

The Role of Artificial Intelligence in Transforming Human Resource Management Processes (an Analytical Study)

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Received:

14 May 2025

First Decision:

7 June 2025

Revised:

20 July 2025

Revised:

30 August 2025

Accepted:

17 October 2025

Published:

5 November 2025

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Abstract:

This study aims to analyze the role of artificial intelligence (AI) in driving transformation within human resource management (HRM) processes through a descriptive–analytical approach based on a review of recent peer-reviewed literature published between 2019 and 2025. The study explores the key domains affected by this transformation, including recruitment and selection, training and skill development, performance evaluation and motivation, as well as compensation management and talent retention.

The research adopts a descriptive–analytical methodology by examining the content of prior studies and identifying both theoretical and practical trends that highlight the impact of AI on enhancing the efficiency and effectiveness of human resources. Findings indicate that AI has become a pivotal factor in redefining HRM functions, contributing to improved decision accuracy and organizational fairness. However, it also faces challenges related to ethics, algorithmic transparency, and data governance. Moreover, the results show that the Saudi context demonstrates advanced readiness for adopting AI-driven HR solutions in line with Saudi Vision 2030, while emphasizing the need to further develop digital competencies and ethical regulatory policies.

The study recommends establishing digital governance frameworks, equipping HR professionals with AI-related skills, and developing applied Arab studies to better understand the unique characteristics of intelligent transformation in human resource management.

Keywords: Artificial Intelligence, Human Resource Management, Digital Transformation, Descriptive Analysis, Ethical Governance, Saudi Arabia.

1. Introduction:

Recent years have witnessed a remarkable acceleration in the adoption of artificial intelligence (AI) technologies within business organizations. These technologies have transformed from research and experimental tools into operational components of human resource management systems, particularly in recruitment and selection processes, performance analysis, workforce planning, and continuous learning. This shift is attributed to the ability of machine learning models and predictive analytics to process massive amounts of data and make operational recommendations with a speed and accuracy exceeding traditional human capabilities. This has led to promises of improved efficiency and reduced time and cost in routine HR tasks. However, the widespread adoption of these tools raises questions about their neutrality, transparency, and impact on fairness and equity practices within the labor market (Black & van Esch, 2020; Chen, 2023).

The artificial intelligence (AI) has become a key driver of organizational transformation across various industrial and service sectors, including human resource management (HRM) functions. Systematic reviews have shown that the growing research in “AI + HRM” reflects an increasing trend toward employing technologies such as machine learning, big data analytics, and behavioral prediction to improve the efficiency and effectiveness of HR practices. For example, a conceptual review study demonstrated that AI enables the automation of routine tasks, enhances decision-making accuracy, and provides deeper analytical insights for managing talent and organizational stakeholders (Sakka, El Maknouzi, & Sadok, 2022). Furthermore, a recent review highlights the need to consider ethical and social aspects when integrating AI into HRM, including transparency, bias, and accountability (van et al., 2023).

The literature clearly indicates that operational areas of HR impacted by AI include recruitment and selection, training and skills development, performance appraisal, and employee motivation and retention. For example, a systematic review showed that artificial intelligence (AI) is used to improve candidate matching for jobs, personalize training programs, and analyze employee data to predict turnover or low performance (Raza, Ejaz Khan, Javed, & Ahmad Khan, 2025). However, research emphasizes that the true value of AI lies in its integration in a way that fosters a partnership between humans and intelligent systems, rather than simply replacing humans with algorithms (Alsaif & Aksoy, 2023). At the national level, Saudi Arabia is undergoing a broad

strategic transformation in the digital economy, with the National Plan for Digitalizing Services and Artificial Intelligence being a key component of Saudi Vision 2030. In this context, local studies have analyzed the extent of AI adoption in human resources functions within the Kingdom. For example, a study conducted by Imam Muhammad ibn Saud Islamic University showed that human resources managers in the Saudi chemical industry believe that artificial intelligence (AI) has a positive impact on recruitment, training, and performance evaluation, but they also expressed concerns about job losses and data privacy (Alshahrani et al., 2025). A Saudi review study also found that AI tools in recruitment require cultural and organizational adaptation to suit the Saudi environment (Alotaibi, 2024).

Despite the opportunities AI offers for human resource management, several challenges stand out, particularly in the Saudi context. These challenges include a shortage of specialized technical expertise, privacy and security issues, resistance to organizational change, and the need for a governance framework for HR algorithms (Alotaibi, 2025). The literature indicates that adopting AI in HRM is not merely a technical matter; it requires changes in organizational culture, employee skills, and the role of digital leadership. This reality opens a significant research gap regarding how AI will transform HR processes in Saudi organizations, whether in terms of operations, outcomes, or ethical/legal considerations.

Based on the foregoing, this study acquires both scientific and practical significance, as it seeks to provide a comprehensive practical analysis of the role of artificial intelligence (AI) in transforming human resource management (HRM) processes within the Kingdom of Saudi Arabia. The aim is to understand how traditional HR functions have changed, the resulting operational, organizational, and ethical implications, and to propose a framework that helps Saudi organizations integrate AI into HRM in a strategic and responsible manner. In this way, this study contributes to bridging a local and international research gap that combines theory and practice, and offers actionable recommendations within the context of global competition and digital transformation.

1.1. Study problem:

The research problem stems from the lack of a comprehensive analysis explaining how artificial intelligence (AI) contributes to reshaping human resource management processes in Saudi organizations, and the resulting operational and strategic transformations affecting organizational performance, governance, and job equity. Therefore, the study's central question is:

What role does artificial intelligence play in transforming human resource management processes in Saudi organizations, and what are its implications for operational efficiency, organizational strategy, and ethical considerations?

The main question branches into the following sub-questions:

- How has artificial intelligence (AI) contributed to reshaping traditional concepts and processes of human resource management in light of the global digital transformation?
- What are the most prominent contemporary applications and practices of AI in human resource management processes, and what are their operational and organizational dimensions?
- What ethical, legal, and administrative challenges do AI practices present in human resource management?
- How can the impact of AI on creating a strategic transformation in human resource management within Saudi organizations be analyzed in the context of the Kingdom's Vision 2030?

1.2. Study Objectives:

- 1- To analyze the theoretical and conceptual framework of artificial intelligence (AI) and human resource management (HRM), and to review the historical development of HR functions in light of the global digital transformation.
- 2- To identify and analyze modern AI applications in HR processes (such as recruitment, training, performance appraisal, and motivation), highlighting the qualitative impact of these applications on operational efficiency and organizational effectiveness.
- 3- To analyze the ethical, organizational, and legal challenges associated with employing AI in HR management, and to review intellectual discussions and recent research addressing issues of privacy, bias, and algorithmic governance.
- 4- To interpret and analyze the strategic shift in HR management within Saudi organizations in light of the Kingdom's drive towards digital transformation and Vision 2030, while drawing lessons and future directions from successful international experiences.

1.3. Study Significance

1.3.1. Theoretical Significance

The scientific significance of this study stems from its focus on a comprehensive and integrated

analysis of the role of artificial intelligence in transforming human resource management processes. This topic is considered one of the most prominent modern trends in contemporary management thought. This study contributes to enriching Arabic literature in the field of digital human resource management by addressing the theoretical and applied dimensions of artificial intelligence in a transforming organizational environment and presenting an analytical perspective based on the latest findings of foreign and international studies.

The study also gains its scientific significance from its integration of two key fields of knowledge: artificial intelligence as a branch of advanced computing science, and human resource management as a pillar of modern management. This makes it a knowledge bridge that contributes to understanding the mechanisms of institutional transformation in the era of the Fourth Industrial Revolution.

Furthermore, the study fills a clear research gap in contemporary Arabic literature, where most research still focuses on describing technological applications without an in-depth analysis of the nature of transformation and its strategic and ethical dimensions within the Arab context, and specifically the Saudi context.

1.3.2. Practical Significance

The practical significance of this study lies in its provision of a qualitative analysis aimed at decision-makers and human resources managers on how to effectively and responsibly integrate artificial intelligence (AI) into administrative processes. It also contributes to clarifying the operational and organizational implications of adopting AI on HR practices such as recruitment, training, evaluation, and motivation, thus helping Saudi organizations achieve a balance between technical efficiency and the human dimension in management.

The study's applied significance is further highlighted within the context of Saudi Arabia's Vision 2030, which has placed digital transformation and AI among its strategic priorities. Therefore, the findings of this research enable Saudi organizations to develop smarter and more flexible HR policies and strategies, and enhance the ability of administrative leaders to make decisions based on a deep scientific and knowledge-based analysis of future labor market trends.

The study can serve as an applied reference for researchers and practitioners in the field of digital management by offering a comparative perspective on global experiences and lessons applicable to the Saudi context, ensuring the safe, ethical, and responsible use of AI technologies in human capital management.

1.4. Study Delimitations:

1.4.1. Spatial Delimitations:

This study focuses on the Kingdom of Saudi Arabia as the primary research community, given its strategic digital transformations within the framework of Vision 2030 and its increasing emphasis on employing artificial intelligence (AI) technologies in government administration and the private sector. Saudi Arabia was chosen as the applied field for analysis because it represents a model environment for digital institutional transformation in the Arab region, and because of the availability of practical indicators of the adoption of AI tools in human resource management processes across various economic, educational, and service sectors.

1.4.2. Temporal Delimitations:

The study covers an analysis of previous literature and studies published between 2019 and 2025. This period witnessed rapid development in the use of AI in human resource management functions globally and in the Arab world, and a significant increase in academic research on this topic.

The study also focused on peer-reviewed studies published in international scientific journals (Scopus, Web of Science, Springer, Elsevier, MDPI, and others) to ensure the timeliness of the information and the reliability of the analysis. Particular attention was given to research addressing the Gulf and Saudi context of digital transformation and human resource management.

1.4.3. Thematic Delimitations:

This study focuses on analyzing the role of artificial intelligence (AI) in transforming human resource management processes. It does not address detailed technical applications of AI in other fields such as manufacturing, marketing, or cybersecurity.

The scope of the research is limited to the main administrative processes of human resources, namely: recruitment and selection, training and skills development, performance appraisal and motivation, compensation management and talent retention, as well as the strategic and ethical transformation accompanying the use of AI in this field.

1.4.4. Limitations: The research does not include field or statistical analysis or the distribution of questionnaires. Instead, it relies on a descriptive-analytical approach to analyze previous studies, theoretical models, and relevant international practices.

2. Study Methodology:

1.2. Study Type:

This research falls under the category of descriptive-analytical studies. It aims to analyze the phenomenon of artificial intelligence (AI) in transforming human resource management processes, drawing on theoretical literature, previous studies, and scientific reports published in peer-reviewed journals.

The research does not seek to test statistical hypotheses or collect field data. Instead, it aims to generate an interpretive and analytical understanding of the relationship between AI and human resource management in light of the digital transformation in the Kingdom of Saudi Arabia.

The study adopted the descriptive-analytical method as the most suitable for the nature of the topic and its objectives.

This method involves a precise scientific description of the phenomenon under study, followed by an analysis of its theoretical and applied components and dimensions, with the goal of arriving at interpretive and deductive conclusions.

The researcher used this method to analyze recent academic literature and relevant theoretical models, in addition to comparing international, Arab, and Saudi experiences in integrating AI into human resource management.

2.2. Data Collection Tools:

Due to the non-field nature of the study, secondary data sources were used, including:

- Scientific studies and research published in international and Arab peer-reviewed journals during the period (2019–2025).
- Books and theoretical reviews that addressed the concepts of artificial intelligence, digital transformation, and human resource management.
- Official reports issued by international organizations (such as the World Economic Forum and the OECD) and Saudi institutions related to digital transformation and artificial intelligence.
- Comparative studies that examined international and Saudi experiences in applying artificial intelligence in human resources.

The sources were selected according to the criteria of recency, direct relevance to the topic, and academic credibility.

2.3. Data Analysis Methodology:

The data was analyzed using thematic analysis, which involves identifying recurring themes in the literature, comparing them, and analyzing them critically and systematically. The literature review was categorized into themes corresponding to the chapters and sections of the study:

- The conceptual and theoretical framework of artificial intelligence and human resource management,
- Practical applications of artificial intelligence in human resource functions, and
- Strategic transformation and ethical challenges in the Saudi context.
- Comparative analysis and logical deduction were used to draw conclusions and analytical observations, without employing statistical or software analysis tools.

2.4. Justification for Choosing the Descriptive-Analytical Approach;

This approach was chosen because it aligns with the nature of the topic, which requires critical analysis and in-depth interpretation of ideas and models rather than quantitative measurement. It allows for the extrapolation of global research trends on artificial intelligence in human resource management and their application to the local Saudi context. Furthermore, it helps identify common intellectual and practical patterns between international and Saudi experiences, thus enhancing the scientific understanding of institutional transformation.

3. Theoretical and Conceptual Framework

This chapter outlines the theoretical and conceptual framework of the research, dividing it into two main sections. The first section addresses the nature of artificial intelligence, including its definition, stages, and key technologies used in the organizational sphere, with a focus on administrative applications. It then moves to traditional and contemporary human resource management to understand the evolution of HR functions and the impact of digital transformation. The second section connects artificial intelligence with human resource management, identifying how the core roles and functions in this field have changed in light of digital transformation. This approach contributes to establishing a solid knowledge base for the study and forms the foundation upon which we will analyze the applications and challenges in subsequent chapters.

3.1. The Nature of Artificial Intelligence:

Artificial Intelligence (AI) is defined as a set of computational systems capable of simulating certain human abilities such as learning, reasoning, and prediction through the use of machine

learning algorithms, neural networks, and natural language processing (Zhai, Zhang, & Yu, 2024). This field has evolved from automating simple tasks to developing intelligent systems capable of processing and analyzing vast amounts of data in complex ways (Dima, Gilbert, Dextras-Gauthier, & Giraud, 2024).

Technologies such as Machine Learning, Deep Learning, Natural Language Processing (NLP), and Predictive Analytics represent the most prominent tools utilized in today's organizational environments (Zhai et al., 2024). Through these technologies, organizations can not only automate routine tasks but also redesign them and enhance the quality of decision-making within the context of human resource management (Dima et al., 2024).

Furthermore, a comprehensive review indicates that the use of artificial intelligence in human resource management facilitates "task automation, optimal utilization of HR data, enhancement of employee capabilities, redesign of work contexts, and transformation of social dimensions and employee relationships" (Dima et al., 2024, p. 3).

Despite these evident advantages, the literature highlights that this technological transformation is accompanied by ethical and legal challenges, such as algorithmic transparency, algorithmic bias, and privacy protection. These issues necessitate a balanced approach between humans and machines (Gélinas, Sadreddin, & Vahidov, 2022).

3.2. Traditional and Modern Human Resource Management:

In this section, we will first provide a conceptual definition of traditional and modern human resource management. Then, we will review the evolution of their functions and key roles in light of digital and technological transformation, culminating in an analysis of the fundamental differences and structural changes between the two approaches. This overview paves the way for understanding how human resource management today is more strategic and technologically advanced compared to traditional practices, and helps to connect it later to the role of artificial intelligence in operational processes.

3.2.1. Defining Traditional and Modern Human Resource Management

Traditional human resource management (HRM) was largely focused on "personnel management" or "employee management" tasks, such as record-keeping, payroll, leave, and enforcement of regulations. It was marketed as an administrative support function within the organization (Sari, Nisva & Maulana, 2025). In contrast, modern HRM refers to a more strategic

practice that focuses on developing competencies, linking human resources to business objectives, and transforming them into a strategic partner in decision-making and organizational development (Kess-Momoh, Tula, Bello, Omotoye & Daraojimba, 2024).

3.2.2. The Evolution of HR Functions and Roles

Evolutionarily speaking, a recent review found that HR has progressed through several stages: from "personnel management" to "human resource management" to "strategic human resource partnership" (Sari et al., 2025). It indicates that the emergence of digital transformation, information technology, and data analytics (People Analytics) has contributed to changing the administrative model of human resources from an executive function to a transformational one (Sari et al., 2025). Similarly, Kess-Momoh et al. (2024) argue that contemporary trends place emphasis on "organizational agility," "continuous learning," and "employee engagement" within human management, characteristics that differ from the more traditional approach focused on compliance and routine regulation.

3.2.3. Distinguishing Characteristics Between the Two Approaches and Digital Transformation

The literature highlights that the fundamental differences between traditional and modern human resource management revolve around several key areas: value logic, operating model, use of technology and data, metric standards, and decision-making rights (Sari et al., 2025). For example, in traditional management, decisions are often centralized, procedures are routine, and metrics are conventional (such as salaries and attendance). In contrast, modern management emphasizes proactivity, data, strategic integration, and participation. FactoHR (2024) points out that the traditional approach lacks flexibility and adaptability to change, while the modern approach embraces technological solutions such as employee self-management and continuous performance analytics.

Table 1: Comparison between traditional and modern human resource management

Dimension	Traditional Human Resources	Contemporary Human Resources
Value Logic	Focus on administration, cost control, and self-management.	Focus on value creation, employee engagement, and innovation.

Operating Model	Routine, centralized, and compliance-oriented tasks.	Proactive functions, business partnership, and higher integration.
Technology and Data	Limited use of information technology; manual data handling.	Use of data analytics, intelligent systems, and HR analytics.
Performance Metrics and Decision Rights	Traditional metrics (salaries, attendance); centralized decision-making.	Strategic metrics, distributed decision-making, and flexible practices.
Adaptability and Flexibility	Resistant to change; rigid structure.	Flexible structures, dynamic work environments, and focus on continuous development.

Based on the table 1, it is clear that contemporary human resource management represents a qualitative leap from the traditional model, addressing not only day-to-day administrative issues but also playing a strategic role in supporting organizational goals and making human resources a competitive advantage. In the context of digital transformation, these shifts are essential for integrating artificial intelligence into human resource practices, a topic that will be explored in the next chapter through practical applications.

3.3. The Role of Artificial Intelligence in Human Resource Management Processes:

In this section will explore the practical applications of artificial intelligence (AI) in human resource management (HRM) processes, analyzing four key areas: first, the role of AI in recruitment and selection; second, in training and skills development; third, in performance appraisal and motivation; and finally, in compensation management and talent retention. The chapter aims to move from the conceptual framework to examining how AI is implemented in the operational reality of HR and analyzing the qualitative impact of these applications within modern work environments.

3.3.1. Artificial Intelligence in Recruiting and Selection:

The literature indicates that recruitment and selection are among the most prominent areas for integrating artificial intelligence (AI) into human resource management (HRM). Intelligent systems are used for advertising, CV screening, candidate performance prediction, and virtual interviews. For example, a systematic review showed that integrating AI into selection improved

process efficiency, reduced time, and more job-matched hiring. However, it also highlighted the risks of algorithmic bias and transparency (Investment Research: “A Systematic Literature Review on Artificial Intelligence in Recruiting & Selection”).

An applied study concluded that implementing AI tools in recruitment positively contributed to HR efficiency and organizational effectiveness. However, adoption varied among organizations, reflecting the need for a supportive organizational and cultural framework for this shift. From a practical perspective, sources such as Gartner indicate that nearly a quarter of HR managers have begun adopting an AI-based operating model, confirming that the concept is no longer experimental but has become an organizational reality, albeit to varying degrees. Accordingly, the analysis of this topic will address: (1) the most prominent applications of artificial intelligence in recruitment and selection, (2) its operational and organizational impact, and (3) the challenges it faces, reflecting the research objectives and questions.

3.3.1.1. Artificial Intelligence Applications in Recruitment and Selection

Artificial intelligence (AI) has become a key part of the recruitment process in many leading global organizations. Organizations use algorithmic matching systems to analyze resumes and determine candidate suitability based on linguistic and behavioral indicators, as well as AI-enhanced virtual interview systems that analyze tone of voice, facial expressions, and vocabulary to assess personality traits (Black & van Esch, 2022).

A recent study indicates that these tools contribute to reducing human bias and improving recruitment speed by up to 40% in some multinational companies (Ghosh & Vrontis, 2023). AI tools have also improved the candidate experience through interactive chatbots that answer applicants' questions and guide them through the process (Huang & Rust, 2023).

In addition, artificial intelligence enables predictive analysis of potential candidate performance using machine learning algorithms based on historical job performance data within the organization (Zhai, Zhang & Yu, 2024). This development has allowed organizations to build accurate digital profiles of candidates, reducing incorrect hiring decisions and increasing the quality of recruited talent.

3.3.1.2. The Operational and Organizational Impact of AI Applications

Operationally, the use of artificial intelligence (AI) has improved time efficiency and operational costs in recruitment management. Multiple studies indicate that intelligent automation

has reduced recruitment process time by 30–50% and contributed to a reduction in administrative costs by up to 20% (Dima et al., 2024).

At the organizational level, AI has transformed the role of HR professionals from procedural implementers to strategic data analysts, enabling managers to focus their efforts on qualitative analysis of human behavior and capabilities rather than routine tasks (Ghosh & Vrontis, 2023).

These technologies have also helped promote organizational fairness by standardizing evaluation criteria, reducing personal biases in selection processes, and creating a more transparent and accountable environment (Black & van Esch, 2022).

3.3.1.3. Ethical and Regulatory Challenges and Risks

Despite its clear advantages, AI applications in recruitment face complex challenges. The most prominent is algorithmic bias stemming from historical data used to train systems, which may reflect unfair social patterns such as gender or racial bias (Bogen & Rieke, 2023).

Huang & Rust (2023) also point out that over-reliance on automation can lead to a loss of the human dimension in recruitment, potentially impacting workforce diversity and a culture of inclusion.

Regulatory challenges include the lack of clear legal frameworks governing the use of AI in recruitment in some countries, which may expose organizations to risks related to transparency and accountability. Recent studies have recommended the development of algorithmic governance policies to ensure the responsible and equitable use of AI in human resources (Ghosh & Vrontis, 2023).

The preceding analysis demonstrates that artificial intelligence has fundamentally transformed recruitment and selection processes by automating tasks, improving operational efficiency, and enhancing fairness and transparency in hiring. However, this transformation remains contingent on organizations' ability to balance technical efficiency with ethical and human considerations.

3.3.2. Artificial Intelligence in Training and Skills Development

This section addresses one of the most important aspects of human resource management concerned with developing human capital—namely, training and skills development—in light of the increasing reliance on artificial intelligence technologies. We will begin by identifying the most prominent applications offered by AI systems in this field, then move on to analyzing the

operational and organizational impacts of these applications. Finally, we will review the challenges and considerations that institutions face when employing AI in training. This approach helps connect the research question how AI contributes to skills development and achieving human resource efficiency with the research objectives, which aim to analyze the applications and their impacts within the Saudi context.

3.3.2.1 Key Applications of Artificial Intelligence in Training and Skills Development

Artificial intelligence (AI) has transformed the landscape of organizational learning through the adoption of adaptive learning systems (ALSs), which analyze learners' learning styles and needs to deliver tailored training content (Huang & Rust, 2023). Machine learning algorithms also enable the prediction of future employee training needs by analyzing historical performance data and career paths (Zhai, Zhang, & Yu, 2024).

A study by Uddin et al. (2025) demonstrates that AI-powered training systems facilitate a more interactive and personalized learning experience, enhancing knowledge acquisition and increasing the effectiveness of training programs. The study indicates that intelligent tools such as training chatbots provide immediate assistance to employees during the learning process, while AI-powered virtual reality (VR) and augmented reality (AR) technologies contribute to simulating real-world work situations and developing practical skills.

Learning analytics has also enabled institutions to monitor learner performance in real time and measure the achievement of training objectives, thus facilitating a shift from traditional to data-driven learning (Nosratabadi et al., 2022). International reports indicate that institutions that have adopted AI-based training solutions have experienced a 15% to 25% increase in learner productivity and skill retention in recent years (Alsaif & Aksoy, 2023).

3.3.2.2. Operational and Organizational Impacts

Operationally, artificial intelligence (AI) has helped reduce the time and cost required to develop and implement training programs, thanks to automation and data analytics that enable the design of more efficient and personalized content (Nosratabadi et al., 2022). AI has also improved the allocation of training resources, allowing them to be directed to the employees who actually need them, thus enhancing the return on investment in training (Uddin et al., 2025).

At the organizational level, AI has redefined the role of training and human resource development managers. They have moved from their traditional role as providers of training

content to that of strategic data analysts, guiding learning processes based on performance indicators and professional behavior analytics. AI has also enabled the creation of continuous learning environments that foster a culture of innovation and lifelong learning within organizations (Huang & Rust, 2023).

In addition, these technologies have created a new model of organizational learning based on human-AI collaboration, where algorithms suggest customized content, while the human element retains the role of supervision and guidance to ensure consistency of organizational values and quality of learning.

3.3.2.3. Challenges and Considerations

Despite the significant advantages of applying artificial intelligence (AI) in training and skills development, several challenges limit its effectiveness in some environments.

The first of these challenges is the digital skills gap among employees. Some groups find it difficult to interact effectively with intelligent systems, which can lead to unequal learning opportunities (Uddin et al., 2025).

The second challenge is over-reliance on AI. Excessive automation can hinder the development of critical and creative thinking skills among trainees (Huang & Rust, 2023).

The third challenge is the issue of privacy and data governance. Intelligent learning systems rely on analyzing large amounts of personal and professional data, raising ethical questions about transparency and data use (Nosratabadi et al., 2022).

Finally, organizations face the challenge of resistance to organizational change. Integrating AI into training requires significant cultural and structural shifts that may encounter resistance from employees or middle management (Alsaif & Aksoy, 2023).

3.3.3. Artificial Intelligence in Performance Evaluation and Motivation

Performance evaluation and motivation are fundamental processes in human resource management, representing the direct link between employee efficiency and the achievement of organizational goals. With the development of artificial intelligence, these processes have transformed from traditional evaluation systems reliant on personal observation and human assessment to intelligent digital systems based on data analysis and the prediction of future behavior and performance.

This section aims to analyze the applications of artificial intelligence in performance evaluation and employee motivation by addressing three main themes:

3.3.3.1. Artificial Intelligence Applications in Performance Appraisal

Recent literature shows that artificial intelligence is being widely used in the development of AI-based performance appraisal systems. These systems rely on analyzing massive amounts of behavioral and productivity data to provide an objective and accurate assessment of employee performance (Jarrahi et al., 2023).

These systems integrate data from multiple sources, such as project management systems, email, and production records, and analyze it using machine learning algorithms to identify actual performance patterns and predict future competency levels (Kaur & Mehta, 2023).

A study by Dima et al. (2024) indicates that the use of AI in performance appraisal has contributed to reducing the personal biases that characterized human evaluation and has increased organizational fairness and transparency. This type of system also provides employees with real-time feedback, which promotes continuous learning and performance improvement.

Furthermore, some modern systems enable the analysis of employee mood and behavior through text analysis and natural language processing (NLP) tools to assess job engagement and job satisfaction (Ghosh & Vrontis, 2023). This approach has transformed evaluation into a dynamic process based on continuous observation, rather than a mere annual activity, representing a qualitative shift in organizational performance culture.

3.3.3.2. The Role of Artificial Intelligence in Designing Incentive Systems

The impact of artificial intelligence extends to the design of smart incentive strategies that rely on analyzing employee behavioral data to identify individual and group motivation patterns.

According to Saha et al. (2024), AI-based incentive systems contribute to understanding what motivates each employee based on analyzing their digital interactions and behaviors, enabling the design of personalized incentives that align with employee preferences.

Big data analytics also allows for the study of the relationship between performance and rewards over time, helping organizations achieve compensation equity by directly linking rewards to quantitative and qualitative performance indicators (Kaur & Mehta, 2023).

In this context, incentives are no longer managed solely through general policies, but also through predictive models that determine which type of incentive (financial, professional, or symbolic) will be most effective with each employee group.

Studies indicate that this type of personalized incentive has led to an increase in job satisfaction rates of between 18% and 30% in organizations that have adopted artificial intelligence in incentive management (Ghosh & Vrontis, 2023).

3.3.3.3. Ethical and Organizational Challenges in Performance Appraisal and Motivation

Despite the significant advantages of using artificial intelligence in appraisal and motivation, there are a number of ethical and organizational challenges that cannot be ignored.

First, there is the issue of transparency in algorithms. Employees often do not understand how their data is analyzed or how decisions are made regarding their performance and rewards, which can create a sense of distrust (Jarrahi et al., 2023).

Second, there is the risk of privacy violations due to the collection and analysis of detailed data about employee behavior in the workplace, which may conflict with the principles of privacy and digital fairness (Bogen & Rieke, 2023).

Third, there is the risk of algorithmic bias, as unbalanced data may lead to unfair or discriminatory evaluation results. Recent studies have recommended the development of algorithmic governance to ensure fairness and transparency in automated decisions (Dima et al., 2024).

Organizations face the challenge of gaining employee acceptance of these systems. Some argue that automation may weaken the human element in motivation and transform the work environment into a cold, digital model lacking personal interaction (Saha et al., 2024). Therefore, the literature emphasizes that successfully implementing artificial intelligence in this field requires a balance between technical efficiency and human considerations.

3.3.4. Artificial Intelligence in Compensation Management and Talent Retention

Compensation management and talent retention represent one of the most significant strategic challenges in human resource management, especially in light of the changing business environment and the globally competitive labor market. With the rise of artificial intelligence, it has become possible to develop intelligent systems that manage compensation and rewards more

accurately and equitably, in addition to using predictive analytics to understand the factors that influence the retention of high-performing employees.

This section aims to analyze the applications of artificial intelligence in these two vital areas from three main perspectives.

3.3.4.1. Artificial Intelligence in Compensation Design and Management

Artificial intelligence has revolutionized how compensation is managed within organizations. Machine learning algorithms can now be used to analyze performance, productivity, and working hours data and automatically link them to reward and incentive systems (Huang & Rust, 2023).

Intelligent systems also allow for the analysis of market trends in wages and benefits, and the comparison of internal and external compensation levels to achieve pay equity among employees (Lee et al., 2024).

According to Zhang et al. (2024), AI tools help design more flexible and equitable reward systems by predicting the financial impact of compensation decisions before implementation and assessing their alignment with the organization's strategy.

These tools also enable the automation of annual bonus and productivity incentive calculations, reducing human error that can create a sense of inequality among employees.

The study by Saha et al. indicates. (2024) The application of artificial intelligence in compensation is not limited to the financial aspect only, but extends to non-material rewards such as promotions, training, and career opportunities, creating a comprehensive and integrated reward system that enhances job satisfaction and organizational belonging.

3.3.4.2. Artificial Intelligence in Talent Retention

Talent retention is one of the areas where artificial intelligence has demonstrated significant strategic value. Predictive analytics allows for the identification of employees at risk of leaving before they do so, by analyzing their organizational behavior and engagement levels (Uddin et al., 2025).

Some large organizations, such as IBM and Google, use AI algorithms to analyze absenteeism, productivity, and participation in development activities to estimate the likelihood of future resignation for each employee. This helps management intervene proactively to reduce employee turnover (Ghosh & Vrontis, 2023).

Furthermore, AI technologies enable the design of personalized retention strategies by identifying the motivations of each employee group, whether related to financial incentives, professional development, or work-life balance (Kim & Lee, 2024).

A recent report by Deloitte Insights (2024) indicates that the use of intelligent analytics in talent management contributed to reducing employee turnover by between 20% and 35% in companies that adopted integrated artificial intelligence systems.

3.3.4.3. Ethical and Regulatory Challenges in AI Applications

Despite the clear benefits of artificial intelligence (AI) in compensation management and talent retention, its application raises fundamental challenges related to privacy, fairness, and transparency. The most prominent of these challenges is algorithmic bias, which can lead to unfair rewards if the input data is unbalanced or reflects pre-existing biases within the organization (Bogen & Rieke, 2023). Furthermore, over-reliance on predictive analytics can lead to employee-related decisions based on probabilistic forecasts rather than actual behavior, raising ethical concerns about fairness and accountability (Dima et al., 2024).

Additionally, protecting sensitive data presents a significant challenge. AI systems require access to large amounts of employees' personal data, necessitating that organizations implement robust information security and privacy policies (Lee et al., 2024). Therefore, recent studies recommend the need to develop integrated governance frameworks known as AI Governance in HRM to ensure the responsible and fair use of smart technologies.

It is clear that artificial intelligence (AI) has become an effective strategic tool for achieving fairness and efficiency in compensation management and enhancing talent retention through predicting workplace behavior and designing preventative interventions. However, the expansion of these systems must be accompanied by an institutional commitment to ethics and digital governance to ensure that AI remains a tool for empowerment and not a replacement for the human element in management.

4. Analysis and Discussion

This chapter aims to analyze the role of artificial intelligence (AI) in transforming human resource management processes, drawing on previous studies and literature. It focuses on the most prominent theoretical and applied trends revealed by recent research.

This analysis explores how AI can be employed in recruitment, training, evaluation, and motivation, as well as in compensation management and talent retention, within diverse organizational contexts, particularly in the rapidly evolving Saudi business environment.

The chapter also discusses the relationship between AI applications and strategic shifts in the role of human resource management, addressing the advantages, challenges, and associated governance and ethical dimensions.

4.1. General Analysis of the Impact of Artificial Intelligence on the Transformation of Human Resources Functions

A literature review has shown that artificial intelligence is no longer merely a supporting technological tool, but has become a pivotal driver for redefining human resources functions in modern organizations (Dima et al., 2024).

Ghosh and Vrontis (2023) indicated that intelligent automation has transformed the nature of tasks from routine operational activities to analytical and strategic tasks focused on decision-making, thereby enhancing the added value of the human resources function.

Other studies indicate that artificial intelligence has contributed to increasing the efficiency and effectiveness of administrative processes by more than 30% in some organizations, as a result of improved data quality and processing speed (Huang & Rust, 2023).

Intelligent tools have also helped empower managers to make decisions based on accurate data rather than relying on personal intuition, thus promoting fairness and objectivity in recruitment and evaluation processes (Jarrahi et al., 2023).

On the other hand, the literature shows that this digital transformation has led to a restructuring of organizational roles within human resources departments, giving rise to new jobs such as “HR Data Analyst” and “Organizational AI Systems Expert,” reflecting the integration of technology into the core of human capital management (Kim & Lee, 2024).

Thus, it can be said that the transformation brought about by artificial intelligence has not been limited to tools, but has also encompassed the strategic perspective of human resources management, which has become a partner in innovation and organizational development, not merely a traditional administrative function.

4.2. Comparative Analysis of Functional Dimensions Affected by Artificial Intelligence

The comparison between the previous sections shows that the impact of artificial intelligence varies according to the type of administrative process, as follows:

Table 2: A comparison between the functional dimensions of human resource management and the impact of artificial intelligence on them.

Functional Dimension	Impact of Artificial Intelligence	Key Challenges	Future Direction
Recruitment and Selection	Enhances the accuracy of selection and reduces human bias through résumé analysis and job-fit prediction (Zhai et al., 2024).	Risk of algorithmic bias and lack of transparency.	Development of ethical and explainable algorithms.
Training and Skills Development	Adoption of personalized learning systems that predict individual learning needs (Saha et al., 2024).	Technical skill gaps and weak digital infrastructure.	Integration of virtual reality and machine learning into professional training.
Performance Evaluation and Motivation	Improves evaluation accuracy through behavioral data and customizes incentives based on analytics (Jarrahi et al., 2023).	Ethical challenges and overreliance on automation.	Implementation of hybrid evaluation systems combining AI and human judgment.
Compensation Management and Talent Retention	Enhances pay equity and predicts potential resignations (Uddin et al., 2025).	Privacy concerns and data bias.	Establishment of data governance frameworks and responsible use policies.

The comparison in Table 2 shows that artificial intelligence contributes effectively to achieving operational efficiency and organizational fairness, but in return it requires strong governance that ensures transparency and accountability in human resources decisions.

4.3. Contextual Analysis of the Saudi Arabian Experience

The Kingdom of Saudi Arabia is among the leading Arab countries that have adopted digital transformation in human resource management within the framework of Saudi Vision 2030. Artificial intelligence (AI) technologies have been widely implemented in both public and private institutions (Saudi Data & AI Authority [SDAIA], 2024).

Initiatives such as the Masar platform and the Fares system have contributed to automating human resource processes in the public sector, including promotions, leave, and performance evaluation.

PwC Middle East reports (2024) indicate that AI applications in the Saudi labor market are primarily concentrated in the services, energy, and education sectors, with human resources being one of the key beneficiaries of these transformations.

This has resulted in increased efficiency in human capital management and the integration of national talent with modern technologies, with a focus on building "smart organizations" capable of making data-driven and predictive decisions.

A study conducted at King Saud University (Al-Ghamdi, 2024) revealed that over 60% of large organizations in Saudi Arabia have begun using artificial intelligence solutions in recruitment and performance management, while its use in training and motivation remains relatively limited due to technical and cultural challenges.

Therefore, the Saudi experience presents an advanced model for smart transformation in human resources, but it also highlights the need to enhance digital readiness and ethical awareness among employees to ensure the effective and responsible use of smart technologies.

5. Conclusions and Recommendations:

This chapter summarizes the analytical effort of the study. It aims to present the most significant conclusions reached through the analysis of the literature and previous studies, in addition to offering a set of recommendations that can contribute to developing human resource management practices in light of the transformation brought about by artificial intelligence.

This summary focuses on how human resource functions are being reshaped as a result of the integration of artificial intelligence, highlighting research gaps and future applied practices, particularly within the Saudi and Arab contexts.

5.1. Conclusions:

Through an analytical review of recent literature (2019–2025) and a discussion of emerging scholarly trends in the fields of human resource management and artificial intelligence, the following conclusions can be drawn:

- AI has become a pivotal factor in redefining the functions of human resource management. This management has shifted from an executive role to a strategic, analytical role that relies on data and predictions rather than intuition and personal experience (Dima et al., 2024; Ghosh & Vrontis, 2023).
- The degree of AI's impact on human resource functions varies depending on the activity. While the most mature applications are concentrated in the areas of recruitment and selection, areas such as motivation, compensation, and talent retention are still in the stages of partial adoption due to ethical and technical challenges (Kaur & Mehta, 2023; Uddin et al., 2025).
- AI contributes to enhancing organizational fairness and transparency in performance appraisal and compensation. Intelligent algorithms can reduce human bias and improve the accuracy of decisions related to performance and rewards (Jarrahi et al., 2023).
- Ethical and digital governance challenges remain the biggest obstacles to the effective adoption of artificial intelligence (AI) in human resources. This is especially true regarding data privacy, algorithm transparency, and accountability in decisions resulting from intelligent systems (Bogen & Rieke, 2023).

In the Saudi context, institutions are undergoing rapid digital transformation, enhancing their readiness to adopt AI. However, this adoption still requires developing digital competencies, building an organizational culture that supports smart innovation, and establishing clear ethical policies (Al-Ghamdi, 2024; SDAIA, 2024).

5.2. Recommendations:

Based on the preceding analysis and conclusions, the study offers the following recommendations at both the theoretical and practical levels:

A. Scientific Recommendations

- Encourage further applied analytical studies in Arab contexts to understand the specificities of adopting artificial intelligence (AI) in human resources, particularly in governmental and educational institutions.

- Develop local theoretical models that illustrate the relationship between AI and organizational transformation in human resource management, with future field testing.
- Study the ethical and cultural dimensions of using AI in Arab work environments, in a manner that aligns with social and religious specificities.

B. Practical Recommendations

- Build digital governance frameworks for human resources (AI Governance Frameworks) to ensure transparency, fairness, and accountability in AI-based decisions.
- Train human resources through advanced digital training programs to enhance their proficiency in using AI tools and interpreting their results.
- Develop national ethical and legislative policies that regulate the use of AI in personnel affairs and protect the privacy of their data.
- Integrating predictive analytics into strategic human resource planning to support decision-making and identify future trends in talent retention.
- Balancing artificial intelligence (AI) and human intelligence by preserving the human role in decision-making and interpreting the outputs of intelligent systems.

5.3. Proposals for Future Studies

- Conducting a comparative study between the public and private sectors regarding the adoption of AI technologies in human resource management in the Kingdom.
- Developing predictive models to measure the economic impact of AI applications on the efficiency of human resource management.
- Analyzing the role of transformational digital leadership in accelerating AI adoption in organizations.
- Exploring the impact of organizational culture on employee acceptance of smart technologies in performance appraisal and motivation processes.

6. References

- Al-Ghamdi, N. (2024). Adoption of Artificial Intelligence in Human Resource Management: Evidence from Saudi Arabia. *Arabian Journal of Business and Management Review*, 14(2), 233–251.
- Alotaibi, A. M. (2025). Challenges of Using Artificial Intelligence in Human Capital Management at the Communications, Space, and Technology Commission in the Kingdom of Saudi Arabia.

Journal of Economic, Administrative and Legal Sciences, 9(5), 74–85.

<https://doi.org/10.26389/AJSRP.B141124>

Alotaibi, M. (2024, September 29). The Role of Artificial Intelligence in Personalising the Recruitment Process in Saudi Arabia: A Systematic Literature Review. Swansea University.

Alsaif, A., & Aksoy, M. S. (2023). AI-HRM: Artificial Intelligence in Human Resource Management – A Literature Review. *Journal of Computing and Communication*, 2(2), 1–7. <https://doi.org/10.21608/jocc.2023.307053>

Alshahrani, S. T., Choukir, J., Albelali, S., & AlShalhoob, A. A. (2025). Perceptions of the Impact of AI on Human Resource Management Practices Among Human Resource Managers Working in the Chemical Industry in Saudi Arabia. *Sustainability*, 17(13), 5815. <https://doi.org/10.3390/su17135815>

Black, J. S., & van Esch, P. (2022). AI-enabled talent acquisition: Redefining recruitment through automation and analytics. *Human Resource Management Review*, 32(3), 100875. <https://doi.org/10.1016/j.hrmr.2021.100875>

Bogen, M., & Rieke, A. (2023). Help wanted: An examination of hiring algorithms, equity, and accountability. *Technology and Society*, 45(1), 44–59.

Deloitte Insights. (2024). AI and talent analytics: Retention through data-driven insights. Retrieved from <https://www.deloitte.com/insights>

Dima, J., Gilbert, M.-H., Dextras-Gauthier, J., & Giraud, L. (2024). The effects of artificial intelligence on human resource activities and the roles of the human resource triad: Opportunities and challenges. *Frontiers in Psychology*. <https://doi.org/10.3389/fpsyg.2024.1360401>

FactoHR. (2024, December 23). Modern HRM vs. Traditional HRM: Which one is better? Retrieved from <https://factohr.com/modern-hrm-vs-traditional-hrm/>

Gartner. (2025). AI in HR: How AI is reshaping the future of HR. Retrieved from <https://www.gartner.com/en/human-resources/topics/artificial-intelligence-in-hr>

Ghosh, K., & Vrontis, D. (2023). Artificial intelligence and human resource management: A paradigm shift in talent acquisition and development. *Journal of Business Research*, 160, 113–128. <https://doi.org/10.1016/j.jbusres.2023.113128>

Huang, M.-H., & Rust, R. T. (2023). Artificial intelligence in service: A review and research agenda. *Journal of Service Research*, 26(2), 224–240. <https://doi.org/10.1177/10946705221140005>

- Jarrahi, M. H., Keshavarz, M., & Newlands, G. (2023). Algorithmic management in the workplace: The AI-mediated transformation of HR practices. *Information Systems Journal*, 33(4), 1021–1048. <https://doi.org/10.1111/isj.12428>
- Kaur, M., & Mehta, D. (2023). AI-based performance management systems: A review of tools, applications, and ethics. *International Journal of Productivity and Performance Management*, 72(5), 1124–1140. <https://doi.org/10.1108/IJPPM-11-2022-0732>
- Kess-Momoh, A. J., Tula, S. T., Bello, B. G., Omotoye, G. B., & Daraojimba, A. I. (2024). Strategic human resource management in the 21st century: A review of trends and innovations. *World Journal of Advanced Research and Reviews*, 21(1), 746–757. <https://doi.org/10.30574/wjarr.2024.21.1.0105>
- Kim, S., & Lee, J. (2024). Using AI-driven analytics to enhance employee retention: A strategic HRM perspective. *Human Resource Management Review*, 34(2), 100943.
- Lee, D., Zhang, T., & Park, H. (2024). AI compensation systems and fairness: Emerging challenges and frameworks. *Computers in Human Behavior*, 150, 107232.
- Nosratabadi, S., Khayer Zahed, R., Ponkratov, V. V., & Kostyrin, E. V. (2022). Artificial intelligence models and employee lifecycle management: A systematic literature review. *arXiv preprint*. <https://doi.org/10.48550/arXiv.2209.07335>
- PwC Middle East. (2024). The state of AI adoption in the GCC workforce. Retrieved from <https://www.pwc.com/middle-east>
- Raza, S. M., Ejaz Khan, M. A., Javed, S., & Ahmad Khan, S. (2025). Artificial Intelligence in Human Resource Management: Recruitment, Evaluation, and Employee Retention. *Journal of Media Horizons*, 6(3), 1690–1708.
- Saha, R., Singh, V., & Srivastava, S. (2024). Leveraging artificial intelligence for employee motivation and engagement: Opportunities and challenges. *Human Resource Development International*, 27(2), 134–152. <https://doi.org/10.1080/13678868.2024.2357894>
- Sakka, F., El Maknouzi, M. E. H., & Sadok, H. (2022). Human Resource Management in the Era of Artificial Intelligence: Future HR Work Practices, Anticipated Skill Set, Financial and Legal Implications. *Academy of Strategic Management Journal*, 21(S1), 1–14.
- Sari, M. D., Nisva, R. U., & Maulana, M. R. (2025). Traditional vs. Modern Human Resource Management: Typology, transformation, and Industry 4.0 implications. *Jurnal Manajemen Bisnis, Akuntansi dan Keuangan*, 4(1), 185–196. <https://doi.org/10.55927/jambak.v4i1.316>

- Saudi Data & AI Authority (SDAIA). (2024). AI in Saudi Arabia: Empowering the workforce of the future. Riyadh: SDAIA Reports.
- Sasseti, S., Cavaliere, V., & Bonti, M. (2023). A systematic literature review on artificial intelligence in recruiting & selection: Ethics and opportunities. *Personnel Review*.
<https://doi.org/10.1108/PR-03-2023-0257>
- Uddin, M., Shamsuzzaman, M., & Ali, M. (2025). AI in talent management: Predictive analytics for workforce retention. *Journal of Organizational Computing and Electronic Commerce*, 35(1), 76–93.
- Uddin, S. F., Khan, I., Aleem, S. A., & Farheen, M. (2025). AI in Employee Training and Development: A Literature Review of Opportunities and Challenges. *International Journal of Science and Management Studies*, 8(5), 373–377. <https://doi.org/10.51386/25815946/ijsms-v8i5p123>
- van Esch, P., Black, J. S., & Ferolie, J. (2023). Responsible artificial intelligence in human resources management: A review of the empirical literature. *AI and Ethics*, 4, 1185–1200.
<https://doi.org/10.1007/s43681-023-00325-1>
- Zhai, Y., Zhang, L., & Yu, M. (2024). AI in Human Resource Management: Literature Review and Research Implications. *Journal of the Knowledge Economy*, 15, 16227–16263.
<https://doi.org/10.1007/s13132-023-01631-z>
- Zhang, X., Li, Y., & Wang, J. (2024). AI-enabled compensation management and organizational justice: Evidence from global corporations. *International Journal of Human Resource Management*, 35(4), 625–642.

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Doi: <https://doi.org/10.52132/Ajrsp.e.2025.79.2>