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Fourth Industrial Revolution and Preparedness Required for the 21st Century Managers

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Introduction

The last few years have been marked by the disruption of technologies (National Academies of Sciences, Engineering, and Medicine, 2010). To keep pace with the development of technology, the business world is continuously changing. Rapid changes in the industry are the result of continuous improvement in ICT (Information and Communication Technology). Over the centuries, the world has witnessed different industrial revolutions which are evident by various technological breakthroughs. The latest revolution that has taken place in the business sector is the fourth industrial revolution (4IR). 4IR has impacted the business environment in both ways, positive and negative. Therefore, all the business stakeholders need to adapt accordingly to keep themselves competitive, to utilize the opportunities from the positive impacts, and to confront the threats.

4IR will have a great impact on the global workforce due to the adoption of artificial intelligence and automation. Few sectors (manufacturing, logistics, retail, wholesale, and lower-skilled occupations) will shift to vulnerable positions but jobs requiring human interaction, high degree of imagination, creative analysis and strategic thinking, supply of personalized services, and training and education sector will gain during 4IR (Sun, 2018). The World Economic Forum reports that 50% of companies believe that this adoption will decrease their full-time employees by 2030, 38% of businesses believe that new productivity enhancing jobs will be carried out by their employees and 25% think that new roles will be emerged (World Economic Forum, 2018). So, employees will need to upskill or shift their specialization to new disciplines. Therefore, it can be said that the recruitment industry will have a significant impact on 4IR. That is why managers need to focus on bringing changes to different managerial issues to stay in the game.

This chapter has covered the meaning and different phases of the industrial revolution, skill, characteristics, and intelligence required by company leaders and employees, practices that must be performed by leaders, and a new concept: Smart HR 4.0. The chapter has mainly focused on the impact

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of 4IR on human resources and therefore how HR departments of different organizations need to respond to this situation.

Definition and Phases of Industrial Revolution

To understand the fourth industrial revolution, we first need to know the previous phases and their impacts. The first industrial revolution was the consequence of the invention of the steam engine which brought mechanization to the manufacturing sector; the second industrial revolution was brought up by the use of electricity which results in mass production; the third industrial revolution was driven by the introduction of digital processes which spread automation processes and use of the internet (Petrillo et al. 2018 and Oliver, 2018). The fourth phase of the industrial revolution was characterized by the cyber-physical system which results in increased automation, advanced communication, and the production of smart machines that enabled to perform different tasks with little human interventions. So basically, the fourth industrial revolution (4IR) is the use of modern smart technology which limits human interventions in manufacturing and industrial practices (Moore, 2018). This term was first mentioned in a book of the same name in 2016 by the founder of the World Economic Forum, Klaus Schwab. It is a fusion of, but not limited to a few technologies, such as artificial intelligence, Internet of Things, robotics, virtual reality, mobile devices, 3D printing, smart sensors, big data/analytics, augmented reality (AR), data visualization, cognitive computing, location detection, customer profiling, block chain, quantum computing, cloud computing (Wigmore, 2020). The interesting thing is fifth industrial revolution is coming in the near future which will be characterized by the co-working of

humans and machines in the workplace. As it has not occurred yet, the impacts are still unknown. The following table shows the five phases of the industrial revolution along with their timing, drivers, and outputs in brief:

Table 1: Phases of the Industrial Revolution along with their timing, drivers, and outputs

Phases	**1st**	**2nd**	**3rd**	**4th**	**5th**
Timing	End of 18th century	Beginning of 20th century	Beginning of 21st century	2013	2020+
Drivers	Water and Steam Power	Electricity	Digital processes	Cyber physical system	Co-working of human and machines
Outputs	Mechanization of manufacturing	Mass Production	Automation processes and use of the internet	Automation, advanced communication, production of smart machines	As it has not occurred yet, the impact will be seen in future

4IR and 21st Century Skills required by Employees

Technology is continuously developing in the 21st century which is making the working environment more dynamic. To cope up with this dynamic working environment, employees need to reskill themselves and show flexibility and adaptive capabilities (Schwab, 2016). In a study, it has been found that among the hiring managers, 59% believe that artificial intelligence will change the skill requirements of the future workforce (Salesforce Research, 2017). So, to future-proof the workforces, businesses need to assure the right mix of skills. Here skill refers to those learned abilities that help one to perform the job properly. Rather than learning these skills only once, employees will need to upgrade these several times throughout their professional life (McGinnis, 2020). World Economic Forum (2015) referred to these skills as '21st Century Skills'.

In different surveys and report different skills have been identified as 21st Century Skills. Results found from these sources have been presented in the table below, where similar skills mentioned in different names by different surveys/reports have been mentioned in name of the skills column by putting a slash (/). In the table, survey 1 included 750 hiring managers, conducted by Salesforce research in the year 2017; survey 2 included 951 employers, conducted by Hays company (a recruiting company), and the

report was prepared by the World Economic Forum, titled as Future of Jobs. Both surveys presented the percentage of respondents who gave importance to the particular skills, although the report only mentioned the skills, not the degree of importance. Therefore, only tick marks (√) have been given to exhibit the report's result:

Table 2: 21st Century Skills

Skill Categories	Name of the skills	Percentage of Survey 1*1	Percentage of Survey 2*2	Resultof Report*3
Hard Skills	**Data Analysis (i.e., gaining insights from data)/ Data based decision making**	80%	35%	
	Data Science (i.e., building models from data)	78%		
	Software development/ Coding	77%	6%	
	Digital proficiency in new technology		64%	
	Technical skills		43%	
Soft Skills	**Collaboration and Team work/ Coordinating with others**	76%		√
	Judgement and Decision making	73%		√
	Critical thinking		61%	√
	Interpersonal communication	68%	77%	
	Social skills (e.g., negotiation, persuasion) / Emotional Intelligence	65%	53%	√
	Creativity/ Creative thinking/ Innovation	73%	63%	√
	Cognitive Flexibility			√
	Adaptability		66%	

Mixed	Service Orientation			√
	Complex Problem Solving			√
	People Management			√
	Service Orientation			√
	Self-learning		40%	

*1 Survey of Salesforce Research in 2017 among 750 hiring managers (Salesforce Research, 2017)

*2 Survey of Hays (a recruiting company) among 951 employers (Deligiannis, 2018)

*3 WEF's report titled as 'Future of Jobs' report (World Economic Forum, 2018)

From the above-mentioned table, it can be said that few skills have more importance than others. Hard skills, such as developing software, analyzing data, and making decisions based on that have more significance. But, as humans are more capable than machines in terms of applying intuition, creativity, motivation, artificial intelligence alone is not enough to run the business (O'Connor, 2016). Rather, there will be a shift towards learning soft skills, such as emotional intelligence, creativity, innovation, social and communication skills. Even, few authors have found in their studies that employees dealing with interpersonal communication believe that this role will never be replaced by any machine or robot, and that is why will always be performed by humans (Akihito, et al., 2017).

Characteristics and Leadership Skills required by Company Leaders in the Era of 4IR

World Economic Forum has identified few characteristics of company leaders which will help them not only to survive but also shine in the era of 4IR (University of the Witwatersrand, 2021). These characteristics have been classified into four categories. They are mentioned below:

❖ ***Social Supers***

These leaders are informed about their teams' readiness for change and provide the right training adequately to prepare them.

❖ ***Data-Driven Decision Makers***

They take the correct decisions based on their company's data and

strategies.

❖ ***Disruption Drivers***

These are the leaders who invest in disruptive innovations and make their decisions following a structured process.

❖ ***Talent Champions***

These leaders can recognize their talents and prepare them for the digital transformation.

During 4IR, as the business environment will change dramatically, so people who will lead the organizations will require certain skills. They will need to be agile, emotionally intelligent, humble but confident, accountable, visionary, courageous, flexible, technologically knowledgeable, intuitive, collaborative, quick learners, culturally intelligent, authentic, and focus on the objectives of the organization (Marr, 2019).

4IR Intelligence required by Leaders

Different scholars have identified ten types of intelligence for the leaders to combat the challenges and explore the opportunities inherited in the 4IR (Schwab,2016; Oosthuizen, 2016 and Oosthuizen, 2017). These intelligence are described below:

❖ ***Contextual Intelligence***

Leaders must have the ability to understand and apply their knowledge (Schwab, 2016).

❖ ***Emotional Intelligence***

Leaders must have the ability to monitor and discriminate among feelings and emotions and use this data to direct their followers' thoughts and activities (Salovey and Mayer, 1990).

❖ ***Inspired Intelligence***

Leaders need to motivate, develop trust, and engagement to inspire their employees (Horwitch and Whipple, 2014).

❖ ***Physical Intelligence***

Leaders should pay attention to the physical well-being of their followers. Leaders should take necessary steps so that employees can maintain a

healthy lifestyle (Schwab, 2016).

❖ ***Entrepreneurial Intelligence***

Leaders must be able to recognize opportunity and combine resources in new ways to create or renew something economically and/or socially valuable (Oosthuizen, 2017).

❖ ***Strategic Intelligence***

Leaders must be able to adapt to the changing situations so that they can change their courses of action as and when needed (Wells, 2012).

❖ ***Transdisciplinary Intelligence***

Leaders must have the ability to respond according to the requirements of the subject matter, not by the boundaries of subject matter (Montuori, 2013).

❖ ***Ecosystem Intelligence***

Leaders need to consider the mutual relationship between organism and environment (Bloom and Dees, 2008).

❖ ***Socratic Intelligence***

Leaders must have the ability to find out the answers to some fundamental questions by discussing those in small groups for a considerable amount of time. Here leaders only act as a facilitator, not as a decision-maker (UNESCO, 2007).

❖ ***Ethical Intelligence***

In situations where ethics are challenged, leaders must be able to respond to those situations effectively and correctly (Ocreus,2016).

Six Mandatory Practices of Leadership for Future Workforce

Poor leadership can act as the biggest obstacle to a successful 4IR strategy (Akberdina and Pushkareva, 2019). Therefore, leadership practices need to be updated for successful strategy implementation in 4IR. Six new leadership practices that can act crucially for the future workforce are mentioned below with examples:

Table 3: Six Mandatory Practices of Leadership with Examples

Imperatives	Examples
Develop new leadership capabilities	Make a blend of operational management, technology integration, and people management skills
Manage technology- workforce integration	Reskill workforce whose job is being automated
Escalate employee experience	Use technology for engaging employees
Build a customized learning culture	Stimulate lifelong learning
Establish benchmarks for human capital evaluation	Employ new technologies and data for creating benchmarks for human capital evaluation and decision making
Embed diversity and inclusion (D&I)	Rigorous use of data analytics for measuring and assessing D&I

Source: Based on Spagnoletto, L., AlabdulJabbar, D. and Jalihal, H., 2019. HR4. 0: shaping people strategies in the fourth industrial revolution. In World Economic Forum.

Smart HR 4.0

Emerging technologies along with the entry of generation Y and Z into the workforce have brought enormous changes in the business environment. Especially, the new generations are dominating the world of IT and they want customized treatment. These changes have made the emergence of a new concept: Smart HR 4.0 (PuhovichovaandJankelova, 2020.). The basic characteristics of this concept are given below:

Table 4: Basic Characteristics of Smart HR 4.0

HRM Elements	4IR Technologies Used	Improvements in the system
Recruitment	Intelligent applications on smartphones	Candidates can get notification of job advertisements based on individual profiles and preferences mentioned in the 'Settings' option.
	Big data and artificial intelligence (AI)	Companies can select specific candidates' resumes based on their requirements set on the program within a short time and less manual effort.
		Companies can arrange automated and customized interviews for each candidate.
	Faster data network	Distant interviews via video chat can be arranged which will shorten the whole recruitment process.
	AI chat robots	Candidates' reactions can be interpreted and verified in real-time and thus the number of selected candidates for an interview can be reduced.
Training and Development	Artificial intelligence	Companies can identify knowledge gaps of employees by comparing them with market requirements.
		Companies can arrange customized induction programs to provide 'on-demand knowledge' to the newly appointed employees based on their jobs, positions, etc.
	Augmented reality/ virtual reality	Employees can participate in training.
		New employees' orientation can be arranged.
	Faster network	Training through video conferencing can be arranged to not only reduce time but also solve space and distance issues of offline training.

Performance Appraisal	Artificial intelligence	Companies can set personalized performance goals for individuals.
		Real time feedback of employees can be received and recorded.
Compensation and Benefits	Big data	Companies can determine compensation and benefits based on the analysis of demand and supply of skills from the existing database
Employee Health and Wellbeing	Health-oriented applications in smartphones	Employees' fitness criteria can be monitored in real-time which will help to reduce absence from work.
Employee Termination	Big data	Companies can identify high/low performing employees.
		Proactive actions can be taken to prevent the turnover of high-performing employees.

Source: Based on Sivathanu, B. and Pillai, R., 2018. Smart HR 4.0–how industry 4.0 is disrupting HR. Human Resource Management International Digest; Shamim, S., Cang, S., Yu, H. and Li, Y., 2016, July. Management approaches for Industry 4.0: A human resource management perspective. In 2016 IEEE Congress on Evolutionary Computation (CEC) (pp. 5309-5316). IEEE, and Puhovichova, D. and Jankelova, N., 2020. Changes of human resource management in the context of impact of the fourth industrial revolution. Industry 4.0, 5(3), pp.138-141.

Other than these HRM elements, changes are also required in the structure and culture of the organizations to become compatible with the 4IR (Angrave et al., 2016). Some of those points are mentioned below:

Structural Change Required

A flat organizational structure is required for implementing Smart HR 4.0. It helps in many ways, namely:

- ❖ Reduce communication levels
- ❖ Speed up decision making
- ❖ Help to respond to the sudden environmental changes

Cultural Changes Required

- Power must be decentralized.
- Open leadership style is required.
- A culture that stimulates innovation is needed.
- Focus should be given on knowledge
- Rewards need to be given for innovative thinking.
- Conflict among generational groups should be minimized.
- Modern technologies need to be installed to achieve long term goals of the organization and attract the talents of Y and Z generations.

4IR and Bangladesh Context

Bangladesh will face a few challenges during the 4IR. It will also provide attractive opportunities to be availed by the country. Different scholars have also provided suggestions to the government and other stakeholders to keep and grow Bangladeshi businesses in the competitive market in the era of 4IR.

Opportunities and Challenges to Bangladesh

4IR has possessed both opportunities and challenges for Bangladesh. This will help Bangladesh to produce products at a cheaper rate and of better quality as well as reduce the harmful effect on the environment (Rumi, Bala, Shah, Sayem, and Abedin, 2021). Moreover, it will help to expand communication efficiency, reduce accidental hazards, and form a sustainable environment (Islam, Jantan, Hashim, Chong, Abdullah, and Abdul Hamid, 2018).

The deficiency of knowledge of the top-level management is one of the greatest challenges in introducing automation in the manufacturing and production industries in Bangladesh. Lack of education and ideas about new technologies and concepts of the owners of the textile garments create barriers to introducing automation in their companies. Poor infrastructural facilities, weak broadband connection, and recurrent occurrence of natural calamities also pose barriers to the implementation of automation. The unwillingness of the owners and associates to change the system without government intervention is another constraint in introducing 4IR. Although the elements of 4IR are expensive, they are highly efficient and

useful. This primary expense creates unwillingness among the owners and associates (Shabur and Hridoy, 2021).

However, even if organizations adapt to the latest technologies, they will not get the benefits immediately. It will create a loss of jobs for both manual and knowledge workers. In a study by a2i study, it has been found that 60% of garment workers will lose their jobs by 2030 and 5.5 million jobs by 2041. Due to automation, a good number of SMEs have also shut down. So, the Bangladesh government should take an integrated plan and act strategically to combat the negative impact of automation in order to stop losing the international market. (UNDP, 2020; Rumi, Bala, Shah, Sayem, and Abedin, 2021; Kabir 2022).

Suggestions to Avail the Opportunity and Counter the Threats of 4IR

In Cisco Digital Readiness Index 2019 and Network Readiness Index (NRI), 2020 Bangladesh secured 118th and 115th place, respectively (Nile, 2022). These two indicators signify that the Bangladesh government needs to rethink and redesign the plans to adapt to 4IR. It should concentrate on building awareness, forming capital, developing skills, providing training, and bringing infrastructural development (Bhuiyan, Ali, Zulkifli, and Kumarasamy, 2020). Different stakeholders also do need to take the necessary steps. To acquire the benefits of 4IR, concentration should be given to task level rather than occupational level as well as bring skill transformation (UNDP, 2020). Upskilling and reskilling can also help to counter the threats possessed by 4IR. As all the redundant manpower cannot be upskilled, they can be reskilled and placed in other professions. An example can be a laid-off garment worker who may be reskilled and placed as a nurse or caregiver (Kabir,2022). Hence, it is needed to build awareness among the stakeholders and take necessary actions to avail the opportunities for the benefit of the country.

Conclusion

The concept of 4IR is relatively new in the business industry of Bangladesh. The business sector still needs to learn the present and following phases of 4IR and their impact on different aspects of the business. The fourth industrial revolution is going to bring negative impacts, like downsizing to a few industries but it has many positive impacts, such as enabling more work flexibility, allowing working at home/ in the office, working during on and off duty hours, reducing office expenses and many more. As the world is moving towards a Gig economy, businesses need to embrace technological advancements. The employees should not feel threatened,

rather they should focus on skilling/reskilling themselves. The company employers, top managers, and other company leaders should pay attention to taking actions and measures to keep themselves in the competition and gain from these changes.

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