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The Role of Artificial Intelligence in Human Resources Management: A Sectoral Review

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ABSTRACT

Artificial Intelligence (AI) is transforming Human Resource Management (HRM) across various sectors by improving talent management, streamlining administrative tasks, and enhancing employee experiences. This study provides a comprehensive analysis of AI's integration into HRM, examining its impact on key functions such as recruitment, performance assessment, and training in industries like IT, healthcare, manufacturing, and education. Employing a mixed-methods approach that includes quantitative surveys, qualitative interviews, and case studies from leading organizations, the research assesses stakeholder responses to AI-driven HR tools and highlights gaps between technological progress and human-centric practices. It tackles challenges such as resistance to AI, ethical dilemmas, data privacy issues, and implementation costs, while also pointing out opportunities for increased accuracy, personalized development, real-time analytics, and bias reduction. The literature review emphasizes AI's potential to boost HR adaptability and capabilities, particularly in the context of Industry 4.0 and remote work. However, there is a lack of empirical evidence on AI's long-term effects across sectors, highlighting the need for interdisciplinary longitudinal studies that encompass various industries and employee perspectives. Future research should focus on ethical issues, transparency in decision-making, and potential biases in AI-based HR practices.

Keywords: Artificial Intelligence, Human Resource Management, Talent Management, Machine Learning, Performance Evaluation, Employee Development, Stakeholder Perspectives, Workforce Scheduling, Recruitment Automation, Safety Compliance, Predictive Analytics, Natural Language Processing, Resume Screening, Behavioral Algorithms.

1. INTRODUCTION

Artificial Intelligence: Artificial Intelligence (AI) has not only emerged as a technological breakthrough, but also as a transformative force that alters how humans interact with information, systems, and decision-making processes. Unlike traditional computing, which relies on rules and is deterministic, AI is distinguished by its ability to learn, adapt, and enhance data, without explicit programming. Fundamentally, AI integrates elements from computer science, cognitive psychology, mathematics, and neuroscience to mimic aspects of human intelligence such as reasoning, problem-solving, perception, and language understanding.



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Human Resources Management: Human Resource Management (HRM) has evolved from merely a support role to a strategic pillar that significantly affects the long-term sustainability and innovation of businesses. Beyond handling administrative tasks such as hiring and payrolling, modern HRM now includes responsibilities such as talent development, shaping organizational culture, and aligning human resources with the strategic objectives of the company. This shift underscores the increasing acknowledgment that employees are not just assets, but also crucial drivers of adaptability, creativity, and resilience in a rapidly changing, knowledge-based economy. As digital transformation progresses, Artificial Intelligence (AI) becomes more deeply embedded in Human Resource Management (HRM). AI tools such as machine learning, natural language processing, and predictive analytics allow companies to enhance talent management, simplify administrative processes, and improve employee experience. Nevertheless, the adoption of AI in human resource management (HRM) varies across industries. Each sector encounters distinct operational needs, workforce characteristics, and regulatory challenges that affect how effectively AI can be integrated, and the obstacles it presents.

Importance: The impact of Artificial Intelligence (AI) on Human Resource Management (HRM) differs greatly among various industries, yet this sector-specific viewpoint is frequently neglected. Every industry faces unique challenges - like high staff turnover in retail, skill shortages in IT, or informal employment in logistics - that require tailored AI solutions. AI can provide industry-specific approaches like individualized skill development, focused retention plans, and tailored HR policies. Additionally, it facilitates more precise bias reduction, effective crisis management, and the integration of gig and informal workers into formal HR frameworks. Conducting a sectoral review is essential to reveal these intricacies and ensure that AI in HRM is properly aligned with the unique requirements and dynamics of each industry.

Challenges:

- 1. Fears surrounding AI often arise from concerns about job loss.
- 2. The ethical issues include transparency, bias, and accountability.
- 3. There is a mismatch between AI tools and the culture of organizations.
- 4. The risks involve data privacy and cyber security.

Opportunities:

- 1. Enhanced recruitment accuracy and reduced time-to-hire.
- 2. Personalized employee development and learning pathways.
- 3. Real-time analytics for workforce planning.
- 4. Reduction of unconscious bias in decision-making.
- 5. Streamlined HR operations with predictive insights.



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Sectoral Applications of AI in HRM

IT Sector: The IT industry has been at the forefront of integrating AI into human resource management, especially in areas like talent acquisition, onboarding, and performance analysis. AI-driven platforms such as HireVue and Pymetrics are extensively employed for tasks like resume screening, evaluating video interviews, and aligning candidates with roles using behavioral algorithms.

Healthcare Sector: In the healthcare field, AI is predominantly utilized for workforce scheduling, compliance training, and employee wellness initiatives. The essential nature of medical services necessitates AI systems that emphasize accuracy, safety, and adherence to regulations. Chatbots are being increasingly utilized to manage internal HR queries and handle administrative tasks.

Manufacturing Sector: Manufacturing companies apply AI for predictive maintenance training, ensuring safety compliance, and optimizing labor. AI also plays a crucial role in reskilling and upskilling programs that are aligned with automation trends in the sector. However, the adoption of AI in HR within this industry is still limited due to financial constraints and gaps in digital skills.

Education Sector: The use of AI in educational human resource management is still developing, with its applications spanning recruitment automation, faculty performance assessment, and the management of online learning. Additionally, AI aids in ensuring policy adherence and planning for academic HR, especially in universities shifting towards hybrid education models.

Stakeholder Perspectives: HR professionals typically see AI as a means to boost productivity and improve decision-making. Nonetheless, employees have concerns about job loss, data privacy, and the fairness of decisions made by algorithms. Managers highlight the necessity for AI systems that are explainable and the need for training to understand AI outputs. Effective communication strategies and inclusive design are essential for gaining stakeholder acceptance.





Figure 2.Sector -wise Adaptation of AI in HRM functions

To critically examine the sector-specific adoption, challenges, and strategic impact of AI-powered Human Resource Management practices across high-growth and traditionally low-tech industries, with a focus on comparative stakeholder perspectives and implementation maturity.

2. LITERATURE REVIEW

Dr. Riya Sharma (2025): This study explores how Artificial Intelligence (AI) is reshaping HR functions within the framework of Industry 4.0. The research surveyed 271 HR professionals across IT, manufacturing, and service industries, concentrating on five AI application domains and three dimensions of HR preparedness. Utilizing SPSS and AMOS for data analysis, the findings indicate that AI significantly boosts HR's adaptability and overall capabilities. Key advantages identified include organizational diagnostics and employee well-being. The results underscore AI's essential role in fostering sustainable HR practices.

Dr. Anjali Mehta (2025): This research investigates the influence of AI on Human Resource Management (HRM) amid the COVID-19 pandemic and the surge in remote work. It demonstrates how AI has optimized crucial HR functions such as recruitment, hiring, performance evaluation, training, and job distribution. The study highlights AI's contribution to reducing workload and improving workplace efficiency, while also addressing new opportunities and challenges posed by AI in HR.

Sabrina Zeh, Andreas Eckhardt, and Christian Maier (2023): This research delves into AI's impact on decision-making in personnel selection within HRM. It reveals that decision-makers often exhibit a status quo bias, prioritizing higher-ranked candidates suggested by AI systems. The study identifies three types of information search strategies, noting that more extensive and balanced searches lead to better selection outcomes, whereas minimal searches result in poor decisions. Efforts to mitigate over reliance on AI through responsibility priming or AI transparency showed no significant impact.

Kalia, P. and Mishra, G. (2023): This research investigates the use of AI in four essential HR areas: talent acquisition, training and development, performance management, and employee engagement. Utilizing secondary research and real-world case studies, it demonstrates how AI-powered tools enhance



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operational efficiency and aid strategic decision-making. The results indicate that although AI provides substantial advantages, its implementation remains limited and is affected by the size and structure of organizations. This study adds to the ongoing discussion by presenting a new viewpoint on the integration of AI in HRM specific to the sector.

P. Hinge, H. Salunkhe, and M. Boralkar (2023): This research explores the transformative impact of Artificial Intelligence in Human Resource Management, emphasizing how automation assists HR professionals without eliminating the human aspect. By automating tasks such as creating job descriptions, screening candidates, and promoting jobs, AI enables HR teams to focus more on employee engagement and problem-solving. The study also includes a sentiment analysis of We360.ai application users to assess their attitudes toward AI adoption in HR processes. The findings show a positive balance between technological efficiency and preserving workplace humanity. Practical examples from leading companies demonstrate AI's increasing role in enhancing HR operations.

Johnson, Coggburn, and Llorens (2022): This research highlights that AI tools offer promising improvements but also raise critical ethical and governance challenges. Key concerns include algorithmic bias, lack of transparency, and potential threats to equity and merit-based principles. The authors emphasize the importance of aligning AI implementation with public values such as fairness and accountability. They call for further research to guide ethical and effective use of AI in public sector HRM.

Bhardwaj, Singh, and Kumar (2021): This research highlights that AI significantly enhances HR performance, particularly when aligned with organizational innovation and ease of use. Through a survey of 115 HR professionals, the study confirms that integrating AI into recruitment, training, and appraisal functions boosts operational efficiency. It also stresses the importance of adaptability and technological readiness for successful AI adoption. This research emphasizes AI's strategic role in advancing HRM within the Industry 4.0 framework.

3. RESEARCH GAP

Empirical evidence regarding the long-term effects of AI on human resources across various industries is scarce. Employee perspectives are often underrepresented in studies on AI in HR. However, there is a lack of comparative research across different sectors. There is also an inadequate emphasis on the ethical considerations of HR algorithms. Thus, an interdisciplinary approach that integrates human resource management, ethics, and AI engineering is necessary, highlighting the need for comprehensive longitudinal studies that encompass diverse industries and employee viewpoints. Future research should focus on the ethical implications of AI-driven HR practices, particularly regarding decision-making transparency and potential biases. Interdisciplinary collaborations between HR professionals, ethicists, and AI engineers can yield valuable insights into developing responsible and effective AI systems for human resource management.

Scope of the study:

This study aims to provide a comprehensive sectoral review of Artificial Intelligence (AI) adoption in Human Resources Management (HRM). It examines the impact of AI on core HR functions such as recruitment, appraisal, and training across different industries, including IT, healthcare, manufacturing, and education. This research will assess stakeholder responses to AI-driven HR tools and explore perspectives from HR professionals, employees, and managers. Additionally, this study identifies gaps between technological innovation and human-centric HR practices, addressing challenges such as



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resistance to AI, ethical concerns, and data privacy risks. By analyzing sector-specific applications and reviewing the relevant literature, this research seeks to highlight opportunities for enhanced HR operations through AI integration while acknowledging implementation barriers. This study contributes to the understanding of AI's role of AI in reshaping HRM practices and its potential to improve organizational efficiency and decision-making processes. This will involve a mixed-methods approach, combining quantitative surveys with qualitative interviews to gather comprehensive data on AI adoption in HR practices. Case studies from leading organizations in each industry sector are analyzed to identify the best practices and lessons learned in AI implementation. The findings can be used to develop a framework for successful AI integration in HR, taking into account industry-specific challenges and opportunities.

4. **RESULTS & CONCLUSION**

AI offers significant transformative potential for HRM, but its full benefits can only be achieved through careful implementation that honors human values, ethics, and inclusive. Adopting a sector-specific approach allows for more customized and effective AI strategies, while engaging stakeholders to actively ensure alignment with organizational objectives. Future research and practice should emphasize transparency, fairness, and collaboration in the development of AI-enabled HR systems. As organizations continue to integrate AI into their HR processes, it is crucial to establish clear guidelines and frameworks for responsible AI use. Regular audits and assessments of AI systems should be conducted to identify and mitigate potential biases and unintended consequences. By prioritizing ethical considerations and fostering a culture of transparency, companies can harness the power of AI in HRM while maintaining trust and fairness in the workplace.

Recommendation for improvement:

To enhance the introduction, it is advised to create a more seamless and unified transition between the topics of Artificial Intelligence (AI) and Human Resource Management (HRM). Although each section distinctly outlines its respective area, establishing a more direct connection by emphasizing how AI's cognitive abilities align with the strategic evolution of HRM will improve the conceptual flow. Including a concise summary sentence at the conclusion of the introduction could also clarify the paper's aim: to investigate the sector-specific effects of AI on HRM functions, challenges, and opportunities. This would help establish a clear research focus and capture the reader's interest from the beginning.

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