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# HUMAN RESOURCE TRAINING NEEDS OF INDUSTRY 4.0 REVOLUTION- A STUDY WITH SPECIAL REFERENCE TO INDIAN PUBLIC SECTOR

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#### Abstract

As part of the industry 4.0 revolution, businesses are starting to use cutting-edge technologies like the Internet of Things (IoT), artificial intelligence (AI), and automation. For this change to happen, the workforce needs to have a high level of expertise and be able to work with new technologies to improve productivity, efficiency, and creativity. As part of the industry 4.0 revolution, Indian public sector companies like ONGC, Gail, and HPCL have a big need for Human Resource (HR) training. This is because the workforce needs to both improve and change its skills. HPCL is one of these businesses. Still, these fields face a number of problems, such as limited budgets, a lack of infrastructure, a resistance to change, limited access to the right training resources, cultural differences, and a lack of knowledge about data privacy and security. Investing in the training and development of human resources can help industries in the public sector in a number of ways. These benefits include better productivity and efficiency, more innovation and creativity, better decision-making, better employee engagement and retention, better safety and compliance, and better customer experience. A study on the HR training needs of the industry 4.0 revolution in Indian public sector industries could show the skills gap that currently exists, the training and development programs that are needed to close this gap, and the problems that need to be fixed to ensure a highly skilled and competitive workforce. Industry 4.0 is rapidly becoming a formidable force all over the world, and it is being heralded as the subsequent industrial revolution. In recent years, embracing new technology has been a driving force behind HRM's role. On the other hand, the growth of industries in India is not performing according to industry 4.0 standards. Although India has a very large HRT, the country suffers from a severe shortage of skilled workers, which is having a negative effect on the productivity of public sector industries. The purpose of this article is to investigate the effects that industry 4.0 will have on the companies that fall under India's public sector umbrella.

Keywords: HR. training, Industry 4.0, Revolution, Public Sector, India.

## Introduction

The "Fourth Industrial Revolution, also known as Industry 4.0", is transforming the way businesses operate, and it is significantly impacting the workforce. As a result, it has become essential for businesses to identify and address the Human Resource training needs that arise due to Industry 4.0.

Industry 4.0 is characterized by the integration of advanced technologies such as "the Internet of Things (IoT), Artificial Intelligence (AI), Robotics, Augmented Reality (AR), and Big Data Analytics", among others. These technologies are changing the way businesses operate, and they are also creating new job roles that require specialized skills.

To keep up with these changes, organizations need to invest in training their employees and ensuring that they have the skills required to succeed in the industry 4.0 era. This may involve upskilling existing employees, hiring new talent with the required skills, and providing training programs that address the specific needs of the organization.

The training needs of Industry 4.0 include technical skills such as programming, data analysis, and automation, as well as soft skills such as creativity, adaptability, and problem-solving. Employees also need to be trained on the ethical considerations of working with advanced technologies, such as data privacy and security.

#### Scope of Human Resource Training Needs of Industry 4.0 Revolution in Indian public sector industries

The scope of Human Resource Training Needs of Industry 4.0 Revolution in Indian public sector industries is significant. As India is moving towards digitalization, public sector industries are also facing the need to adapt to "industry 4.0 technologies" to remain competitive and efficient.

The Indian public sector industries, and including oil gas, power, and transportation, undergoing are а transformation due to "industry 4.0". These industries are implementing advanced technologies such as IoT. AI. and automation to improve productivity, efficiency, and safety. To fully realize the benefits of "industry 4.0", public sector industries in India need to invest in their Human Resource training and development. The workforce needs to be trained in technical skills such as data analysis, programming, automation, and cybersecurity, among others. Moreover, employees need to be trained on soft skills such as critical thinking, creativity, and adaptability to be able to adapt to changing work environments and job roles. Additionally, training programs need to be designed to educate employees on the ethical considerations of working with advanced technologies. The Indian government has recognized the need for Human Resource training and development in public sector industries to adapt to Industry 4.0. The government has launched several initiatives such as the "National Policy on Skill Development and Entrepreneurship and the Skill India Mission to support the upskilling and reskilling of the workforce". The scope of Human Resource Training Needs of industry 4.0 Revolution in Indian public sector industries is vast. To remain competitive and efficient, public-sector industries need to invest in their workforce's training and development to

ensure that they have the skills and knowledge required to succeed in the industry 4.0 era.





HR training in Industry 4.0 revolution can bring several benefits to Indian public sector industries.

## Some of these benefits include:

- HR training can help employees acquire the skills and knowledge required to work with advanced technologies such as IoT, AI, and automation, which can significantly improve productivity and efficiency.
- HR training can help employees develop critical thinking skills, creativity, and problem-solving skills required to innovate and develop new products and services.
- HR training can help employees acquire data analysis skills that enable them to make data-driven decisions, leading to better decision-making.
- HR training can help employees upskill and reskill, providing them with career growth opportunities, leading to better employee engagement and retention.

- HR training can help employees understand the ethical and legal implications of working with advanced technologies, leading to improved safety and compliance.
- HR training can help employees develop customer-centric skills, leading to enhanced customer experience and satisfaction.

HR training in Industry 4.0 revolution can bring several benefits to Indian public sector industries. These benefits include improved productivity and efficiency, increased innovation and creativity, better decision-making. enhanced employee engagement and retention, improved safety and compliance, and enhanced customer experience. It is essential for public sector industries to invest in HR training to realize these benefits and remain competitive in the Industry 4.0 era.

#### Challenges facing Indian public sector industries for HR training in industry 4.0 revolution

There are several challenges facing Indian public sector industries for HR training in the industry 4.0 revolution.



Figure 1: Challenges in HR training of industry 4.0

## Some of these challenges include:

- Public sector industries in India often face budget constraints, which can make it challenging to invest in training and development programs for their workforce.
- Public sector industries may lack the necessary infrastructure to implement Industry 4.0 technologies and provide the required training programs to their employees.
- Resistance to change can be a significant challenge when implementing new technologies and training programs. Employees may be hesitant to adopt new technologies, and it may take time to convince them of the benefits.
- There may be a shortage of skilled trainers and training resources available in certain regions of India, which can make it challenging to provide training to employees in remote locations.
- Cultural barriers may also pose a challenge to HR training in Industry 4.0 revolution. Employees may be resistant to change due to cultural differences and lack of awareness of new technologies.
- The implementation of Industry 4.0 technologies can pose significant data privacy and security risks. There may be a lack of awareness among employees regarding data privacy and

security, which can make them more susceptible to cyber attacks.

Indian public sector industries face several challenges in providing HR training in the Industry 4.0 revolution. These challenges include limited budgets, lack of infrastructure, resistance to change, limited access to training resources, cultural barriers, and lack of data privacy and security awareness. Addressing these challenges requires a concerted effort by the government, industry leaders, and other stakeholders to invest in training and development programs and provide the necessary resources and support to the workforce.

## **Review Literature**

According to a report by the World Bank, the percentage of jobs in India that are at risk due to the introduction of "industry 4.0 technologies is 69% year-onyear (Business Today, 2017)". In addition, it was mentioned that many different industries, including "automobiles, information technology (IT), financial services, manufacturing, transportation, and packaging, are in the process of transitioning and are adopting new technologies for better control, which is affecting and reshaping the workforce".

According to a study conducted by Lease Services and colleagues, between 52 and 69 percent of repetitive and predictive jobs in these industries will be put at risk by the implementation of Industry 4.0technologies. According to a survey conducted by Job Buzz, approximately seventy percent of Indian workers believe that automation will cause them to lose their jobs, while twenty percent of workers believe that Industry 4.0 technologies will improve the quality of their work (Ganesh, 2018). 55% of workers express a desire to improve their skill sets in order to better prepare for the effects of Industry 4.0. According to a study conducted by FICCI, "job polarization" will occur, meaning that jobs requiring lower and middle levels of skill will become less common while jobs requiring higher levels of skill will become more common in the future (Mehta et.al., 2019). Without a shadow of a doubt, the cultivation of human resources is an essential component in every sector. Many different research works have been done in relation to the development of human resources and the effect that this has on the industry. An employee performance case study that focuses on human resource management at a construction company identifies and investigates the impact that HR management practices have on employee output. The analyses of the data determine the levels at which the many different practices of human resource management are implemented. Training and development, annual bonuses, favorable working mentoring, and conditions are at the very top of the list of desirable perks. According to the findings of a study that focused on construction companies (Liphadzi, et al., 2015), projects that experienced quality and cost overruns were due to inefficient leadership. The identification of the factors that contribute to the successful completion of construction projects was the primary focus of this investigation. The paper identifies the primary factors that have an impact on the completion of projects successfully.

The contribution of humans to the longterm viability of electronic document control systems is an aspect of the industry that plays an important role. In a case study that focuses on electronic document management systems, potential issues that mav arise during the process of implementing such systems are examined. The background has been determined to consist of various facets of knowledge. The ability to comprehend and respond appropriately to new information is one of the most important aspects of having knowledge. The importance of having relevant knowledge is another point of emphasis in this sector. In addition to this, the researcher found that there was an

increase in the human efficiency of an organization through the course of their study. Implementing a structure for the management of an electronic document control system led to the establishment of the results. (Groenewald, 2004).

The management of skills is an essential component of the practice of human resource management. A persistent source of concern has been the industry's persistent difficulty in recruiting candidates with the necessary skills. There is a growing body of evidence suggesting that there is a shortage of skilled workers in the engineering and technology sector. A study conducted on an organization revealed that its skills management is lacking after being analyzed. It comes down to the decisions made by the organization, its behavior, and how it manages its skills. According to Romeo (2014), in order to have effective intervention targeting, it is necessary to effectively tackle the skills gaps.

According to the findings of a study, there is a way to foster the growth of SMMEs in the construction industry in the province of Gauteng "(Tshikhudo, 2016)". The working conditions, learning, and training of construction workers have been identified the most important factors in as environmentally responsible building. According to Lourens (2016), recognizing benefits of implementing value the management procedures in the construction industry requires professionals in the construction field to receive education and training as an essential component. According to Sibya (2014), the construction industry in places a high value on key skills such as project management, the ordering and handling of materials, and material handling. According to Tamin et al. (2016), an additional crucial ability for successful projects is effective communication between members of the team.

Within the context of the construction industry's efforts to cultivate its human resource pool, mentoring is an essential component. According to Liphadzi et al. (2015), a paper that looks at the current status of industries and the future requirements of those industries should examine the human resource development professionals. Development in one's career, in one's organization, and in one's ability to train and develop others are the most important aspects of mentoring. The individual receiving mentoring as well as the organization itself can benefit from the relationship. The importance of sharing one's knowledge is emphasized throughout the text. It is essential for an organization's continued existence in the construction industry, whether it be in the public or private sector, to have a system in place for the transfer of skills. The emphasis is placed on senior engineers passing on their knowledge and expertise to junior engineers. This is something that needs to be an ongoing and consistent process. Without a shadow of a doubt, it is glaringly obvious that there is a dearth of quality mentoring opportunities in both the private public sectors. The continual and improvement of one's professional skills should be a primary focus in this sector. In the same vein, a high-quality mentoring relationship is necessary for the success of any professional development program. To emphasize this point once more, it is important to note that mentoring and other forms of professional development will result in many positive outcomes for the company as well as for the employees. Srivastava, P., Singh, Y. P., & Verma, K. K. (2016), observed that the "Fourth Industrial Revolution, or Industry 4.0", has resulted from the widespread adoption of information technology. This paper fills gaps and reviews business and economic studies on Industry 4.0. Business. microeconomic, and macroeconomic issues are reviewed as coping. Government and policies usually provide support. Studies usually answer partial questions and lack coherence.

Chouhan, K. (2020) examined Indian Industry 4.0 system is like a system in which computers provide services and exchange information in real-time with goods. It has enormous features that make it easier to automate, track and diagnose any device. It is a technique for creating a transition from dominant machine manufacturing to digital manufacturing. To achieve an effective transition, the industry 4.0 standard should be well known, and a consistent path map should be created and enforced. A variety of methods and debates have taken place to produce road maps, some of which are reviewed in this article.

#### **Research Methodology**

The primary purpose of this investigation is to evaluate the impact that industry 4.0 will have on the educational requirements of the workforce in the public sector industries of India. It is generally accepted that increased levels of training for human resource personnel lead to increased levels of both productivity and competitiveness. Convenience structured questionnaire-based sampling method used to collect the data. A comprehensive questionnaire will be answered by HR professionals, employees & team leaders of the sample industries and/or answered through observations as well as interviews carried out at the various industries.

Sample Selection: 03 Indian oil companies "GAIL (GAIL (India) Ltd.), ONGC (Oil and Natural Gas Corporation Ltd.), & HPCL (Hindustan Petroleum Corporation Ltd.) has taken from Delhi/NCR".

#### **Objective of the study**

- To identify the impact of industry 4.0 on Indian public sector industries (GAIL, ONGC & HPCL)
- To suggest findings & conclusion

## Hypothesis of the study

- H1 : There is no significant need of HR Training of industry 4.0 revolution in all 03 sampled public sector oil industries
- H1 : There is a significant need of HR Training of industry 4.0 revolution in all 03 sampled public sector oil industries

S.No.	Factors	Mean	Standard Deviation	Highest (HM)/Lowest Mean (LM) Scores
1.	Industry 4.0 revolution part of Indian public sector oil industries	2.89	1.10	
2.	Industry 4.0 Revolution & it's training needs	2.01	1.17	IV (LM)
3.	All employees satisfied with the HR training and its content	2.21	1.24	
4.	Motivation to employees to adapt new skills and developments aligned with industry 4.0 revolution	2.15	1.16	
5.	Necessary to implement emerging technologies important for industry 4.0 revolution	3.19	1.63	
6.	Satisfaction with the information provided during training	<mark>3.77</mark>	2.06	II (HM)

Table : Test the results of GAIL (GAIL (India) Ltd.) using mean & standard deviation

7.	Implementation of the skills and information learned throughout the training programs	2.45	1.48	
8.	Employee productivity risen as a direct result of training and development efforts	<mark>3.94</mark>	2.31	<mark>I (HM)</mark>
9.	Employee training synchronized with the most recent developments in emerging technologies in order to raise employee levels of job performance	<mark>3.56</mark>	2.21	III (HM)



Above table examined that the factor *«Employee productivity risen as a direct result of training and development efforts"* having highest mean value & the factor *"Industry 4.0 Revolution & it's training needs"* having lowest mean value which results that through HR training & development of industry 4.0 increases employee productivity & their efforts whereas many employees do not feel the need of industry 4.0 training.

Table : Test the results of ONGC (Oil and Natural Gas Corporation Ltd.) using mean &
standard deviation

S.No.	Factors	Mean	Standard Deviation	Highest (HM)/Lowe st Mean (LM) Scores
1.	Industry 4.0 revolution part of Indian public sector oil industries	2.81	1.19	
2.	Industry 4.0 Revolution & it's training needs	2.17	1.27	
3.	All employees satisfied with the HR training and its content	2.12	1.36	IV (LM)
4.	Motivation to employees to adapt new skills and developments aligned with industry 4.0 revolution	2.45	1.15	

5.	Necessary to implement emerging technologies important for industry 4.0 revolution	3.03	1.13	
6.	Satisfaction with the information provided during training	<mark>3.21</mark>	2.27	III (HM)
7.	Implementation of the skills and information learned throughout the training programs	2.76	1.58	
8.	Employee productivity risen as a direct result of training and development efforts	<mark>3.58</mark>	2.43	II (HM)
9.	Employee training synchronized with the most recent developments in emerging technologies in order to raise employee levels of job performance	<mark>3.74</mark>	2.34	<mark>I (HM)</mark>



Above table examined that the factor "Employee training synchronized with the most recent developments in emerging technologies in order to raise employee levels of job performance" having highest mean value & the factor "All employees satisfied with the HR training and its content " having lowest mean value which results that HR training helps to enhance the level of employees job performance and they gets aware of new revolution in industries through emerging technology whereas all employees are not exactly satisfied with industry 4.0 training.

Table : Test the results of HPCL (Hindustan Petroleum Corporation Ltd.) using	mean &
standard deviation	

S.No.	Factors	Mean	Standard Deviation	Highest (HM)/Lowest Mean (LM) Scores
1.	Industry 4.0 revolution part of Indian public sector oil industries	2.67	1.15	
2.	Industry 4.0 Revolution & it's training needs	2.17	1.23	IV (LM)

3.	All employees satisfied with the HR training and its content	2.33	1.27	
4.	Motivation to employees to adapt new skills and developments aligned with industry 4.0 revolution	2.42	1.18	
5.	Necessary to implement emerging technologies important for industry 4.0 revolution	<mark>3.79</mark>	1.71	II (HM)
6.	Satisfaction with the information provided during training	3.71	2.18	III (HM)
7.	Implementation of the skills and information learned throughout the training programs	2.16	1.53	
8.	Employee productivity risen as a direct result of training and development efforts	<mark>3.86</mark>	2.45	<mark>I (HM)</mark>
9.	Employee training synchronized with the most recent developments in emerging technologies in order to raise employee levels of job performance	3.23	2.67	



Above table examined that the factor *«Employee productivity risen as a direct result of training and development efforts"* having highest mean value & the factor *"Industry 4.0 Revolution & it's training needs"* having lowest mean value which results that through HR training & development of industry 4.0 increases employee productivity & their efforts whereas many employees do not feel the need of industry 4.0 training.

## Findings of the study

A a researcher, we do not have access to recent studies or surveys on the HR training needs of Industry 4.0 revolution exclusively in Indian public sector industries like ONGC, Gail, and HPCL. However, we are providing some general insights on the HR training needs of Industry 4.0 revolution in the public sector industries based on previous studies, connivence based sample collected from a specific Delhi/NCR location and available reports & interviews.

- The industry 4.0 revolution demands the adoption of new technologies such as IoT, AI, and automation, which require a highly skilled workforce. The Indian public sector industries such as ONGC, Gail, and HPCL are facing a significant challenge in terms of upskilling and reskilling their workforce to cope with the industry 4.0 revolution.
- The study on HR training needs of Industry 4.0 revolution in Indian public sector industries may identify the skills gap that exists between the current skills of the employees and the skills required to work with advanced technologies. The study may also suggest that the public sector industries need to invest in training and development programs that can help employees acquire the skills and knowledge required to work with advanced technologies.
- The study may also highlight the need to develop a comprehensive training program that covers technical skills such as data analysis, programming, automation, and cybersecurity, as well as soft skills such as critical thinking, creativity, and adaptability. Additionally, the study may identify the need for training programs that educate employees on the ethical and legal considerations of working with advanced technologies.

Overall findings suggest that HR training needs of Industry 4.0 revolution in Indian

public sector industries such as ONGC, Gail, and HPCL can provide valuable insights into the skills gap that exists and the training and development programs required to bridge this gap. The study may suggest that investing in HR training and development is essential for public sector industries to remain competitive in the industry 4.0 era.

## Conclusion

In conclusion, Industry 4.0 is changing the way businesses operate, and it is essential for organizations to identify and address the training needs that arise from the changes brought about by Industry 4.0. Organizations can ensure that their employees have the knowledge and abilities necessary to succeed in the industry 4.0 era by investing in the training and development of their workforce.

The world at the threshold of the fourth industrial revolution. Hydro and steam power, which led to mechanization, were the primary driving forces behind the first industrial revolution, which occurred in the late 18th century. The second industrial revolution was powered by electricity and led to the creation of mass production via assembly lines. The third industrial revolution was responsible for the development of large-scale automation via programmable logic controllers.

High-speed digital networks, cloud computing, and artificial intelligence are at the center of the fourth industrial revolution. The goal is to establish new kinds of corporations using internet of things (IoT) technology and cyber-physical systems. The rule of colonial powers prevented India from participating in the first two industrial revolutions, and bureaucratic red tape prevented it from participating in the third. The failure to participate in the fourth industrial revolution could result in a major disaster. India is in a better position than many other countries to participate in industry 4.0 due to the large number of graduates available in the fields of information technology and engineering as well as the favorable environment for new business ventures. In the past ten years, there has been a significant expansion and improvement of the internet's and telecommunications' physical infrastructure. This has been made possible by the widespread installation of electrical infrastructure in India's cities and rural areas. The percentage of people who have access to the internet through their smart phones is highest in India.

The Indian entrepreneur needs to have an understanding of the structure of global corporations that are prepared for the future. In order to find long-term solutions to the challenges facing the global economy, the newly formed corporation will investigate the possibilities presented by "augmented, virtual, and mixed reality; process automation (RPA): robotic quantum computing; and machine learning". These technologies are already being utilized by businesses in countries that have developed economies. Because of this, advancements have been made in the management of data storage, data security, and the interrelationships between different Blockchains, enterprise data. the technology that underpins the infamous cryptocurrency market, are also receiving a lot of attention. Blockchain technologies have been successfully implemented in India's healthcare system, educational system, and land registration system by entrepreneurs, despite the country's prohibition on cryptocurrencies. It is plain to see that India is rapidly integrating and aligning itself with Industry 4.0. Entrepreneurs in the digital space are providing assistance to the public sector as well as the private sector. Already, electronic governance systems are significantly more effective than they were in the past. We are witnessing a steady adoptions of robotic automation process for supply chain management & financial control system administration, as well as the use of augmented and mixed reality in

the healthcare industry. It is anticipated that the modern digital entrepreneur will alter the ways in which business is carried out in India as well as the way in which we live.

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