

Human-AI Collaboration at Work and its Role in Employee Engagement and Performance: An Empirical Study

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Abstract:

Rapid advancements of artificial intelligence (AI) technology have made human-AI collaboration increasingly prevalent in work places which showed deep impact on psychology and behaviour of the employees. There are studies that have examined the impact of human-AI collaboration on work engagement on the basis of job demands-resources along with tech-learning anxiety, moderating roles of humble leadership and AI self-efficacy as well. The landscape of Human Resource Management (HRM) has been revolutionised by AI where it has reshaped the way the way companies recruit, develop, and retain employees. The HRM department is experiencing a transformative force in the form of AI where the synergy amid human and AI capabilities became one of the impactful shifts in the organization. The tasks are completed, problems are solved, and better decisions are made with Human-AI collaboration at work involving employees and AI systems working together. Employee engagement and performance can be improved by effective collaboration with AI where it reduces the routine work, supports employees with valuable information and also help them work more efficiently. 301 employees were surveyed to explore the factors that shows different role of role of Human-AI collaboration at work. The study also measured the impact of Human-AI collaboration on employee engagement and performance. The study concludes that there is significant impact of Human-AI collaboration on employee engagement and performance.

Keywords: Human, Artificial Intelligence (AI), Employee, Engagement, Performance

Introduction

Artificial Intelligence and its collaboration with human are serving as powerful tool in all the aspects of business including Human Resource (HR). AI tools assist in screening thousands of resumes in seconds and also help to track the employee sentiments in real-time with sentiment-analysis software. The AI is being implemented within Human Resource Management (HRM) at extraordinary speed (Tambe et al., 2019). The traditional HR processes is being transformed with the adoption of AI in Human Resource Management (HRM). AI in collaboration with Human is being used in the processes like “recruitment, employee performance evaluation, training, workforce planning, and decision-making” which makes HR activities faster and more efficient. The analytical muscle of HR professionals is supercharged with AI where it helps in reducing the cognitive bias in hiring and firing. Evidence-based work force planning is being facilitated at great scale (Cheng & Hackett, 2021). There are so many benefits of human-AI collaboration but at the same time critics argued that existing inequalities are increased by the use of algorithms in HR. It also reduces the freedom in decision making among the employees which in turn weakens the human relations which is very important for employee engagement (Raisch & Krakowski, 2021). AI-driven incessant performance management systems help in gathering live behavioural data, providing prompt feedback, and predicting employee attrition. The studies suggest that yearly performance appraisals can be replaced with more continuous data-based feedback helping the employees to recognise the areas which improves and support their development at professional level. Developments refers to the concept that use of AI by the humans help them to produce mixed effect on work engagement. Engagement is improved as it makes it more expressively available and meaningful in the task. At the same time, if the implementation is inadequate or

irresponsible, it can destroy engagement with doubt and stress (Liu and Li, 2025). Investigation shows that the quality of human-AI cooperation should be high in order to promote work engagement where both the fundamental and developmental needs of the employees are satisfied (Wu et al., 2025). Beside this, it is warned that “algorithmic management, the process of directing, assessing, and punishing employees with a set of data-driven algorithms” are some new ways of control limiting the voice of the employees and increases their stress associated to surveillance (Kellogg et al., 2020). A previous study also revealed that the intrinsic motivation is effectually decreased due to constant algorithmic monitoring system.

Work engagement means that the mind is in the state of positive work where the individual is completely integrated into their work roles including three dimensions like “vigour (high levels of energy and mental resilience while working), dedication (a strong identification with and sense of significance in one’s work), and absorption (the state of being fully concentrated and happily engrossed in work activities)” (Bakker and Demerouti, 2024). It is found that work engagement among the employees is established as a significant component of stress of an individual which possesses a solid theoretical foundation (Bakker and Demerouti, 2017). At the same time, there is a need of more examination and validation while exploring the application related to human-AI collaboration. Performance of the employees is considered to be one of the most vital elements of success and competitiveness within the organisation (Singh et al., 2016). Companies working on online platforms expects their employees to adapt technological changes as quick as possible as it is required to manage large amount of information. Continuous innovation among the employees is also required to meet the demands of the customers. At the same time, the organisations are coming forward to invest in AI technologies supporting the productivity of their employees. This approach also helps in improving the work quality, accelerating the completion of the task, and improving the decision-making effectiveness. In spite of evidences of growing adoption of AI, still there is ongoing debate associated with impact of AI on employee performance. On the other hand, there are studies which shows that productivity and efficiency is improved by AI as it automates the routine tasks and provide intelligent support. It is also suggested that excessive use and reliance on AI leads towards reduction of human creativity, increases dependence on technology, and creating challenges associated to trust and transparency.

Literature Review

Rulandari and Silalahi (2025) investigated on the way the factors like “processing time, resource utilization and service accessibility” impacts operational effectiveness of the employees while collaborating with AI. It is found that operational effectiveness is significantly boosted by service accessibility and processing time. There is limited effect of resource utilization on operational effectiveness. It is also highlighted that operational effectiveness is the key element of job satisfaction among the employees. The effect of efficiency factors on operational outcomes is strengthened by human-AI collaboration. Since the operational effectiveness is identified as vital element for employee satisfaction it makes it important to address the challenges of resource alignment.

Wan and Jiang (2025) found that employee performance is significantly improved by AI-driven initiatives where “digital finance and capital allocation efficiency” plays partial mediating part in the relation amid AI-driven and employee performance. The impact of AI on employee performance is positively moderated by human-AI collaboration indicated by moderating effect analysis. The study also revealed that in the firm which is facing higher financing constraints, the effect of AI on improving employee performance is more noticeable. The study suggests the companies that are undergoing intelligent transformation to optimise the relation amid human and AI, make better use of financial tools, and improve the efficiency of resource allocation.

Wang, Liu & Luo (2026) indicated in their investigation that human-AI collaboration (HAI-C) task complexity shows negative effects on work engagement of the employees where it amplifies human-AI collaboration tech-learning anxiety. This negative indirect impact of HAI-C task complexity on work engagement can be mitigated by AI self-efficacy. This negative indirect effect is indirectly alleviated by humble leadership by improving AI self-efficacy of the employees. The study also revealed the repressive effect of human-AI collaboration task complexity on work engagement of the employees.

Mert (2025) indicated a positive and significant effect of human-AI collaboration on employee performance. Specifically, “trust in AI, AI usability, and AI reliability” found to be significant elements of effective collaboration

which contributes to higher productivity. It also helps in improving the work quality, greater efficiency, and better results of decision making. The digital organizations should make investments in “AI education, transparent AI governance, and employee-centred AI integration strategies”. the AI implementation in the future must focus on collaborative intelligence which improves human capabilities.

Sun, Hu & Su (2026) revealed that work engagement is positively enhanced by employee-AI collaboration where it increases perceptions of “meaningful work and creative self-efficacy” of the employees. Here the “meaningful work and creative self-efficacy” serves as partial mediators in this relation. The authors contribute to “Job Demands-Resources theory” by their investigation where they have identified Employee–AI collaboration as new job resource fostering engagement through improved personal resources. The importance of mixing AI into the workplace is highlighted sensibly by the implications for AI system design and employee training in order to increase the engagement and well-being. The usefulness of AI technology improves the efficiency and also provides the psychological resources and work experience to the employees. This is possible through successful interaction of humans and AI. The study provides insights having significant implications on the way of establishing positive human-AI collaborative relation. This also helps in developing tuneful relation amid technology and human work.

Kong (2023) studied that employee-AI collaboration means the interaction and cooperation amid employees and the AI system while working. The work force uses AI technology to improve the effectiveness of their work, capabilities of making decisions, and overall efficiency as well. Both traditional task allocation and information exchange are included in this collaboration which focuses also on current interaction nurturing mutual adaptation and learning. The centre point of collaboration amid employees and AI is to exchange the information. This helps the employees to get and understand the quick suggestions offered by AI assisting in knowledge sharing and providing strong foundation of trust to work as a team. This approach improves the employee performance at work and their engagement as well.

Objective

1. To explore the factors that shows different role of Human-AI collaboration at work.
2. To measure the impact of Human-AI collaboration on employee engagement and performance.

Methodology

301 employees were surveyed to explore the factors that shows different role of Human-AI collaboration at work. The study also measured the impact of Human-AI collaboration on employee engagement and performance. “Random sampling method” and “Exploratory Factor Analysis” followed by “Multiple Regression Analysis” are used.

Findings

Male are 57.1 and rest 42.9% are females. 30.9% among them are below 32 years of age, 41.9% are between 32-42 years and rest 27.2% are above 42 years of age. 24.2% of the respondents are from human resource department, 17.6% from diagnostics, 18.9% from art and design, 22.9% from business operations and rest 16.3% from other sectors working on human-AI collaboration.

“Table 1 General Details of Respondents”

“Variables”	“Respondents”	“Percentage”
Gender		
Male	172	57.1
Female	129	42.9
Total	301	100
Age (years)		

Below 32	93	30.9
32-42	126	41.9
Above 42	82	27.2
Total	301	100
Sectors		
Human Resource management	73	24.2
Diagnostics	53	17.6
Art and Design	57	18.9
Business operations	69	22.9
Others	49	16.3
Total	301	100

“Exploratory Factor Analysis”**“Table 2 KMO and Bartlett's Test”**

“Kaiser-Meyer-Olkin Measure of Sampling Adequacy”		.805
“Bartlett's Test of Sphericity”	“Approx. Chi-Square”	4998.386
	“df”	120
	“Sig.”	.000

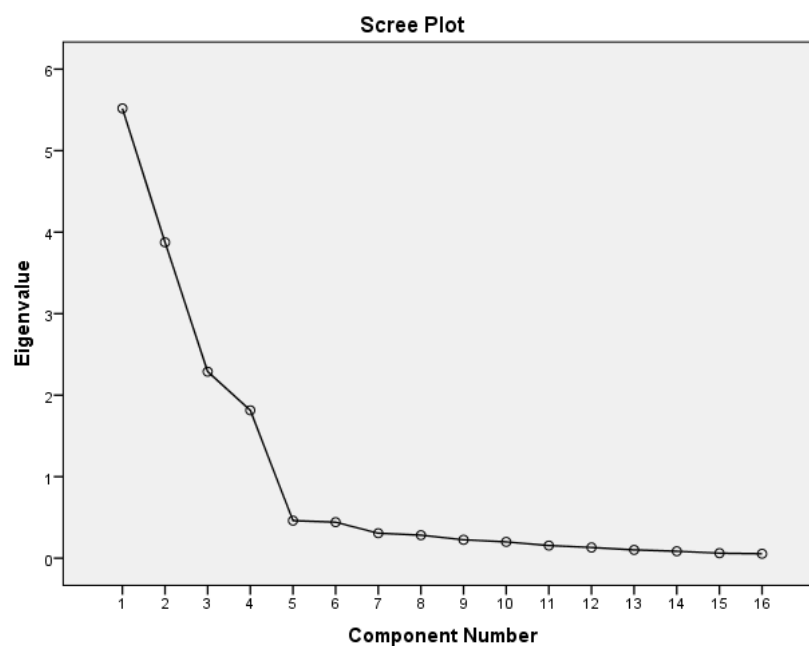
“KMO value” is 0.805 and the “Barlett’s Test of Sphericity” is significant.

“Table 3 Total Variance Explained”

“Component”	“Initial Eigen values”			“Rotation Sums of Squared Loadings”		
	“Total”	“% of Variance”	“Cumulative %”	“Total”	“% of Variance”	“Cumulative %”
1	5.518	34.489	34.489	3.596	22.473	22.473
2	3.875	24.219	58.709	3.433	21.453	43.927
3	2.288	14.301	73.010	3.369	21.055	64.982
4	1.814	11.339	84.349	3.099	19.367	84.349
5	.460	2.878	87.227			
6	.441	2.759	89.986			
7	.306	1.914	91.900			
8	.282	1.765	93.665			
9	.226	1.412	95.077			
10	.200	1.247	96.324			

11	.155	.969	97.293			
12	.131	.819	98.112			
13	.102	.635	98.747			
14	.085	.532	99.279			
15	.061	.383	99.663			
16	.054	.337	100.000			

In a “principal component analysis”, 16 variables were grouped into 4 factors with 22.473%, 21.453%, 21.055% and 19.367% variance respectively and total variance is 84.249%.



“Figure 1 Scree plot of Eigen Values”

Figure 1 shows the “Eigenvalues” derived from the "Total Variance Explained" table, indicating an elbow point at 4 components.

“Table 4 Rotated Component Matrix”

“S. No.”	“Statements”	“Factor Loading”	“Factor Reliability”
	AI-Assisted Decision Making		.961
1	AI provides valuable information to make work related decisions	.932	
2	Help in analyzing the information before making decision	.930	
3	Generates suggestion for making work related decisions	.927	
4	Helps in making more informed decisions related to work	.911	
	Task Automation and Work Support		.942

5	AI helps in quickly completing routine work	.951	
6	Reduces the times spend in repetitive work	.925	
7	Assist and support in completing tough tasks	.887	
8	Helps in effectively managing the workload	.882	
	Skill Enhancement		.938
9	AI helps in learning new skills needed at work	.913	
10	Provides useful knowledge to improve work	.890	
11	Helps in understanding complicated tasks at work	.886	
12	Helps in improving professional abilities	.881	
	Problem-Solving Support		.900
13	AI helps in generating new ideas at work	.894	
14	Provides suggestions for work related issues	.861	
15	Helps in developing different solutions for work related problems	.856	
16	Encourages to explore new ways to do work	.787	

Factor “AI-Assisted Decision Making” includes the variables like AI provides valuable information to make work related decisions, help in analysing the information before making decision, generates suggestion for making work related decisions and helps in making more informed decisions related to work. Factor “Task Automation and Work Support” consists of variables like AI helps in quickly completing routine work, Reduces the times spend in repetitive work, Assist and support in completing tough tasks, and helps in effectively managing the workload. Factor “Skill Enhancement” includes the variables like AI helps in learning new skills needed at work, provides useful knowledge to improve work, helps in understanding complicated tasks at work, and helps in improving professional abilities. Factor “Problem-Solving Support” consist of variables like AI helps in generating new ideas at work

Provides suggestions for work related issues, helps in developing different solutions for work related problems and encourages to explore new ways to do work.

“Table 5 Reliability Statistics”

“Cronbach's Alpha”	“N of Items”
.868	16

“Table 6 Model Summary”

“Model”	“R”	“R Square”	“Adjusted R Square”	“Std. Error of the Estimate”
1	.878 ^a	.771	.768	.36986
Predictors: (Constant), AI-Assisted Decision-Making, Task Automation and Work Support, Skill Enhancement and Problem-Solving Support				

0.768 is “adjusted R-squared value” with approx. 77% of the variation.

“Table 7 ANOVA”

“Model”		“Sum of Squares”	“df”	“Mean Square”	“F”	“Sig.”
1	“Regression”	136.287	4	34.072	249.075	.000 ^b
	Residual	40.491	296	.137		
	Total	176.777	300			
DV: Overall impact of Human-AI collaboration on employee engagement and performance						
Predictors: AI-Assisted Decision-Making, Task Automation and Work Support, Skill Enhancement and Problem-Solving Support						

Value under significant column indicates a significant relationship between the factors namely “AI-Assisted Decision-Making, Task Automation and Work Support, Skill Enhancement and Problem-Solving Support”.

“Table 8 Coefficients”

“Model”	“Un standardized Coefficients”		“Standardized Coefficients”	“t”	“Sig.”
	“B”	“Std. Error”	“Beta”		
(Constant)	4.239	.021		198.855	.000
AI-Assisted Decision Making	.053	.021	.069	2.488	.013
Task Automation and Work Support	.101	.021	.132	4.729	.000
Skill Enhancement	.649	.021	.845	30.389	.000
Problem-Solving Support	.142	.021	.185	6.654	.000
DV: Overall impact of Human-AI collaboration on employee engagement and performance					

All the factors “AI-Assisted Decision-Making, Task Automation and Work Support, Skill Enhancement and Problem-Solving Support” are showing significant impact of Skill Enhancement (.845), Problem-Solving Support (.185), Task Automation and Work Support (.132) and AI-Assisted Decision Making (.069).

Conclusion

Digital companies working on online platforms witnessed positive and significant impact of Human-AI collaboration on employee performance. “Productivity, efficiency, work quality, decision-making effectiveness, and innovation capability” are all improved by effective collaboration amid employees and AI systems. Trust in AI, AI usability, and AI reliability are the most vital elements among the dimensions of human-AI collaboration. It is important for successful collaboration which indicates that employees are able to perform well only when the AI systems are perceived as “trustworthy, user-friendly, and dependable”. The literature shows that human-AI collaboration works as organizational capability which contributes to competitiveness in the modern world of digital business where it enables the employees to use AI-generated insights and maintain the creativity and judgment skills of the humans at the same time. On the basis of the findings, companies come forward to adapt AI initiatives and also invest in training their employees and on AI training programs to make sure the effective use of technology. It is becoming important for the organizations to establish “ethical, transparent, and accountable AI governance frameworks strengthening the trust among the employee and promoting responsible AI implementation as well. scholars are encouraged to conduct their future studies in examining “potential mediating

and moderating variables such as job satisfaction, digital skills, employee engagement, organizational culture, and technology readiness to gain a deeper understanding of the mechanisms through which Human-AI Collaboration influences performance outcomes". It is also found in previous studies that employee engagement is improved by effective collaboration where it reduces the routine workload and provide timely support and insights to the employees. Productivity, accuracy, decision-making, and problem-solving are also improved which in turn improves employee performance.

The study aims to explore the factors that shows different role of role of Human-AI collaboration at work and the impact of Human-AI collaboration on employee engagement and performance. AI-Assisted Decision-Making, Task Automation and Work Support, Skill Enhancement and Problem-Solving Support are the factors that shows different role of Human-AI collaboration at work. The study concludes that there is significant impact of Human-AI collaboration on employee engagement and performance.

References

- [1] Tambe, P., Cappelli, P., & Yakubovich, V. (2019). Artificial intelligence in human resources management: Challenges and a path forward. *California Management Review*, 61(4), 15–42. <https://doi.org/10.1177/0008125619867910>
- [2] Cheng, M. M., & Hackett, R. D. (2021). A critical review of algorithms in HRM: Definition, theory, and practice. *Human Resource Management Review*, 31(1), Article 100698. <https://doi.org/10.1016/j.hrmr.2019.100698>
- [3] Kellogg, K. C., Valentine, M. A., & Christin, A. (2020). Algorithms at work: The new contested terrain of control. *Academy of Management Annals*, 14(1), 366–410. <https://doi.org/10.5465/annals.2018.0174>
- [4] Raisch, S., & Krakowski, S. (2021). Artificial intelligence and management: The automation–augmentation paradox. *Academy of Management Review*, 46(1), 192–210. <https://doi.org/10.5465/amr.2018.0072>
- [5] Wang, B., Liu, S., & Luo, C. (2026). How does human-AI collaboration task complexity affect employee work engagement? The roles of humble leadership and AI self-efficacy. *Frontiers in Psychology*, 17, 1767967. <https://doi.org/10.3389/fpsyg.2026.1767967>
- [6] Bakker, A. B., & Demerouti, E. (2024). Job demands–resources theory: Frequently asked questions. *Journal of Occupational Health Psychology*, 29(3), 188–200. <https://doi.org/10.1037/ocp0000376>
- [7] Bakker, A. B., and Demerouti, E. (2017). Job demands-resources theory: taking stock and looking forward. *Journal Occupational Health Psychology*, 22, 273–285. doi: 10.1037/ocp0000056
- [8] Rulandari N, Silalahi ADK (2025), "Human-AI collaboration for efficiency and employee job satisfaction in public administration: insights from a resource-based perspective". *Transforming Government: People, Process and Policy*, Vol. 19 No. 2 pp. 264–287, doi: <https://doi.org/10.1108/TG-01-2025-0011>
- [9] Wan, S., & Jiang, Y. (2025). AI-driven, human–AI collaboration, and employee performance: The roles of digital finance. *Finance Research Letters*, 90, 109292. <https://doi.org/10.1016/j.frl.2025.109292>
- [10] Mert, L. (2025) The Impact of Human-AI Collaboration on Employee Performance in Digital Companies. *Journal on Economics, Management and Business Technology*, 4(1), 1-11.
- [11] Singh, S. K., Burgess, T. F., & Heap, J. (2016). Managing performance and productivity for organizational competitiveness. *International Journal of Productivity and Performance Management*, 65(6).
- [12] Sun, L., Hu, R., & Su, H. (2026). Unlocking human potential in the AI Age: how employee-AI collaboration transforms work engagement through dual psychological pathways. *Frontiers in Psychology*, 16, 1705671. <https://doi.org/10.3389/fpsyg.2025.1705671>
- [13] Kong, H., Yin, Z., Baruch, Y., & Yuan, Y. (2023). The impact of trust in AI on career sustainability: The role of employee–AI collaboration and protean career orientation. *Journal of Vocational Behaviour*, 146, 103928. <https://doi.org/10.1016/j.jvb.2023.103928>

- [14] Liu, X., & Li, Y. (2025). Examining the Double-Edged Sword Effect of AI usage on work Engagement: The moderating role of core task characteristics substitution. *Behavioral Sciences*, 15(2), 206. <https://doi.org/10.3390/bs15020206>
- [15] Wu, T., Zhang, R., & Zhang, Z. (2025). Navigating the human-artificial intelligence collaboration landscape: Impact on quality of work life and work engagement. *Journal of Hospitality and Tourism Management*, 62, 276–283. <https://doi.org/10.1016/j.jhtm.2025.02.005>