taken when examining all touch points. A workforce that is willing to challenge existing processes and business models of customer delivery will more readily identify opportunities to leverage i4.0 in ways that drive business growth, enhance market competitiveness, and increase customer value.

#### **Indian scenario of Socio-culture Industry 4.0:**

Industry 4.0 bringing unprecedented changes in workforce perspective, speed & spread of technological transition taking at the faster pace. Globally, Indian IT sectors demonstrating considerable progress, this could possible for India due to talent pool & leveraging low-cost workforce. As a result, India



shows significant progress in oversee investment in service sectors, most importantly in R&D space. Indian collaboration shelling out huge investment on training campaign towards develop new capability and attempt to reduce the skill gap to attain global competitiveness. However as whole implementation of Industry 4.0 lagging in India due various externalities. A study reveals, at present only about 4.7% of the total workforce in India has undergone formal skill training. What's worse - employability of skilled graduates is also dismally low. Of the more than three million graduates and post-graduates entering the Indian workforce each year, according to NASSCOM, only 25% of technical graduates and 10-15% of other graduates are considered employable by the IT and ITES segments in the country. Over the years, the IT sector has become a significant contributor to the growth of the Indian economy. In 2019 the sector had generated over 180 billion dollars as annual revenue. It is estimated that there are more than 3 million professionals directly employed in the Indian IT sector. The number is set to rise as companies are shifting focus to high end IT services like consulting and software R & D. Advancements in the IT sector are also facilitating employment in BFSI, retail, health & pharma, manufacturing, telecommunications, energy, travel, and communication, which adds to an increased number of indirectly employed individuals, which increases the strength of the IT workforce. The Indian IT sector is also investing in employee skill assessment tools for specialized domains. The assessment reports are used to create personalized training programs that facilitate upskilling and reskilling. This initiative will enable the IT sector in India to evolve and generate value for both the employees and the customers. Many institutions & companies out-reaching to reap the advantage of Industry 4.0, Industry leaders putting extensive efforts in transforming industry 4.0 in full potential. Indian institute of science's for the product design and manufacturing [CPDM] putting profound effort in building Indian first smart factory in Bangalore, the project is funded by The Boeing company , the chief focus is on automation, machine to machine communication, data procurement done by sensors and productive maintenance will be employed machine. Bosch has started off implementing of smart manufacturing at all its 15 manufacturing centres in India production system are embedded with smart watches which highlight and alarm machine malfunctions. Automobile sectors making a huge investment in digital transformation, major players like Bajaj auto, Maruti Suzuki, Ford motors, Mahindara and Hyundia motors stride towards structural changes in their production systems, looking for robot driven productions system to prevent accidents and streamlining end to end operational solutions. Indian FMCG companies deploying collaborative Robots called "Corobot" that work with workers in the factory they required minimum supervision, these functionalities reduce cost, increase the efficiency and enhance competitiveness in operations. Andra Pradesh Government vision to establish IoT hub in India, strategies are in execution stage, more than 10 companies collaboratively participating in the projects. Many core sectors transiting their operation at the structural level, inviting Techpower companies to integrate new technology in the core operation to streamline the process through new IoT and machine to machine solutions.

## **CONCLUSION:**

Industry 4.0 is game a changer for all the domain of industrial sectors, be it manufacturing, service or retailing sectors. The transformation is occurring in structure level, industries are leveraging advanced technologies and innovative strategies to deliver the product and services around the world. The leading techpower companies are shelling out huge investment in R&D to innovate the unprecedented methods and integrating new techniques to operate, although the core objective of Industry 4.0 is to accomplishing the competitiveness by streamlining the process and methods, India leveraging 4.0 at faster pace, technological transformation occurring in the major handful industries such ITES, Automobile, Pharmaceutical and Banking, these sectors majorly focusing on huge investment towards advancement in value chain and supply chain, R&D and workforce training campaign to reskilling/upskilling and redefining the process and methods. However Indian Small and Medium sectors and Unorganized segment of industries not yet utilizing full potential Industry 4.0 to transform their operation at the core level, which is one of the major cause for non-competitive to face major players in the market. Thus, India must address the preventive factors for diffusion of technology, the major hindrances are knowledge gap, lack of affordable infrastructure, skill gap, high cost of digital technology etc. A study revels, 92% of Indian workforce pertains to Small and Medium sectors and Unorganized segment, these sector contributing 50% of nation GDP, which indicates huge scope of industrial transformation yet to occur in this sphere. Energy sector is also one of the major sector lagging technological transformation, where huge requirement of green energy and clean energy has high potential of transformation. Thus, Indian government and business leaders

required to formulate strategies to build and integrating technology transformation through in an incentivising schemes and capitalizing workforce by training campaign at global standards.

**REFERENCE:**

1. <https://www.desouttertools.com/industry-4-0/news/503/industrial-revolution-from-industry-1-0-to-industry-4-0>
2. [https://www.implementation.com/wp-content/uploads/2019/08/Practice-Brief\\_Industry-4.0\\_Org-Culture-1.pdf](https://www.implementation.com/wp-content/uploads/2019/08/Practice-Brief_Industry-4.0_Org-Culture-1.pdf)
3. <https://www.linkedin.com/pulse/industry-40-indian-context-lakshmi-nair>
4. <https://timesofindia.indiatimes.com/blogs/voices/role-of-industry-4-0-in-accelerating-make-in-india-goals/>
5. <https://www.forbesindia.com/blog/technology/industry-4-0-how-india-can-build-for-the-future/>
6. <https://www.dqindia.com/make-india-industry-4-0-important-transition-manufacturing-vk-saraswat-niti-aayog/>
7. <https://www.newindianexpress.com/opinions/2022/may/16/is-our-nation-ready-for-industry-4-0-2454161.html>
8. <https://www.financialexpress.com/industry/industry-4-0-technology-the-key-game-changer-for-indian-manufacturing-sector/2199098/>
9. <https://www.becosan.com/industry-4-0-the-fourth-industrial-revolution/>
10. <https://www.fibre2fashion.com/industry-article/4121/role-of-unorganised-sector-in-indian-economy>
11. <https://www.newindianexpress.com/opinions/2020/may/30/what-is-it-that-ails-our-informal-sector2149869.html#:~:text=As%20per%20Government%20of%20India,50%25%20of%20the%20total%20GDP.>