UNDERSTANDING THE ROLE OF HUMANS IN INDUSTRY AUTOMATION

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Abstract: There are levels or revolutions that have taken place in the field of manufacturing, and currently we are in the fourth industrial revolution or Industry 4.0. Industry 4.0 is possible because of Internet of Things (IoT), cyber-physical systems (CPS) and Internet of Systems which together interact and help build a smart factory. Automation and smart decision-making are key characteristics of this revolution. In the early stages of Industry 4.0, various applications of Artificial Intelligence (AI) and Machine Learning (ML) enabling automation in the real world can be seen. Over the coming years, it is expected that the extent of automation will only increase and thus can replace repetitive jobs. The nature of job that a human does will most definitely change. In this era of industrialization, it is very important for humans to understand their role, where do they exactly stand in this industry automation for efficient working of the systems. This paper aims to reflect the role of human intelligence and experience in decision-making which cannot be fulfilled in this era of industrialization. The organizations and governments also have a huge role to play in this industry automation which has been stated in the paper for an in-depth understanding. Human-technology interactions are also explained in this paper to show how the combination of two enables a better working environment. In the end, a broader picture of the future is given in terms of industrial revolution and human involvement to equip the reader with an idea of the upcoming scenario and get a better understanding as a whole.

***Keywords*- Industry automation, industry 4.0, human capital, role of management.**

I. INTRODUCTION

With the enhancement in technology, creation of intelligent systems and need of handling huge data in a short time, a great transformation is taking place in our society. The demand for faster, reliable and more accurate systems is increasing and as a result intelligent automation is being adopted at an increasing pace. Industry 4.0 or 4th Industrial revolution is one of them. Industry 4.0 is basically the integration of the existing industrial systems with the smart technologies like Internet of Things (IOT), Machine Learning (ML) and Big Data. It is digitalization of production or manufacturing based industry with the integration of cyber physical systems in manufacturing technologies. Moreover, it is a smart factory that is not only interconnected but it also communicates, analyses and uses information to drive productivity, improve efficiency and eliminate human error.

Industry 4.0 will be a billion dollar market by 2025. Additionally, Accenture predicts that the smart factories could bring as much as $14.2 trillion to the global economy over the next decade [1].

1. EVOLUTION OF INDUSTRY 4.0

Modern industry has seen various revolutions [2].

1.1. Industry 1.0 (Industrial Revolution):

In the old times, all the goods were produced by handmade methods but with the introduction of Industry 1.0 the world saw a positive transition from handmade methods of production to machines. These machines which worked on steam and water power met the growing demand of people as they were faster and facilitated large scale production.

The textile, iron, agriculture and mining industries saw the implementation of industry 1.0. Some of the mark able applications were the steam engine created by James Watt around the 1760s and the factories for weaving which were introduced around 1784.

1.2. Industry 2.0 (Technological Revolution):

Second industrial revolution, also referred to as the technological revolution, and took place at the beginning of the 20th century in mainly three countries, America, Britain and Germany. Introduction of steel and use of electricity were the main enhancements observed [3].

Electricity was more cost effective and required less labor as compared to the earlier used steam and water power and as a result it was easily introduced leading to the introduction of the first assembly lines and greater production of steel leading to the formation of railways. Although, the production and economic growth was positively affected but due to the replacement of human labor with machines in the factories, this era also saw a sudden increase in unemployment.

1.3. Industry 3.0 (Digital Revolution):

The advancement in electronics like invention of transistors and integrated circuits formed the base of Industry 3.0 which took place in the late 20th century. This was also called the Digital Revolution as digital electronics was introduced. Apart from application of digital electronics, the introduction of Programmable Logic Controllers (PLCs) added up to the automation in electronics [11]. PLCs keep a track of the input devices and make decisions about the actions to be taken based on a custom program. The enhancements resulted in reduced efforts with better accuracy and speed.

The introduction of electronic hardware in the manufacturing sector demanded an increase in software technologies leading to the expansion of the software development market and the information and communication technology sector.

1.4. Industry 4.0:

To enhance productivity and efficiency in the manufacturing sector, The Federal government of Germany along with many universities and private firms first introduced the term Industry 4.0 publicly announced in the Hannover Fair in the year 2011 [4].

Industry 4.0 uses the smarter and intelligent technologies which are capable of constant monitoring of data with easy detection of faults. Moreover, these machines are clever enough to predict the faults which might occur in future making it beneficial for the users.

Technically, some of these smart and intelligent technologies are machine learning, internet of things (IoT), big data and cloud computing. The data is collected from the products which are connected to each other through the sensors and form a cyber-physical system connected through the industrial internet of things. This allows the constant monitoring of the products, production method and supply chain.

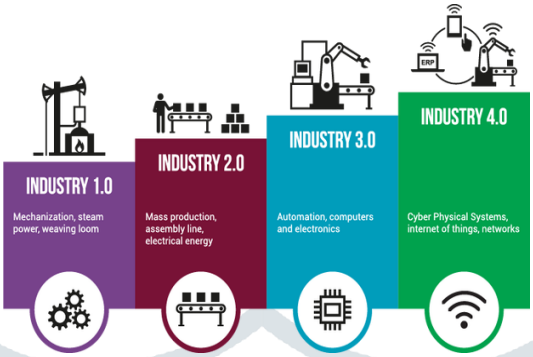

Fig 1: industrial revolution [31]

2. FUNCTIONING OF INDUSTRY 4.0

In production, there is one central mind or central control unit that communicates with individual modules and knows how the finished product will look like. In industry 4.0, this unit is located in the individual modules. Single work steps are right there on the product. So, each module knows what to do without having to communicate with the central hub. In addition, the modules of a smart factory are able to communicate with each other. So, the finished product can be passed on to the next module. As a result, avoidance of detour during production saves a lot of time. The input from all the sensors and engines of the machine are processed locally in the modules. Thus, in industry 4.0, the control system is distributed and there is intelligent and self-organized assembly.

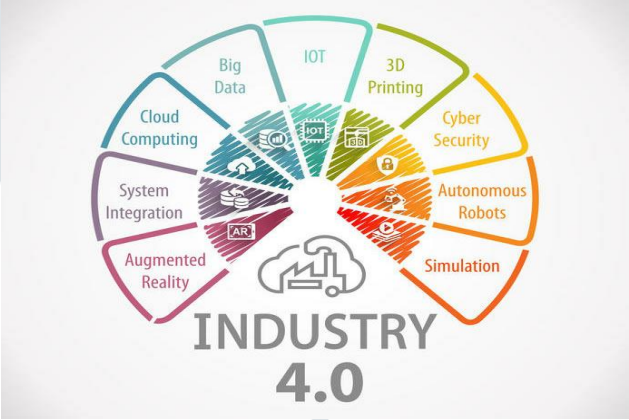

Fig 2: nine pillars of industry 4.0 [5]

3. PILLARS OF INDUSTRY 4.0

There are nine pillars of Industry 4.0 [5]:

i. IOT (Internet of Things)

The main task of IoT is to collect data from physical objects using different sensors and connect it to the internet. It relies on a cloud based system for computation analytics. Business operations become more lively and integrated by using IoT.

ii. 3D Printing

3D printing is building of three dimensional objects using the computer aided design (CAD) module. It is used in the production of customized goods as per the requirements of customers. These techniques are used by aerospace companies to minimize their aircraft weight as well as raw material consumption such as titanium.

iii. Cyber Security

Cyber security is the protection of data from illegal access or exploitation. If not maintained, it can ruin the business due to dangerous intentions of terror attacks. Some explanations have been devised that can destroy cyber terror attacks by examining earlier terror attacks via radiation controllers prior to future attacks occur.

iv. Autonomous Robots

Production, logistics, distribution activities and many other areas use robots and could be controlled remotely by humans. Robotics technology helps in achieving sensitive tasks and collaborates with humans.

v. Simulation

In production related activities with the aid of real time data gained, simulation tools play a supportive role by facilitating dynamic examination for production systems. These digital tools have the ability of self-configuration.

vi. Augmented Reality

It is a collaborative technology that establishes harmony among the users and virtual world. It combines graphics and physical objects generated by computer. It provides the motion control of the users by using technology for controlling different tasks.

vii. System Integration

It uses the flexible and re-designable systems in the factory and the extent to which they are completely combined together for reaching agility.

viii. Cloud Computing

Cloud computing brings various advantages such as automation and integration and also facilitates administration of the company. It is a way of combining client server based systems and virtualizing the services. The data is stored over the internet instead of computer's hard drive.

ix. Big Data

The large, complex and diverse data sets affects organizational decision making of an agency and their strategy. Big data projects help to deal with the demands at the organizational level by monitoring, measuring and controlling in a finer way.

II. CURRENT SCENARIO

Internationally, it is predicted that the industry 4.0 market will reach a value of INR 13,90,647 crore by 2023.U.S.,Japan,China and some European countries like Austria, Ireland, U.K. and Sweden have started implementing Industry 4.0. India is the 6th largest manufacturing country, so the manufacturing sector is an important component. Recently, the government has launched a 'Make in India' campaign with an agenda to boost the economy through the manufacturing sector and make India a global manufacturing hub. Through this initiative, the government has planned to increase the current contribution of manufacturing in GDP which is about 17 percent to 25 percent, by 2022. Under the 'Make in India' programme, new initiatives, like GST (Goods and Services Tax) and FDI (Foreign Direct Investment) policy, have been brought into practice by the government.

III. LITERATURE REVIEW

Substantial amount of studies have explored the different aspects of industry 4.0 and the role of humans in it.

Dan Paulin [6], based on the interview of shop floor operators and office workers at two Swedish small and medium sized enterprises (SMEs) states that the companies are in the pre industry 4.0 maturity stage. Furthermore, as a need for foundation of industry 4.0, it is very important to create a supportive organization culture.

Viraj Vijay Jadhav [7] discussed the need of Industry 4.0 and its various out comings. There are a plethora of challenges as well as opportunities in Industry 4.0.

Saqib Shamim [8] button downed the best suitable management practices which could promote innovation as well as facilitate the business to match the pace of Industry 4.0.

A.N.A. Ahmad [9], based on the study, listed various government initiatives around the world including the Made in China, RIE 2020 and Factories of Future by China, Singapore and European government respectively. Moreover, a conclusion was made stating that industry 4.0 is the future of global manufacturing.

T. Jeevitha [10] threw light on the drivers, enablers, goals and limitations of Industry 4.0 and how relevant information plays a vital role in industry 4.0.

Joseph Evans Agolla [11], emphasized on the crucial role of humans in capital management in Smart Manufacturing and Industry 4.0. He considers human capital not only creative but also a super human capital.

Antonella Petrillo [12] stated how globalization and competitiveness are driving companies towards industry 4.0 paradigm and what challenges are they facing.

Jonathan Wilkins [13] remarks the specific domains where robots can and cannot replace humans. Many of the industry's inclination is towards creativity, innovation and individual personalities, something that robots can't achieve yet.

Dragan Vuksanović [14] concluded that smart factories due to its uncomplicated setup and automated procedures will help the companies in the manufacturing sector thereby boosting their internal efficiency.

David H. Autor [15] predicted that employment polarization will not be forever. The tasks in current middle-skill jobs are vulnerable to automation but on the other hand many middle-skill jobs will definitely require a mixture of tasks from different domains of skill.

Alina-Georgiana IANCU [16] expresses that motivation increases performance of humans which helps them in meeting the organization's goal. Although, motivation not only varies with money, rather there should be a combination of other incentives so that the right amount of motivation can be reached which can further lead to maximum performance.

Nurazwa Ahmad [17] mentioned human capital needs to shift from the traditional education methods to a newer method that focuses more on skill development in order to meet the advancement in technologies.

Ayhan GÖRMÜ [18] highlights that industry 4.0 will lead to loss of some jobs but new jobs will also emerge. However the spectrum of job destruction and creation will take a huge amount of time.

Saurabh Vaidya [19] discussed the nine pillars of industry 4.0 for easier understanding of the application of Industry 4.0 and associated challenges. It is also stated that new research streams should be developed to cater to the need of industry 4.0.

IV. OUR ROLE

One-time implementation of the automated systems in the industry won't be sufficient for the future. The employees or the work-force have to understand the nuances of the technology so that it can tweak it according to the circumstance to maximize the benefits. It is only by the collaboration and a mutual connection between the human and the machine that the firm will truly be benefitted.

The automated systems can aid the talented employees in their day to day tasks. The robots and the humans can work on the same assembly line. The robots can help to hand a tool, put alternate parts, work on areas where the human is not working, etc. Humans would always be the center of all the activities, and the robots and other automated systems would only assist them to increase their efficiency.

With the implementation of AI in industries, the nature of work done by humans would change. More of skilled labor would be required. All the repetitive work would be done by automated systems and the configuration of those would be done by skilled workforce. Also, this would lead to less errors and greater productivity of the system. Thus, with the effective human-machine collaboration, we can improve the effectiveness of the overall production system with humans taking the main administrative and decision-making role in this system.

V. HUMAN CAPITAL

Human capital refers to the economic value of the key attributes of a person like skills, knowledge, experience, motivation, creativity and education. It emerges out to be an integral part of every organization because of its ability to make decisions, develop, improvise and innovate things. In this world of growing competition, the potentials that humans possess are quite significant for the success of a company or organization.

Therefore, even though we are shifting towards more automated and smart systems, the need for human capital still remains one of our prime concerns. The implementation of industry 4.0 does not reduce the amount of workforce but rather impacts its quality. More trained and specialized labor will be required to deal with the modern changes made to the factories and as a result, better education infrastructure will be necessary leading to the expansion of the education sector too.

Automation has been involved at various stages, be it digging ditches or making tools of wrought iron, yet the fraction of US adults employed in the labor market has seen an increase [20].

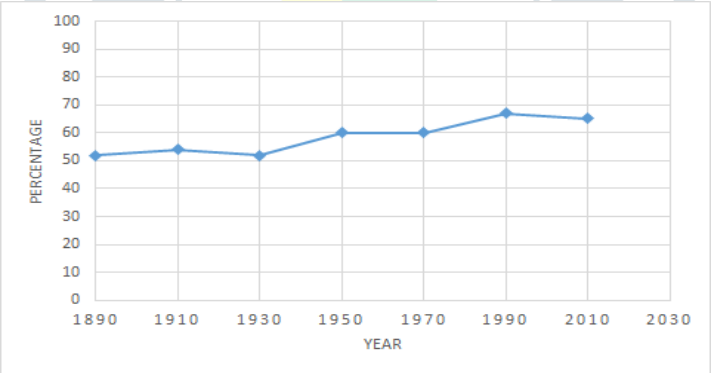

Fig 3: fraction of US adults participating in workforce, 1890-2016 [20]

So, Industry 4.0 cannot work alone with the machines. Human participation is also important.

Skill: Machines cannot beat humans in terms of their skills. Despite the production rate, it is important for every company to have a strong company-customer relationship which can be established very easily by humans because of their ability to interact with others. They know exactly when the right time to speak is. Additionally, the flexible and patient approach of a person to solve the problems, makes them highly valuable. Even in adverse situations, where the machines fail to work, humans can make appropriate decisions. They can use their negotiation skills and sense of humor to attract more customers.

Although, with the invention of artificial intelligence (AI) and machine learning, it is now possible for the machines to interact with humans as well but that cannot happen without the intervention of humans. For the devices to function in a desired manner intense training needs to be done and this training skill is present in humans. Consider the virtual assistants, Amazon's Alexa or Microsoft's Cortana. Both of them required numerous training sessions to establish the desired traits. A team of many humans were involved behind this task [21].

But there are skills that machines possess and humans lag, one of the being the ability to predict faults. Through the introduction of newer technologies like machine learning, prediction is made possible for machines but humans still do not possess this skill. Machines have large computation power and thus, they can process large data in a short interval of time. The

product recommendations that are displayed on the websites like amazon, myntra and flipkart is due the implementation of machine learning. Also, in 2017, Google developed LYNA (LYmph Node Assistant), a deep learning tool, which can predict metastasized breast cancer with 99% accuracy. It is quite difficult for the doctors to determine the spread of disease. When done by humans, the detection of small metastases on each pathological slide can be as low as 38% and this may lead to an increase in the complications, risking the life of the person. LYNA was not only capable of determining the location of cancer but also the other doubtful areas within each slide which were extremely small to be detected by pathologists [22].

Experience: When it comes to experience, humans have an edge over the machines. One of the strong factors for humans is that they gather experience while performing the tasks. Based on their previous experiences, they can read the body language of a person which helps them to persuade others.

Machines fall short here. They are not yet developed to match humans in this aspect. Moreover, humans can learn from their previous mistakes efficiently which contributes to their experiences.

Creativity: Creativity means the execution of imaginative and innovative ideas into reality. The minds of humans are capable of making these innovations. They can imagine or invent new things and innovate the already existing ones.

Machines on the other hand can work only according to the predefined instructions. They can follow what is fed to them but cannot produce an idea of their own.

Education: Education is basically the process of learning along with acquiring values, skills and habits and implementing them in practical situations. It is a way through which overall development of a person takes place. Any person who can read or write is termed to be literate but only the one who is able to apply it in real life is termed as educated.

Humans have a brain which is capable of learning, remembering, enhancing and reciprocating skills in the day today life while machines can work only according to the predefined programs. Human education is something which machines have not yet gathered. In practical situations, where humans apply their brain to get the desired or better results, machines still work monotonically, performing the task as stated to them.

Thus, for any industry, it is essential to apply the skills and mold the things according to the situation to yield maximum profit.

Motivation: When it comes to machines, they have no personal or emotional inclination towards the work they are assigned whereas humans work for certain benefits. They are in need of money to have a better lifestyle. Moreover, they might have emotional attachment to the company or towards the designated work. This keeps them motivated and as a result, they endeavor to work to the best of their abilities.

Also, humans can work according to the need. For example, if there is a requirement for more products, humans can be provided with incentives which will keep them motivated to work more. Machines, on the other hand, can work only within their maximum limits. They have no motivation, they only complete the work assigned to them.

The following nexus shows that if given the right motivation, the performance level of humans can reach a maximum value. But no such thing exists in the machine.

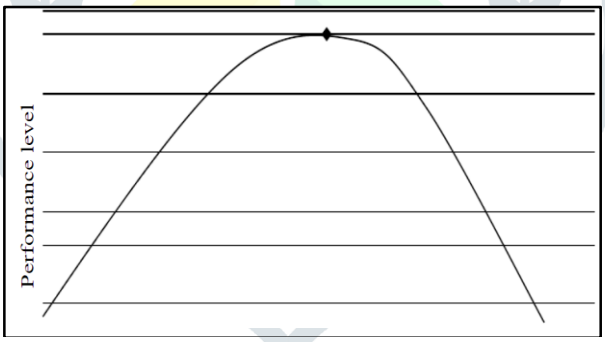

Fig 4: hypothetical relations between motivation and performance level [16]

VI. Role of Management

A company's management plays a significant role in deciding its future. They analyze certain trends and factors and take further actions for the company. So, implementation of any new technology can happen only when a company's management is receptive about it. Various factors affect their decisions such as skills possessed by the employees, budget, present level of the machines and technology adopted by the organization.

Willingness to Adopt Newer Technologies:

The management needs to abandon its previously acquired techniques and adapt the newer technologies. With the changing situations, the employees should be able to change themselves accordingly. They should be able to use their creative and innovative skills as a routine process. A management with slow and sluggish attitude has no place in Industry 4.0.

Human Resource Practices:

Training: To deal with the changes inculcated, the management needs to organize frequent training sessions to teach it employees about the various methods included with the changes made. Moreover, innovative and learning capabilities should be enhanced through these techniques enabling the employees to be multitasking.

Focus on selection procedure: While hiring the new set of employees, there should be more focus on hiring people with a variety of skills and diversified knowledge. The one who possesses flexible thinking, creativity, intellectual curiosity,

attentiveness and imagination should be preferred over others. Extensive screening process with multiple testing rounds has to be incorporated to hire better employees.

Siemens Company is among the forerunners in the country to provide a suite of solutions in industry 4.0 revolution. Siemens uses a software called Sinumerik which allows easy control and integration of multiple machines to a single controller. Further, Siemens provides a cloud based IoT platform called Mind sphere which can give engineers a real-time analytical view of the shop floor activities and also help communicate with each other.

So to cope up with the changes it is necessary to change the existing recruitment model to a newer one.

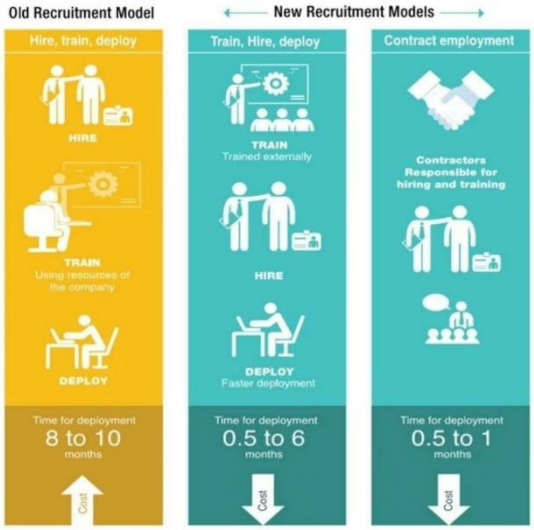

Fig 5: new recruitment method [23]

Infosys featured research on Industry 4.0 evolution. This report enlightens us about the logical phases which manufacturers should take into consideration before boarding on Industry 4.0 journey. This report could help lift the current low rate of successful full scale adoption [24].

VII. Role of Government

Government plays the role of an important stakeholder in industry 4.0 revolution as its intervention can make a significant impact on the production, manufacturing and industrial sector. Also, it can make sure that everyone can access the benefits of industry 4.0, by providing a notable push in respect of funds infrastructure, and technical skilling. Advanced technology also plays a critical role in industry 4.0. Therefore, it is important to discover the core skills other essentials of industry 4.0 and make it possible through education and enablement. Government can bring into use its research infrastructure in order to facilitate learning and innovation. It could also propose a proper governing body, develop competitiveness and form a helpful policy environment for establishing industry 4.0 in the country.

Industry 4.0 was initiated in Germany. Other countries like the United States, Japan, China and the Nordic countries are gradually picking up the momentum. US targets to increase digitization from the current 32 percent to 74 percent by 2020, Asia Pacific from current 36 percent to 67 percent and Africa, the Middle East and Europe from the current 30 percent to 71 percent.

Development of the industrial sector is a major concern for every government as industrialization increases the gross national product (GNP) consequently increasing the national income which further increases economic stability. Therefore, many policies have been launched by the government of different countries for a smooth growth of the industrial sector.

Various government initiatives which impacted the manufacturing sectors:

Indian Government

India is following the global trend by expanding its contribution of Global Manufacturing GDP by embarking on major initiatives. According to IBEF, the Indian Government has set a goal of increasing the share of manufacturing output from current 16 percent to 25 per cent of Gross Domestic Product (GDP) by 2025 [25].

1. The Indian Government has started projects on **Green Energy Corridors** in many states which targets to bring in more renewable energies and create its storage. In this initiative, India has devoted over US$ 1 billion.
2. India is setting up its first **smart factory**, moving from automation to autonomy where machines speak with each other, in Bengaluru.
3. Andhra Pradesh has initiated to fund for the growth of IoT in the country. With the goal of turning the state into an IoT hub, the state government of Andhra Pradesh has approved the **first-of-its-kind IoT policy.**
4. In order to win against the global competition, Indian Government has integrated the "**Make in India**" initiative with the idea of Industry 4.0.

Government across the globe

Table 1: Government Initiatives in Manufacturing Sector [9]

Country	**Initiatives**	
Singapore	RIE2020 Plan	The initiative has a funding budget of $19 billion from 2016 to 2020 and includes four strategic technology domains.
China	Made in China 2025	Government's 10 years plan to renovate China's manufacturing base by expanding 10 high tech industries.
European Union	Factories of Future	EU's public-private partnership (PPP) to enable a more competitive European industry - generating growth and securing jobs.
Germany	High- tech strategy 2020	Germany is annually setting billions of Euros aside for developing new technologies which aims at achieving targeted growth for German research and innovation system.

Fig 6: main initiatives for industry 4.0 [12]

Reason for Slow Adoption of Industry 4.0 in India:

For a country like India, even though the government has launched so many projects and schemes, there are various challenges that will be faced in order to bring transformation in the manufacturing sector. Moreover, these reasons have resulted in slow adoption of Industry 4.0. On the basis of the analysis published in the tech section of The Economics Times by Anandi Chandrashekhar the following conclusions have been made:

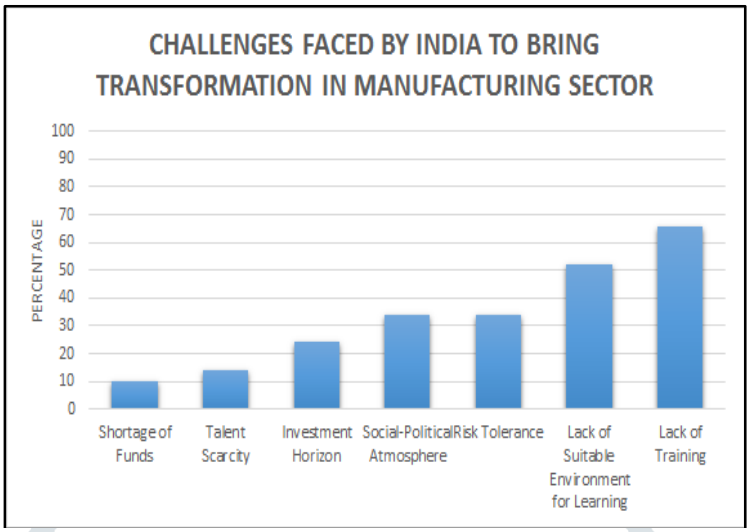

Fig 7: form the economics times, article by Anandi Chandrashekhar [26].

- The most notable reason for the slow adoption of Industry 4.0 is lack of training. Lack of suitable environment for learning serves as the second most notable reason.
- Also, out of the three phases: preparation, scale up and sustainability of result, preparation for the upcoming transformation emerges as the most challenging phase with 59%.

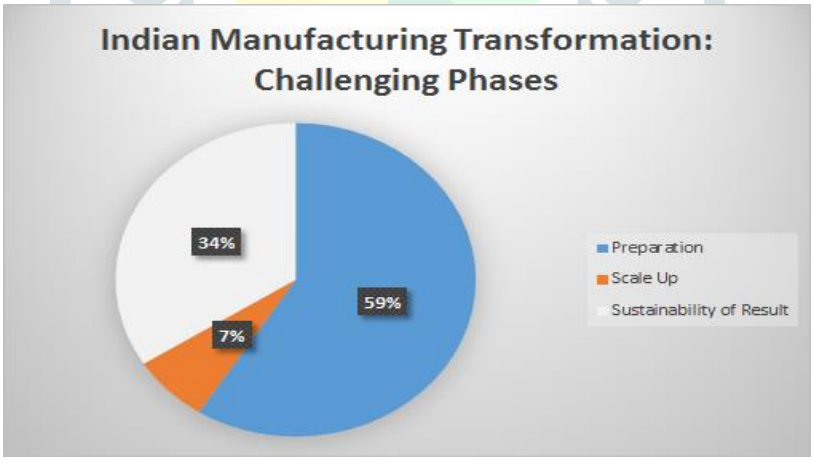

Fig 8: from the economics times, article by Anandi Chandrashekhar [26].

Current Status of Workforce (In India):

According to KPMG (as of 2018), the scenario looks like:

Fig 9: from KPMG and AIMA report on industry 4.0, march 2018 [27]

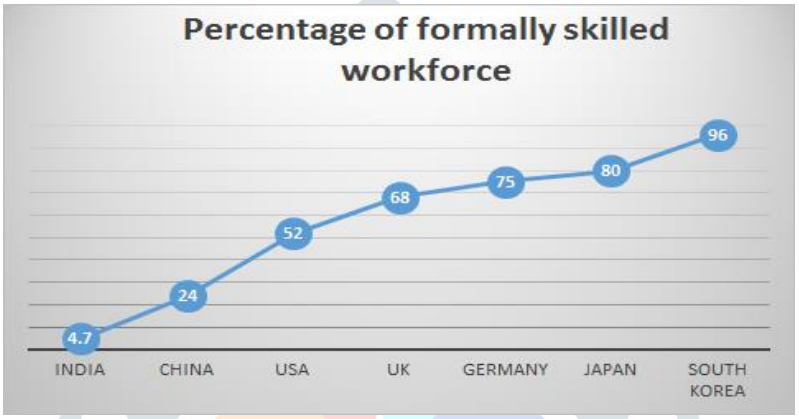

Fig 10: from KPMG and AIMA report on industry 4.0, march 2018 [27]

- Only 4.7% of the total workforce in India is skilled enough which is very low as compared to the other countries like South Korea, China, Germany, USA, UK and Japan.
- For a 50 crore workforce, India has only 44 lakh vocational training capacity.

Therefore, in the process of adopting Industry 4.0, there will be a great need to up skill the current workforce. Government, together with the industries and the educational institutions will have to provide better infrastructure, new recruitment methods and facilities in order to train the employees, making them skilled enough to cope up with the execution of the new technologies.

VIII. HUMAN TECHNOLOGY INTERACTIONS

Fig 11: from future jobs survey 2018, world economic forum [28]

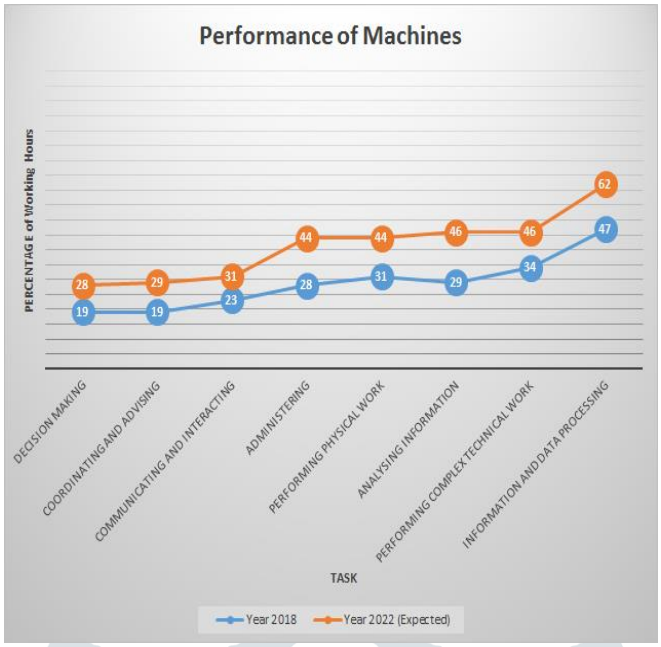

Fig 12: from future jobs survey 2018, world economic forum [28]

The working hours for humans in various fields is expected to decrease by 2022. Maximum decrease will be seen in analyzing work (about17%) followed by physical work (about 16%). This will definitely be favorable for the human workers as these tasks require tedious and repetitive work culture [28].The working hours for machines is expected to increase by 2022 but humans will still be leading all the sections of work even by 2022. In the works involving decision making, coordinating and advertising, humans will play a major role.

Fig 13: from future jobs survey 2018, world economic forum [28]

So, neither machines nor humans can survive alone in Industry 4.0. The importance of alliance between technology, namely artificial intelligence (AI), and humans can be seen through a survey which was conducted in about 1,075 companies and 12 industries. It was found that as the collaboration between humans and machines increased, the performance also improved.

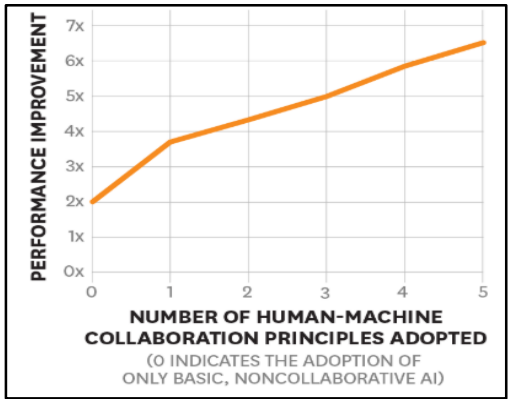

Fig 14: human machine collaboration [21]

Therefore, machines and humans, if they go hand in hand can reach greater heights. Another such example was set up by a Swedish bank where a virtual assistant named Aida handles all customer calls related to frequently asked questions. After several improvisations she can now talk very well in Swedish language too. But in almost 30% of the cases she is not able to solve the problem and so, the call is referred to a related person. Aida monitors that entire conversation and gains the knowledge of dealing with a similar question in the future. As a result, the work can be carried out 24x7 without much pressure.

IX. FUTURE SCOPE

Future scope of Industry 4.0 is very bright. If implemented properly, scenarios like machines autonomously detecting the need of spare parts, production systems running their own quality control during operation, robots autonomously detecting and moving parts will become a part of reality.

To meet the requirements of the fourth industrial revolution and in order to reach higher levels of efficiency of consumption and production, expand new markets and compete on new products, companies are likely to adopt new and emerging technologies. To build and sustain, leading companies are rapidly adopting advanced digital technologies like big data and analytics, web enabled markets etc. The following graph illustrates the percent by which each technology is expected to be adopted by 2022 [30].

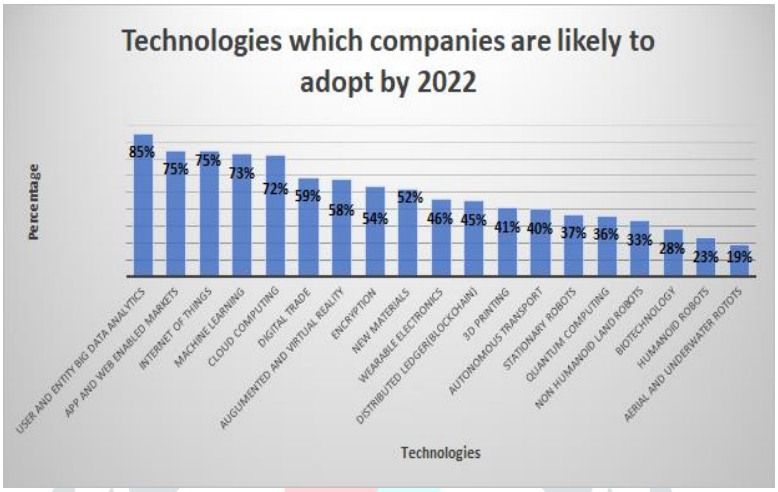

Fig 15: from future jobs survey 2018, world economic forum [28]

Also, it is expected that redundant roles will decrease from the present (as of 2018) 31% to 21% by 2022 and new roles are going to increase from 16% to 27%.

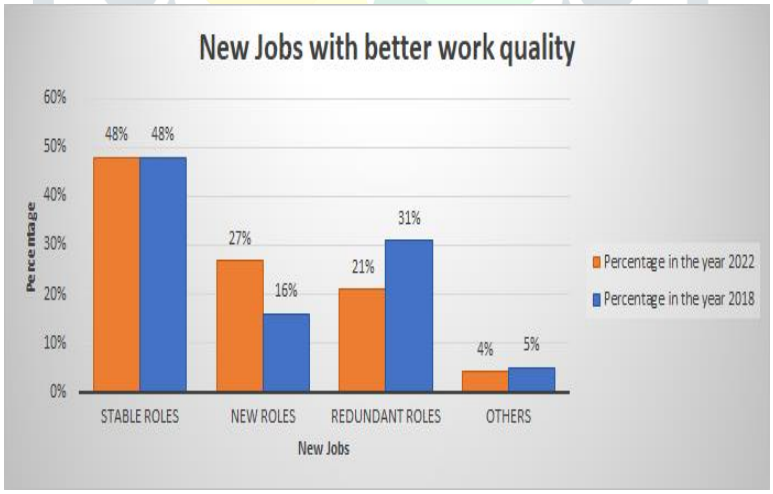

Fig 16: from future jobs survey 2018, world economic forum [28]

So, with industry 4.0 many positive changes are expected to happen in future.

Future: Industry 5.0: Industry 5.0 is the revolution in which both humans and machines embark hand in hand on the journey of industrialization. This revolution will improve the means and efficiency of production by combining the workforce of humans and machines. As artificial intelligence enhances and achieves more human-like capabilities interaction among human workers, computers, robots will become mutually illuminating.

X. CONCLUSION

Industry 4.0 is an Evolution, Not a Revolution. Article published in IndustryWeek portrays IIoT (The Industrial Internet of Things) as a smart upgrade and improvement rather than a replacement of legacy technology.

So, Industry 4.0 is set to evolve manufacturing sector around the globe. The global supply chains and highly interactive markets will make it much faster as compared to the previous revolutions and generate results that were unexpected before. Due

to connectivity all over the supply chain and the high propagation speed of information, this evolution will show that if some change is made in one area of the manufacturing ecosystem, it will create a significant effect throughout.

Industry 4.0 presents tremendous opportunities which demand a highly skilled, well trained and flexible workforce with a production capacity that can meet the requirements of tomorrow in addition to those of today. To achieve success in the new global market, it is important to have the ability to accept Industry 4.0 and make good use of the opportunities that will be generated. With the increasing pace of technology transformation, it will become highly appropriate in the future.

With the implementation of industry 4.0, it is expected that although the job scenario will change but the amount of jobs will not reduce. There will be a reduction in the amount of jobs requiring physical labor and redundant approach but there will certainly be an increase in newer opportunities requiring a more skilled workforce.

So to survive and flourish in the era of industry 4.0, education, training and reskilling of the workforce should be on top priority. AIMA KPMG industry 4.0 report looks into the state of adoption of Industry 4.0 in India and highlights the role that the stakeholders- Government, academia and enterprises have to play in order to flourish the Indian Manufacturing society.

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