International Journal of Applied Science and Engineering
Citation: *IJASE*: **13**(01): 131-139, June 2025
DOI: 10.30954/2322-0465.1.2025.12

CASE STUDY

MANAGEMENT SCIENCE

Human Capital and Its Role in Futuristic Workplaces: An Exploratory Study of Jobs and Sustainable Growth in Industry 5.0

Syed Ather Hasan[1*], MVS Murthy[2] and B Mohan Kumar[3]

[1]*Research Scholar, GIET University, Odisha, India*
[2]*Professor SMS GIET University, Odisha, India*
[3]*Principal Badruka College of Commerce, Kachiguda, Hyderabad, Telengana, India*

** Corresponding author: syed.atherhasan@giet.edu*

Received: 16 Apr., 2025 **Revised:** 29 May, 2025 **Accepted:** 08 June, 2025

ABSTRACT

As they say change is inevitable hence nothing can stop change, we are witness to rapid and disruptive changes happening in our lives thanks to technology. Industry 1.0 lasted 70 years, 2.0 nearly the same, 3.0 lasted about 40 years where as 4.0 hardly 25 and now are knocking at the door of Industry 5.0. This is going to be exciting and somewhat scary as well. This study is an attempt to know how futuristic employment and job opportunity would be what would be the impact of AI and other technological advancement would be in quality of life and work as well as sustainable development means inclusivity or just industrialisation. Some of the key areas to explore is about future of work and skills, human-centric innovations, technological integration and sustainability, and long-term impact. One third jobs can be taken away by 2025 this was predicted by futurists in 2017 and that could be taken away by as what they termed it as Smart Technology, Artificial Intelligence, Robotics, and Algorithms (STARA). Covid-19 accelerated the usage of technology and it is changing more in fast pace thus employees need new skill sets and companies need to update and transform business.

Keywords: Future Workplace, human-centric innovation, Industry 5.0, Sustainability, Economic Resilience, Technological Disruptions

In fast changing world everything pertaining to life is becoming more technology dependent. Whether you like or not, whether you are prepared or not life is witnessing a change around us. The last decade in particular and especially post covid-19 pandemic the whole scenario has changed. As industry 4.0 brought technology such as automation, computerisation and internet of things to common usage the I5.0 is expected to make inclusivity, man-machine co-existence and artificial intelligence being used

How to cite this article: Hasan, S.A., Murthy, M.V.S. and Mohan Kumar, B. (2025). Human Capital and Its Role in Futuristic Workplaces: An Exploratory Study of Jobs and Sustainable Growth in Industry 5.0. *IJASE.,* **13**(01): 131-139.

Source of Support: None; **Conflict of Interest:** None

everywhere. All the phases of Industrialisation were meant to solve problems faced by mankind simpler, at the same time make life less hard working but it also brought a lot of change in the lives of working class and working conditions, putting pressure on the population who is engaged in supporting economic activity. There has always been resistance to change but after proper training and development workers were able to get assimilated with new environment and there was a possibility of preparing a new work force altogether. But the future work environment will be more depended upon machines that can also make decision thanks to artificial intelligence. Although it is termed as more human centric but it will make many professions obsolete thus it is critical to understand as to what could be termed as human capital then.

One third jobs can be taken away by 2025 this was predicted by futurists in 2017 and that could be taken away by as what they termed it as Smart Technology, Artificial Intelligence, Robotics, and Algorithms (STARA) by 2025 (David Brougham & Jarrod Haar, 2017) covid-19 accelerated the usage of technology and it is changing more in fast pace thus employees need new skill sets and companies need to update and transform business models (Trenerry, B. *et al.* 2021).

REVIEW OF LITERATURE

Industry 5.0 would create an environment that will have focus on interaction of humans with AI generated technologies. It is profoundly tuned within human-centric artificial intelligence, elevate, proliferate and collaboratively interacted. This development concentrates on the agreement amongst human innovativeness and smart technologies, setting a united surrounding that put way past the limits defined by Industry 4.0 (Rane, Kaya, & Rane, 2024). I 5.0 will have concerns on contemporary employment, the future work force needs to adapt and up skill themselves to be ready in an ecosystem where human and robots coexist. It is observed that I5.0 arranges human-robot partnership, requiring exertions towards shop floor workers' restoration. Insistent protection issue evolves out of unemployed human-machine link plans. Looking at the shop floor workers' wellbeing end, the observation revealed that it is truly important" (Diego A, de J. Pacheco, & Iwaszczenko, 2024). In a systematic review of 26 papers on human centric zero defect manufacturing it was felt that it is commonly perceived that human interaction causes the error whereas European commission has emphasised more human centric approach in future manufacturing facilities "Industry 5.0 demands against people-oriented production where people become smartly lounged rather oppositely doing. On holding the requirements, the generation and installation of advanced mechanisms, productive influence amongst people and machineries will set the production centres nearer towards ZDM look up, (Wan & Leirmo, 2022). There is a lot of curiosity amongst the researchers in recent past with regard to implications and effect of industry 5.0 and sustainability. The observation highlights an enhancement tendency in the matter of publications and certifications concern with Industry 5.0, expresses the uplift attention towards this domain, (Rajumesh, 2024).

The future of labour laws and work environment lies in the inclusivity labour empowerment and employer's duty. There is more emphasis given to multi-cultural and multi-racial workforce and maintaining harmony, (Nkechi Emmanuella Eneh, Seun Solomon Bakare, Adekunle Oyeyemi Adeniyi, & Chidiogo Uzoamaka Akpuokwe, 2024). Future research should focus on understanding the long-term impacts of remote work on productivity, employee well-being, and organizational culture, as well as identifying strategies for effectively managing remote teams and fostering inclusion in virtual environments." Remote work is going to stay and this can be resolved by effective communication and inclusivity, (Olawale, Funmilayo

Aribidesi Ajayi, Chioma Ann Udeh, & Opeyemi Abayomi Odejide, 2024). Diversity and inclusivity is an integral part of future workplace but at the same time challenges include unconscious bias, resistance to change and lack of understanding of deep rooted issues necessitates D & I efforts, (Temitayo Oluwaseun Jejeniwa, Noluthando Zamanjomane Mhlongo,, & Titilola Olaide Jejeniwa, 2024).

AI that is a combination of machine and integration of fast data analysis may disrupt many existing business functions such as marketing. People also are spending long hours on internet thus print and other marketing techniques are getting replaced with digital marketing. Ai could be used to target customers in more précised manner but ethical issues such as privacy will also crop up due availability of big data and easy analytical tools, (Hicham1, Habbat Nassera, & Sabri Karim, 2023).

Future workplaces will have more usage of technology such as AI artificial intelligence, thus the work force needs to up skill themselves to get synchronised with changed environment, more over employers will shift simple tasks to the workers and skilled tasks such as calculation etc will be done by AI thus perceived workspace may be disruptive, (Zirar, Syed Imran Ali, & Nazrul Islam, 2023).

There is a lot of curiosity among nations with regard to I5.0 hence there is a series of publications, conferences and presentations. The highest standard states comprising India, China, along with the United States of America, preceded by certain European regions namely Italy, Spain, United Kingdom, and South Asia's Pakistan, the Middle East Saudi Arabia, as well as Australia finishes with a minimum eight publications, (Barata & Kayserb, 2023). The preparedness of I5.0 is mostly in discussion since it aptly expresses a lot of production units experience the significance of Industry 4.0 (I4.0), Industry 5.0 (I5.0) being the platform ahead, setting towards dealing of new ambient, (Romero, *et al.* 2023).

In the next phase of industrialisation, the emphasis is more on mass customisation as well as on co-evolution of man and machine, Industry 5.0 stated again as the people-technology association through preserving the individual feature towards fabrication. This essentially converses the course of associations, that previously concentrated upon the modelling of methodical explanations exact to machineries, (Pizon, J.; & Gola, A, 2023). The stretch Industry 5.0 linked through European commission in order to point out the resilience, sustainability, and people oriented. Consequently, the uprising will happen out of manufacture goods revolves around technological advancement and greater output to produce unit past around people along with superior customization, (Alves, Lima, T.M, & Gaspar, P.D, 2023).

Sustainability particularly organisational sustainability is still unexplored in practical way, researchers cannot bring a model which really translates into meaningful outcome hence organisational sustainability is basically attained by the organisations on its own." Sustainability plans become a kind of inside trade workout where arrangement accept following to sustainability executions. Sustainability policies comprise some mechanism, data, capability setup, training promotion, observation plans, verification, confirmation, declaration, (Demastus & Landrum, 2023).

It is revealed that environmental, technical and social governance are increasingly integral to corporate strategy. Since universal ever living aim goes on to advance, Companies must continue to become resilient and practical in resolving evolving movements, namely the very circular economy along with enhanced controlling enquiry, (bdul-Azeez, Nwabekee, Agu, & Ijomah, 2024). Emergence of digital economy and wide spread concern for ecological balance has resulted in more serious approach towards sustainability. The operation of alphanumeric evidence and declaration expertise via many companies considered usual towards the drive of assembly, operating, as well as distributing extensive volumes of individual facts and consequently privacy being encroached and sustainability being developed, (Raihan, 2024).

Many new technological interfaces have resulted in disruption of existing businesses and processes such among them is metaverse that widely used in tourism industry. Metaverse supports an indepth, active and creative digital foundation on behalf of expressing tourism stops, entertainment, actions along with kindness provisions. Based on the tourism dealers' perspective, Metaverse supports an energetic path to advance yields and facilities via definite assembly, (Buhalis, Leung, & Lin, 2023).

Disruption in labour market is not as fast as it was way back in 1880 as at that time loss of jobs due to steam and later electricity powered facilities has caused to labour market. "The updated proof concern with work-force business interruption must be acknowledged within the extended prospect deal to professional progression inside white-collar workplace job. Managerial supportive works including budget, invoice generating, as well as data-dispensation assistants reduced from the level of 2% of entire professions in the year 1990 to 1.1% in 2024, a reduction of approximately 50%, (Deming, Ong,, & Summers, 2024).

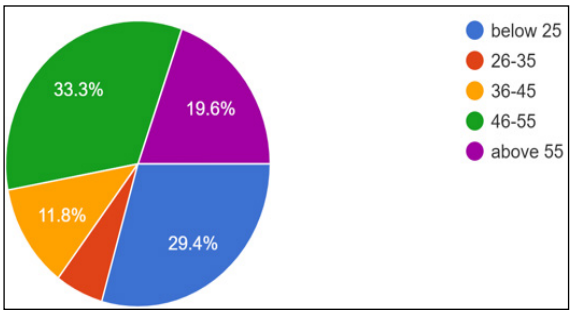
Objective of the study

1. This research aims to investigate the current understanding of Industry 5.0, future workplace preparedness, and the significance of human capital in the evolving work environment.
2. The study seeks to assess the awareness and readiness of Industry 5.0, as well as the role of human capital in shaping the future of work.
3. The primary objective of this research is to explore the intersection of Industry 5.0, future workforce preparedness, and human capital, with a focus on understanding their relevance and importance in the modern work environment.

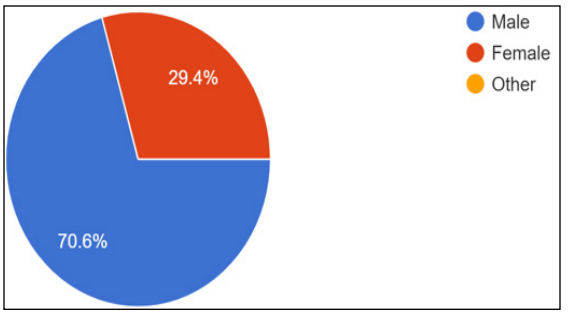
Methodology and research approach

A mixed method approach having both qualitative and quantitative methods with survey questionnaire distributed among the professional combined with literature review and interview. Descriptive Statistics, Cross-tabulation and Thematic Analysis.

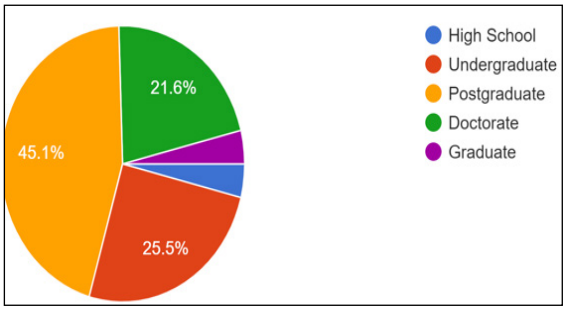
Data Analysis and interpretation



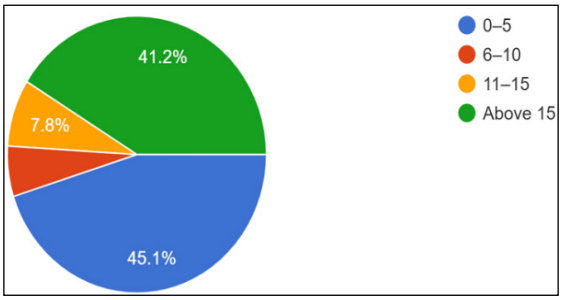
(a) Age of respondents



(b) Gender



(c) Educational Qualification



(d) Industry Experience

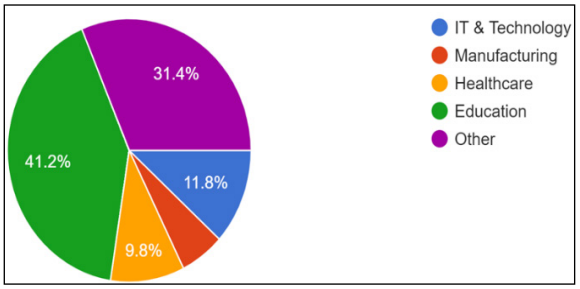


Fig. 2(a): Sector of employment

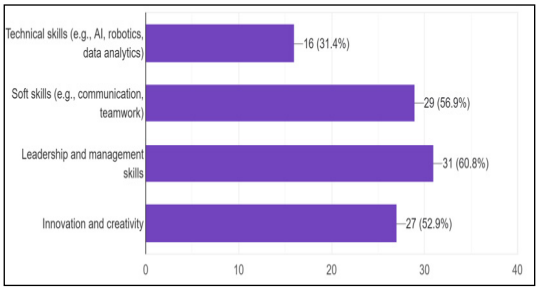


Fig. 2(b): Critical skill for success

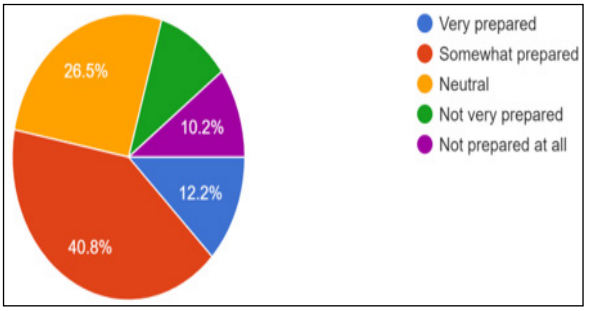


Fig. 2(c): Preparation towards challenges in industry

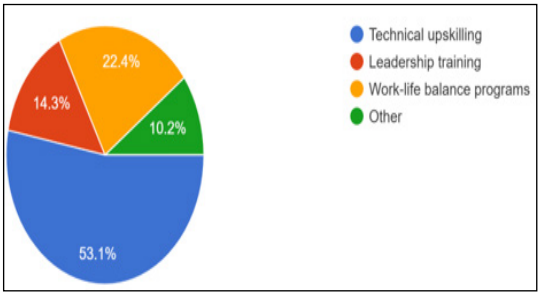


Fig. 2(d): Support/training towards futuristic workplace

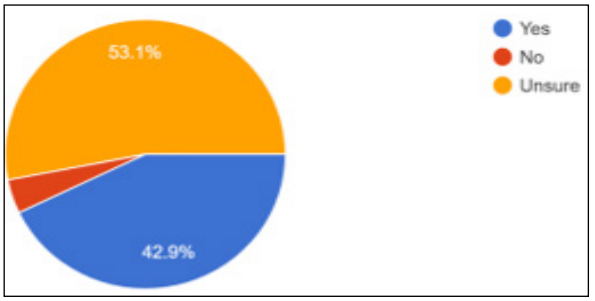


Fig. 3(a): Evolvement of current job due to I-5.0

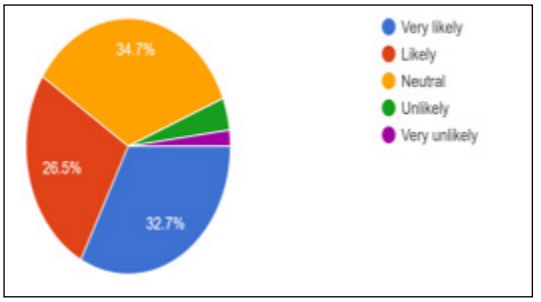


Fig. 3(b): Embrace of working alongside AI and Robotics in future

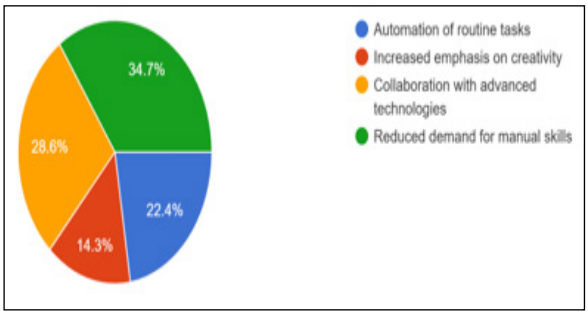


Fig. 3(c): Factors affected most by Industry 5.0

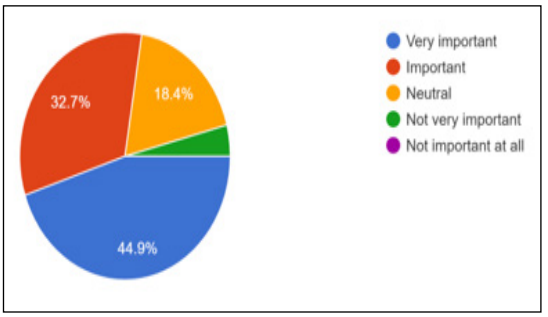


Fig. 3(d): Sustainable practices in futuristic workplaces

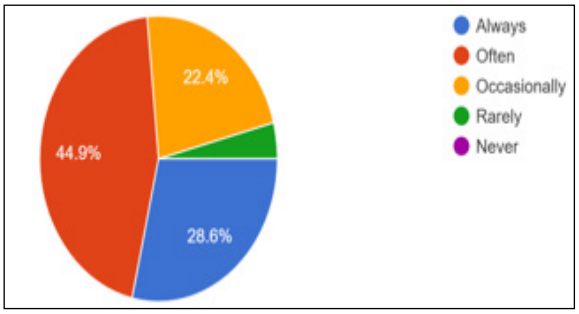


Fig. 4(a): Organization focus on sustainable business strategy

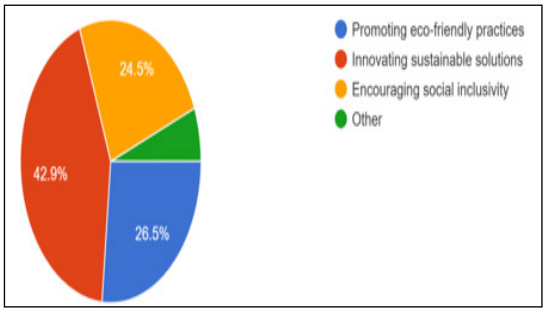


Fig. 4(b): Human capital drive sustainability in organization

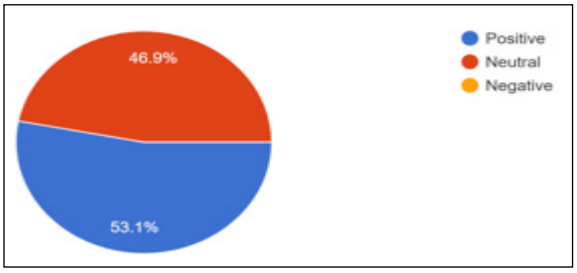


Fig. 4(c): Overall perception of I-5.0's impact on workplaces

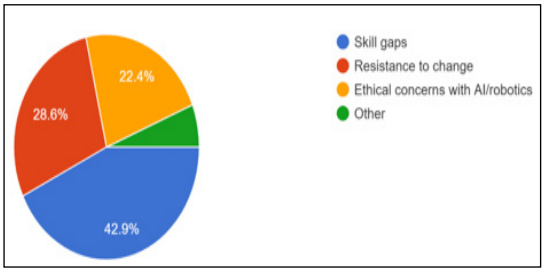


Fig. 4(d): Human capital adapting to industry 5.0

DISCUSSION

After the analysis of the literature review it can be projected that the industry is ready to embrace the next phase of industrialisation. 5.0 is seen as something that could change the industrial landscape dramatically. There are apprehensions also with regard to operations and human capital as well. The literature is mostly based upon assumptions and there is hardly any real time data or experience that could predict the future precisely.

Most of the respondents among the surveyed sample are optimistic about the outcome of next industrialisation phase. New generation is more enthusiastic than the seasoned ones thus nearly half-half is equally divided of being positive to unsure about the future workplace.

Findings and Suggestion

Assessing Human Capital

Key Skills: Most respondents emphasize technical skills (AI, data analytics), leadership, and innovation. Preparedness: Quite a few feels 'Somewhat Prepared' or 'Neutral' for Industry 5.0, with a significant need for technical up skilling.

Training Needs: among the most requested support areas are technical up skilling and leadership training.

Sustainability

It is felt Sustainability is viewed as 'Very Important,' especially in sectors like education and IT.

Role of Human Capital: It is also felt Innovation, eco-friendly practices, and social inclusivity are keyways human capital can drive sustainability.

Cross-Sector Insights

Industry Trends:

- Education: For many Heavy emphasis on soft skills and leadership with growing focus on technical skills.
- Healthcare: It is Similar to education, with concerns for automation and ethical AI integration.
- IT & Technology: Focus on technical up skilling with emphasis on creativity and innovation.

Generational Trends

- Under 25: Gives more Focus on creativity and soft skills.
- Above 55: Give more Focus on leadership and maintaining manual skills alongside technological change.

Research Direction and Practical Recommendations

For Human Capital Development:

- Focus on technical and leadership training, especially for those feeling unprepared.
- Tailored interventions for older workers to ease transitions towards AI and automation.

For Sustainability:

- One must integrate sustainability goals into training programs, emphasizing eco-friendly practices and social inclusivity.
- One must also Foster collaborative efforts to integrate sustainability into daily operations.

Correlation Insights

4. Preparedness vs. Sector: Among the respondents Those in education and IT are somewhat more prepared for Industry 5.0.
5. Age vs. Skills: Younger groups prioritize creativity, while older groups focus on leadership and manual skills.
1. Sustainability vs. Sector: Education and IT sectors show stronger commitment to eco-friendly practices.

CONCLUSION

Change is inevitable and change is there to stay thus we must be positive about the results of next change. Though on one side it would make the lives much easier due to AI and ML but on other side there is a fear of job losses. There needs to be new ways to up skill the work force and re define the human capital.

There is lot of scope of further research in this area as there are hardly practical studies conducted on I5.0 and future researchers and find a better answer about impact upon the implications of AI enabled technology.

Limitation

There was not enough time to conduct a comprehensive survey. The sample could have been much larger and there is also limitation with regard to responses. There could be some error in understanding the essence of topic as people are still not much familiar with futuristic workplace idea.

REFERENCES

1. Hicham, N., Habbat Nassera, and Sabri Karim. 2023. Strategic Framework for Leveraging Artificial Intelligence in Future Marketing Decision-Making. *Journal of Intelligent Management Decision*, pp. 139–150.

2. Nkechi Emmanuella Eneh, Seun Solomon Bakare, Adekunle Oyeyemi Adeniyi, and Chidiogo Uzoamaka Akpuokwe. 2024. Modern Labor Law: A Review of Current Trends in Employee Rights and Organizational Duties. *International Journal of Management & Entrepreneurship Research*, pp. 540-553.

3. Olawale, O., Funmilayo Aribidesi Ajayi, Chioma Ann Udeh, and Opeyemi Abayomi Odejide. 2024. Remote Work Policies for it Professionals: Review of Current Practices and Future Trends. *International Journal of Management & Entrepreneurship Research*, pp. 1236-1258.

4. Temitayo Oluwaseun Jejeniwa, Noluthando Zamanjomane Mhlongo, and Titilola Olaide Jejeniwa. 2024. Diversity and inclusion in the workplace: a conceptual framework comparing the USA and Nigeria. *International Journal of Management & Entrepreneurship Research*, pp. 368-1394.

5. Zirar, A., Syed Imran Ali, and Nazrul Islam. 2023. *Worker and workplace Artificial Intelligence (AI)*.

6. Diego, A., de J. Pacheco, and Iwaszczenko, B. 2024. Unravelling human-centric tensions towards Industry 5.0: Literature review, resolution strategies and research agenda. *Elsevier B.V*.

7. Rajumesh, S. 2024. Promoting sustainable and human-centric industry 5.0: a thematic analysis of emerging research topics and opportunities. *Journal of Business and Socioeconomic Development*, pp. 111-126.

8. Rane, N.L., Kaya, Ö. and Rane, J. 2024. Human-centric artificial intelligence in industry 5.0: Enhancing human interaction and collaborative applications. *Deep Science Publishing*, pp. 94-114.

9. Alves, J., Lima, T.M. and Gaspar, P.D. 2023. Is Industry 5.0 a Human-Centred Approach? A Systematic Review. *Processes*, 193.

10. Barata, J. and Kayserb, I. 2023. Industry 5.0 – Past, Present, and Near Future. *Elsevier B.V.*

11. Pizon, J. and Gola, A. 2023. Human–Machine Relationship—Perspective and Future Roadmap for Industry 5.0 Solutions. *Machines*.

12. Romero, E., Alcedo, Avila, Sánchez, Gutiérrez, Hurtado, *et al.* 2023. Industry 5.0: Tracking Scientific Activity on the Most Influential Industries, Associated Topics, and Future Research Agenda. *Sustainability*, 5554.

13. Abdul-Azeez, O.Y., Nwabekee, U.S., Agu, E.E. and Ijomah, T.I. 2024. Strategic approaches to sustainability in multinational corporations: A comprehensive review. *International Journal of Frontline Research in Science and Technology*, pp. 038–054.

14. Demastus, J. and Landrum, N. 2023. Organizational sustainability schemes align with weak sustainability. *Wiley*, pp. 707-725.

15. Raihan, A. 2024. A review of the potential opportunities and challenges of the digital economy for sustainability. *Elsevier B.V.*

16. Trenerry, B., Chng, S., Wang, Y., Suhaila, Z.S., Lim, S.S., Lu, H.Y. and Oh, P.H. 2021. Preparing Workplaces for Digital Transformation: An Integrative Review and Framework of Multi-Level Factors. *Front. Psychol.,* **12**: 620766.

17. Journal of Management & Organization, 24:2 (2018), pp. 239–257© 2017 Cambridge University Press and Australian and New Zealand Academy of Management. DOI:10.1017/jmo.2016.55

18. Aheleroff, S., Huang, H., Xu, X. and Zhong, R.Y. 2022. Toward sustainability and resilience with Industry 4.0 and Industry 5.0. *Front. Manuf. Technol*., **2**: 951643.

19. Evaldo Costa Jose. Costa@iscte-iul.pt 1Centro de Estudos Sobre a Mudança Socioeconómica e o Território, Instituto Universitário de Lisboa (ISCTE-IUL), Lisboa, Portugal.

20. Journal of Theoretical and Applied Information Technology 31st December 2023. Vol.101. No 24© 2023 Little Lion Scientific.