

4th Industrial Revolution: Skills Sets for Employability of Business Graduates in Bangladesh



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ABSTRACT: This paper aims to find out whether the current business graduates of Bangladesh are ready to perform in the new era of Industry 4.0 by unearthing the lacking of their skill sets. Industry 4.0 will bring new implementation and integration of technologies which will be very difficult for business graduates to adapt without adequate skills needed for Industry 4.0. After conducting an extensive literature review a skill set has been revealed to help the business graduates for better employment opportunities in the new environment of Industry 4.0. However, after completing the whole study, it is clear that there is a huge gap between the skills that have in our current business graduates and the skills required for better employability in Industry 4.0. Current business graduates mainly have lacking in three areas: Knowledge of AI, Cognitive Flexibility, and Data Analysis skills. Recent business graduates indicate inadequate facilities as a barrier to developing the skills needed for Industry 4.0. Although lack of interest, lack of awareness and additional cost also work as a barrier to developing the needed skills. After finding out the skill gap of current business graduates this study recommends some important measures to optimize the skill gap.

KEYWORDS: Industry 4, Skills Set, Revolution, Employability, Business Graduates, Bangladesh.

I. INTRODUCTION

In the 21st century, the pattern of business is changing. The driving force of Industry 4.0 is robotics, AI, virtual reality, block chain, the internet of things, nanotechnology, genomics, biotechnology, cloud computing, 3D printing, big data, and others. As a developing country, Bangladesh has a growing manufacturing base, huge manpower, and creative entrepreneurs. But the country is far behind the automation facility in every sector. However, the industry sector of Bangladesh is mainly based on garments and a few other minor industries and the level of infrastructure is poor enough to cope with the changes of Industry 4.0 (Shibli, 2022). The 4th industrial revolution highlights the importance of various digital technologies and how these technologies will be managed. Bangladesh has to be fast enough to formulate policies to govern the use and development of new technologies for grabbing the benefits of Industry 4.0. However skilled human resource is required to support the process of policymaking and implementation. According to different sources, businesses will be key drivers for Industry 4.0, as a result, the government should attract global business giants to step ahead in the competition and the skill base of workers should be developed enough to cope with the changing environment (Nile, 2022). In Bangladesh the nature of jobs in demand will change, many skills available in the market will become invalid, and different new skills have to be learned. As Bangladesh is moving toward Industry 4.0, it is assumed that high-income cognitive jobs and low-income manual jobs will increase in demand. Demographically Bangladesh is mainly youth-based. About 30% of the current population is under the age of 15. This age group has to be developed with proper skills for Industry 4.0. The skill of problem-solving, interpersonal skills, creative thinking, and adaptability will be highly in demand in the upcoming age. However, for the current workforce upskilling and reskilling are required to cope with changes (A. 2022). With automated production, connected machines, big data, AI, smart transport systems, networked supply-chain, production simulation, etc., Bangladeshi businesses can increase the value of products and services, create new revenue streams, reduce labor costs, and expand both local and global markets. But for this, the challenges must have to be considered carefully. To understand the future scenario of Industry 4.0 it is important to understand what employers want and what is the current level of skill sets. Although, it is not surprising that the new upcoming era will call for new skills. It is also a matter of consideration whether our current graduates are equipped with the proper skill to lead the

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upcoming days of automation. This paper will focus on finding the skill sets for business graduates in terms of their employment requirements in Industry 4.0. In Bangladesh, the industries are traditionally running their businesses and moving toward automation and tech-oriented method of business day by day. So there is a possibility that there will be a huge gap between the skills required by employers and the skills of our graduate students. For optimizing this gap, this study will try to develop the skill set for the employability of the business graduates and will try to find out the lacking of the skills of business graduates.

LITERATURE REVIEW

In the past every industry was run through a manual process but as time passes digitalization and automation occur in every industry and so develop day after day. Now key personnel of every industry focuses on finding out ways of making easy the way they are doing their jobs. As a result, the industry is moving through a development phase from Industry 1.0, Industry 2.0, and Industry 3.0 to Industry 4.0.

The concept of Industry 4.0 came into existence in 2011 from a project in the high-tech of the German government, which focuses on promoting the computerization of manufacturing. At the Hannover Fair, the term "Industry 4.0" was publicly announced in the same year. Since then the journey of Industry 4.0 began (Short History of Manufacturing: From Industry 1.0 to Industry 4.0 – KFactory, n.d.). The characteristics of Industry 4.0 includes convergence of information technology and operation technology, automated machines, artificial intelligence, machine learning, cyber-physical systems enabled by the internet of things, smart factories, and cloud-based architecture. It may appear that the skills of humans will not be needed at all. But in a real sense soft skills and skills that are transferable across functions and organizations cannot be replaced by machines (Sugant, 2022). It will be challenging for enterprises to develop human resources for a completely new environment of Industry 4.0 because more focus is given to technological changes in the organizations but the concern about human resources is ignored. The challenge will be more difficult because of the changing nature of the employment structure, requirements for future industrial employees, managerial staff, and the education process (Saniuk et al., 2021). For dealing with the new era of Industry 4.0 managers have to overcome the barrier of strategy and analysis, planning and implementation, cooperation and network, business models, human resource, and change and leadership (Schneider, 2018). A skill set refers to a specific area of competence, knowledge, experience, and abilities required to do a job (What Is a Skill Set? | Definition and Examples | Resume.Com, 2019). For industry 4.0 the skill set of adapting to and greater communication across production lines, industrial data analysis, and understanding and managing advanced information technology is required in a greater concern to deal with technological integration. The new era of industry 4.0 will be in the favor of the workforce having the skill of monitoring, managing, and optimizing integrated smart manufacturing facilities (Perron, 2018).

Employability refers to the attributes of a person that make that person able to gain and maintain employment (*Employability - Wikipedia*, 2022). The word employability indicates one's ability to get initial employment, maintain current employment, and acquire new employment if needed.

Bangladesh is the fastest-growing economy in South Asia. According to different scholars, the main challenges for Bangladesh in moving toward Industry 4.0 are poor infrastructure, availability of cheaper labor, expensive installation of technologies, lack of government supports, and lack of knowledge (Islam et al., 2018). The problem for Bangladesh is that the skills needed for getting the benefits of industry 4.0 are inadequate till now. The Cisco Digital Readiness Index 2019 and Network Readiness Index (NRI) 2020 indicate that the present initiatives for producing a skilled human resource for industry 4.0 are not sufficient (Nile, 2022). In Bangladesh fourth industrial revolution is a huge threat to unskilled labor. Around 5.7 million unskilled laborers will lose their jobs because of automation in the upcoming days (Masud, 2019). However, 90 percent of the industrial units in Bangladesh are SMEs, who are not able to adapt the emerging technologies and Bangladesh is subject to criticism for its lack of production, labor skills, factory infrastructure, technology applications, and low-level adjustments based on industry development and availability (Bhuiyan et al., 2020)

DEVELOPMEN OF SKILLS SET REQUIRED FOR INDUSTRY 4 AND EMPLOYABILITY OF BUSIESS GRATUATES

From extensive literature review it has been found out that, followings are the major skills that will be required by business graduates for better employment during Industry 4.0.

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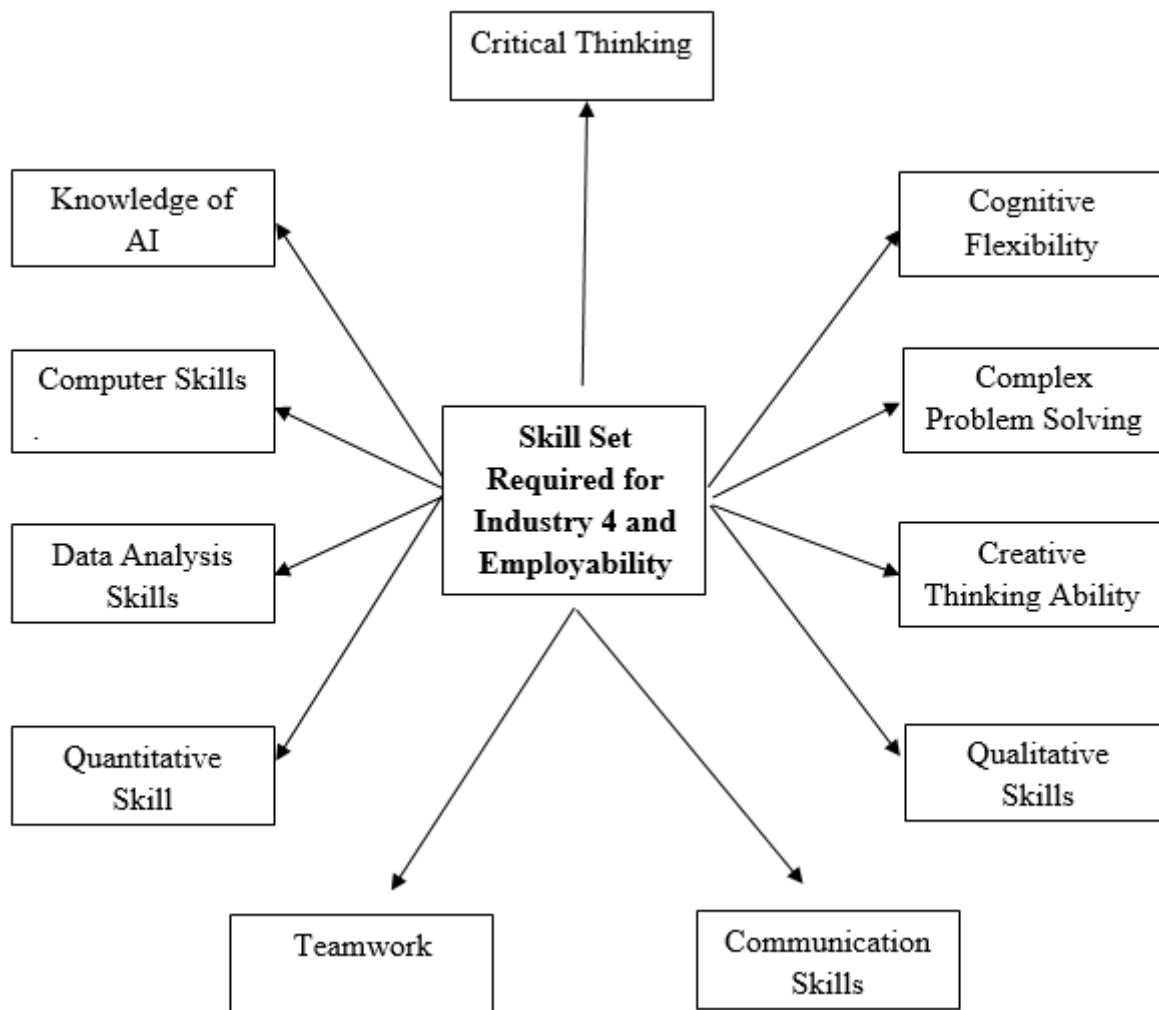


Figure 1: Skill Set Required for Industry 4.0 and Employability of Business Graduates.

For doing any job effectively and efficiently skill sets are important. In this 21st century for the upcoming fourth industrial revolution different skills are needed. To deal with the changes and innovations of Industry 4.0 business graduates of Bangladesh must have the following skills:

- **Critical Thinking:** Critical thinking is the analysis of available facts, evidence, observations, and arguments to form a judgment (*Critical Thinking - Wikipedia, 2022*).
- **Cognitive Flexibility:** Cognitive flexibility is the ability to adapt our behavior and thinking in response to the environment (Makowski, 2020).
- **Complex Problem Solving:** Complex problem-solving skill is a collection of self-regulated psychological processes and activities necessary in dynamic environments to achieve ill-defined goals that cannot be reached by routine actions (Dörner & Funke, 2017).
- **Qualitative Skill:** Qualitative skills are those which can be observed, but are not measurable. This is in direct contrast with quantitative skills, which can be measured objectively (McMahon, 2022).
- **Communication Skills:** Communication skills are one of the fundamental life skills which are required for a greater understanding of information. It can be done vocally, visually, non-verbally, and through written media (Khullar, 2022).
- **Teamwork:** Teamwork is the collaborative effort of a group to achieve a common goal or to complete a task most effectively and efficiently (*Teamwork - Wikipedia, 2022*).
- **Quantitative Skill:** It includes the use or manipulation of numbers in different forms and can be applied to everything from the design of evaluation surveys and experiments to the use of digital media, archives, or open data (Khromova, 2020).
- **Data Analysis Skills:** Data analysis skills include the ability to use analytical and logical reasoning to evaluate the collected data (*Data Analysis | Definition, Importance for Career, Ways to Improve, 2016*).

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- **Computer Skill:** Computer skills are the skills and abilities which enable anyone to use computers effectively, including related equipment and computer software (*Computer skills: Definitions and examples | indeed.com* 2021).
- **Knowledge of AI:** Knowledge of Artificial Intelligence (AI) represents how the beliefs, intentions, and judgments of an intelligent agent can be illustrated suitably for automated reasoning (Deb, 2022).

STUDY OBJECTIVES

This study aims at investigating the skills of graduates for the 4th industrial revolution needed in Bangladesh. Another objective includes finding out the gap between the skill sets required in Industry 4.0 and the skills that are possessed by business graduates by highlighting the lacking of different skills. However, this study will also unearth the reasons why business graduates are not able to develop their skill sets for dealing with the new environment of Industry 4.0 and for greater employability.

DATA SOURCES AND METHODOLOGY

For finding out the gap between the skill sets that are required for industry 4.0 and the skill sets that current business graduates of Bangladesh have, primary data were collected by the extensive distribution of a set of questionnaires. However, secondary data were collected from various published sources including national and international journals, books, relevant websites, etc. Microsoft Excel 2016 has also been used for analyzing collected data and for constructing all necessary tables and figures.

RESULTS AND ANALYSIS

For this study, data were collected from 117 business graduates from different universities in Sylhet. The collected data have analyzed using Excel 2016 by using descriptive statistics.

Demographic Information of Respondents:

The research questionnaires help to find out the demographic information of respondents by unearthing their age and gender. The overall identification of respondents is not conveyed because of safeguarding confidentiality.

Table 1: Demographic Information of Respondents.

Total Respondents	No. of	Particulars	Frequency	Percentage
117	Age	Below 25	81	69%
		25-34	26	22%
		35 and above	10	9%
	Gender	Male	97	83%
		Female	20	17%

Table 1 illustrates that a larger segment of the respondents are below the age of 25, which indicates that research covers mostly the fresh business graduates of recent times and it accounts for 69% of the respondents. However, 22% of the respondents are between 25 and 34, and 9% of the total respondents are between 35 and above. Although 83% of our respondents are male, female respondents stand for only 17%.

Weaknesses of Required Employability Skills of Business Graduates:

Table 2: Weaknesses in Skills Required for Employability of Business Graduates for Industry 4.0

Serial No.	Weaknesses in Skills Required for Employment in 4.0	Frequency	Percentage	Ranks
1	Critical Thinking	5	4%	9
2	Cognitive Flexibility	14	12%	2
3	Complex Problem Solving	6	5%	8
4	Creative Thinking Ability	7	6%	6
5	Qualitative Skills	4	3%	11
6	Communication Skills	5	4%	9
7	Teamwork	7	6%	6
8	Quantitative Skills	9	8%	5

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9	Data Analysis Skills	13	11%	3
10	Computer Skills	10	9%	4
11	Knowledge of Artificial Intelligence	37	32%	1
	Total	117	100%	

Table 2 illustrates the detailed analysis of the collected data, and represents the lacking of skills among business graduates and ranked them based on their frequency. By analyzing the questionnaires it is observed that there is a huge knowledge gap among recent business graduates about Artificial Intelligence. The analysis suggests that 32% of the respondents do not have adequate knowledge of Artificial Intelligence. However, 12% of business graduates do not possess the skill of cognitive flexibility, and 11% of business graduates do not have the skill of analyzing data. In the 21st century, it is surprising to know that till now 9% of business graduates have not learned the skills needed to operate a computer effectively. Furthermore, among 8% of our respondents, there is a lack of quantitative skills. For teamwork and creative thinking ability, the percentage stands at 6%. 5% of the respondents cannot solve complex problems, and 4% of business graduates do not know how to communicate effectively in a business climate. The percentage of respondents who do not have the skill of critical thinking is also 4%. Finally, 3% of business graduates do not have qualitative skills.

Why Business Graduates were not able to Develop Their Skills Required for Industry 4.0:

Table 3: Reasons why Business Graduates were not able to Develop Skills Required for Employment during Industry 4.0

Particulars	Frequency	Percentage
Inadequate Facility	43	37%
Lack of Interest	31	26%
Lack of Awareness	27	23%
Additional Cost	16	14%
Total	117	100%

Table 3 illustrates the reasons why business graduates were not able to develop their skills required for Industry 4.0 with relative frequency and percentage. According to Table 3, 37% of business graduates are deprived of the facilities required for developing the skill sets essential for Industry 4.0. However, 26% of the respondents have not had any interest to develop their skill sets for better employment in the job market. Although, 23% of the respondents were not aware of the importance of acquiring these skills, and 14% of the respondents indicate additional cost as a barrier to their skill development process.

RECOMMENDATIONS

For moving toward Industry 4.0 and getting its benefits, the gap between the skills required for Industry 4 and the skills that are currently possessed by business graduates should be at the optimal level. For this the following measures are strongly recommended:

- ✓ Redesigning the traditional education system by integrating different soft skill training facilities within the academic curriculum.
- ✓ Increasing awareness among young people about the skills needed for upcoming days to deal with the new era of Industry 4.0
- ✓ Increasing collaborative efforts by the projection of team-based case study that focuses on solving complex problems.
- ✓ Business graduates should keep on linking what they have learned during their academic study with different real-life situations.
- ✓ Training facilities for computer learning should be implemented in every educational institution by authority or by the government through a collaborative effort with educational institutions.
- ✓ Business students have to focus on network building from their early academic life for improving both verbal and written communication skills.
- ✓ Industry-based qualitative and quantitative skills must be taught during academic life by introducing business students to business culture by enabling them to deal with corporate data and by providing adequate internship facilities.

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- ✓ Different course work should be implemented problem solving that requires extensive thinking in a completely new environment to improve the adaptability of the new environment.

CONCLUSION

Overall, the findings of the study represent that the business graduates of Bangladesh are not well equipped with the needed skills for Industry 4.0. And there is no doubt that a lack of skills among the business graduates will suffer them a lot in creating better employment because the overall environment and operating system of the industries will change dramatically with innovations and integration. This will result in an increasing rate of unemployment among graduates. However, it will be very challenging to get the immense benefits of Industry 4.0. As a developing economy, Bangladesh is quite difficult to implement the necessary steps for moving toward Industry 4.0 rapidly. As a result, the policymakers of government levels should focus on necessary steps along with making a skillful workforce by providing needed facilities and uprooting the barriers from the key level.

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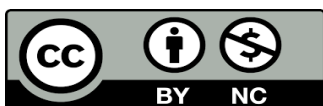
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REFERENCES

- 1) Shibli, A. (2022, February 12). *The economic impacts of the 4IR on Bangladesh*. The Daily Star. <https://www.thedailystar.net/recovering-covid-reinventing-our-future/blueprint-brighter-tomorrow/news/the-economic-impacts-the-4ir-bangladesh-2960641>
- 2) Nile, M. A.-U.-R. (2022, February 14). *Preparing Bangladesh for the Fourth Industrial Revolution (4IR)*. The Daily Star. [https://www.thedailystar.net/recovering-covid-reinventing-our-future/fourth-industrial-revolution-and-digital-transformation/news/preparing-bangladesh-the-fourth-industrial\(2022, February 15\). 4th Industrial Revolution \(4IR\) and the job market of Bangladesh. Astha IT. https://www.asthait.com/tech-stuffs/4th-industrial-revolution-and-the-job-market-of-bangladesh](https://www.thedailystar.net/recovering-covid-reinventing-our-future/fourth-industrial-revolution-and-digital-transformation/news/preparing-bangladesh-the-fourth-industrial(2022, February 15). 4th Industrial Revolution (4IR) and the job market of Bangladesh. Astha IT. https://www.asthait.com/tech-stuffs/4th-industrial-revolution-and-the-job-market-of-bangladesh)
- 3) Sugant, R. (2022, May 29). *Industry 4.0: Challenges, advantages and the skills you need to shape the future*. Telegraph India. <https://www.telegraphindia.com/edugraph/career/industry-4-0-challenges-advantages-and-the-skills-you-need-to-shape-the-future/cid/1867410>
- 4) *Short history of manufacturing: from Industry 1.0 to Industry 4.0*. KFactory. Retrieved September 03, 2022, from <https://kfactory.eu/short-history-of-manufacturing-from-industry-1-0-to-industry-4-0>
- 5) Saniuk, S., Caganova, D., & Saniuk, A. (2021). Knowledge and Skills of Industrial Employees and Managerial Staff for the Industry 4.0 Implementation. *Mobile Networks and Applications*. Published. <https://doi.org/10.1007/s11036-021-01788-4>
- 6) *What is a Skill Set? | Definition and Examples | Resume.com*. (2019, December 30). Resume.Com Career Advice. <https://www.resume.com/career-advice/resumes/what-is-a-skill-set-and-how-to-develop-one/>
- 7) Perron, G. (2018, April 16). *Industry 4.0 and the new worker skillset explained*. KnowledgeOne. <https://knowledgeone.ca/industry-4-0-and-the-new-worker-skillset-explained/>
- 8) *Employability - Wikipedia*. (2022, August). <https://en.wikipedia.org/wiki/Employability>
- 9) Islam, Md Asadul and Islam, Md Asadul and Jantan, Amer Hamzah and Hashim, Haslinda and Chong, Choo Wei and Abdullah, Mirza Manirajah and Abdul Hamid, Abu Bakar, *Fourth Industrial Revolution in Developing Countries: A Case on Bangladesh* (December 1, 2018). *Journal of Management Information and Decision Sciences (JMIDS)*, Volume 21, Issue 1, 2018, Available at SSRN: <https://ssrn.com/abstract=3417813>
- 10) Masud. (2019, February 14). *What the 4th Industrial Revolution has in store for Bangladesh*. Dhaka Tribune. <https://archive.dhakatribune.com/opinion/op-ed/2019/02/14/what-the-4th-industrial-revolution-has-in-store-for-bangladesh>
- 11) Bhuiyan, A. B., Ali, M. J., Zulkifli, N., & Kumarasamy, M. M. (2020, October 21). *INDUSTRY 4.0: CHALLENGES, OPPORTUNITIES, AND STRATEGIC SOLUTIONS FOR BANGLADESH*. *International Journal of Business and Management Future*, 4(2), 41–56. <https://doi.org/10.46281/ijbmf.v4i2.832>
- 12) *Critical thinking - Wikipedia*. (2022, September). https://en.wikipedia.org/wiki/Critical_thinking
- 13) Makowski, M. (2020, December 1). *What Is Cognitive Flexibility and How Do I Help My Child With It? - Foothills Academy*. <https://www.foothillsacademy.org/community/articles/cognitive-flexibility>

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- 14) Dörner, D., & Funke, J. (2017, July 11). *Complex Problem Solving: What It Is and What It Is Not - PMC*. PubMed Central (PMC). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5504467/>
- 15) McMahon, M. (2022, August 19). *What Are Qualitative Skills? (with pictures)*. Practical Adult Insights. <https://www.practicaladultinsights.com/what-are-qualitative-skills.htm>
- 16) Khullar, H. (2022, January 6). *Communication Skills: Definitions and Examples- Talent Economy*. ShineLearning. <https://learning.shine.com/talenteconomy/career-help/communication-skills/>
- 17) *Teamwork - Wikipedia*. (2022, August). <https://en.wikipedia.org/wiki/Teamwork>
- 18) Khromova, Y. (2020, July). *Quantitative Skills: What Professions Require [+Examples]*. <https://www.getcoverletter.com/blog/quantitative-skills-what-professions-require/>
- 19) *Data Analysis | Definition, Importance for Career, Ways to Improve*. (2016, August 12). Cleverism. <https://www.cleverism.com/skills-and-tools/data-analysis/>
- 20) *Computer skills: Definitions and examples | indeed.com*. (2021, May 21). Indeed. <https://www.indeed.com/career-advice/resumes-cover-letters/computer-skills>
- 21) Deb, S. (2022, August). *What is Knowledge Representation in AI? | Different Techniques | Edureka*. Edureka. <https://www.edureka.co/blog/knowledge-representation-in-ai/>
- 22) Islam, M. A. (2022). Industry 4.0: Skill set for employability. *Social Sciences & Humanities Open*, 6(1), 100280. <https://doi.org/10.1016/j.ssaho.2022.100280>



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