

A Study of AI-Based Information Systems in Human Resource Management

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Abstract -

The way businesses handle their employees is changing as a result of the adoption of artificial intelligence (AI) in human resource management (HRM). Information systems driven by AI offer sophisticated capabilities for decision-making, employee engagement, performance management, and talent acquisition. This study investigates the integration of AI in HRM, analysing its benefits, challenges and ethical implications. It further evaluates the effectiveness of AI systems in enhancing HR processes and their impact on the future work.

Key Words – Artificial intelligence, human resources, management, talent acquisition, decision-making.

1. INTRODUCTION

Human Resource Management (HRM) plays a crucial role in organizational success by managing workforce talent and ensuring alignment with organizational goals. Traditionally, HR processes such as recruitment, employee engagement, performance evaluation and workforce planning have been intensive and time-consuming. However, the approach of Artificial Intelligence (AI) is reshaping HRM by introducing intelligent, data-driven solutions to enhance these processes.

The origin of Artificial Intelligence (AI) has revolutionized the way organizations operate, and Human Resource Management (HRM) is no exception. The integration of AI-based information systems in HRM has transformed the way HR functions. This enabling organizations to make data-driven decisions, improve efficiency, and enhance employee experiences. AI-powered HR systems can handle regular tasks, give helpful predictions, and suggest personalized options. This allows HR professionals to concentrate on more important and strategic work. AI-driven information systems are made to handle large amounts of data, find patterns and provide useful insights. These systems help HR professionals make informed decisions, work more efficiently, and focus on important projects. For instance, AI tools can handle tasks like checking resumes, matching candidates, and onboarding new hires, which makes things easier for HR teams. Also, AI technologies such as machine learning and natural language processing are being used to evaluate employee performance, track engagement levels, and forecast future workforce requirements.

The study of AI in HRM is a new area that explore at the advantages and challenges of using AI in HR tasks. Following are recruitment, talent management, employee engagement and benefits administration. This research paper aims to investigate the current state of AI adoption in HRM. The impact of AI on HR processes are the main factors that influence the successful use of AI-based information systems in HRM.

By looking at how AI and HRM work together, this study aims to create more informed and effective way to manage HR. It wants to use AI to help businesses succeed and improve the overall well-being of the employees. Ultimately, this research aims to provide insights and recommendations. The HR professionals, organizations and policymakers seeking to leverage AI to create a more efficient, effective and employee-centric function.

The study of machine intelligence that mimics human cognitive capacities, including language comprehension, learning, reasoning, problem-solving, planning, pattern recognition and all other human talents, is known as artificial intelligence [1]. Artificial intelligence can be used by HR managers to identify and evaluate applicants based on certain qualities and skills required for a given role. Software technologies that analyse language and emotions, for instance, can assist HR managers in evaluating a candidate's motivation and empathy, which can be crucial in choosing the best candidate for the team [2]. It is crucial for HR managers to become familiar with the ethical concerns surrounding the use of artificial intelligence in HR [3].

This study aims to provide a comprehensive overview of the role of AI-based information systems in HRM, highlighting their applications, benefits, challenges, and future prospects. By exploring the current state of AI adoption in HRM and

analysing case studies of successful implementations, this paper seeks to contribute to the growing body of knowledge on the intersection of AI and HR.

2. LITERATURE REVIEW

The human resources functions have evolved over the time and are considered to be dynamic [4]. The academic literature shows approaches using AI in the healthcare sector to achieve agility and the study showed the effectiveness of the HR function [5]. The key characteristic of AI is its ability to connect physical objects (or “things”) to the Internet, such as vehicles, screens, pacemakers, electric motors, and more [6,7], as discussed by [8]. The Internet of Things (IoT) has practical implications that involve the technical aspects of sensing, processing, and communication [9,10,11]. Sensors play a crucial role in IoT, as they are responsible for gathering data about various factors, such as area, speed, temperature, and condition of use [12]. This data is then transmitted to AI systems for analysis and decision-making [13,14]. The data collected by sensors is characterised by its detailed nature, continuous flow, natural origin, reliability, and large volume [7,13].

2.1 Study of AI in HRM

The use of Artificial Intelligence (AI) in Human Resource Management (HRM) is changing the way organizations handle their employees. AI is being applied in many areas of HRM, such as finding and hiring talent, onboarding new employees, managing performance, boosting employee engagement, and analysing workforce data. This technology is making HR processes more efficient and effective. For recruitment, AI-powered tools like applicant tracking systems and automated resume screening streamline the hiring process, while chatbots enhance candidate engagement.

In learning and development, AI facilitates personalized training programs, ensuring employees acquire the skills they need. Performance management is getting a boost from AI-driven tools that offer real-time feedback and performance analytics.

AI provides many benefits, like making processes more efficient, improving decision-making with data insights, and enhancing employee experiences. It helps reduce biases in hiring and promotions and can save organizations money by automating everyday HR tasks. However, there are challenges, including worries about data privacy, potential biases in AI systems, and ethical concerns about monitoring employees. Additionally, HR professionals may face resistance to adopting AI and require upskilling to work effectively alongside these technologies.

Despite these challenges, the future of AI in HRM is promising. Emerging trends include AI-powered tools for remote and hybrid work environments, generative AI for talent engagement, and predictive analytics for workforce planning. As AI continues to evolve, it will play an increasingly critical role in creating efficient, equitable, and innovative HR practices. Organizations must adopt AI responsibly, addressing ethical concerns and ensuring transparency while leveraging its full potential to enhance HR functions.

2.2 Conceptual Framework

The conceptual framework of AI in HR management consists of several interconnected components that work together to enhance the efficiency and effectiveness of HR functions.

2.2.1 Data Collection and Integration:

The foundation of AI in HR lies in the systematic collection of data from various sources, such as employee records, performance metrics, recruitment platforms, and employee feedback systems. This data is integrated into a centralized database, allowing HR professionals to access and analyse comprehensive information about their workforce.

2.2.2 AI Algorithms and Models:

At the core of AI in HR are advanced algorithms and machine learning models. These technologies look at combined data to find patterns, trends, and connections that might not be obvious right away. For instance, predictive analytics can be used to forecast employee turnover or identify high-potential candidates based on historical performance data.

2.2.3 Applications in HR Functions:

2.2.3.1 Recruitment:

AI makes the recruitment process easier by automating tasks like screening resumes, matching candidates to job descriptions, and even doing initial interviews with chatbots. This saves time and helps reduce bias in selecting candidates.

2.2.3.2 Performance Management:

AI tools can analyse employee performance data to provide insights into individual and team performance. This enables more objective performance reviews and helps identify areas for development.

2.2.3.3 Employee Engagement:

AI can assess employee sentiment through surveys and feedback analysis, allowing HR to gauge engagement levels and address issues proactively.

2.2.3.4 Training and Development:

AI facilitates personalized learning experiences by recommending training programs based on individual employee needs, skills gaps, and career aspirations.

2.2.4 User Interface:

A user-friendly interface is crucial for HR professionals to interact effectively with AI tools. Dashboards and visualization tools present data insights in a clear and accessible manner, enabling HR teams to make informed decisions quickly.

2.2.5 Ethical Considerations:

As AI becomes more prevalent in HR, addressing ethical concerns is paramount. Issues such as algorithmic bias, data privacy, and transparency must be carefully managed to ensure that AI applications are fair and equitable for all employees.

2.2.6 Continuous Learning and Improvement:

AI systems should be designed to learn continuously from new data and feedback. This iterative learning process enhances the accuracy of predictions and recommendations, allowing HR departments to adapt to changing workforce dynamics.

2.2.7 Impact Measurement:

Finally, organizations must measure the impact of AI on HR outcomes. This includes evaluating improvements in recruitment efficiency, employee satisfaction, retention rates, and overall organizational performance. By regularly assessing the effectiveness of AI initiatives, HR can ensure continuous improvement and alignment with business goals.

3. APPLICATIONS OF AI IN HUMAN RESOURCE MANAGEMENT

Artificial Intelligence (AI) is revolutionizing Human Resource Management (HRM) through its diverse applications across key functions.

3.1 Talent Acquisition and Recruitment

AI-powered tools like applicant tracking systems, automated resume screening, and chatbots simplify the recruitment process and improve candidate engagement. Predictive analytics also helps evaluate a candidate's chances of success, leading to better hiring decisions.

3.2 Onboarding

AI enables personalized onboarding programs, virtual assistants, and automated compliance handling, creating a seamless and efficient experience for new hires.

3.3 Employee Engagement and Retention

AI-driven tools that analyse employee feelings can measure morale, while predictive analytics can spot employees who might leave. Ongoing feedback systems powered by AI also improve communication and engagement.

3.4 Learning and Development

AI provides personalized training pathways, adaptive learning platforms, and immersive experiences using virtual and augmented reality, ensuring employees acquire the skills they need effectively.

3.5 Performance Management

Real-time feedback, goal tracking, and identifying high-potential employees for leadership development are made possible through AI-driven performance management tools.

3.6 Payroll and Benefits

AI automates payroll processing, minimizing errors and enhancing efficiency. It also offers personalized benefits recommendations and ensures competitive compensation through trend analysis.

3.7 Workforce Analytics

AI-powered workforce analytics provides predictive insights for future hiring needs, monitors diversity and inclusion metrics, and tracks key HR indicators such as turnover rates and productivity. By leveraging these applications, AI empowers HR professionals to improve efficiency, enhance decision-making, and create a more engaging and equitable workplace environment.

4. METHODOLOGY

In general, research design may be seen from two perspectives: quantitative research design and qualitative research design. A quantitative research design examines the relationship between variables using numbers and statistics to explain and evaluate its findings. There are three types of quantitative research designs:

4.1 Research design:

4.1.1 Descriptive research:

This approach is used to explain the features of a group or circumstance under study. It answers the "what" question (what are the traits of the population or situation?), but it doesn't explain how, when, or why these characteristics occur. It is common practice to group the attributes into descriptive categories. We will be using this strategy for our study since we need to gather data for our research that incorporates population information.

4.1.2 Correlational design research:

This aims to determine whether two variables are connected or related in some way by utilising statistical analysis while watching the variables.

4.1.3 Experimental design research:

A cause-and-effect relationship between two or more variables can be ascertained in this manner. To observe the impact on the dependent variable, the independent variable is altered. A group may be exposed to a variable, for instance, and then contrasted with another group that was not.

4.1.3.1 Qualitative Research:

Using case studies, a qualitative research design is employed to investigate the significance and comprehension of intricate social contexts, such as the character of individuals' experiences. In contrast, the exploratory nature of qualitative research design aims to explore rather than forecast results.

4.1.3.2 Research Methodology:

The precise steps or methods used to find, pick, process, and evaluate data on a range of subjects are referred to as research methodology. The methodology part of a research paper gives readers the opportunity to evaluate the study's overall validity and dependability. A variety of qualitative and quantitative research techniques, including surveys, participant observation, experiments, and secondary data, are employed by sociologists. In order to test theories and provide an explanation for data, quantitative approaches concentrate on categorising features, counting them, and developing statistical models. On the other hand, qualitative approaches seek to offer a thorough and comprehensive account of observations, encompassing the background of events and situations.

4.2 Data Collection:

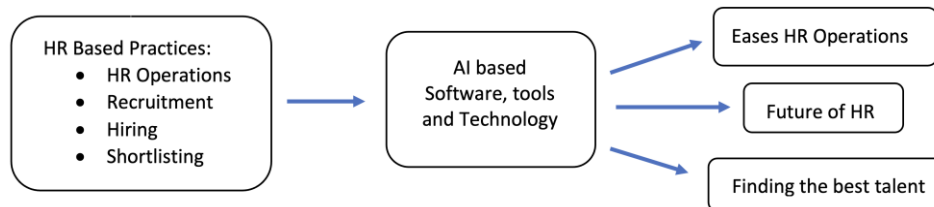
This study combined primary and secondary data. The primary data was gathered through a standardised questionnaire. The questionnaire was distributed to 150 responders. After examining the trustworthiness and plausibility of the data, 19 fully completed questionnaires were utilised for data analysis. The secondary data was gathered from publications, journals and PDFs. Primary and secondary data were analysed and analysed to reach a reasonable conclusion.

4.3 Data Analysis Tool:

Data analysis was done using SPSS software. The questionnaire's internal consistency and reliability were assessed using Cronbach's alpha. Multiple linear regression analysis was then used to examine the data. The purpose of this analysis was to ascertain whether the impact of artificial intelligence on HRM and HR practices was considerable and how well the research model performed in doing so.

4.4 Research Model:

The research model used for this project is shown in the figure given below. Software and technology related to artificial intelligence are the independent variables in this study model. HRM and HR practices serve as the study's dependent variable.



4.5 Research Hypothesis:

H ₀ (Null)	AI has no substantial impact on Human Resource Management.
H ₁ (Alternative)	Artificial intelligence has a big impact on HRM.

5. OBJECTIVE OF THE STUDY

The following are the study's goals:

1. This study's goal is to determine how artificial intelligence affects human resource management.
2. To determine how AI-based software helps recruit the top industry professionals.

6. DATA ANALYSIS AND INTERPRETATION

6.1 Respondent's characteristics analysis:

This section contains an analysis and explanation of the data collected through the questionnaires. The questionnaire was distributed to 150 responders. After validating the data's quality and dependability, 19 replies were received and evaluated. The first segment examines the respondents' ages, occupations, and organisations. Out of 19 respondents, 15 (78.9%), or the majority of the respondents, are between the ages of 20 and 30, followed by 31 to 40 and 51 years and older. This is depicted in **Fig-1** given below.

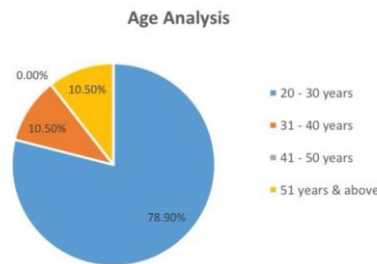


Fig-1: Age analysis of the respondents of the organizations

It is possible to analyse the respondents' occupations from **Fig-2** given below. Corporate personnel make up the majority of responders (31.6%), followed by other categories (31.6%) and business categories (26.3%). Working professionals make up the smallest percentage of responders.

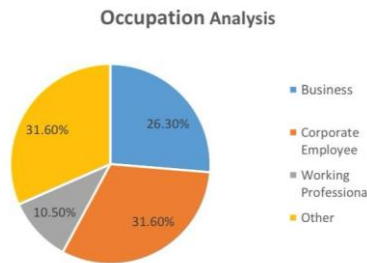


Fig-2: Occupation analysis of the respondents of the organizations

It is possible to evaluate the respondents' occupations from **Fig-3** below. The majority of respondents (57.8%) do not fall into any of the aforementioned categories and instead belong to another industry, such as the education, pharmaceutical, journalism, engineering, etc. sectors. The manufacturing sector (15.8%), retail sector (10.5%), automotive sector, and consulting sector (5% each) come next.

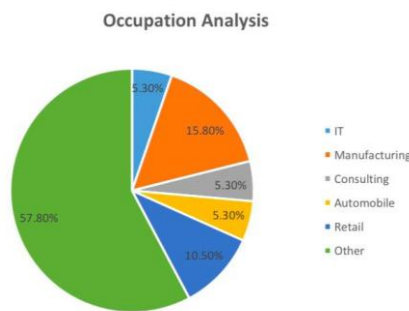


Fig-3: Occupation analysis of the respondents (sector wise) of the organizations

6.2 Analysis of the impact of AI on HRM:

After ensuring the questionnaire's reliability and consistency, the influence and significance of Artificial Intelligence on HRM and HR Practices were assessed. Multiple regression analysis was done to determine the impact of the. The independent variables for this study were artificial intelligence technology and AI-based software, while the dependent variable was HRM & HR Practices such as HR Operations. The model's R square value, which is displayed in **Table-1**, indicates how much of the variability of the dependent variable can be explained by the independent variable and helps determine whether the research model being used fits the data well. It is evident from **Table-1** that the R square value is 0.622. This indicates that artificial intelligence accounts for 62.2% of the variability in human resource management.

Table-1: Model Summary indicates how much of the variability of the dependent variable can be explained by the independent variable and helps determine whether the research model being used fits the data well.

Model	R	R square	Adjusted R square	Std. Error of the Estimate
1	0.789 ^a	0.622	0.506	0.99387

The results of the ANOVA test, which are displayed in **Table-2**, provide insight into how well the independent factors in this model predict the dependent variable. Table 2 shows that the sig value is 0.009, which is below the conventional p-value of 0.05. Thus, it demonstrates that the independent factors selected for this model - software and artificial intelligence technologies - help determine the dependent variable, HRM & HR Practices.

Table-2: ANOVA^a Test provide insight into how well the independent factors in this model predict the dependent variable

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	21.159	4	5.290	5.353	0.009 ^b
Residual	12.841	13	0.988		
Total	34.000	17			

Table 3 displays the regression test results. This contributes to understanding the significance and impact of artificial intelligence on human resource management and HR practices. It also demonstrates the link between AI and HRM. **Table-3** shows that the sig value for all independent variables (familiarity with AI introduction - 0.005) and (agreement of AI software assisting in finding the best talent for the job - 0.011) is less than the standard significance value of 0.05, indicating that these factors are significant and have an effect on HRM. However, the other two components have a value greater than 0.05, indicating that their organisations currently do not use AI-based software for HR practices. **Table-3** also shows that all of the criteria except the use of in-house or third-party software have positive beta values. This suggests that these variables are favourably associated to HRM and HR Practices. So, based on the results of the investigation, hypothesis H₁ can be accepted: AI has a favourable and significant impact on HRM. Thus, the H₁ (Alternate) hypothesis is supported, whereas the H₀ (Null) hypothesis is denied, implying that Artificial Intelligence has a significant impact on Human Resource Management.

Table-3: Multiple Regression Output shows that the sig value for all independent variables & also shows that all of the criteria except the use of in-house or third-party software have positive beta values.

Model	Unstandardized B	Coefficients Std. Error	Standardized Coefficients beta	Sig
(Constant)	3.571	1.380	-	0.023
Do you utilise third-party software systems for hiring or do you have your own HRM software?	-0.836	0.489	-0.302	0.111
Do you know about the use of AI in hiring procedures?	0.915	0.273	0.587	0.005
Does your company's hiring software use artificial intelligence (AI) or other cutting-edge technologies?	0.288	0.299	0.178	0.353
How much do you think AI-powered tools are assisting in identifying the most qualified candidates for open positions?	0.777	0.263	0.529	0.011

7. FINDINGS

1. AI has been included into HRM practices by the great majority of companies.
2. The positive responses from the respondents suggest that they will probably support the use of AI at various HR-based function levels.
3. Companies are using third-party and internal technology, such Ezieka and Omnidocs, as AI solutions for human resource management.

4. The vast majority of the organisation supports AI as the future of human resources.
5. Companies who haven't used AI-based software yet will like to in the future.

8. CONCLUSION

The introduction of AI-based HR activities for applicants will surely have a stronger impact on improving the organisation's efficiency. Although AI applications lack human-like emotional and cognitive capacities, they can understand, forecast, and diagnose data, making them a valuable tool for any organisation. However, the underlying problem that is overwhelming the global workforce is how AI is exhibiting its impact in reducing jobs in numerous industries around the world. However, the truth is that improved technology do not replace humans; rather, it is about how humans can adapt to and exploit these innovations to increase wealth and prosperity. In the genuine sense, AI-based services will touch a subset of workers, and it is the job of HR leaders and businesses to consider their employees' requirements and future consequences. And, eventually, based on our data, most organisations effectively use AI-related methodologies into recruitment; however, AI will be everywhere in HR in the near future: recruitment, training, onboarding, performance analysis, retention, However, most firms are currently trailing in adopting AI into their HR processes due to integration expenses. To summarise, the usage of AI should be viewed as a good opportunity because it improves people's lives and creates a better future provided it is correctly understood and applied..

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