Implementation Of The Smart Industry Competences In Indian Industry

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Abstract

Introduction: The fifth largest, fastest-growing economy in the world by nominal GDP of $ 2.94 trillion and among the top 1o countries in shares of global manufacturing output, India has become one of the manufacturing hubs along with a service sector. To further boost the economy government had taken initiatives such as "Make In India" supplemented with 'Digital India' and 'Skill India' Mission. Achieving the target of $ 5 trillion by 2024 seems to be postponed due to the COVID-19 pandemic by another two years or must be geared up for a continuous growth rate of 11.5% per annum. To achieve the growth rate double along with all constraints like inflation, unemployment, GST, low demands, low purchasing power is a big challenge. We need to look fresh to our industry, their practices, effectiveness, productivity, technology adoption, skillset and overall reform through policy to work upon the fundamental dimension of technology, people, governance, and impact to achieve sustainable growth. This paper study and analyze the readiness of industrial enterprises, especially manufacturing companies on six dimension model.

Aim: This study aims to understand the preparedness of the industry stakeholders for awareness and adoption of nine key technology components that pave the way for industry 4.0 or SAMARTH Udyog Bharat 4.0. This study analyzing the working environment of the industry to understand the workforce is ready with the technologies they are working upon. This will help to findthe gap of readiness for Industry 4.0 and to bridge them quickly to achieve a growth rate of approximately 11.5%. The industry, which is there in 2.0 or 3.0 will immediately move in the direction of 4.0 to fill the gap.

Material and Methods: The survey of one hundred fifty industry manager is carried out to understand the current implementation of industry 4.0 components. The companies are from the Vidharbha region and mostly from Nagpur and nearby areas. The attributes required in the Industry 4.0 is considered for data collection and analysis. Cross tabulation is used to analyze the data.

Result:The study reveals that manufacturing units are more ready towards Industry 4.0 rather than the service industry. The age group of 46-55 are more active in the manufacturing sector to work upon future generation technology whereas the young age group is rarely involved and aware about the same.

Conclusion:Industry needs to be more geared up for the preparedness of Industry 4.0. As early the corporate take the move as other stakeholders will improve to match the environment. The

influencing and resulting barriers have to minimize to attain the targeted growth in a specified time period.
KEY WORDS: Smart factory, Industry 4.0 Readiness, Skillset for Industry 4.0, Readiness for SAMARTH Udyog Bharat 4.0

INTRODUCTION

Distribution of Service and Manufacturing together to the GDP is almost 75% (Statistica, July 2020)[1] for

India. The 'Make In India' program initiated by the Government of India targeted 25% contribution to the GDP by manufacturing industries has now confronting a series of constraints from COVID-19 Pandemic, lockdown, lost jobs and less purchasing power in the hands of consumer. The Development plan has been paving the way for an ambitious growth rate of 12-14% per annum against the average growth rate of the average 4.3 % of the last 3 years (Statistica, March 2020)[2]. As per the revised target of 2025, halfway remained to leap the 3 times bigger growth with all constraints. Indian corporate struggling for the resources either in the form of capital, human or technology adoption coerces to bend and learn to leap like a pole vault. This stage constricts to embrace the essence of Industry 4.0 primarily includes cyber-physical system, Internet of Things, availability of computer system on demand and cognitive computing (Erboz, Gizem,2017) to upgrade and upskill the industrial house with smart manufacturing and cloud computing. Industry 4.0 not only revolutionize the optimization of your business process, but also working with standards, reforms, security applications, innovations, business models, new education and skills, and global collaborations[3].

To be a future manufacturing hub, India needs to endeavour with many areas like adequate infrastructure for smart factories, high investment, up-skilling, efficient communication. The cyber-physical system plays vital role in stepping smartfactory and essentially worked upon the four-layer, cyber, cognitions, and configuration layer. Industry needs to work upon the current research and innovation, digital modelling, information sharing, autonomous process, RFID enabled materials, flexible manufacturing by means of improving the skill set required for working in smart factories. Collaborative transformation for smart factories, where the government playscrucial role as a facilitator, corporate as an architect and employee as smart managers to create an ecosystem for the smart factories. The key challenges India facingtoday is with lack of adequate infrastructure for the Industry 4.0, even though the government has taken initiatives like GST reforms, FDI Policy, National Manufacturing policy, National program on Artificial Intelligence, a Mission on Cyber-Physical system, The Canter for Excellence on IT, Skill India and Ease of doing business (KPMG, 2018)[4]. As a forerunner, Government should promote the private sectors to be a part of industry bodies to support MSME in adopting the recent technology, upgrading skills 4.0, process improvement, initial investment, collaboration with other multinational companies to result in new changes. Top Corporate helps their stakeholders to improve their supply chain. SAMARTH Udyog Bharat 4.0 is the initiative taken by the government of India to create an ecosystem for manufacturing, customers, suppliers, and stakeholders.

Industry 4.0, started in Germany aims at minimizing the labor cost and boost labor productivity by targeting skill uplift of the workforce for smart manufacturing. India's 22% of the workforce is employed in the manufacturing industry and adoption of Industry 4.0 will lead to converting low-skilled job into I4.0 enabled job which age persist in the next few decades. The Workforce need to upgrade to new technologies like data analytics, additive manufacturing, IIoT, cloud computing to be a digital leader. Preparing the digital leader by up-skilling the workforce requires contribution from various stakeholders like the education system, vocational training, research and development labs, academia, and individual trainers(KPMG, AIMA, 2018)[5]. The skills, like attention to minute things, analytical thinking, problem-solving approach, research-based projects, working with digital interfaces, virtual information management is fundamental

to the industry 4.0[6]. A Skill India program of the Government of India provides a single window for training providers, training centers, students, corporate to ensuring sector-wise skill counselling and competency-based training. Takshashila is another website to find out the appropriate subject area to choose and set of skills in policy and its evaluation, economic reasoning, effective communication, and public persuasion[7].

The Global Competitiveness Index assesses on the 12 indicators, Institutions,Infrastructure, Information and Computer Technology adoption, competitive skills, Macroeconomic stability Health; Market of Product, Country's Financial system, Labour market, Market size, Insights of Business and Innovation at place (GCI, WEF 2019). India scored 61.4 and ranked 68 out of 141 countries. It slipped down 10 positions from 2018. India has ranked 25 in the technology governance picked up after 2017 and performs well in the innovation, whereas the poor performance in health condition, skills, product market efficiency, trade openness, and low in the active labor market. The relatively low rank is observed for current and future workforce 108 and 105 respectively and the skill of the future workforce is 114. (GCI, WEF 2019)[8].

The automation revolution and digital India have leaped in COVID-19 pandemic. Companies are now emerging with a smart workforce with more automation, cloud computing, smart offices and factories to survive the business. Manufacturing companies are redesigning their business process and supply chain to meet the demand of the digital customer. This refinement and realignment of the process and system requires to relook the workforce skills and their capability to work with machines, systems and information. The repetitive task of the industry will completely outmoded soon and up to 58% will be replaced by a machine (Kweilin Ellingrud et.al. 2020)[9]. Smart material, smart sensor cut the workforce by half to two-third. The nature of the job will be related to skills required for Industry beyond. As there are various types of barriers in implementing these technologies like prominent barrier, influencing barriers, resulting barriers (Alok Raj et al., 2019)[10]but this additional investment will reap the benefits in the near future. Organizational culture also plays a vital role to get the lead in the transformation of the process from level 1 to level 2 (Sameer et al,2018) due to the adoption of technology and learning new skillsets[14].

Material and Methods

The survey of a hundred and twelve top level, middle level and shop floor managers was conducted to understand the environment in which they are working. The skillset and smart factory environment are a complement to each other. The Smart factory needs to up-skill its workforce and future-ready workforce likely to implement technology in a shorter time. These are the direct questions related to the skillset required to work in the smart factory. This study considers the manufacturing as well as the service industry which is contributing together nearly 75 % of GDP and 43.45% employment (Statistica, July 2020)[1]. The Study also considers the age group band from 25-60 and more. As per the Indian context, students who graduated in their age group 21-24 and average people start working at the age of 25. India's median age is also 28.4 as of today or 29 as of average in the year 2020[9]. Age group divided into three parts 25-35 is most young people who actively participate in everything industry plan to do. More adaptive age group, dynamic and ready to leap in new technology, new process and love to remain in the virtual world. Another age group is 36-45, where people are more knowledgeable, ready to move to the next world along with the experience of the past and future. This age group is more concern about performance up gradation, sustainable development, more for the future than the current and past. Age group 46-60 having more experience, but not ready to take the risk and wants to do the better what is there today, just carrying on and on to survive in the business. So as an investigator more focuses on the initial two age groups for future smart factories. The study considers only top level, middle level and shop floor manager of the organization to fit into this category. Top level and middle level managers know the concept of Industry 4.0 and its requirement related to workforce, equipment, material and process. Shop floor managers are the

people who know about the machine and its related work and therefore the question asked in the survey form included the keywords of their day- to-day operations.

The sample distribution is representing the true population by considering the gender, age group, and company type. The stratified random sampling is used to select the respondent from each category for proportionate representation in the dataset. The questionnaire is prepared based on the literature review of various articles published on components of Industry 4.0 and identified variables are working with data analytics, cloud computing, IoT, simulation, deployed Robot for routine tasks, virtual supervisions and control, information security and 3D printing. The method of data collection is surveyed through Google form to the employee working in either manufacturing or service sector, who are directly interacting with the system on regular basis. The sample frame is 150 people of the Nagpur region reflected nearby areas. Instead of region-wise bifurcation, company type bifurcation has done and collected 112 responses which are to be considered for the current study. Apart from demographic information, the responses are collected on the continuous variable on 5-points Likert scale from Strongly Disagree, Disagree, Neutral, Agree and Strongly Agree representing numbers from 1-5 respectively. The study collected the data of almost 50% of manufacturing and 50% from the service sector so that the weightage can be equal for both the sector even though their actual contribution varies from this.

Results and Discussion

As per the study conducted for selected samples, 74% of them are completely filled form in all aspects and only consider for analysis. The descriptive variables are company type, age group, designated level and gender. The distribution of form is not considered gender wise and received a response in the ratio of male vs female is 75% to 25%. As per table 1.1 Company wise data distribution and collection was 50% and similar. We found that the age group 25-35 has participated more and whereas the other two age groups of 36-45 and 46-60 have 25% and 19% respectively.

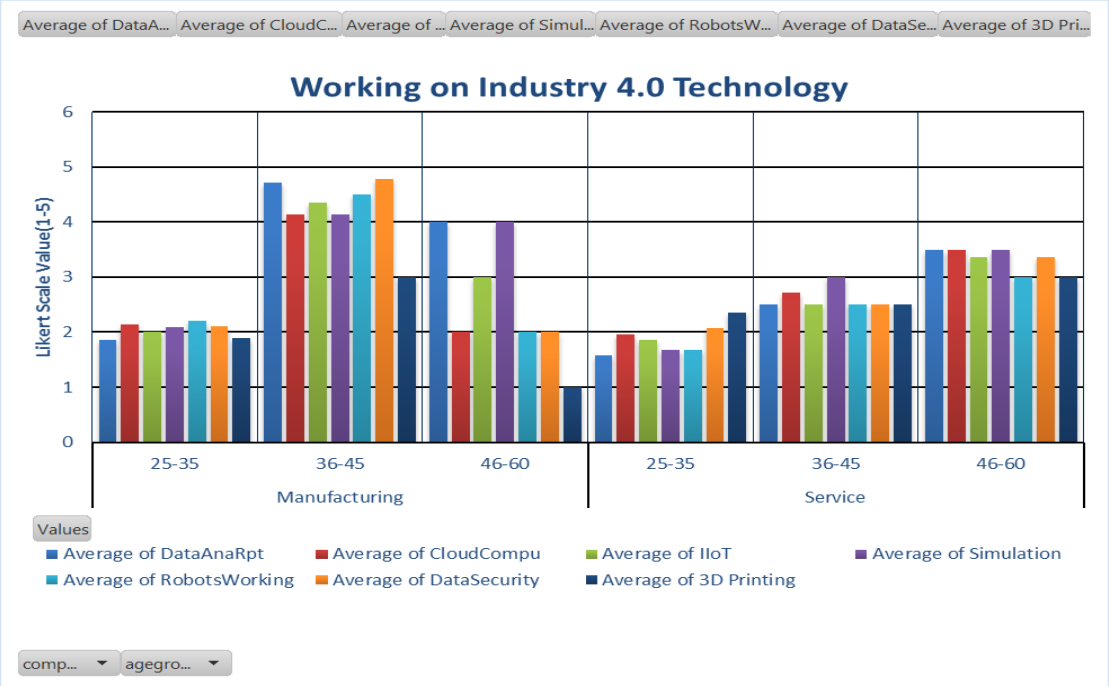
Table 1.1: Demographics

Company	**Percen**	**Gender**	**Percent**
Manufacturi	50%	Female	25%
Service	50%	Male	75%
Grand	**100%**	**Grand Total**	**100%**

Agegroup	**Percen**	**Designation**	**Percent**
25-35	56%	Top Level Manager	25%
36-45	25%	Middle Level	56%
46-60	19%	Shop Floor	19%
Grand	**100%**	**Grand Total**	**100%**

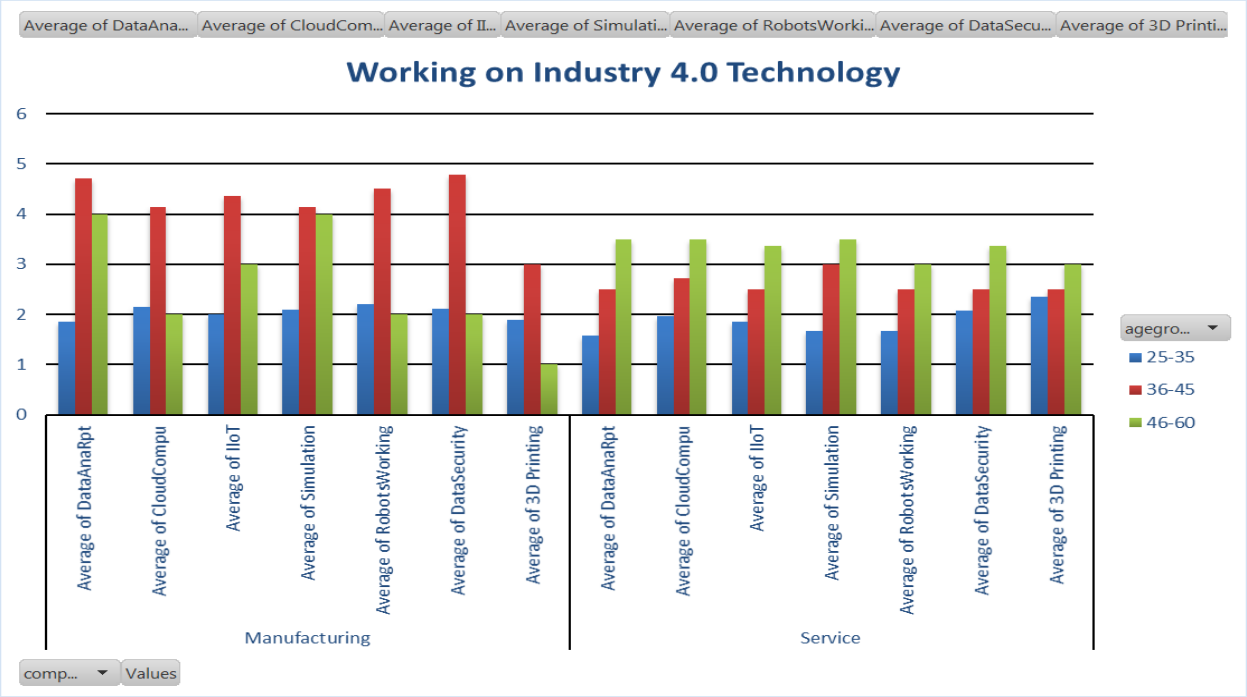
Their contribution to the total respondent is 56% whereas the second age group 36-45 is having a quarter presentation and the rest is less than 20%. Only 25% presentation as designated at the top level, 56% presentation of middle level and 19% presentation of the shop floor managers are present in the sample. All other parameters of the continuous variable are on the Likert scale of 1-5 points. 1 represents to the most disagree to whereas 5 represents most agree and three represent the neural value. As we could see from the Graph-1.1 that the manufacturing concern is more aware and using technology like data analytics, cloud computing, internet of things, working robots and data security. The age group 36-45 is working more on this and the rest of the age groups are either neutral or seems to be not involved. Some people in the age group 46-60 are involved in the process like data analytics and simulation but not conversant with all the processes for Industry4.0.

Graph-1.1 : Sector working on Industry 4.0 Technology



In the service industry, the only age group which is involved up to some extent is 46-60 and all young people still not ready to leap for the smart industry 4.0. Even the service sector is way behind the implantation of required technology at their place. If we see from the technology services service sector is near to the average value of 3 or just above. They agree to work, but not much comfortable with these services whereas in the case of manufacturing Data Analytics, Data security and working with Robots seem to be high and the rest of the things are not implemented with the companies as per the Graph-1.2.

Graph-1.2 : Skillset working in Industry 4.0 Technology



The adoption level is not up to the mark in the service industry and India is at a very nascent stage of implementing Industry 4.0 technologies. The so-called active age group 25-35 is not

involved in any of the technology implementations or not aware of these technologies. The study has taken the question based on whether they are working on future technology or not this directly infer that corporate houses are not equipped with such technology and therefore not used by their workforce. Most of the service sector companies are not working with the technology which is accounted for 31.45 % (IBEF, 2019) of the overall employment in the Indian economy[13-16].

CONCLUSION

As per the literature review and analysis of the data, implementation of the Industry 4.0 is a very primary stages where most of the people are not aware of the technology. The study survey of the 112 top, middle and shop floor managers to understand the technology they are working on. This helps to identify the maturity level of the business process and prepare for smart factories. In the Indian context, the influential barrierslike lack of digital training, resource scarcity, lack of clarity regarding benefits plays crucial role whereas resulting barriers like high investment, value chain integration, security breaches and resistance to change are supporting the first type of barriers. Companies are using several approaches to address the skills gap and impart the right types of skill for I4.0 and some of them like data analytics, deployment of robotics are implemented fairly at manufacturing sector. Medium and small size companies also collaborate with various agencies and big player to get the pace with the recent trends. As our data shows that companies not touched upon the additive manufacturing concepts like 3D printing, different design and printing software and processes. It is very powerful, cost effective and open new market in the future

Recommendation

The stakeholder of the Industry 4.0 essentially be geared up for the future technology ecosystem with Government, Tax Reform, Digital Policy, Data Security, Artificial Intelligence, Research Based projects, Big data and Analytics, Additive manufacturing labs and education system to support the skill set required for the I4.0. Installing Laboratory at Middle School and Higher studies to get the insights of future technology help us to prepare for smart factories. Facilitator and Actuator both required to reap the benefit for “Make in India” program to become self-reliant and self-dependent in timely manner.

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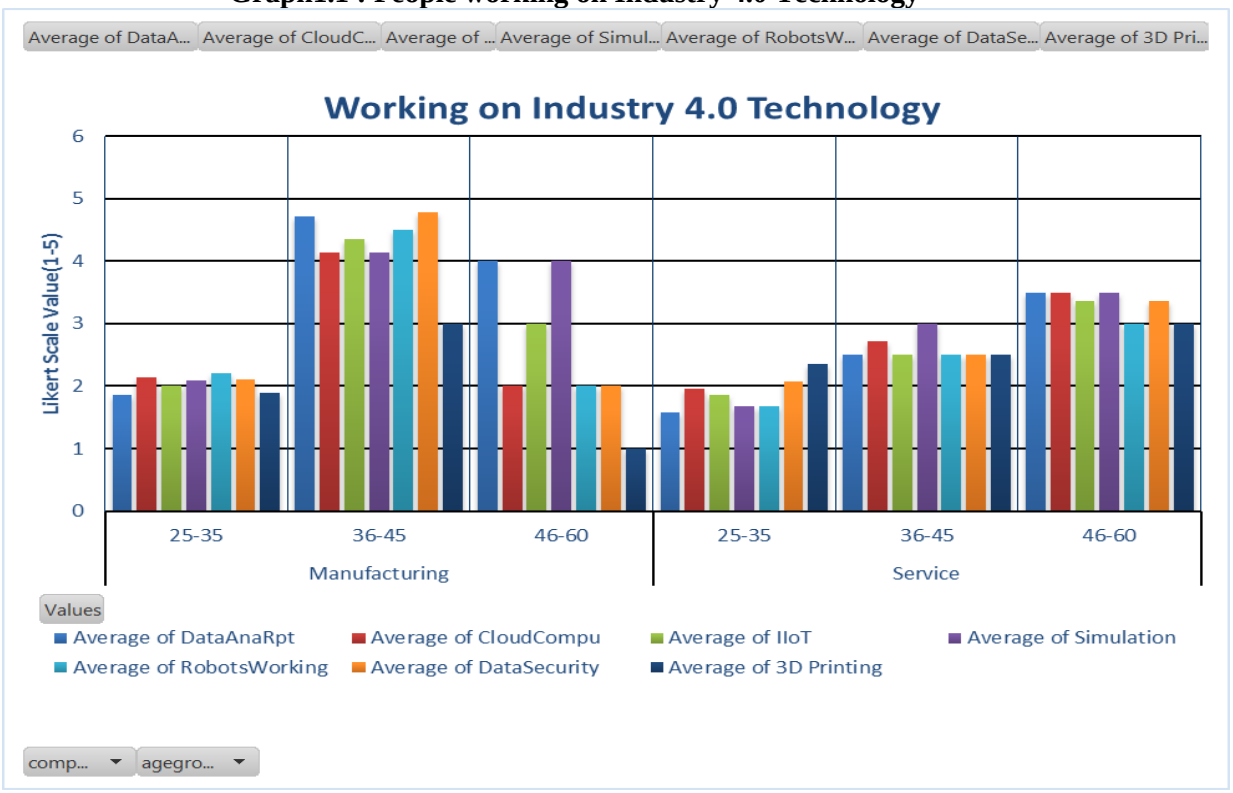
Annexure:

Graph1.1 : People working on Industry 4.0 Technology



Graph1.2 : Skillset working in Industry 4.0 Technology