Advanced International Journal for Research (AIJFR)
E-ISSN: 3048-7641 ● Website: www.aijfr.com ● Email: editor@aijfr.com

A Comparative Analysis of Artificial Intelligence and Human Capital

Kawat Komal Janardhan [1], Dr. Anuj Kumar Singh [2]

[1,2] Department Of Computer Engineering,
Shri Jagdishprasad Jhabarmal Tibrewala University, Jhunjhunu Rajasthan, India

Abstract:
Artificial Intelligence (AI) has predominantly influenced global human capital. The concept of human capital has been clarified, emphasising its evolving relationship with AI. This paper examines the various aspects of human capital, including aptitude, proficiency, and competence, focussing on the subtle relationship between AI and human capital. This study involved a secondary data analysis, utilising 16 studies that were carefully selected from online search engines. Search terms including "Human Capital and AI" and "AI and Human Resource Management" were utilised for article collection. Significant data was derived from these articles to elucidate the connection between AI and human capital. The study produced both positive and negative results after a comprehensive examination of papers. The study revealed significant issues related to AI-driven HR practices around bias, equity, privacy, and security. It emphasises the necessity of integrating ethical AI practices and using AI's promise while minimising dangers and guaranteeing equal human capital development. The relationship between AI and human capital is a crucial asset for researchers, practitioners, and policymakers addressing the changing dynamics of workforce development in an age of AI-driven innovation.

Keywords: Artificial intelligence, human capital, Policy makers, management

1. Introduction

Human capital, encompassing the knowledge, skills, and competencies of the labour force, is essential for economic progress and seen as the primary catalyst of economic advancement in growth theories (Aldieri et al., 2023). It pertains to the intrinsic productive capacities of individuals that can be augmented by investments in education, vocational training, and health (Eide & Showalter, 2010). Per capita and human capital per worker are metrics of human capital quality that denote the average human capital intensity for the entire population and the labour force, respectively. Both variables influence present economic activities, but the quality of human capital within the population also affects future economic activities when younger generations enter the labour force (Xiong et al., 2021).

The concept of human capital is challenging to define and quantify, and has been examined by social scientists from multiple viewpoints. The importance of its role in economic well-being is paramount. It encompasses the information, talents, skills, experience, intelligence, judgement, and wisdom of individuals, serving as a sort of wealth that may be utilised to attain national or state objectives (Srivastava & Das, 2015). It has emerged as a significant metric for enhancing economic growth (Jing, 2019).

Human capital denotes the aggregation of skills and competencies among a region's workforce,

quantifiable through education and training. Human capital include not just formal education but also practical experience and unconventional technical training. It exerts a beneficial influence on economic development (Ogunade, 2011). Artificial intelligence entails enabling computers to execute activities traditionally reserved for humans. The swift advancement has transformed lifestyles, rendering it a crucial approach for nations to bolster competitiveness and ensure security (Zhang & Lu, 2021).

Artificial intelligence represents a significant advancement in electronic marketplaces and is an expanding subject of inquiry inside information systems research. While certain efforts concentrate on developing AI to supplant people, research in information systems and decision support systems emphasises utilising AI to assist humans. Recent studies on hybrid intelligence and human-AI collaboration seek to integrate AI research across disciplines, fostering synergy and complementarity between human and artificial intelligence (Kühl et al., 2022).

We have acquired insights on human capital and artificial intelligence. The review focusses on the interplay between artificial intelligence and human capital.

Materials and Methods

The current study performed a secondary analysis of the data. Sixteen articles were incorporated to investigate the relationship between AI and Human Capital. The analysis was performed using a four-step methodology: Establishing the study's objective, Performing an exhaustive inquiry utilising online search engines with targeted phrases such as “Human Capital and AI” and “AI and Human Resource Management” Curating items according to relevance and Conducting a thorough analysis of each of the 16 selected articles. The data acquired from the secondary analysis was employed to assess the extent of AI in human capital, examine trends, and discern difficulties.

Results and Discussion

AI and human capital: The following literatures are linking with AI and human capital

A recent study investigated the application of artificial intelligence to discover appropriate people for particular roles and to form cohesive teams with shared objectives. The study employed machine-learning algorithms to categorise and assess the personality attributes of applicants in order to identify their strengths and weaknesses. The research utilised a publicly accessible dataset of Big-Five personality traits, incorporating pre-processing and Pearson's correlation analysis. The results demonstrated a positive association among agreeableness, conscientiousness, extraversion, and openness, while exhibiting a negative correlation with neuroticism. K-means clustering was utilised to categorise the dataset, and supervised machine learning models, including random forest (RF), support vector machine (SVM), K-nearest neighbour (KNN), and AdaBoost, were employed to classify applications. The SVM model achieved an accuracy of 98%, surpassing other models, and the work enhances the literature on the use of artificial intelligence in human resource management. This study may assist enterprises, organisations, and human resource executives in enhancing their recruitment strategies and team integration (Ammer et al., 2023a).

A study examining the interplay between human capital and the use of artificial intelligence in the fourth industrial revolution using a qualitative methodology and evaluated 79 pertinent articles about the suggested model's variables. The results indicate that people must be re-educated and trained to fulfil the jobs necessitated by artificial intelligence. During industrial revolutions, certain employment may become obsolete; yet, other roles may emerge that require human competencies like as judgement,

knowledge, decision-making, and critical thinking, which surpass automation (Huertas-Lopez et al., 2021).

A study examining AI's contributions to HR digitalisation and practices, which focused on five AI applications and three HR preparedness factors, assessed input from 271 HR specialists in IT, manufacturing, and administration using SPSS and AMOS. Results demonstrate a crucial role for organisational analysis in achieving sustainable development, facilitated by adaptability and human competence enhanced through AI applications. (Murugesan et al., 2023).

A study utilising data-labeling techniques was conducted to assess an applicant's strengths and weaknesses. This facilitated the advancement of artificial intelligence in human resource management, which can beneficially influence corporations and organisations in identifying suitable candidates while attaining their objectives (Ammer et al., 2023b).

Artificial intellect is a domain within computer science that seeks to address issues related to human intellect and cognition. It endows machines with the capacity to emulate human cognition, executing tasks such as problem-solving, learning, reasoning, and language processing, and is propelled by two fundamental technologies: machine learning and deep learning. The integration of artificial intelligence with human resource management can facilitate cost reduction, elevate talent quality, and augment the efficacy of employee team strategies. The research presents an innovative methodology for human resource management in the era of artificial intelligence, highlighting its influence on the field (Balu & Sowmya, 2022).

A study intended to identify optimal practices for the integration of human capital and artificial intelligence inside organisations indicated that artificial intelligence has emerged as a distinct category of human capital. Furthermore, a change of employment procedures and a redesign of positions are necessary to facilitate collaboration between employees and technology for enhanced efficiency (Burton, 2019).

The application of machine learning in knowledge-based industries and the biases inherent in ML predictions were examined through an observational and experimental analysis within the patent examination context. The study revealed that ML exhibits a bias towards identifying prior art that is textually similar to focal claims, highlighting the necessity of domain expertise to locate the most pertinent prior art. It underscores the significance of vintage-specific competencies and examines the ramifications for artificial intelligence and the strategic management of human capital (Starr & Agarwal, 2020).

Examine the application of artificial intelligence in human resources, since the majority of IT businesses utilise it for many functions, including recruiting automation, performance evaluation, and management of employee benefits. The objective is to enhance the total employee experience, as leaders and executives contend that incorporating AI into HR activities may augment efficiency. It presents instances of leading corporations utilising AI and examines the obstacles and constraints they encounter in deploying this technology. The study ultimately offers insights into the future of artificial intelligence in human resources (Verma & Bandi, 2019).

The essay discusses obstacles in applying data science approaches to HR activities and suggests three principles to overcome them: causal reasoning, randomisation and experiments, and employee contribution (Tambe et al., 2019).

Advanced generative AI tools have intensified the "AI arms race," generating uncertainty for employees while broadening commercial uses and exacerbating problems associated with well-being, prejudice,

disinformation, privacy, ethics, and security. These study avenues aim to enhance HRM scholarship in the domain of generative AI, hence influencing the future of HRM research (Budhwar et al., 2023).

Machine Learning is extensively utilised in Human Resources to automate procedures, augment decision-making, and enhance efficiency. Nonetheless, the absence of interpretability may impede its effectiveness in Human Resources, as transparency is essential in decision-making that directly impacts individuals' lives. A study employs Anchors, a model-agnostic post-hoc explanation method, on a Human Resources dataset. The findings indicate that employing Anchors enables Decision Makers to act prescriptively and conserve vital resources, with each decision being comprehensible to a layperson (Abonamah et al., 2022).

The research on the impact of AI (Machine Learning Algorithms, Deep Learning, and Big Data) on Human Capital Management in Indonesia sought to investigate the implications of AI on Human Capital Management. The findings demonstrated that the implementation of Deep Learning and Big Data significantly enhanced Human Capital Management (Purwaamijaya & Prasetyo, 2022).

The study on the impact of AI on economic growth and household utility in both the short and long term indicates that AI development can enhance economic growth and short-term household utility if it results in increased productivity in the goods or AI industry. The research indicates that the long-term implications of AI on household welfare remain ambiguous (Purwaamijaya & Prasetyo, 2022).

Trends and challenges of AI and human capital

New regulations are required in the digital economy to prevent further market concentration, ensure adequate data protection and privacy, and facilitate the equitable distribution of productivity gains through profit sharing, digital capital taxation, and a reduction in working hours. The study promotes a cautiously optimistic perspective on the opportunities and risks presented by artificial intelligence, contingent upon their consideration through the lens of these technologies' unique characteristics by policymakers and societal stakeholders (Ernst et al., 2018).

A review article aims to provide a thorough depiction of current discussions in the social sciences concerning the anticipated impact of artificial intelligence on the work sector. The subjects covered include technological unemployment, algorithmic governance, platform-based employment, and the political dimensions of AI-driven labour. The analysis effectively identifies the primary academic and methodological perspectives highlighting two factors that motivate the creation and use of AI in the economy: capitalist impetus and the impact of nationalistic ideologies (Deranty & Corbin, 2022).

A recent study utilises a dataset from 2005 to 2021, encompassing 24 advanced high-tech nations, to examine the association between a country's Google Trend Index pertaining to AI and its unemployment rate. Utilising a dynamic panel data and GMM-system estimate methodology, it addresses the dynamic impact of unemployment and determines the influence of AI on it (Guliyev, 2023).

Findings and Future Scope

The previously stated papers have analysed the diverse connections between artificial intelligence and human capital. The inquiry explores the complex interaction between these two entities and highlights their developing relationship in modern society. The research indicates that AI is not an autonomous entity but a transformative tool that can profoundly influence human capital. This study posits that AI can beneficially enhance the development of human capital.

Conclusion

To leverage AI for the enhancement of human capital, it is essential to prioritise educational and upskilling programs. Moreover, ethics is a crucial aspect that must be taken into account regarding the relationship between AI and human capital. Topics such as employment change, research, and policy formulation should be actively deliberated within the framework of AI and human capital. The research highlights the necessity of a proactive strategy for AI integration that prioritises ongoing education and strategic investments to fully realise AI's promise in augmenting human capital in the digital age.

References

1. Aldieri L, Bich T, Dao T, Khuc VQ. The Impact of Openness on Human Capital: A Study of Countries by the Level of Development. Economies. 2023;11(7):1–13.
2. Ammer MA, Ahmed ZAT, Alsubari SN, Aldhyani THH, lmaaytah SA. Application of Artificial Intelligence for Better Investment in Human Capital. . Mathematics. 2023;11(3):612.
3. Balu L, Sowmya S. Artificial intelligence and human resource. In: and others, editor. Th International Conference on Managing Human Resources at the Workplace; 2022. p. 1–5.
4. Bonamah A, Torre DL, Poulin M, Repetto M. Explainable Artificial Intelligence in Human Resources: a Computational Study. . In: and others, editor. Conference: 2022 International Conference on Data Analytics for Business and Industry (ICDABI); 2022. p. 277–
5. Budhwar P, Chowdhury S, Wood G, Aguinis H, Bamber GJ, Beltran JR. Human resource management in the age of generative artificial intelligence: Perspectives and research directions on ChatGPT. HumResou Manag J. 2023;33(3):606–59.
6. Burton S. Grasping the Cyber-World: Artificial Intelligence and Human Capital Meet to Inform Leadership. Int J Econ Comm Manag. 2019;7(12):707–59.
7. Deranty JP, Corbin T. Artificial intelligence and work: a critical review of recent research from the social sciences. Economics. 2022;1:1–17.
8. Eide ER, Showalter MH. 2010. Available from: https://doi.org/10. 1016/B978-0-08-044894-7.01213-6.
9. Ernst E, Merola R, Samaan D. The economics of artificial intelligence: Implications for the future of work. ILO. 2018;p. 1–41.
10. Guliyev H. Artificial intelligence and unemployment in high-tech developed countries: New insights from dynamic panel data model.
11. J. 2019;61:15–42.
12. Jing W. The study on the impact of health human capital to economic growth of Xi'an City. In: Proceedings - 2019 International Conference on Economic Management and Model Engineering; 2019. p. 552–6.
13. Kühl N, Schemmer M, Goutier M, Satzger G. Artificial intelligence and machine learning. Elect Mark. 2022;32(4):2235–44.
14. Lopez CH, Hernandez LC, Ruiz IR. Artificial Intelligence: Transformation of the Roles of Human Capital. Int J Sci Technol Res
15. Murugesan U, Subramanian P, Srivastava S, Dwivedi A. A study of Artificial Intelligence impacts on Human Resource Digitalization in Industry 4.0. Decision Analytics J. 2023;7:100249.
16. Ogunade AO. Human Capital Investment in the Developing World: An Analysis Human Capital

Investment in the Developing World: An Analysis of Praxis of Praxis. Seminar Res Paper Series. 2011;11:1–25.
17. Purwaamijaya B, Prasetyo Y. The Effect of Artificial Intelligence (AI) on Human Capital Management in Indonesia. JMDK. 2022;10(2):168–74.
18. Res Globalization. 2023;7:100140.
19. Srivastava K, Das RC. Human capital management: Economics of psychological perspective. Indus Psych J. 2015;24(2):115–8.
20. Starr E, Agarwal R. Machine Learning and Human Capital Complementarities: Experimental Evidence on Bias Mitigation. Strategic Manag J. 2020;41(8):1381–411.
21. Tambe P, Cappelli P, Yakubovich V. Artificial Intelligence in Human Resources Management: Challenges and a Path Forward. SSRN Elect
22. Verma R, Bandi S. Artificial Intelligence & Human Resource Management in Indian IT Sector. SSRN Elect J. 2019;p. 1–6.
23. Xiong X, Chen X, Ning Y, Li H, Fleisher BM. Human Capital of Mainland China, Hong Kong and Taiwan, 1997-2018. . Measuring Hum Cap. 2021;p. 139–66.
24. Zhang C, Lu Y. Study on artificial intelligence: The state of the art and future prospects. J Indus Inf Integ. 2021;23:100224.