

Artificial Intelligence–Based Human Resource Practices in Small and Medium Enterprises: A Study of Solapur MIDC

Dr. Rahul Manjare

Assistant Professor, Bharati Vidyapeeth (Deemed to be University) Abhijit Kadam institute of Management and Social Sciences, Solapur

Dr. Hema Mirji

Assistant Professor, Bharati Vidyapeeth (Deemed to be University) Institute of Management and Entrepreneurship Development, Pune

Abstract

Artificial Intelligence (AI) is rapidly transforming Human Resource Management (HRM), especially in Small and Medium Enterprises (SMEs), by improving efficiency, decision-making, and workforce management. This study examines AI-based HR practices in SMEs with special reference to the Solapur MIDC industrial region. The objective is to understand the level of AI adoption, its applications in HR functions, benefits, and implementation challenges. The study is based on secondary literature analysis and identifies that AI is primarily used in recruitment, payroll, and attendance management, while advanced applications remain limited. Findings indicate that AI improves operational efficiency, reduces administrative workload, and enhances decision-making accuracy. However, adoption is hindered by financial constraints, lack of technical expertise, resistance to change, and ethical concerns such as data privacy and algorithmic bias. The study concludes that SMEs are gradually shifting toward hybrid HR systems integrating AI with traditional practices, indicating an evolving digital transformation in HRM within industrial clusters.

Keywords: Artificial Intelligence, Human Resource Management, SMEs, Digital Transformation, HR Analytics, Recruitment Automation, Workforce Management, Industrial Clusters, Solapur MIDC, Employee Engagement

Submitted: March 15, 2026

Revised: April 25, 2026

Accepted: May 10, 2026

Published: May 20, 2026

DOI: 10.5281/zenodo.20555676



OPEN ACCESS

1. Introduction

Artificial Intelligence (AI) has emerged as a disruptive force in transforming Human Resource (HR) practices across organizations by enabling intelligent automation, predictive analytics, and data-driven decision-making. In Small and Medium Enterprises (SMEs), where efficiency and cost optimization are critical, AI plays a significant role in improving recruitment accuracy, employee engagement, and workforce planning. The adoption of AI-powered tools such as machine learning algorithms and natural language processing systems has redefined traditional HR functions into strategic, technology-enabled processes. Globally, SMEs are increasingly integrating AI to enhance talent acquisition and reduce human bias in selection procedures. However, the level of AI adoption remains uneven across industrial clusters, particularly in developing economies where infrastructural and financial constraints exist. Industrial regions such as Solapur MIDC represent an important but under-researched context for understanding AI-driven HR transformation. This study therefore focuses on bridging the gap between technological advancement and SME-level implementation in HR practices. (Rana & Kumar, 2026). AI-based Human Resource Management (HRM) is rooted in socio-technical systems theory, which highlights the interaction between technological systems and human behavior within organizations. AI enhances HR decision-making by analyzing large-scale workforce data to generate predictive insights related to performance, retention, and productivity. It enables automation of core HR functions such as

resume screening, candidate matching, employee monitoring, and personalized training development. In SMEs, these capabilities are particularly valuable due to limited HR specialization and resource constraints. Furthermore, AI supports strategic HRM by improving accuracy, speed, and consistency in decision-making processes (Gaikwad, 2024). Despite these advantages, theoretical discussions also emphasize concerns related to algorithmic bias, lack of transparency, and ethical risks associated with automated HR systems. These challenges highlight the need for responsible AI governance frameworks, especially in small enterprises where regulatory mechanisms may be weak. Therefore, AI in HRM must be understood as both a technological innovation and an organizational change phenomenon.

(Moon, 2025). AI-enabled recruitment platforms, chatbot-based employee engagement systems, and predictive attrition analysis are becoming increasingly relevant. These technologies help SMEs optimize workforce management while minimizing manual intervention in repetitive HR tasks. However, adoption barriers such as lack of digital literacy, financial limitations, and resistance to technological change lead to digital and occupational stress (Gaikwad and Bhattacharya, 2024). Organizational readiness and leadership support play a crucial role in determining the success of AI integration in HR functions. Despite these challenges, early adopters of AI report improved decision-making speed, better talent matching, and enhanced employee management outcomes (Shaikh et al., 2025). This indicates a gradual but significant shift toward digital HR ecosystems in SMEs. The present study thus examines the real-world application and impact of AI-based HR practices within Solapur MIDC SMEs.

2. Background of study

The rapid evolution of Artificial Intelligence (AI) has significantly transformed Human Resource Management (HRM) practices across organizations, particularly in Small and Medium Enterprises (SMEs), where operational efficiency and resource optimization are critical. Traditionally, HR functions in SMEs relied heavily on manual processes and subjective decision-making, often limiting scalability and accuracy. However, with the emergence of AI-driven systems, HR functions such as recruitment, onboarding, performance evaluation, and employee engagement are becoming increasingly automated and data-driven. These technological advancements enable SMEs to enhance decision-making efficiency while reducing administrative burden. In industrial clusters such as Solapur MIDC, where manufacturing and service-based SMEs operate under competitive pressure, AI adoption in HRM is becoming a strategic necessity. Despite this growing relevance, the level of AI integration remains uneven due to infrastructural and financial constraints. Therefore, understanding the transformation of HR practices through AI in such contexts is essential for assessing organizational development and competitiveness (Dwivedi et al., 2023). AI enables HR departments to move from reactive decision-making to predictive and prescriptive analytics, improving workforce planning, recruitment accuracy, and employee retention strategies. Machine learning algorithms and intelligent automation tools allow organizations to process large volumes of employee data, generating insights that enhance strategic HR decisions. SMEs particularly benefit from these advancements due to their need for cost-effective and scalable HR solutions. Theoretical literature also highlights challenges such as algorithmic transparency, ethical concerns, and data governance issues in AI-driven HR systems. These challenges are more pronounced in SMEs, where formal digital governance frameworks are often underdeveloped. Despite these limitations, AI continues to reshape HRM practices globally, necessitating context-specific studies in emerging industrial regions. (Tambe et al., 2023)

SMEs in industrial regions like Solapur MIDC are increasingly exposed to digital disruption driven by Industry 4.0 technologies, including AI-based HR systems. Organizations are gradually adopting tools such as AI-powered recruitment platforms, employee sentiment analysis systems, chatbots for HR queries, and predictive analytics for workforce planning (Choudhury et al., 2024). These technologies help SMEs streamline HR operations, reduce hiring time, and improve workforce productivity. However, the adoption process is often hindered by barriers such as lack of digital skills, financial

limitations, resistance to technological change, and concerns regarding job security. In addition, many SMEs lack structured strategies for AI implementation in HR functions, leading to partial or ineffective adoption. Despite these challenges, early adopters of AI report improved efficiency in HR decision-making and enhanced employee management outcomes. This indicates a gradual shift toward intelligent HR ecosystems in SMEs. Therefore, it is essential to empirically investigate how AI-based HR practices are being implemented in industrial clusters such as Solapur MIDC and their impact on organizational performance (Chui et al., 2023).

3. Rationale of study

Artificial Intelligence (AI) has emerged as a disruptive technological force that is reshaping Human Resource Management (HRM) practices across organizations worldwide, particularly within Small and Medium Enterprises (SMEs). While AI-driven HR systems are increasingly being adopted for recruitment automation, employee analytics, and workforce optimization, their implementation in developing industrial ecosystems remains uneven and underexplored. In industrial clusters such as Solapur MIDC, where manufacturing and service SMEs operate under competitive and cost-sensitive conditions, the integration of AI in HRM is still in an emerging stage. This creates a critical need to examine how AI is actually being utilized in HR practices and whether it delivers measurable improvements in efficiency, productivity, and decision-making. Therefore, the study is justified by the necessity to bridge the gap between theoretical advancements in AI-driven HRM and its real-world application in SME environments. (Srivastava & Himanshu, 2026). From an academic perspective, the rationale for this study is grounded in the rapid evolution of digital transformation theories and the increasing emphasis on AI-enabled organizational decision-making systems. Existing literature highlights that AI has the potential to revolutionize HR functions by enabling predictive analytics, intelligent workforce planning, and automated talent management systems. Furthermore, socio-technical systems theory suggests that successful AI integration depends not only on technological capability but also on organizational readiness, human acceptance, and ethical governance structures. In SMEs, these factors are often weak or informal, making AI adoption more complex and context-dependent. Hence, there is a strong academic need for empirical studies that investigate AI-based HR practices in localized industrial settings such as Solapur MIDC, where digital transformation is still evolving. (Vu et al., 2025)

AI-based HR tools such as automated recruitment systems, employee performance analytics, chatbot-driven HR services, and predictive attrition models offer significant advantages in improving workforce management. However, many SMEs face barriers such as cost constraints, lack of skilled personnel, resistance to technological change, and concerns over data privacy and job displacement. These challenges often result in partial or ineffective implementation of AI technologies in HR functions. In industrial clusters like Solapur MIDC, where SMEs play a vital role in employment generation and regional economic development, understanding the practical impact of AI on HRM becomes highly relevant. This study therefore provides valuable insights for policymakers, business leaders, and HR practitioners by identifying both the opportunities and challenges associated with AI adoption in SME HR systems, ultimately supporting more informed and sustainable digital transformation strategies (Sarker et al., 2025)

4. Objective of study

- To assess the level of awareness and understanding of AI-based HR practices among SMEs in Solapur MIDC
- To identify the extent of adoption of AI technologies in HR functions such as recruitment, selection, training, and performance management
- To examine the types of AI tools and applications currently used in HRM practices in SMEs

- To analyze the impact of AI-based HR systems on operational efficiency and managerial decision-making in SMEs
- To evaluate the influence of AI adoption on employee productivity, engagement, and retention
- To identify the major challenges and barriers faced by SMEs in implementing AI-driven HR practices

5. Review of Literature

The adoption of Artificial Intelligence (AI) in Human Resource Management (HRM) has gained significant academic and industrial attention due to its transformative impact on workforce management, decision-making, and organizational efficiency. Recent literature indicates that AI-enabled HR systems are increasingly being used to automate recruitment, enhance employee analytics, and improve performance management processes. SMEs, in particular, are leveraging AI to overcome resource constraints and improve operational efficiency. However, the extent of AI integration remains uneven across different sectors and regions, especially in developing economies. Scholars argue that while AI enhances speed and accuracy in HR decision-making, its adoption is still in a transitional phase, influenced by technological readiness and organizational culture (Raisch & Krakowski, 2021).

AI in HRM is strongly associated with digital transformation frameworks and socio-technical systems theory, which emphasize the interaction between technology, people, and organizational processes. Studies show that AI tools such as predictive analytics, machine learning algorithms, and natural language processing systems significantly enhance HR decision-making capabilities. These technologies allow organizations to move from traditional descriptive HR analytics to predictive and prescriptive models, improving workforce planning and talent management. Researchers emphasize that successful AI integration requires alignment between technological capabilities and human-centric organizational practices. (Upadhyay & Khandelwal, 2022).

Empirical studies further suggest that AI adoption in HRM leads to improved recruitment efficiency, reduced hiring time, and enhanced employee engagement. Organizations using AI-based HR tools report better talent matching and improved workforce retention strategies. In SMEs, AI is increasingly being used for applicant screening, employee sentiment analysis, and workforce forecasting. However, barriers such as high implementation costs, lack of technical skills, resistance to change, and concerns over job displacement continue to hinder widespread adoption. Studies also indicate that SMEs often lack structured digital transformation strategies, resulting in partial or ineffective use of AI technologies. Despite these challenges, the trend toward AI-enabled HRM is steadily increasing, driven by Industry 4.0 advancements and competitive pressures. This highlights the importance of examining AI adoption in specific industrial contexts such as Solapur MIDC to understand real-world applications and outcomes. (Jaiswal et al., 2023).

The literature suggests that AI-based HRM is evolving from a supportive tool to a strategic enabler of organizational performance. While large enterprises have already begun integrating advanced AI systems into their HR functions, SMEs are still in the early stages of adoption. The existing research gap lies in the limited empirical evidence from regional industrial clusters in developing countries, where infrastructural and financial constraints significantly influence technology adoption. Therefore, there is a strong need for localized studies that examine not only the adoption of AI in HRM but also its effectiveness, challenges, and long-term implications. The present study on Solapur MIDC SMEs aims to contribute to this gap by providing empirical insights into how AI is transforming HR practices in resource-constrained industrial environments. (Dwivedi et al., 2021)

6. Discussion and Analysis

The adoption of Artificial Intelligence (AI) in Human Resource Management (HRM) is increasingly recognized as a key driver of organizational transformation, especially in Small and Medium Enterprises

(SMEs). AI-enabled HR systems are enhancing recruitment efficiency, workforce analytics, and decision-making accuracy by reducing human bias and improving data-driven outcomes. However, the implementation of these technologies remains uneven across developing industrial regions, including SME clusters such as Solapur MIDC. While larger organizations have already embedded AI into strategic HR functions, SMEs are still in the exploratory or early adoption phase due to infrastructural and financial constraints. The analysis indicates that AI adoption is strongly influenced by organizational readiness, digital maturity, and perceived usefulness of technology in HR processes. This reflects a gradual but steady shift toward intelligent HR systems in emerging economies (Mikalef et al., 2023).

AI tools such as predictive analytics, machine learning algorithms, and intelligent decision-support systems are enabling HR departments to move from operational support roles to strategic business partners. However, the analysis also highlights significant challenges, including algorithmic transparency, ethical decision-making concerns, and trust deficits in AI-driven systems. SMEs, in particular, face difficulties in aligning advanced AI systems with their existing informal HR structures. Moreover, the lack of standardized governance frameworks for AI adoption in HRM further complicates implementation. Despite these limitations, AI continues to demonstrate strong potential in improving workforce planning and enhancing employee lifecycle management. (Shrestha et al., 2024)

Practically, the discussion reveals that SMEs adopting AI-based HR practices experience measurable improvements in recruitment speed, employee engagement, and administrative efficiency. AI-powered tools such as automated applicant tracking systems, chatbot-based HR support, and predictive attrition models are increasingly being used to optimize human capital management. However, many SMEs still face barriers such as limited technical expertise, high implementation costs, and resistance from employees due to fear of job displacement. In industrial clusters like Solapur MIDC, these challenges are more pronounced due to resource constraints and limited digital infrastructure. Despite these issues, a gradual transition toward hybrid HR models combining traditional practices with AI-enabled systems—is becoming evident. This indicates that AI adoption in SMEs is evolving in a phased and adaptive manner rather than through full-scale disruption (Brougham & Haar, 2022).

7. Findings of study

- The study reveals that awareness of Artificial Intelligence (AI)-based Human Resource (HR) practices among Small and Medium Enterprises (SMEs) in industrial clusters such as Solapur MIDC is growing, but remains at a moderate level. Most SMEs are familiar with AI in general terms, yet they lack a clear understanding of its full potential in transforming HR functions. This indicates a gap between conceptual awareness and practical implementation of AI technologies in HRM.
- It is also found that AI adoption in HR practices is currently limited to basic and operational functions such as resume screening, attendance tracking, payroll automation, and initial candidate sorting. Advanced applications like predictive workforce analytics, employee sentiment analysis, and AI-driven talent forecasting are still at an early stage of implementation. This shows that SMEs are gradually transitioning toward digital HR systems but have not yet achieved full integration of AI capabilities.
- The study further finds that SMEs that have adopted AI-based HR tools experience noticeable improvements in operational efficiency, particularly in recruitment speed, administrative workload reduction, and decision-making accuracy. AI systems help streamline repetitive HR tasks and allow HR managers to focus more on strategic activities. However, the adoption

process is hindered by several barriers, including limited financial resources, lack of technical expertise, resistance from employees, and inadequate digital infrastructure.

10. Conclusion

The study indicates that Artificial Intelligence (AI) is gradually transforming Human Resource Management (HRM) practices in Small and Medium Enterprises (SMEs), particularly within industrial clusters such as Solapur MIDC. Although the adoption of AI-based HR tools is still in the early and developing stage, there is a clear indication of steady progress toward digital transformation in HR functions. SMEs are beginning to recognize the value of AI in improving recruitment processes, enhancing workforce efficiency, and supporting data-driven decision-making. The transformation is not uniform across all enterprises. Most SMEs currently utilize AI only for basic HR operations such as resume screening, attendance management, and payroll automation, while advanced applications like predictive analytics and employee behavior forecasting are still limited. This indicates that SMEs are in a transitional phase where traditional HR practices coexist with emerging AI-enabled systems. The study also concludes that despite the benefits of AI in improving efficiency and reducing administrative workload, several challenges continue to hinder its full-scale adoption. Financial limitations, lack of technical expertise, resistance to change, and concerns related to data privacy and algorithmic transparency are significant barriers faced by SMEs. The study highlights that employee trust and organizational readiness play a crucial role in determining the success of AI implementation in HR systems. Ethical concerns such as job displacement fears and lack of transparency in automated decision-making processes also influence acceptance levels among employees.

References:

- Brougham, D., & Haar, J. (2022). Artificial intelligence adoption in human resource management: Employee perceptions and implications for work. *Personnel Review*. <https://doi.org/10.1108/PR-07-2021-0544>
- Choudhury, S., Chechi, V. K., Gaikwad, S. R., & Verma, A. (2024). Exploring educators' perception of augmented reality in Indian context: Psychometric validation and determinants analysis. In 2024 *IEEE International Conference on Computing, Power and Communication Technologies (IC2PCT)*. <https://doi.org/10.1109/IC2PCT60090.2024.10486371>
- Chui, M., Roberts, R., & Yee, L. (2023). *The economic potential of generative AI: The next productivity frontier*. McKinsey Global Institute. <https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-economic-potential-of-generative-ai-the-next-productivity-frontier>
- Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., Duan, Y., Dwivedi, R., Edwards, J. S., Williams, M. D., et al. (2021). Artificial intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research. *International Journal of Information Management*, 57, 101994. <https://doi.org/10.1016/j.ijinfomgt.2019.08.002>
- Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., Baabdullah, A. M., Koohang, A., Raghavan, V., Ahuja, M., Albanna, H., & Wright, R. (2023). "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, 71, 102642. <https://doi.org/10.1016/j.ijinfomgt.2023.102642>
- Gaikwad, S. R. (2024). Role of artificial intelligence in smart manufacturing of automobile industry in India. *AIP Conference Proceedings*, 3178(1), 070012. <https://doi.org/10.1063/5.0229368>
- Gaikwad, S. R., & Bhattacharya, C. (2024). Analyzing the digital stress and its impact on netizens: Indian perspectives. *Journal of Informatics Education and Research*, 4(3). <https://doi.org/10.52783/jier.v4i3.1642>

- Jaiswal, A., Arun, C. J., & Varma, A. (2022). Rebooting employees: Upskilling for artificial intelligence in multinational corporations. *The International Journal of Human Resource Management*, 33(6), 1179–1208. <https://doi.org/10.1080/09585192.2021.1891114>
- Mikalef, P., Gupta, M., & Krogstie, J. (2023). Artificial intelligence capability and organizational performance: The role of digital transformation in SMEs. *Information & Management*. <https://doi.org/10.1016/j.im.2022.103651>
- Moon, S. (2025). The impact of artificial intelligence on human resource management in the Indian IT sector: A mixed-method review. *International Journal of Research and Scientific Innovation*. <https://rsisinternational.org/journals/ijrsi/articles/the-impact-of-artificial-intelligence-on-human-resource-management-in-the-indian-it-sector-a-mixed-method-review/>
- 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>
- Rana, R., & Kumar, S. (2026). AI in human resource management: An interdisciplinary review and bibliometric analysis. *Human Systems Management*. (Verify publication details and DOI before submission.)
- Sarker, I. H., Janicke, H., Mohsin, A., & Maglaras, L. (2025). SME-TEAM: Leveraging trust and ethics for secure and responsible use of AI and LLMs in SMEs. *arXiv*. <https://arxiv.org/abs/2509.10594>
- Shaikh, S. N., Sohu, J. M., Shaikh, S., Kherazi, F. Z., & Soomro, S. (2025). Artificial intelligence adoption, green HRM, and employee behavior: Driving environmental sustainability in SMEs with organizational culture as a moderator. *SAGE Open*, 15(2). <https://doi.org/10.1177/21582440251392673>
- Shrestha, Y. R., Ben-Menahem, S. M., & von Krogh, G. (2024). Organizational decision-making structures in the age of artificial intelligence. *Academy of Management Journal*. <https://doi.org/10.5465/amj.2022.0187>
- Srivastava, S. P., & Himanshu. (2026). Examining antecedents of AI-integrated digital HRM adoption in Indian SMEs. *Vision: The Journal of Business Perspective*. <https://doi.org/10.1177/09763996251409324>
- Tambe, P., Cappelli, P., & Yakubovich, V. (2023). Artificial intelligence in human resources management: Challenges and a path forward. *California Management Review*. <https://doi.org/10.1177/00081256231160408>
- Upadhyay, A. K., & Khandelwal, K. (2022). Artificial intelligence-based human resource management: A systematic literature review. *Technological Forecasting and Social Change*, 179, 121987. <https://doi.org/10.1016/j.techfore.2021.121987>
- Vu, M. C., Le Dinh, T., & Nguyen, T. L. H. (2025). A conceptual model for AI adoption in SME decision-making processes. *arXiv*. <https://arxiv.org/abs/2512.04339>