

AI-Based HR Practices and Talent Management Effectiveness

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Abstract. Artificial intelligence is increasingly transforming human resource management by automating routine processes, improving data-driven decision-making and supporting strategic talent management. AI-based HR practices, including recruitment automation, HR chatbots, predictive analytics and AI-powered performance systems, are becoming important tools for improving recruitment efficiency, employee performance, employee development and retention. At the same time, the adoption of AI in HR creates challenges related to data privacy, algorithmic bias, transparency, implementation costs and employee trust. The objective of this study is to examine the influence of AI-based HR practices on talent management effectiveness in organisations, with particular attention to recruitment, employee performance, employee development and retention outcomes. The study applies a quantitative research approach based on primary and secondary data. Primary data were collected through a structured questionnaire distributed among 100 employees and HR professionals from different organisations. A five-point Likert scale was used to measure respondents' perceptions. The study adopted a descriptive research design and convenience sampling technique. Structural Equation Modeling was used to analyse the relationship between AI-based HR practices as the independent variable and talent management effectiveness as the dependent variable. The findings indicate that AI-based HR practices have a positive influence on talent management effectiveness. The SEM results show strong positive relationships between AI-based HR practices and automation, predictive analytics and AI-powered systems. The results also demonstrate that AI contributes to recruitment efficiency, employee performance and employee development, with employee development showing the strongest contribution among the outcome variables. AI-based HR practices are an important strategic instrument for modern organisations. They improve HR efficiency, support evidence-based decision-making and strengthen talent management outcomes. Further research should examine larger and more diverse samples, compare industries, analyse ethical risks, assess employee trust in AI-based HR decisions and investigate the long-term impact of AI on jobs, organisational culture and workforce development.

Keywords: artificial intelligence; AI-based HR practices; human resource management; talent management; recruitment automation; HR analytics; predictive analytics; employee performance; employee development; employee retention; structural equation modeling; digital HR transformation.

JEL Classification: M12; M15; M51; M53; O33; J24.

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Introduction. The modern commercial landscape is advancing rapidly. Technology is constantly changing, digital disruption challenges the status quo, and competition is not only local but also global. Companies are increasingly knowledge-driven, and employees are no longer viewed simply as workers. They are among the most valuable strategic resources of an organisation. For this reason, managing talent is not merely an ordinary HR responsibility. It is one of the ways in which organisations maintain competitive advantage.

Artificial Intelligence has transformed the landscape of human resource management. It is not only about automating paperwork or screening resumes. AI is now embedded in how organisations identify candidates, support employee development, maintain motivation and ensure retention (Maghsoudi et al., 2023). This transformation is changing how organisations understand talent management and how they design workforce strategies.

Artificial Intelligence refers to computer systems performing tasks that were previously assumed to require human intelligence, such as decision-making, problem-solving and learning from previous experience (What Is Artificial Intelligence?, 2020). In HR, AI appears in the form of machine learning systems, natural language processing, predictive modelling, robotic process automation, conversational agents and intelligent data tools (Garem, 2026). These systems help HR teams reduce repetitive work, analyse large datasets and make decisions that are more aligned with organisational needs (Chukwuka & Dibie, 2024).

Traditionally, human resource management was primarily administrative (Lazar, 2020). Recruiters manually reviewed resumes, performance evaluations often relied on intuition, and employee engagement programmes were rarely personalised (Sinclair, 2023). This paradigm has changed. Technological transformation has moved HR beyond its former administrative niche and into strategic organisational discussions (Parry & Battista, 2019). AI technologies now help companies identify skill gaps, predict employee turnover, adapt development plans and align talent strategies with long-term organisational goals (Zafar, 2023).

Talent management includes the processes of attracting, selecting, training, motivating and retaining employees (Gordana & Ilić, 2020). It includes hiring, onboarding, employee training, performance management, succession planning, employee engagement and retention (Wandhe, 2025). Its primary goal is clear: to place people with the right skills in the right roles at the right time (Petkoski & Јаковлев, 2022). Effective talent management enables organisations to improve productivity, strengthen innovation and respond to a competitive job market.

AI has changed the way organisations recruit and develop talent. It can review resumes, match skills, communicate with candidates and support recruitment decisions automatically (Farhan & Hatem, 2024). Predictive analytics can analyse historical recruitment and performance data to identify

suitable candidates (Pessach et al., 2020). These tools allow organisations to recruit faster, reduce human bias and improve the quality of hiring decisions (Oman et al., 2024). AI-powered systems can also support more inclusive hiring by reaching a wider and more diverse pool of candidates (“Cultivating Success,” 2024).

AI is also transforming employee development and performance evaluation. Advanced learning systems can recommend training based on employee performance and career goals (Nikitina et al., 2018). Managers receive real-time insights through AI analytics, allowing them to provide timely support and targeted feedback (Obiki-Osafiele et al., 2024). AI can also identify high-potential employees and support succession planning for leadership roles by aligning individual capabilities with organisational needs (Natarajan & Dhinakaran, 2024).

Employee engagement and retention are also strongly connected with AI-based HR systems. Machine learning tools can analyse surveys, communication patterns and employee data to identify early signs of disengagement (Evseeva et al., 2021). Predictive models can identify employees who may be considering leaving the organisation and give HR managers an opportunity to intervene (Tang et al., 2025). As a result, organisations can design better retention strategies and improve employee satisfaction (Hinge et al., 2023).

However, the adoption of AI in HR is not without challenges. Data protection and privacy must be addressed because AI systems require large volumes of employee data (Kaur & Gandolfi, 2023). There are also concerns about fairness, algorithmic bias and transparency, especially when automated decisions affect recruitment, promotion or performance evaluation (Cabiddu et al., 2022). Overreliance on technology may make HR appear impersonal and may negatively affect trust and organisational culture (Berg et al., 2020). Moreover, AI implementation can be costly, and not all organisations have the technical skills required to use these systems effectively.

Literature review. Artificial Intelligence has become an important technological advancement that is transforming modern HRM practices. Organisations increasingly use AI tools to automate HR functions such as recruitment, employee engagement, performance evaluation and workforce planning (Sundari et al., 2024). AI technologies allow HR managers to analyse large volumes of employee data and generate insights that support better decision-making (Nyathani, 2023).

Strohmeier and Piazza (2015), in their conceptual exploration of artificial intelligence techniques in HRM, analysed how AI, including machine learning, expert systems and data mining, can transform essential HR activities such as hiring, employee selection, training and employee performance tracking. They concluded that AI assists HR teams in making more informed decisions and improving efficiency by analysing employee

data, detecting patterns and supporting planning. However, they also highlighted concerns regarding ethics, data protection and the need for continuous human oversight.

Votto et al. (2021), in a systematic literature review on AI in tactical human resource management, examined how AI is used in recruitment, performance reviews, workforce training, workplace conduct management and compensation. Their findings show that AI is increasingly integrated into Human Resource Information Systems and helps HR teams work more efficiently through data-based decision-making. At the same time, they observed that most AI applications are concentrated in technical and data-heavy tasks, while more human-centred managerial decisions remain insufficiently explored.

Böhmer and Schinnenburg (2023) analysed AI-driven HRM through the Resource-Based View and examined how AI-enabled HRM can build organisational capabilities. They identified four important areas of difficulty: role structuring, openness, performance review and organisational data use. Their research suggests that AI can improve strategic HRM and organisational growth, but its benefits depend on how leaders manage transparency, data and human involvement.

Tinguely et al. (2023) examined the design of HRM systems in the age of AI. Their analysis shows that AI changes established HR practices by enabling data-based decisions, automation of repetitive tasks and better talent management. However, they emphasise that organisations should not allow machines to take full control. The best HR solutions combine AI technologies with human judgement to ensure fairness and transparency.

Bharadwaj (2024) provided a comprehensive overview of AI integration in HRM and argued that AI is reshaping recruitment, talent identification, employee engagement, staff training and performance measurement. AI enables organisations to work faster and make more accurate decisions. However, ethical issues, data privacy and transparency remain significant challenges.

Talent management refers to the process of attracting, developing and retaining skilled employees (Karalar & Atay, 2020; Singh, 2021). Effective talent management ensures that employees with the right skills are placed in appropriate roles to achieve organisational goals (Attar et al., 2025; Touwely et al., 2023). AI-based HR practices support talent management by helping organisations identify talented employees, monitor performance and design personalised training programmes (Alsaif & Aksoy, 2023; Suneetha et al., 2024). These tools also help HR managers understand employee behaviour and engagement levels, which supports retention strategies (Sabil et al., 2023; Vishwanath, 2023).

Recruitment is one of the major areas where AI technologies are widely used (Rathore, 2023; Ważna, 2024). AI-powered recruitment systems help organisations analyse resumes, shortlist candidates and schedule interviews

automatically (Farhan & Hatem, 2024; Khan et al., 2024). This reduces recruitment time and improves the accuracy of candidate selection (Biliavska et al., 2022; Năstase et al., 2024).

AI is also useful in employee development. AI-based learning platforms analyse employee performance and recommend training programmes based on skill requirements and career development needs (Bura et al., 2025; Farhan & Hatem, 2024). These systems help organisations design effective development programmes that improve employee capabilities and career growth (K, 2026; Tusquellas et al., 2024).

Previous studies have focused on HR analytics and digital HR technologies in improving organisational performance (Kiran et al., 2023; Tessema et al., 2025). However, limited studies have specifically examined the role of AI-based HR practices in improving talent management effectiveness. Most research focuses on analytics tools for decision-making rather than understanding how AI influences recruitment efficiency, employee development and employee retention. Therefore, this study addresses this gap by examining how AI-based HR practices contribute to talent management effectiveness in organisations.

Aims. The aim of this study is to examine how AI-based HR practices influence talent management effectiveness in organisations.

The objectives of the study are:

1. To analyse the role of AI-based HR practices in recruitment and talent acquisition.
2. To examine the influence of AI tools on employee performance and development.
3. To determine the relationship between AI-based HR practices and employee retention.
4. To evaluate the overall impact of AI-based HR practices on talent management effectiveness.
5. To identify the benefits and challenges of AI adoption in HRM.
6. To provide practical insights for organisations seeking to integrate AI into talent management systems.

The hypotheses of the study are formulated as follows:

- H1: AI-based HR practices positively influence recruitment and talent acquisition.
- H2: AI-based HR practices positively influence employee performance and development.
- H3: AI-based HR practices significantly improve employee retention.
- H4: AI-based HR practices significantly improve talent management effectiveness.

Methodology. This study is based on both primary and secondary data sources. Primary data were collected through a structured questionnaire distributed among employees and HR professionals working in different

organisations. Secondary data were collected from research articles, academic journals, books and credible online sources related to Artificial Intelligence and Human Resource Management.

A pragmatist research philosophy was adopted. Pragmatism focuses on practical solutions and real-world applications. This philosophy allows the study to understand how AI technologies are practically applied in HR practices and how they influence talent management in organisations.

A quantitative research approach was used. Data were collected through structured questionnaires and analysed using statistical techniques to understand the relationship between AI-based HR practices and talent management effectiveness.

The study adopted a descriptive research design. Descriptive research helps transform collected data into meaningful information that can be interpreted and analysed (Alfred, 2020). The sampling technique used in this study was convenience sampling. The sample consisted of 100 respondents, including employees and HR professionals who are familiar with HR practices and AI-based HR systems.

The independent variable of the study is AI-based HR practices, while the dependent variable is talent management effectiveness. AI-based HR practices include tools such as automated recruitment systems, AI chatbots, HR analytics tools and AI-based performance management systems (Maghsoudi et al., 2023). Talent management effectiveness refers to an organisation's ability to attract, develop, engage and retain talented employees (Nikadimovs & Ivanchenko, 2020).

A five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5) was used to measure respondents' perceptions.

The research model explains the relationship between AI-based HR practices and talent management effectiveness. In this study, AI-based HR practices are considered the independent variable, while talent management effectiveness is considered the dependent variable. The model examines how AI tools such as recruitment automation, AI chatbots, HR analytics and AI-based performance systems influence recruitment efficiency, employee performance, employee retention and employee development.

Results. The demographic profile of respondents shows that the majority of respondents were male, representing 64% of the total sample, while female respondents represented 36%. With respect to age distribution, most respondents were below 30 years old, representing 42% of the sample. Respondents aged 31 to 40 years represented 36%, while respondents aged 41 to 50 years represented 22%. There were no respondents above 50 years old.

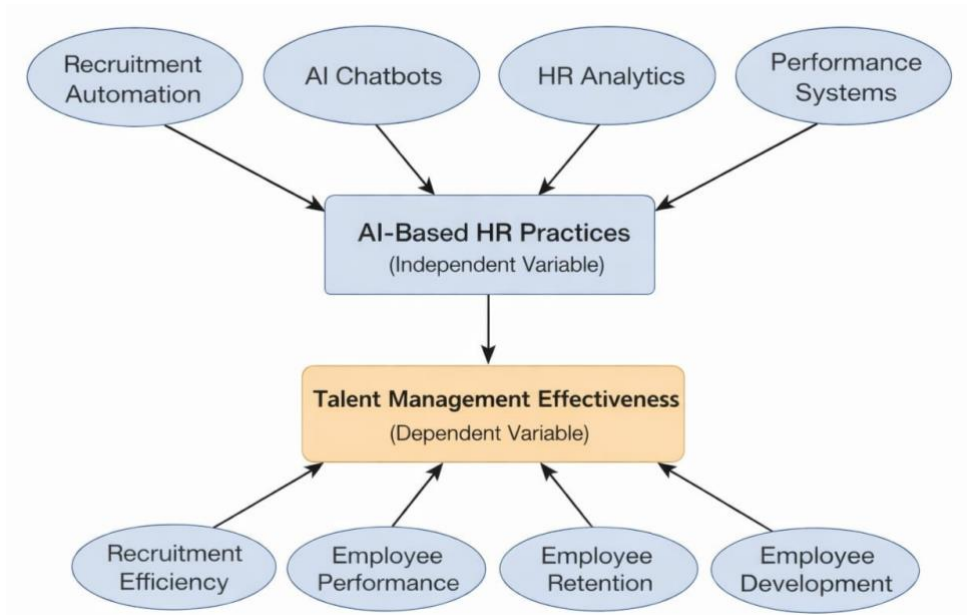


Figure 1. Structural model of the study

Source: developed by the authors based on the research model of the study.

In terms of educational qualification, the majority of respondents were graduates, representing 48% of the sample. Postgraduates represented 14%, diploma holders represented 10%, and respondents with other qualifications represented 28%. Regarding work experience, most respondents had less than five years of experience, representing 56% of the sample. Respondents with 5 to 10 years of experience represented 28%, while those with more than 10 years of experience represented 16%.

Table 1. Demographic profile of respondents

Category	Option	Count	Percentage (%)
Gender	Male	64	64
Gender	Female	36	36
Gender	Total	100	100
Age	Less than 30 years	42	42
Age	31-40 years	36	36
Age	41-50 years	22	22
Age	Above 50 years	0	0
Age	Total	100	100
Education qualification	Diploma	10	10
Education qualification	Graduate	48	48
Education qualification	Postgraduate	14	14
Education qualification	Others	28	28
Education qualification	Total	100	100
Work experience	Less than 5 years	56	56
Work experience	5-10 years	28	28
Work experience	Above 10 years	16	16
Work experience	Total	100	100

Source: compiled by the authors based on primary survey data.

The demographic distribution of respondents is additionally presented in Figures 2-5. These figures provide a visual interpretation of gender, age, educational qualification and work experience.

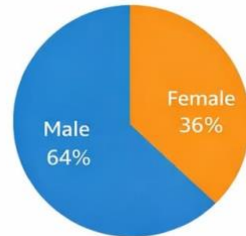


Figure 2. Gender distribution of respondents

Source: compiled by the authors based on primary survey data.

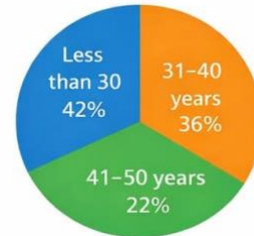


Figure 3. Age distribution of respondents

Source: compiled by the authors based on primary survey data.

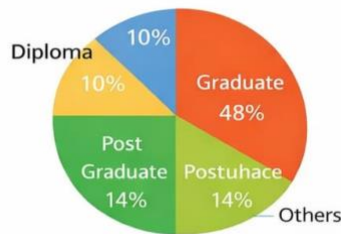


Figure 4. Educational qualification of respondents

Source: compiled by the authors based on primary survey data.

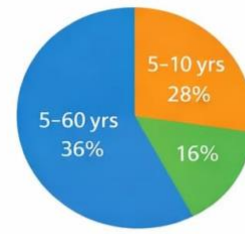


Figure 5. Work experience of respondents

Source: compiled by the authors based on primary survey data.

Overall, the demographic data indicate that respondents are predominantly young, educated and early-career professionals. This profile is relevant to the study because younger and early-career employees may be more familiar with digital HR systems and AI-based tools.

Structural Equation Modeling analysis. Structural Equation Modeling was used to analyse the relationship between variables. In this study, SEM was used to examine the impact of AI-based HR practices on talent management effectiveness. SEM helps to understand how different factors are interconnected and how they influence organisational outcomes.

The values shown in the SEM model represent standardised path coefficients. These coefficients indicate the strength and direction of the relationship between variables. A higher value closer to 1 indicates a stronger positive relationship.

The relationship between AI-based HR practices and automation is 0.80, indicating a strong positive influence. The path coefficient between AI-based HR practices and predictive analytics is 0.85, which shows a very strong impact. Similarly, the value of 0.84 between AI-based HR practices and AI-powered systems indicates a strong relationship.

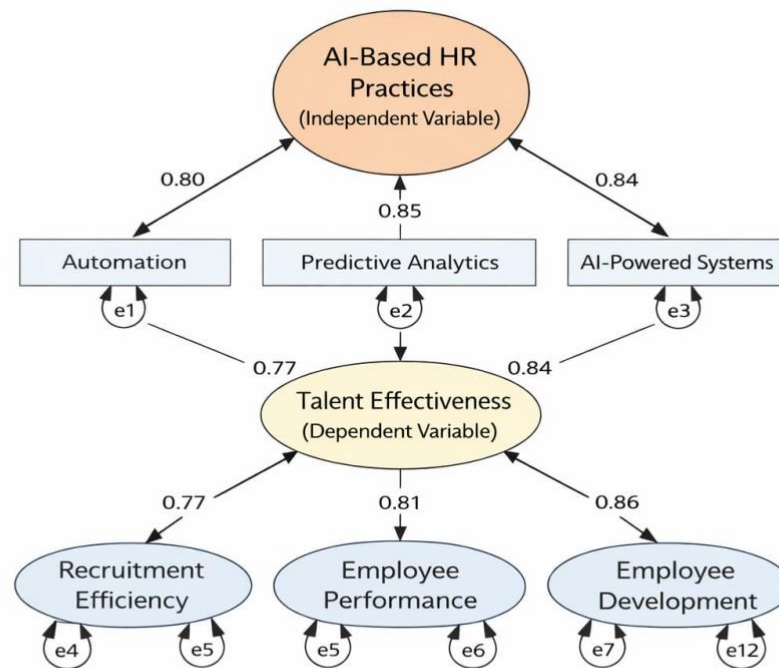


Figure 6: Structural Equation Model of AI-Based HR Practices on Talent Effectiveness

Figure 6. Structural Equation Model of AI-based HR practices on talent effectiveness

Source: developed by the authors based on SEM results from primary survey data.

The relationship between automation and talent effectiveness is 0.77, showing a moderate to strong impact. The coefficient of 0.84 between AI-powered systems and talent effectiveness indicates a strong influence. The value of 0.81 for employee performance suggests a strong contribution to talent effectiveness, while the coefficient of 0.86 for employee development indicates the highest impact among the outcome variables.

Table 2. Interpretation of SEM path coefficients

Relationship	Path coefficient	Interpretation
AI-based HR practices → Automation	0.80	Strong positive influence
AI-based HR practices → Predictive analytics	0.85	Very strong positive influence
AI-based HR practices → AI-powered systems	0.84	Strong positive influence
Automation → Talent effectiveness	0.77	Moderate to strong influence
AI-powered systems → Talent effectiveness	0.84	Strong positive influence
Recruitment efficiency → Talent effectiveness	0.77	Moderate to strong contribution
Employee performance → Talent effectiveness	0.81	Strong contribution
Employee development → Talent effectiveness	0.86	Highest contribution among outcome variables

Source: compiled by the authors based on SEM results from primary survey data.

Overall, all path coefficients are positive and relatively high. This indicates that AI-based HR practices significantly improve talent management effectiveness in organisations.

Discussion. The findings indicate that AI-based HR practices play an important role in improving talent management within organisations. Many organisations are adopting AI technologies to improve recruitment efficiency, employee performance evaluation and workforce planning (Fenwick et al., 2024). AI tools help HR managers analyse employee data and identify potential talent within the organisation (Suneetha et al., 2024). These technologies also help organisations design better training programmes and improve employee engagement (Baki et al., 2023).

The results support the first hypothesis, which proposed that AI-based HR practices positively influence recruitment and talent acquisition. AI recruitment systems reduce manual workload, improve resume screening and allow HR professionals to identify suitable candidates more quickly (Farhan & Hatem, 2024; Rathore, 2023). This supports the view that AI can improve recruitment efficiency and candidate selection accuracy.

The findings also support the second hypothesis, which proposed that AI-based HR practices positively influence employee performance and development. AI-based performance systems and learning platforms allow organisations to monitor employee progress, identify skill gaps and provide personalised development recommendations (Alsaif & Aksoy, 2023; Tusquellas et al., 2024). The SEM coefficient for employee development was the highest among the outcome variables, which suggests that AI may have particularly strong value in learning and career development.

The third hypothesis, which proposed that AI-based HR practices improve employee retention, is also supported conceptually by the literature and the study model. Predictive analytics can identify employees who may be at risk of leaving and help HR managers design retention strategies (Tang et al., 2025). By analysing engagement data, organisations can respond earlier to employee dissatisfaction and improve workplace experience (Vishwanath, 2023).

The fourth hypothesis, which proposed that AI-based HR practices significantly improve talent management effectiveness, is supported by the overall SEM results. Positive path coefficients indicate that AI-based HR practices contribute to recruitment efficiency, employee performance, employee development and retention. These results confirm that AI-based HR systems have become an important strategic tool for improving talent management and organisational performance.

However, AI adoption in HR also creates several challenges. Data privacy is a major concern because AI systems require access to employee and candidate data (Kaur & Gandolfi, 2023). Algorithmic bias is another significant issue because biased data or poorly designed algorithms may produce unfair outcomes in hiring, promotion or performance evaluation (Cabiddu et al., 2022). Employee resistance may also occur when workers fear job loss, mistrust automated decisions or perceive AI systems as impersonal (Berg et al., 2020).

Therefore, organisations should combine AI tools with human oversight. AI can improve HR efficiency and decision-making, but it should not replace human judgement in sensitive personnel decisions. Ethical AI use in HR requires transparency, fairness, accountability and employee trust.

Conclusions. This study examined the role of AI-based HR practices in improving talent management effectiveness. The findings indicate that the adoption of AI technologies in HR processes can enhance recruitment efficiency, employee engagement, employee performance, employee development and workforce planning.

AI-based HR practices enable data-driven decision-making in workforce management, helping organisations identify and analyse talented individuals more effectively (Arora & Babu, 2025). The SEM results show that AI-based HR practices have strong positive relationships with automation, predictive analytics and AI-powered systems. These tools contribute to talent effectiveness, especially through employee development, employee performance and recruitment efficiency.

The study concludes that AI-based HR practices have become an essential component of modern human resource management (Fenwick et al., 2024). Organisations that invest in AI technologies are more likely to improve workforce efficiency and maintain competitiveness in today's digital business environment (Adigwe et al., 2024).

At the same time, the successful use of AI in HR requires careful attention to ethics, privacy, transparency and human oversight. Organisations should not rely on AI as a fully autonomous decision-maker. Instead, AI should be used as a support tool that strengthens HR professionals' ability to make informed, fair and strategic decisions.

The study has some limitations. The sample size was limited to 100 respondents due to time constraints, so the results may not represent all types of organisations. Another limitation is that most data were based on respondents' personal opinions, which may introduce subjective bias.

Future research should use larger and more diverse samples, compare organisations across sectors and examine how AI-based HR practices influence long-term employee outcomes. Researchers should also study issues such as data privacy, algorithmic bias, employee trust, job displacement concerns and the impact of AI on organisational culture.

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