Section: Research Paper

INDUSTRY 4.0 VS. DEFIES FORHUMAN RESOURCE MANAGEMENTPROGRESSION

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Abstract

The field of human resource management is a challenging field. A human resource person has to work under different situations in the same organization. Invention of industry 4.0 is the new biggest challenge to handle for human resource people asthe increase in automation has a direct impact on jobs. Industry 4.0 is a fourth technological revolution in the field of peoples' overall skill with respect to changing technology like artificial intelligence, robotics and others. Digital and intelligent manufacturing processes are the need of today's industry as the industrial world is changing very fast. Industries are now taking a turn from mass production to customized production as these functions are considered as a rapid advancement in manufacturing , technology and applications, which together help industries to be more productive with minimum investment in terms of financial and human resource aspects. Multi skill and talent will have a place under this revolution whereas other employees need to update themselves as early as possible or otherwise find out other alternatives. Therefore, duty is cast upon the human resource person to recruit capable employees having multi skill, quick learning ability, problem solving ability and cognition. This technology revolution has encapsulated future industry development trends to achieve intelligent and smart manufacturing processes. This revolution relies on Cyber-Physical system (CPS), construction of Cyber Physical Production System (CPPS) and adaptation, implementation and operations of smart industry.

Keywords – Internet of things, Smart Manufacturing, Human Integration, Continuous Improvement, Value Adding Activities.

Introduction:

Industrialization is the process by which economy is transformed from primary sector to manufacturing sector which is secondary source of developing national economy. Industrialization is generally associated with increase in total income and living standard in society. Early industrialization occurred in Europe and North America during 18th century and thereafter in other parts of the world. Various strategies have been persued with varying level of success to develop industrialization. Industrialization is nothing but shifting of old traditional business of agriculture to manufacturing sector, which in fact leads to transformation from one sector to other with an objective to develop an economy of the individual or of a family or of the nation. In the process of transformation manual labor is replaced by mechanical work with mechanized mass and quality production and craftsmen are replaced by assembly lines to continue the production flow with the efficient speed.

Industry 4.0: Industry 4.0 is associated with qualitative and quality production, by use of high or newer technology, increase in profitability by increase in productivity,

increase in living standard by increasing income, increase use of other means like food, wears, human desires, family expectations etc, with increased salary and wages. Industrialization has been given a boost by various countries over a period of time with different level of success in terms of use of technology, human resource utilization in terms of employee engagement, employee development and employee welfare. Women empowerment in terms of gender diversification, providing opportunities to work even at risky places etc.

Industry 4.0 is a concept that originated in Germany and is often used to describe data driven artificial intelligence, smart factories as the harbingers of the 4^{th} industrial revolution. The pervasive networking of people, machines and things in physical and virtual realms, leveraging required data through tools and systems that, expose the data's value to drive production efficiency through motivated and productive workforce. This revolution is assumed to be much beneficial for enhancing the productivity in the manufacturing processes.

The earlier three industrial revolutions were started in 18^{th}, 19^{th} and 20^{th} century respectively. The first industrial revolution was industry 1.0 which began with the use of steam generated power and mechanization of production. This revolution was stood much beneficial to the textile and agricultural sector.

The second industrial revolution was industry 2.0 which began with advent of electricity and the assembly line production by use of conveyer belts. This revolution introduced pre- existing systems such as telegraph's and rail roads into industries. This revolution was stood much beneficial to the automobile sector and supported for faster communication.

The third industrial revolution was industry 3.0 which began with innovation in the electronic world; therefore, this revolution is commonly known as digital revolution and brings the change from analog and mechanical system to digitalization. This revolution is also known by the name "information age" it is the direct result of the enormous developments in computer and information technology This revolution was stood much beneficial to the manufacturing sector.

Industry 4.0 is not just about the introduction of various technologies like Internet of Things (IoT) Industrial Internet of Things (IIoT), Cyber Physical System (CPS), Maturation tools around kubernetes and Orchestration. But it impacts on the role of society as well as workers/employees within the organization in the sense collaboration between men and machine, skill sets of employees in an organization amidst all these changes and inevitably reduction in jobs due to high amount of automation. This revolution also has a focus on security including green human resource management and green environment, energy and ecology, cyber security, industrial control system security (ICSS), organizational assets, protection and security of employees, critical infrastructure, physical security etc.

Industry 4.0 stands as a vision that evolves from an initiative to make the manufacturing processes more effective especially the German industries.

Review of Literature:

In pronouncing its High-Tech Strategy 2020 Action Plan, the German Government officially commenced selling modifications in companies that could enhance the competitiveness of manufacturers (Kagermann et al., 2013). Academics, managers, and policymakers agree that the adoption of cyber-bodily structures and Industry 4.0 technology in clever factories lets in for bendy production, improves deliver chains, and results in extra green enterprise control, with big technological, economic, and social affects (Horvath and Szabo, 2019; Bag et al., 2021). However, this possibility comes within side the context of distinguished threats to the destiny of manufacturing: fast modifications

in environmental conditions, converting consumer expectations, decreased product lifecycles, and opposition among countries.

The majority of preceding studies (conventions, conferences, and publications) makes a speciality of the evaluation of the technological demanding situations posed the Fourth Industrial Revolution or Industry 4.0 (Oesterreich and Totenberg, 2016; Pfeiffer, 2017; Frank et al., 2019; Mariucci et al., 2021), and in large part ignores the strategic and operational control of companies` overall performance. In addition, research has in particular explored the subject via conceptual papers and case research, thereby figuring out a high quality dating among Industry 4.0 adoption and companies` overall performance however making sure that empirical studies stay in a kingdom of infancy. Only some authors have completed confirmatory studies at the phenomenon (e.g., Dalenogare et al., 2018, Horvath and Szabo, 2019; Büchi et al., 2020a).

Several authors have referred to that the implementation of Industry 4.0 is a complicated system and that specific companies face a specific collection of limitations (Kiel et al., 2017b; Dalenogare et al., 2018; Stock et al., 2018; Agostino and Filippini, 2019; Birkel et al., 2019; Horvath and Szabo, 2019; Raj et al., 2020; Ivanov and Dolgui, 2020; Müller et al., 2020), with every barrier inflicting specific effects on Industry 4.0 adoption and overall performance.

Therefore, it's far critical to apprehend those differing outcomes of the limitations that preclude the adoption of Industry 4.0 technology as they come to be more and more not unusual inside companies throughout the world (Dalenogare et al., 2018). To triumph over those limitations, numerous commercial plans and public-non-public partnerships (e.g., Industrial Internet Consortium and Factories of the Future) were released to guide Industry 4.0 advancement. However, for that reason far, man or woman limitations and incentives were taken into consideration one at a time and with none constant framework, that means that little is understood approximately their interdependencies (Kiel et al., 2017b). Therefore, there may be a want to become aware of limitations, incentives, and relationships that would guide the improvement of mitigation strategies, that could themselves result in a smoother adoption of Industry 4.0 technology (Kamble et al., 2018).

Objectives:

1. To study the development in the domain of industry 4.0
2. To investigate the existing application industry 4.0 scenario.
3. To find out the challenges of HRM in which industry 4.0 technologies has immersed.
4. To identify the future scope for development for different manufacturing sectors.
5. To identify framework of industry 4.0 in different areas from production to delivery ofgoods.

Challenges of Industry 4.0:

1. New strategies depending upon the business model that industry will implement
2. Restructuring of an organization and operational processes depending upon the technology adopted for greater output..
3. Business case will need to understand to take right decisions. 4.Pilot survey will be require to conduct for success of the business 5.Everyone will need to understand the business to decide right steps.
6. As everything in operation will change, people will require to adopt changed managementpolicy.
7. It will be necessary to identify organization culture.
8. All departments and the open world will need to interconnect strongly.

9. Searching, developing and utilizing skill of new talent different training programmes willneed to conduct.
10. All departments will need to interconnect genuinely
11. Recruitment and employee development method will need to change in the way it should be effective and result oriented.

The Internet of Things (IoT) will connect machines and systems and allow seamless data transmission across all departments of a workplace, opening up opportunities for entirely new business models in manufacturing, computing, and many other industries.

The focus of industry 4.0 is centered on making everything real time, which requires that, the production process, data collection , feedback and monitoring of operational processes will also have to achieved in real time.

Internet of things will create potential services that, others can consume, therefore entire services will going to be required by the smart factories.

By designing and building products, operational system with the use of conveyer belt will be modular and agile. The smart factory will be flexible and can change the production or product as may be architect.

Government Policies and Industry 4.0:

Industrialisation is most commonly associated with European Industrial Revolution of the late 19th century after the constitution of the European Union was written as International body for countries belongs to territory of Europe. Industrialization also occurred in the United States after the second world war which resulted in the growth and development of large urban centers and suburbs.

The late 20th century was noteworthy for rapid industrialization in other parts of the world notably in East Asian countries like Hong Kong, South Korea and Singapore, whereas China famously experienced its own industrial revolution towards a more mixed economy, whereas in India industrial revolution started from 19thcentury onwards. During the period from 1950 to 1990 though the industrial growth was slow but after the entry of computerization introduced by Honorable. Rajiv Gandhi the then Prime Minister of India, we all experienced the industrial growth that happened. Thus from 1990 onwards industrial revolution started in India especially in information technology (IT) and automobile industries (AI).

So far as India is concerned Hon. Prime Minister Mr. Narendra Modi announced to make our country and countrymen “Atmanirbhar Bharat” and “Atmanirbhar” respectively. Therefore, industry 4.0 is commonly known in our country as “Samarth Udyog Bharat 4.0” under the Atmanirbhar programme of Government of India. The focus of the government is on using advanced technology so that, products can be manufactured and can be supplied and provided at low cost to fulfill the society’s need of entire geographical regions . Government of India is also planning for industrial development by use of high grade technology with a view to compete with other developed countries and simultaneously to create jobs for the youth. According to Government of India “Samarth Udyog Bharat 4.0” have sole aim to minimize the wasteful processes, to optimize the use of energy and other inputs and resources without causing damage to the environment and thus to maintain the ecological balance.

Government policies setting the terms o which immigrants enter, deciding wherein the country they settle, and affecting the ease with which business can be strutted affect the rate of immigrant entrepreneurship.

Government policy expresses the goals, decisions and action adopted by a government for political, social and economic management. However, there is a need of increase in policy formulated by establishing close connections with academics, industry experts , responsible politicians and the society.

Government policy includes making ethical judgments mainly by policy makers by selection and reconciliation of interest presented by organizations.

Research Methodology:

This research paper is descriptive in nature. Researcher have emphasized on the challenges encountered by the HR department due to the application of industry 4.0.

To find out the challenges of HRM in which industry 4.0 technologies has immersed. Hypothesis of the research paper is

H_o: There is significant relationship between HRM and change management andstrategy of the industry 4.0

H_1: There is significant relationship between HRM and change management andstrategy of the industry 4.0

Case Processing Summary

		N	%
Cases	Valid	100	100.0
	Excluded[a]	0	.0
	Total	100	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.866	4

Reliability statistics indicate the value of Cronbach's alpha is .866(86.60%). Value more than .70 or higher is considered reliable.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.717[a]	.514	.504	.59643

a. Predictors: (Constant), BM_S, HRM

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36.495	2	18.247	51.297	.000[b]
	Residual	34.505	97	.356		
	Total	71.000	99			

a. Dependent Variable: CHNG_MNG

b. Predictors: (Constant), BM_S, HRM

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.320	.271		4.871	.000
	HRM	.223	.071	.271	3.152	.002
	BM_S	.415	.068	.528	6.148	.000

a. Dependent Variable: CHNG_MNG

The tables of regression analysis in indicating *p* value is 0.000. Consequently if the value of *p* is less than 0.05 i.e. 0.05>0.000 then the relation between dependent and independent is positive. In said hypothesis researcher have considered HRM practices and the change management.

pertinent to the Industry 4.0. On the basis of date analysis indicated that there is positive correlation between change management and its relation on HRM practices. Hence

alternative hypothesis "There is significant relationship between HRM and change management and strategy of the industry 4.0" is accepted and null hypothesis is rejected.

H_0 : Technological changes have correlation with the HRM practices in Industry4.0H_2: Technological changes have correlation with the HRM practices in Industry4.0

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	25.660	1	25.660	31.860	.000[b]
	Residual	78.930	98	.805		
	Total	104.590	99			

a. Dependent Variable: HRM

b. Predictors: (Constant), TECH

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.675	.458		3.657	.000
	TECH	.647	.115	.495	5.644	.000

a. Dependent Variable: HRM

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.495[a]	.245	.238	.89744

a. Predictors: (Constant), TECH

The tables of regression analysis in indicating *p* value is 0.000. Consequently if the value of *p* is less than 0.05 i.e. 0.05>0.000 then the relation between dependent and independent is positive. In said hypothesis researcher have considered HRM practices and the technological changes pertinent to the Industry 4.0. On the basis of date analysis indicated that there is positive correlation between technological changes and its relation on HRM practices. Hence alternative hypothesis "Technological changes have correlation with the HRM practices in Industry4.0" is accepted and null hypothesis is rejected.

Findings:

Based on the above data, it is found that the Fourth Industrial Revolution known as Industry 4.0. 4.0 is a new industrial revolution in the 21st century, enabling businesses to produce "smarter" products and services by lowering prices and increasing efficiency. Human factors are important to the application. Smart workplaces and factories assist industrial enterprises by using more technology, simple and uncomplicated setups with simple and needs-based installations and equipment, and perhaps better measurable Ness. In addition to these new technologies, other technologies were also considered relevant. This indicates that although it is technologically mature, its use in the industrial transformation process is limited. Human Resources Management strives to increase visibility of all physical supply

chains. Organizations looking to find ways to identify and address relevant concerns before they become a major issue for greater overall effectiveness. It provides real-time insights into markets, products, and customers to ensure that your organization's decisions are more appropriate and faster, tailored to a particular area or userof each organization. We need a sexual and flexible concept of production and business operations. Build core competencies by gaining a competitive advantage through transformation. An industry that requires a more integrated enterprise resource planning system, including finance, customer relationships, supply chain management, and production execution. Real-time insights into markets, products and customers, and the concept of stable, consistent and flexible production and operations tailored to specific areas or users of each organization to improve the organization. Is required. Decision Making: Build core competencies by gaining a competitive advantage through digital transformation. Human resource management needs to be strong, face challenges and ready to meet the needs of the organization.

Suggestions:

After undergoing through the history of industrialization, industrial revolutions, aim and objectives of Government of India to make our country and all the countrymen as

"Atmanirbhar Bharat" and "Atmanirbhar" respectively the researcher would like to suggest as follows-

i) We should not look at the Government of India's programme "Samarth Udyog Bharat 4.0" asa standard like American Society of Mechanical Engineers (ASME) or Common Era (CE) or so.

ii) Industrial revolutions or industry 4.0 shall not be considered as an evaluation like 0.5, 1.0, 1.5, 2.0, 2.5 etc.

iii) Industrial revolutions or industry 4.0 shall not be treated as a practice followed and implemented by many companies like 5-S or kaizen.

iv) Industrial revolutions or industry 4.0 to be considered as a technological revolution and phase of industry transformation like a movement that is happening, of which either we are part of "who makes it happen or "let it happen to us".

v) We must understand the Government of India's policy of Industrial revolution or "Samarth Udyog Bharat 4.0"in right perspectives which is nothing but the steps of Government of India towards achieving objectives to reach 25% of total GDP by 2025 which will increase India's GDP from present which is @ INR 20 Lakh Crores to @INR 65 Lakh Crores by 2025.

vi) We as a countrymen must keep in mind that, Growth of the country both financially as well as in the sector of industrial development is possible only if we can replace today's mixed and difficult scenario to a technologically strong and better scenario.

vii) Every citizen of India shall support to policies framed by Government of India under the title "Samarth Udyog Bharat 4.0" which is in the interest of both the citizens as well as national economy.

viii) It is essential and necessary for every one at national and international level to adopt and implement norms of "industry 4.0" because, in today's scenario due to human interventions or physical presence of humans at almost all the levels there is a possibility of

i) Recording less profit than actual ii) Recording less rejection than actual iii)Recording less down time than actual

Conclusion:

From the entire study of industrial revolutions including present industrial revolution and its analysis the researcher has arrived at the conclusions that Industrial revolution is an outburst of new inventions and every business must accompany and adopt new technology. Industry 4.0 is the digital transformation of manufacturing processes. Industry 4.0 is focused on productivity, people, environment & security. Industry 4.0 has an aspect of usage of highly adaptable &

flexible machines. For "Business" there is no scope for further growth without industry 4.0 and Internet of things (IoT).Industry 4.0 enables manufacturers to produce different products with increase productivity with the same set of production facility. By adaptation and implementation of industry 4.0, businesses can achieve a highly flexible, lean and agile production system. It's a need of today to manufacture low cost quality products to survive in the highly competitive market. Industry 4.0 proved its influence in various sectors like, infrastructure, supply chain management and manufacturing. Industry 4.0 transforms industries with the use of intelligent network of machines, processes, people, and information and communication technology (ICT). In this paper author has tried to present the concept of industry 4.0 w.r.to its background and development. Though the concept is comprehensive and complex, author has observed the following important issues –Industry 4.0 concept is not limited just to the manufacturing industries, but it includes a complete value chain from vendors and manufacturers to customers and all business functions and services. Industry 4.0 assumes broad support of an entire life cycle of system, products and series distributed both spatially and organizationally. The smart products are not smart only during the manufacturing process but they continue to provide the data about their state during their lifetime. Data so collected can be used for preventive maintenance. Data collected also can provide useful information about lifetime and reliability of their products to the manufacturer. Industry 4.0 is a specialization of internet of things (IoT) applied to the manufacturing or industrial environment. It assumes a real time data collection leading to the issue of handling and analyzing huge data and cyber security. Industry 4.0 is a new and 4^{th} industrial revolution of 21^{st} century. This industrial revolution enables companies to create smart products and provide smart services by reducing cost with increased efficiency, productivity and profitability, wherein the skilled human factor is crucial for its applications and implementations. Smart industries makes a solution which can help manufacturing industries to optimize their operational processes and significantly boost their internal efficiency. Future industries will have two levels of employees a human and a dog. The task of the human will be to feed to the dog as desired and the dog will have the task to dissuade the human to touch the automated system.

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