

EMERGING AI TECHNOLOGIES: COLLABORATING DATA COMPUTATION AND MANAGING HUMAN RESOURCE

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Abstract

In today's fast-evolving digital landscape, AI is transforming industries across the globe. Among the areas where Artificial intelligence is making important strides is in human resource management, an essential function for all size of companies. The integration of Artificial intelligence technologies into human resource practices is reshaping the way companies handle everything from recruitment to employee engagement, workforce analytics, and employee retention. Emerging Artificial intelligence technologies are transforming human resource management by decision-making processes and improving data computation[1]. These innovations support HR departments to streamline recruitment, improve workforce management, and boost employee engagement through predictive analytics and automation. AI-driven tools such as natural language processing chat-bots, performance monitoring, predictive analytics, sentiment analysis optimize talent acquisition, and retention strategies. Artificial intelligence automates administrative tasks similar to payroll and compliance management, freeing HR professionals to focus on strategic initiatives.

Keywords: AI, recruitment, HR and automation

How to cite this article: K. Gayathri1 K. Majini Jes Bella2. EMERGING AI TECHNOLOGIES: COLLABORATING DATA COMPUTATION AND MANAGING HUMAN RESOURCE. Int J Drug Deliv Technol. 2026;16(82s):1227-1230. DOI: 10.25258/ijddt.16.82s.137.

Introduction

The quick advancement of artificial intelligence is transforming companies worldwide, and human resource management is no exception[1], [2]. Artificial intelligence technologies are being integrated into HR practices, offering powerful tools to handle data computation, enhance decision-making processes and streamline administrative tasks[3]. As companies continue to adopt AI-driven solutions, the collaboration between HR management and data computation is reforming the future of work. The integration of artificial intelligence is reforming how organizations attract, manage, and retain talent. In the territory of recruitment, Artificial intelligence streamlines the hiring process by automating resume screening, matching candidates with roles based on skills and experience, and reducing favouritisms[2].

AI tools, such as virtual assistants and chatbots, provide seamless candidate experiences and reduce the workload of human resource teams by handling initial inquiries and scheduling interviews[4]. Beyond recruitment, Artificial intelligence is transforming employee management through predictive analytics and real-time data analysis. Artificial intelligence improves employee development and providing personalized learning[5], [6]. Artificial intelligence based systems can recommend personalized training programs based on the employee's skill, ensuring continuous learning and growth[4], [6].

Review of Literature

The integration of AI in human resource management has garnered attention in academic and industry research. Cappelli (2019), demonstrates AI technologies, such as natural language processing and machine learning algorithms, are streamlining candidate sourcing, screening, and selection. Nikolaou (2021) argue that the use of AI-driven chatbots in recruitment, which enrich candidate experience by answering queries, scheduling interviews, and guiding candidates through the application process, leading to higher engagement rates.

Dhamija and Bag (2020) highlights artificial intelligence reduces unconscious biases in hiring decisions by focusing on data-driven metrics rather than subjective judgments. This will improve diversity and inclusion in the workplace. Bogen and Rieke (2020) shows artificial intelligence systems can unintentionally continue existing biases if not carefully designed and monitored. Bassi and McMurrer (2017) indicates AI develops workforce planning by analyzing past and present employee data to predict future trends, such as absenteeism, turnover, and performance fluctuations.

Angrave et al. (2016), shows AI tools provide actionable insights that help human resource managers anticipate employee needs and make proactive decisions. Jyoti and Rani (2019) stated that the power of artificial intelligence in performance management, where predictive analytics are used to evaluate employee performance and identify top performers or underperformance. Beck and Libert (2020) highlights AI-based decision systems can help to reduce inefficiencies in workforce allocation.

Factors of AI Technologies

Data Quality and Availability

Organizations must ensure that data from various sources is integrated and accessible for AI systems to analyse holistically[7]. Data quality and availability are critical factors that directly impact the effectiveness and reliability of artificial intelligence systems. High-quality data is essential for Artificial intelligence algorithms to learn and make accurate predictions, as poor data whether incomplete, biased, can lead to flawed models and unreliable outcomes[8], [9]. AI systems rely on vast datasets to identify patterns and make decisions, thus if the data is outdated, inconsistent, it can introduce bias and result in suboptimal performance[10]. The lack of accessible, varied data can limit AI's ability to generalize across different contexts, leading to overfitting or underperformance in real-world applications. Data

availability challenges also include ethical, legal, and privacy concerns, particularly in healthcare or finance, where data sharing is restricted. Balancing data privacy with availability is a major consideration in AI development, quality and accessibility of data are important determinants of AI's success in various domains[11].

Technology Infrastructure

Organizations need to invest in the necessary technology infrastructure to support AI implementation. The integration of artificial intelligence is a strong and adaptable technology infrastructure to support its implementation and scalability[3], [10]. Technology infrastructure in HR is necessary to manage and process large volumes of data. Cloud computing plays an important role in HR, offering scalable storage solutions and computational power that AI algorithms require, while enabling HR departments to access advanced tools for data analysis, automation, and predictive modelling [7].The success of AI in HR depends on the accessibility and usability of the technology.

Skill Development and Training

Skill development is important with the integration of AI technologies[2], [4]. AI can automate routine tasks and enriches decision-making processes, HR professionals need to develop new skills to effectively manage AI systems and adapt to the evolving landscape of work[8]. The adoption of AI demands proficiency in data literacy, as HR teams are required to interpret AI-generated analytics, understand data-driven insights, and make informed strategic decisions.HR professionals must familiar with AI tools and platforms, learning how to influence them for tasks like recruitment, employee engagement, talent management, and performance evaluation[1], [8]. This comprises acquiring skills in using AI applicant tracking systems, predictive analytics for workforce planning, and automation tools that streamline processes such as on-boarding and employee training[5], [10].

Improved productivity

AI has potential to improve productivity by automating routine tasks, streamlining processes, and decision-making[2], [7]. AI tools can develop efficiency in recruitment by quickly screening resumes, identifying top candidates, and automating the stages of communication with applicants, thus reducing the time-to-hire and improving the quality of hires.AI boosts productivity by supporting predictive analytics in HR functions. AI analyse historical workforce data to predict employee turnover, helping HR teams implement retention strategies[1], [5]. It can also forecast workforce needs based on business trends, assisting in better workforce planning and optimizing staffing levels[3], [12]. AI tools can analyse employee productivity and engagement metrics, offering personalized feedback and development opportunities, which promotes continuous improvement and enriches employee performance.

Objectives

To analyse the role of AI technologies in improving HR. To analyze the mediating effect of Skill Development and Training towards Data Quality and Availability and Improved productivity.

Hypothesis

H1: The adoption of Skill Development and Training programme will improve theHR's ability and productivity of the organization.

H2: Mediating effect of Skill Development and Training towards Data Quality and Availability and Improved productivity.

Methodology

This study employed a mixed-methods approach to investigate how emerging AI technologies enable collaborative data computation and enrich the management of HR functions. Cronbach's Alpha Value is 0.843, which surpassed 0.7 threshold, therefore the reliability of the questionnaire is proved. KMO value stands at 0.818, which exceeds the 0.5 threshold. Hence, it is categorized as an excellent level of adequacy.

Analysis and interpretation

Mediation Analysis - Andrews Hayes Test

Model – 4

- ✓ Dependent variable (Y) = IP (Improvedproductivity)
- ✓ Independent variable (X) = Data Quality and Availability
- ✓ Mediating variable (M) = Skill Development and Training

Table 1.1 Hayes process direct effect of Data Quality and Availability on Improvedproductivity

Variable	R	R – sq	MS E	F	df1	df2	P
	.5934	.3522	.6963	50.556	1.000	93.000	.000
	coef	Se	T	P	LL CI	UL CI	
constant	1.2077	.2425	4.9796	.0000	.7261	1.6893	
Data Quality and Availability	.5553	.0781	7.1103	.0000	.4002	.7104	

The table 1.1 shows that the direct effect between Data Quality and Availability and Improved productivity is statistically significant (coeff= 0. 5553, Se = .0781, P = 0.0000).

Hence, H1: The adoption of Skill Development and Training programme will improve the HR's ability and productivity of the organization.

Table 1.2 Mediating effect of Skill Development and Training towards Data Quality and Availability and Improvedproductivity

Variable	R	R- sq	MS E	F	df1	df2	P
	.65	.43	.968	35.04		92.0	.0

	76	24	1	06	2.0	0	00
	coe ff	Se	T	P	LL CI	UL CI	
Constant	.48 91	.32 18	1.51 97	.1320	- 150 1	1.12 83	
Data Quality and Availabil ity	.49 43	.11 44	4.32 02	.0089	.26 71	.721 5	
Skill Develop ment and Training	.39 22	.12 23	3.20 77	.0018	.14 94	.635 0	

Table 1.2 shows that mediating effect of Skill Development and Training between Data Quality and Availability and improved productivity is statistically significant (coeff = 0.4943, Se = 0.1144 and P=0.000). The direct effect Data Quality and Availability to Skill Development and Training is statistically significant (coeff = 0.3922, Se = 0.1223 and P=0.0018).

Table 1.3 Total effect, direct effect and indirect effect of Data Quality and Availability on improved productivity with mediating effect of Skill Development and Training.

Variable	Total Effect of X on Y					
	Effe ct	Se	T	P	LLC I	ULC I
	.712 1	.096 6	7.373 0	.000 0	.520 3	.903 9
	Direct Effect of X on Y					
	Effe ct	Se	T	P	LLC I	ULC I
	.494 3	.114 4	4.320 2	.000 0	.267 1	.721 5
Skill Developme nt and Training	Indirect Effect(s) of X on Y					
	Effe ct	Se	LLCI	ULC I		
	.185 8	.072 1	.0725	.351 4		

The table 1.3 indicates, Indirect effect (IP=0.1858 is statistically significant 95%, CI= (0.0725, 0.3514).

Recommendation

The integration of AI technologies offers substantial opportunities for improving efficiency and effectiveness, it also necessitates strategic recommendations to optimize their implementation. The organizations need to prioritize the establishment of robust data governance frameworks to ensure high-quality data collection, management, and analysis. Promoting culture of continuous learning among HR professionals is crucial, equipping them with the skills to effectively control AI technologies and adapt to evolving tools. The organizations must implement transparency measures and conduct regular audits of AI algorithms to ensure fair treatment in recruitment and performance evaluations. Organizations are encouraged to establish clear key performance indicators to measure the impact of AI. This will facilitate ongoing evaluation and adjustment, ensuring that AI technologies align with organizational goals and employee needs. When organizations considerately incorporate AI into the HR practices, they can achieve improvements in talent acquisition, employee engagement, and personnel management.

Conclusion

The integration of emerging AI technologies represents a transformative shift that enriches data computation, streamlines HR processes, and improves organizational effectiveness. The successful adoption of these technologies requires careful consideration of factors such as ethical implications, data quality, and skill development among HR professionals. The successful integration of emerging AI technologies in HR management depends on a combination of data quality, ethical considerations, organizational culture, infrastructure readiness, and ongoing training. Organizations need to adopt an iterative approach, regularly reviewing and refining AI applications based on performance data and employee feedback. HR teams embrace AI technologies, stand in a culture of lifelong learning within their organizations, encouraging employees to acquire new digital and analytical skills. This will focus on developing technical and ethical capabilities, supports HR professionals to harness AI's potential while maintaining a human-centered approach to managing the workforce.

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