



## *Artificial Intelligence and Human Resource Management: New horizons and challenges*

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### Abstract

Considering the important role that artificial intelligence has become in its ability to create value for consumers employees, and organizations, interest in it has increased more in terms of its relationship to human resource management, which seems at first glance to be inconsistent with it, and that artificial intelligence may replace humans in the future, but what we concluded is that artificial intelligence came to help people, not to replace them and make decisions about them, and this is how technology is, and it was found to be a tool for assistance, not an end. This is discussed in detail in this article as our study provides valuable insights into the relationship between artificial intelligence and human resource management, It attempts to discuss the applications of Artificial Intelligence in human resource management, its benefits, and its challenges.

✓ **Keyword.** Artificial Intelligence (AI), Human Resource Management(HRM), Benefits, Challenges.

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## 1. INTRODUCTION

The most important feature that distinguishes the current stage that organizations are going through is the dependence of their products on the immaterial cognitive component more than their reliance on any other material component, and this has led to the growing importance of the immaterial aspects in the organization and the economy in general, to the point that it has become an intangible capital, and has become the survival of the organization. So its continuity depends on the extent of its control over these intangible aspects in an environment that is moving more and more towards immateriality.

Organizations have gone through many successive changes, as a result of the shift from the industrial economy to the knowledge economy, in which everything has changed, as competition increases and multiplies, technological developments accelerate and develop, and products age and disappear quickly, and these transformations and developments led to an increase in the importance and value of knowledge. It became the organization's weapon and its turning point from failure to success.

Technology is one of the major influential factors in an industry. Since the 19<sup>th</sup> century, the role of robot has been replacing employees in production department. In the third revolution that began in the 1970s personal computers and the internet entered into working life and human labor was replaced by machines. Nowadays, digital technologies like machine language (ML) and (AI) both are entering into day-to-day working at workplace and which will lead transformation in business (Ch Jhansi , 2022, p126).

With the development of (AI) technology, a new generation of labor, such as the human intelligence of AI, has become the key factor for enterprises to survive and transform in a changing environment. Since Google's Alpha Go system has won an overwhelming victory in a battle with South Korean player Lee Sedol, AI has

attracted attentions of both researchers and practitioners (Jia Q. et al,2018,p106).

Furthermore, improving the efficiency of HRM through AI has become an important trend in development of HRM future. However, only 22% of organizations claim to have implemented analytics in HR (T. França et al.2023, p3).

Thus, it is important to investigate the evolution of the application of AI in HR to understand how the evolution of researchers' interest has been applying the AI in HR, Because it is a relatively recent field of research, it is of vital importance for the academy to evaluate what has already been produced and to assist future research on the contributions of technology applied to HRM (Mariana Jatobá et al.2019,p138).

Accordingly, we tried through this study to clarify the benefits of AI in the field of HRM, its effects on it and the potential challenges associated with the application of AI in HRM, so that we can understand the relationship between them, and then determine the future prospects for this relationship.

### ***Research Questions***

The connection between AI and HRM allows us to establish the following research questions for this work.

1. How does AI act?
2. Why does AI vary from ordinary software?
3. What role does AI play in HRM?

### ***Research Objectives***

The objectives of the study are as follow:

1. To know what affects the AI has on HRM in the current era, or how AI will affect HRM in the future.

2. To explore and understand how AI is linked with the HRM and its different processes.
3. To study the challenges of artificial intelligence in human resource department.

## **2. Artificial Intelligence (AI)**

Artificial intelligence was coined first time in academics in 1956 (Ch Jhansi , 2022, p126), seeking to understand the nature of intelligence in living organisms, specifically of the humans (Mariana Jatobá et al.2019,p138).

Despite the ambiguous origin of the concept of AI, Two authors stand out in its development, On one hand we have A.M. Turing, The father of modern computation, while on the other hand, there is J. McCarthy the father of AI. Turing (1937) introduced the concept of algorithms and laid the foundation of computer science, Later, Turing (1950) proposed the Turing test, which tests whether a machine as the capacity to be as intelligent as the person performing its functions. However, J. McCarthy coined the term “artificial intelligence” during a conference in Dartmouth. In the 1950s and 1960s, AI was expected to develop rapidly into computers and robots with human-level cognitive capabilities, but that did not happen until it recently gained prominence (Palos-Sánchez et al. 2022, p3630 ).

In the past three decades of AI, it has been understood that the intelligence is not only confined to the competency of the individual but it also extends to how much you are aware about the things around you. AI required methods for encoding knowledge so that they can be embedded with the computer system. Some of the methods of AI include predicate logic, production rules, neural networks, semantic networks, etc. The main goal of AI is to solve the problems that are complex in nature, that can't be easily solved by human beings (Pooja Tiwari at al,2021,p158)

The concept of AI has multiple definitions, Different researchers have proposed

their definitions, Depending on the time and the level of technological development reached, different studies have focused on its various aspects. A sample of the most relevant definitions since the 20<sup>th</sup> century (Palos-Sánchez et al. 2022, p3630 ):

AI is devoted to the simulation and emulation of human problem-solving abilities, More precisely AI can be defined as follows:

- AI is defined as an ideal cognitive machine which is a dynamic agent that understands the world and takes action and for some reason maximizes its chances of success. Everyday, the term AI takes on new characteristics (Shivani Tiwari,2020, p11607).
- “AI is defined as “an ideal intelligent” machine that is flexible agent that perceives its environment and takes actions that maximize its chance of success at some goal (Ch Jhansi , 2022, p126).
- AI, is an interdisciplinary science that mimics human capabilities and intellectual behavior (Jia Q. et al,2018,p106 ).
- AI refers to technology that is capable of executing operations that require a certain amount of intellectual ability that is, a machine capable of achieving what a human being would do in other words, a tool trained to do what a human can do (Shivani Tiwari,2020, p11607).
- Task which requires human intelligence and thinking like problem solving and decision making for problem solving, and does designing and making machines to do job and work that needs human acumen and intelligence (Pooja Tiwari at al,2021,p158)

According to these definitions, AI system can be defined as systems that acts and thinks like humans and thinks and acts rationally.

The AI is distinguished from the normal applications by three main elements: high speed computation, accurate data and, sophisticated algorithms in significant numbers. Key AI systems improve the precision and reliability of routine operations with an algorithm that connects data quality with fast computing resources (Shivani Tiwari,2020, p11608).

AI has had increased attention in recent years. Innovation, made possible through the Internet, has brought AI closer to our everyday lives. These advances alongside interest in the technology's potential socio-economic and ethical impacts, brings AI to the forefront of many contemporary debates. Industry investments in AI are rapidly increasing (Jharna Soni, 2022, p149).

AI has been a dream for decades, and the writers of science fiction have visualized the development of sophisticated robots that could carry out human activities or even succeed in other fields. AI is the colouring source for fantasy pictures during the period of digitisation. It is a possible turning point that transforms our life both at home and at work. The AI Department operates in a range of ways as an intelligent assistant to the user, such as the Amazon's Alexa, delivering information, monitoring lighting, locking and unlocking intelligence homes, etc(Shivani Tiwari,2020, p11607).

AI is helpful in various business functions where it can help to reduce the workload and work pressure on the employees at workplace. Rapid changes in business needs fast response, With using AI system organization can able to inform the existing performance and day to day function. In business pressure has been increasing, tough managers understood the importance of AI at workplace. (Ch Jhansi , 2022, p126)

AI is having revolutionary impacts on organizational decision making and redefining management models. AI's visible impacts can be observed in core competency and business processes such as knowledge management, customer

outcomes such as perceptions of service quality and customer satisfaction (Kshetri, Nir ,2021,p2)

According to the recent survey conducted it has been analysed that around 62 % of the organization are planning to use AI in managing their management and day to day functions and around 38% of the organizations are already using it. Organizations which are using this technology have seen the increase in the performance of the activity and innovativeness. There are various authors which have conducted research in the domain of AI and also explored the application of AI in different domains (Pooja Tiwari at al,2021,p158).

At the same time, in this complex field, there are specific challenges facing AI, which include: a lack of transparency and interpretability in decision-making, issues of data quality and potential bias, safety and security implications, considerations regarding accountability, and its potentially disruptive impacts on social and economic structures (Jharna Soni, 2022, p150).

Several issues must be considered when addressing AI, including, socio-economic impacts; issues of transparency, bias and accountability, new uses for data, considerations of security and safety, ethical issues, and how AI facilitates the creation of new ecosystems (Jharna Soni, 2022, p150).

### ***3. Human Resource Management***

HR are generally viewed as one of the most valuable assets of any organization and, as a result, handling this asset effectively is deemed a core managerial responsibility. Managing HR includes a broad variety of specific activities, including recruiting, workplace success monitoring, professional training and job growth, and employee contribution benefits. Any organization's success depends on how well it intelligently combines personnel, processes and equipments to deliver change efficiency at reduced expense (Shivani Tiwari,2020, p11607).

In any organization, all managerial functions are performed by individuals. No organization can function and achieve its objectives in the absence of efficient and competent employees. Committed, honest, determined and loyal employees are required not only for the growth but also for the survival of organization. Therefore, HR is considered as the most valuable resource of an enterprise (Jharna Soni, 2022, p151).

HRM is a separate and specialized function which all managers need to perform. It is that branch of management which is concerned with the recruitment, selection, development and the best use of employees. Thus, HRM ensures that every employee makes his maximum contribution to the achievement of organizational goals. The HRM that we find today is the result of a number of significant interrelated developments since the era of industrial revolution (Jharna Soni, 2022, p150).

The main functions performed by HRM are (Jharna Soni, 2022, p151):

- Determining the number and types of employees required.
- Recruitment, selection and placement of employees.
- Providing training to employees for improving their performance and career growth.
- Performance appraisals.
- Motivating the employees by providing both financial and non-financial incentives.
- Ensuring social security for employees and handling their grievances.
- Defending enterprises from legal complications.
- Establishing amicable relations between union and management.



It is important to understand that HRM strategy is concerned with employment policies and practices, which encompasses recruitment, selection, evaluation, development and retention of employees, as well as recruitment, consultation and negotiation with individuals (Mariana Jatobá et al.2019,p138).

The six dimensions of HRM are interconnected and interact to form an effective HRM system (Jia Q. et al,2018,p106 ).

- HR planning is the starting point of HRM. It mainly helps the organization to predict the future needs of personnel and the basic qualities of personnel through the plan.
- Recruitment and deployment, with HR planning as input, is equivalent to the organization's blood, providing nutrition to the organization, solving organizational staffing and staff matching issues.
- Training and development, the theme is "education;"
- Performance management is the core of the six dimensions. It is also the main input for other dimensions.
- Compensation management aims to motivate employees to solve problems in the company.
- Employee relationship management aims to manage personnel and help the company form an effective cycle of rational allocation of HR.

#### ***4. Relationship between Artificial Intelligence and Human Resource Management***

Recently, much attention has been given to the machine learning, probably due to the innumerable possibilities of automation brought by recent advances in AI. In

addition, it is expected that the impact of AI progress will go beyond changing the nature of work, causing changes in economic mechanisms and business models, which will potentially bring impacts to management (Mariana Jatobá et al.2019,p138).

Due to the relative novelty of this technology and its application in different areas of the organization, many of the scientific developments in this field have mostly occurred in recent years. For this reason, although AI has been presented as a powerful tool in HRM, academic research on the subject is not very extensive (Palos-Sánchez et al. 2022, p3629 ).

The adoption of AI in HRM and in recruiting can be called as 'the new age of HR' (Jharna Soni, 2022, p152). Thus, the purpose of AI adoption in HR is to improve the productivity and efficiency of HR so that it can meet its core objectives. Hence, it should be kept in mind that the impact of AI technology in HR is to facilitate employee experience at every level (Jharna Soni, 2022, p155).

Nowadays, AI has penetrated the overall structure of the enterprise and one of the fields is the HR division, which uses the AI human system to replace persons and other roles in the HR department, such as applicant selection, recruiting, coordination of HR operations and success improvement, etc. Humans and intelligent algorithms work together to generate an ever-increasing volume of HR data in the cloud, and the application of AI analyzes give a deeper perspective into how to function and run. AI can help to effectively simplify a variety of back-office tasks for effective HR transfers and service delivery (Shivani Tiwari,2020, p11608).

AI technologies offer significant opportunities to improve HR functions, such as self-service transactions, recruiting and talent acquisition, payroll, reporting, access policies and procedures. We are living in an era in which AI capabilities are reaching new heights and have a major impact on how we operate our business (Jharna Soni, 2022, p151).

The role of AI in an organization is to improve efficiency and effectiveness of the HR function by making the various management processes agile and accurate (Nankervis et al. 2021). For HRM, IA will enable the understanding and control of data collection process so this process is included in an organizational and economic efficiency strategy (Varma et al. 2022).

Among the different areas that make up the HRM in an organization where AI is starting are: (1) talent search and recruitment, (2) training and development, (3) performance analysis, (4) career development, (5) compensation, and (6) staff turnover (Palos-Sánchez et al. 2022, p3631 ).

AI technology can be incorporated with HR functions to come up with innovative solutions to employee problems concerning Human Resource (E Sanyaolu , R Atsaboghena,2022, p1)

AI deployments in HRM issues such as recruitment and selection are becoming increasingly widespread and have drastically reduced time and cost of performing these functions. Practitioners have noted the need to incorporate AI in HRM in order to be competitive in the global economy. According to a 2019 survey by the online infographic and graphic design software company Venngage, 61% of companies were using AI to improve HRM. Some of the key HRM areas that have already been transformed by AI include time consuming and labor intensive tasks in recruiting such as reading many CVs, sorting them out and identifying the best candidates in a fraction and identifying which employees need what type of training (Kshetri, Nir ,2021,p2).

Qamar et al. (2021) showed that AI has been implemented in HRM in various organizations via the following techniques: (Palos-Sánchez et al. 2022, p3631)

- Expert Systems: They are programs designed to configure expert knowledge into logical structures that solve unstructured problems and help develop

complete information systems by providing easy access to knowledge. It is applied mainly in HR planning, compensation, recruitment, and labor management.

- **Fuzzy Logic:** This technique is used in different research fields. In the case of HRM, it's based on set membership levels, whose values vary between 0 and 1. A value of 0 indicates no membership, while a value of 1 shows full membership. With these sets, fuzzy logic can quantify data uncertainty and foresee future scenarios to facilitate decision-making. Its application began in 2000 and was used in personnel selection and optimal workforce design.
- **Artificial Neural Networks:** This application is a simplified model developed to mimic the function of a human brain. Its structure comprises a processing element, a layer, and a network to recreate the human learning process. It is one of the most popular techniques for prediction and is mainly used in selection, recruitment, and personnel performance management.
- **Data Mining:** It is the extraction of valuable but hidden information. Through its application, organizations can transform useful information and patterns into competitive advantages. Data mining was used in HRM in 2006 and has been applied mainly for recruitment, competency and performance evaluation, and talent management.
- **Genetic algorithm:** These information search techniques based on replication, mutation, and gene crossover arrive at optimal solutions to mathematical problems. It is used mainly in workforce planning and personnel performance evaluation.
- **Machine learning:** It is the learning process by which a machine can learn by itself without being particularly programmed to do so. Several papers agree that the use of machine learning in decision-making is quite beneficial for HR

managers and turnover prediction.

Benefits of Artificial Intelligence in Human Resource (Ch Jhansi , 2022, p128)

- It reduces the burden on administrative staff in company.
- It will help in talent acquisition and identify the right candidates for the job.
- AI helps to predict the rate of employee retention at workplace.
- It can overcome the limitations of human and work accordingly.
- The chance of error will be less.
- It will maintain the workflow in various departments.
- Through AI companies can be able to get accurate results.
- It will increase the employee engagement at workplace.
- It will minimize the bias behavior in decision- making.

The impact of AI on HRM is growing rapidly. It has the potential to transform HR operations with relevant and in-depth analyses of various functions. Functions like recruitment and selection, onboarding, performance management, employee engagement, and employee retention are now performed with the help of a virtual assistant (E Sanyaolu , R Atsaboghena,2022, p1).

What are the barriers to adopting AI technologies? What is causing the slow adoption of AI in this field? Financial barriers can be blamed for the lack of wider tool implementation to assist in HR administrative tasks. Other key barriers to AI adoption include (Jharna Soni, 2022, p152) :

- Talent gap: it can be expensive and hard to find properly educated or skilled people.
- Concern over privacy: confidential HR data must be accessed securely and available only to the authorized person.
- Ongoing maintenance: as with other innovative technologies, AI requires deep learning and regular review and updates.
- Integration capabilities: data availability is limited, due to the HR trend toward SAAS (Software as a Service).
- Limited proven applications: many products and services are feasible based on proof of concept only.

Challenges of Artificial Intelligence in Human Resources Management; As with any technological advance, AI brings both benefits and challenges, and its application in HRM is no different. These can be approached from three points of view: employees, company, and society (Palos-Sánchez et al. 2022, p3632):

- **Employees:** The application of AI may contribute to burnout, with some employees being worried about their career uncertainty, since machines may replace them, thereby creating anxiety and job insecurity. There is also dehumanization of personal relationships, as some of the HRM processes may be performed entirely by machines, like the use of chatbots. This implies the continuous need for training in technological matters. Finally, it is necessary to point out that the “techno-stress” is a consequence of excessive and continuous use of any type of technology.
- **Company:** The need for highly qualified personnel to manage and acquire the necessary skills to keep up with the increasing technological developments is a reality in AI. Even though it has high implementation costs, it can reduce costs

in the processes where they are applied. Another challenge is the existence of biases due to the use of small and non-representative data volumes and the increased exposure of the company leading to increased risk of its data security breach.

- **Society:** One of the main challenges in this area is the “technology gap” Since technology in general and AI has divided the world, it has created greater technological inequality. This is because not all countries can implement and maintain technological infrastructure. Potential job losses in certain professions are also important in the face of these challenges.

AI is crucial in improving the quality of HR choices. We expect AI to revolutionize and enhance the HR industry, and AI research’s theoretical and practical significance in HRM has been proven. Although recent studies have discovered more than 300 HR technology start-ups developing AI tools and products for HR or people management, with almost 60 of these organizations attracting customers and funding, there is minimal information on the application and impact of Machine Learning (ML) in HR (T. França et al.2023, p3)

AI might bring a future of significant increases in fairness and efficiency. However, it can also evolve into pervasive injustice and abusive control over managers’ decisions, implying that both scenarios can coexist. Although adopting AI systems in organizations is still restricted, an AI-driven future is rapidly dawning. This phenomenon prompts a more significant concern regarding the implications of the lack of ethics and resulting injustices of the use of AI in HR, potentially leading to a corporate control future, reflecting internal criticisms of the technology sector, which states that AI engineers are excessively focused on technical problems and financial goals while ignoring the ethical and societal implications of their work (T. França et al.2023, p3).

Although different departments of multiple organizations have adopted or integrated AI-based tools, the HR department still cannot implement them. Despite there being many people in the HR department of organizations that recognize the importance of applying AI, they also point out that they have not taken any actions regarding this. This is a reality that shows that even though AI in the HR area is still a developing revolution and is mostly limited to large companies, it is already unstoppable (Palos-Sánchez et al. 2022, p3628 ).

Future Opportunities; Researchers anticipate that in a few years, AI technology will be superior to humans in many tasks and activities. According to experts, AI has a high possibility of exceeding human performance in activities and automating human employment in the coming years. Some scholars think that AI will merely serve as a support system and never completely replace people. The future will consist of cooperation between people and machines. The importance of the collaborative interaction between machines and humans, in which machines forecast the results and humans make decisions and take appropriate action, is emphasized in another study on AI and deep learning (E Sanyaolu , R Atsaboghena,2022, p6).

AI will be able to play a bigger role in HR if it is decided what data to track, examine, manage, and safeguard . The field of people analytics still has a lot to teach us and discover. There will be fierce competition in the market to entice top personnel as more businesses begin to utilize AI technology. In that case, the only thing separating organizations from one another will be their capacity to meet candidates' digital expectations and give them the best experience. The sector that best equips its workers to effectively use the promise of AI and big data to acquire a competitive edge will dominate the industry (E Sanyaolu , R Atsaboghena,2022, p6).

## 5. RESULTS AND DISCUSSION

AI is not yet commonly used in HRM. However, its use has acquired greater relevance in the last five years ,and that the application of AI in HRM has not



advanced as expected. Among the main barriers are: the complexity of HR phenomena, associated data challenges, equity and legal constraints, and employee reactions.

AI is considered as a game-changer since it can provide self-learning capabilities and increase decision quality , and still, both Jia and Tambe state that there is a gap between the promise and the reality of AI technology application in the HRM field

The results obtained show that the literature has largely focused on the analysis of the application of AI in personnel selection. Instead of trying to take advantage of this tool to apply it to the entire people management process, they focused only on a specific sub-area.

There is a research gap for more technological models concerning implementing AI technologies in HRM across organizations. We need more progress regarding what concerns HRM when algorithms make choices, mainly because of the complexity of the HR phenomena, data issues from human resources processes, fairness and legal restrictions, and employee engagement in AI management.

The reviewed literature highlights that most employees still do not welcome the application of AI in HRM. Many HR professionals lack the necessary skills and competencies to meet the challenges of AI application in HR processes, hence their possible contrary attitude.

The organizations have to strive for adopting the innovative HR practices to improve their performance and be different among its competitors. In near future, HRM is moving from the traditional way of HR practices to more advanced progress like automation, augmented intelligence, robotics and AI .

AI has been proved as life-changing for us. From automation of mundane and

time-consuming tasks, to the augmentation and amplification of human capabilities, AI has the potential to drastically transform the way we live and work. For HR, this is not just an opportunity but also an urgency to adapt and adopt

## **6. CONCLUSION**

AI and machine language has been used by many companies in the field of HRM where AI plays integral role in recruitment, selection, hiring, analyzing performance, collecting data regarding employees, providing real time information and providing accurate information.

The incorporation of HR activities for candidates based on AI undoubtedly has a greater effect in enhancing the efficiency of the organization. Although AI applications do not possess emotional and cognitive abilities like humans, these powerful AI-based HR applications may be able to interpret, forecast, diagnose.

But most companies are still lagging behind in incorporating AI into their HR activities due to their integration-related costs.

In conclusion, the application of AI should be regarded as a positive opportunity, because AI improves life, AI produces a better future if it is clearly understood and properly used

## 7. Bibliography List :

1. Ch Jhansi ,(2022) , **Artificial Intelligence in Human Resource Management**, National Conference on Latest Innovations and Future Trends in Management,, Volume 8 Issue 8, ISSN: 2349-6002.
2. Eniola Sanyaolu , Rebecca Atsaboghena, **Role of Artificial Intelligence in Human Resource Management: Overview of its benefits and challenges**, 2022, p 1-7.
3. Jharna Soni, **a study on the impact of artificial Intelligence on Human Resource Management**, International Journal of Research and Analytical Reviews (IJRAR), 2022 IJAR April 2022, Volume 9, Issue 2.
4. Jia Q., Guo Y., Li R., Li Y.R., & Chen Y.W. (2018). **Conceptual Artificial Intelligence application framework in human resource management**. In *Proceedings of The 18th International Conference on Electronic Business*. December 2-6 ICEB, Guilin, China, pp. 106- 114.
5. Kshetri, Nir (2021). **Evolving Uses of Artificial Intelligence in Human Resource Management in Emerging Economies in the Global South: Some Preliminary Evidence**
6. Mariana Jatobá et al.(2019) **Evolution of Artificial Intelligence Research in Human Resources**, Procedia Computer Science 164 , p137–142
7. P.R. Palos-Sánchez, P. Baena-Luna, A. Badicu, and J.C. Infante-Moro,(2022), **Artificial Intelligence and Human Resources Management: A Bibliometric Analysis, applied artificial intelligence**, vol. 36, no. 01, e2145631 (3655 pages)
8. Pooja Tiwari et al,(2021) **Application of Artificial Intelligence in Human Resource Management Practices**, 11th International Conference on Cloud Computing, Data Science & Engineering Confluence
9. Shivani Tiwari,(2020) **Artificial Intelligence and its role in Human Resources Management**, International Journal of Mechanical and Production Engineering Research and Development (IJMPERD) , Vol. 10, Issue 3, 11607–11614
10. T. Jacob Fernandes França et al.(2023) **Artificial intelligence applied to potential assessment and talent identification in an organisational context**, journal Heliyon 9 e14694.