

The Impact of AI on Recruitment and Selection Processes: Analysing the role of AI in automating and enhancing recruitment and selection procedures

Dr. Saurabh Pratap Singh Rathore

Director, International Consortium of Academic Professionals for Scientific Research, New Delhi

Abstract: Human resource management is the process of identifying, recruiting, hiring, and training talented individuals, as well as providing them with career advancement possibilities and critical feedback on their performance. The purpose of this study was to investigate the function of AI in HRM practises using qualitative bibliometric analysis. Scopus, emerald, and the Jstore library are used as data sources. This analysis contains adjustments to data spanning 18 years.

It also showed that there is a constant improvement and introduction of new technological conveniences. In accordance with the present market climate, which promotes and celebrates process management and people management practises targeted at making the organisation economically viable and different from the competition, this is a positive development. This work advances the theoretical understanding of AI's growth in the HR sector in light of this reality. Articles and proceedings examined in this research reveal that different authors and academic institutions provide different perspectives on the problem.

Key words: HR Practices, AI tools and Bibliometric Research, Recruitment, Selection

Introduction:

High turnover rates are a major problem in the business sector in the age of digitization and the Fourth Industrial Revolution. The Bureau of Labour Statistics reports that in the United States, the turnover rate for any given industry often exceeds fifty percent, and that in certain areas (such as hotels and restaurants), it may exceed seventy percent. An industry study indicated that 41% of businesses discovered that when entry-level workers opted to quit, it cost the organisation \$30,000. This has a significant influence on labour costs. Recruiting is an expensive and time-consuming process. Previous studies on employee turnover in Indonesia found that only 25% of millennials felt involved with their companies, while 9% did not feel tied to the company at all, and 66% only felt bound with the company to some extent. Sixty percent of millennial employees are contemplating quitting the firm if they don't sense a good cultural fit. It's safe to assume that this trend will have an effect on employee turnover rates and maybe on how well an organisation does overall. High rates of planned job departure have a detrimental effect on the company's finances and internal communications, among other things.

Human resource management focuses on finding, hiring, and developing talented people, providing them with opportunities to grow professionally, and providing constructive

feedback on how they're doing in their jobs. It does this by keeping tabs on staff habits in light of the technological changes that have taken place inside the company. For any business to thrive in today's cutthroat environment, every member of staff must work together to implement necessary changes and meet strategic objectives. AI, or machine learning, is a rapidly growing field with substantial applications in business. Some businesses maintain the false belief that robots can't perform the work as well as humans. There is some apprehension about using AI systems in the workplace. They're getting closer and closer to being correct, and as a result, robots are becoming better and better at doing their jobs via appropriate demonstration. The importance of AI in the hiring process is now well recognised. In 2018, it has become clear that technology developments in HR are radically altering how businesses source candidates and how they adapt to changing market circumstances in order to regain their competitive edge. Now more than ever, businesses have a fantastic chance to save money by automating the recruiting process and equipping hiring managers with the greatest decision-making analysis possible.

The more specialised software used in artificial intelligence allows for a more accurate assessment of the candidate's abilities in the workplace. Artificial intelligence (AI) makes it possible for human resources managers to do their duties with little effort and paperwork. Human resources managers have a tough job since recruiting top talent and matching them with open positions is essential to the success of any business. Value is created for the company via recruiting that is in line with current market trends, and efficiency and performance are enhanced through the use of artificial intelligence. AI's vast capacity to mimic the human brain allows it to provide effective recruiting outcomes. The best outcomes from AI are achieved when its algorithms are tailored to a specific task. Hence, the use of AI in personnel selection is the finest thing to happen in the field in the near future. Currently, when compared to other HR processes, AI is most closely associated with the recruiting function, which helps businesses find and hire the best possible employees. Using data from previous hires, AI does a preliminary screening of resumes submitted to many firms.

According to the study of published works, 38% of respondents to a 2017 poll by Deloitte predicted that AI will be extensively deployed at their organisation during the next three to five years. The percentage increased to 42% in 2018. Better communication between applicants and companies is one way in which artificial intelligence in recruiting may boost candidate engagement. Overall applicant satisfaction with the system is rated at 9.8 out of 10 on average. This is because it has the ability to provide instantaneous updates, feedback, and direction to applicants while also answering their queries as they arise. The absence of this communication, which may have a major effect on the applicant experience, is a common problem. "Recruitment through AI: A conceptual study," by Geetha R & Bhanu Sree Reddy D. (2018) The primary purpose of this research is to investigate the impact of AI on the hiring process.

The report also sheds insight on how various AI-focused organisations go about hiring new employees. Human Resources Director Ian Bailie's "An Analysis of AI's Effect on HR" (2018) This paper discusses major corporations' use of AI, delves into the foundations of the technology, and investigates its applications in human resources. The Positive Effects of AI on Employment Human resources recruiters have a lot on their plates, including setting up interviews and manually reviewing applicants. Human resources personnel may benefit from

AI in the role of a personal assistant if their companies use software or automated resume checkers. Using a messaging service to automate discussions about certain recruiting or employment inquiries is another wonderful approach to streamline these repetitive procedures so that applicants may obtain the information they need whenever it's convenient for them. Over the phone or over email, and without watering down the candidate's expertise. AI Innovation in Human Resources Companies are actively seeking more effective approaches to HR. In addition, it may be challenging for individuals to effectively embrace and understand a variety of AI tools and methodologies, which can act as a roadblock to the organization's overall objective.

AI has not only altered HR's role in the recruiting process but also drastically streamlined the process itself. Testing Potential Employees Technology may be used to narrow down a pool of applicants for a job. The candidate's resume is read by a resume parser, which then makes the extracted data accessible in several areas. Use this automation tool to make better hiring decisions and speed up the process of selecting candidates. Applicants Matched Find reliable references that are a good fit for a certain résumé or job posting.

The ability to swiftly locate qualified applicants is made possible by match technology' ability to differentiate between a job description and a candidate's skills and experience. By matching synonyms for domain, talents, tools, location, education, etc., it finds the greatest possible fit. Enhancing Your CV Check out their social media pages for the most recent details on the candidates. You may also visit a marketplace and get all the necessary details by entering a candidate's email address.

Artificial intelligence (AI) is the use of technology with the objective of recreating human cognitive skills with the addition of the ability to anticipate and account for potential problems. The Society for Human Resource Management (SHRM) sees AI as a potential game-changer in HRM, ranking it as the top technical trend. An organisation may maximise the benefits of AI technology for HR assistance by learning how science and data can enhance decision-making. First, AI may aid in the automation process, second, it can aid in the decision-making process, and third, it can act as an intelligent agent or chatbot as a supporting tool for the business. 2.2 Digital Setting for Hiring A Virtual Recruitment Environment (or VRE) is a platform for employers and job seekers to connect and network online. a highly developed recruiting platform that facilitates online application submission and even virtual job interviews.

The visual appeal, depth of available information, and efficiency of the application procedure are all factors that shape the online recruiting atmosphere. Management of People Resources Electronically In its simplest form, electronic human resource management (e-HRM) is the coordination of HR-related tasks via the use of electronic means of communication. Organisational support for HR strategy using internet-based technologies is another description of e-HRM. Previous studies have shown that e-HRM technology may boost HR output. E-recruitment and e-selection are two components of e-HRM that facilitate the hiring process. In order to fill open jobs, businesses may pick and choose among the finest candidates by utilising e-recruitment to draw in a large pool of competent applicants from which to choose. E-recruitment is defined as the use of electronic means of communication, including as websites and social media, to source, attract, and retain qualified applicants

throughout the recruitment and selection process. E-recruitment has four main advantages: first, it can reach candidates who are currently working at other companies or passive candidates; second, it can reduce time and cost, as all activities are carried out online; third, it can increase the attractiveness of applying for jobs; and fourth, it can reach candidates who are already employed. The organization's website may be tailored to the specific requirements of the applicants. E-selection is the second e-HRM activity that can aid in the recruitment process; doing so has four advantages: first, it streamlines the job analysis process; second, it makes it easier to purchase online screening tests for potential hires; third, it streamlines the interview process; interviews can be conducted remotely using video conferencing software like Zoom or Skype; and fourth, it aids in making a final decision. 2.4

The Hiring Procedure Recruitment is the process of identifying, recruiting, and selecting potential new employees in order to fill open positions within an organisation. Internal sources include promotions and transfers, whereas external ones include things like ads, schools, placement agencies, job fairs, outsourcing platforms, and job portals. The primary goal of e-recruitment is to increase the volume of applications received so that qualified candidates may be selected to fill open jobs in the organisation. The organisation uses both traditional and modern recruitment practises as a point of reference; the two approaches are similar in that they both involve finding candidates, testing them, talking to them, and ultimately placing them in a position. The media and technology used at each level of recruiting in the contemporary approach makes it distinct from the conventional approach, which makes less use of such aids.

Objective of the Study:

To make the bibliometric research for exploring the role of AI in HRM practices.

Methodology:

This study adopted bibliometric analysis for conducting qualitative research for understanding the role of AI in HRM practices. Sources of the data is scopus, emerald, Jstore library. This study incorporates corrections for 18 years of data.

Research area: research area is concerned to the Indian human resource companies which have adopted the AI tools to manage their human resource practices like recruitment and selection process, updating training programs etc.

Methodology of Review and Analysis:

Literatures are thematically arranged not followed by chronological order. It does have included the frequency counting of literature that are published in various journals. Among them filter was applied to extract the homogeneous contents in the articles. So, literature is arranged in cohesive manner not in chronological order.

Literature review:

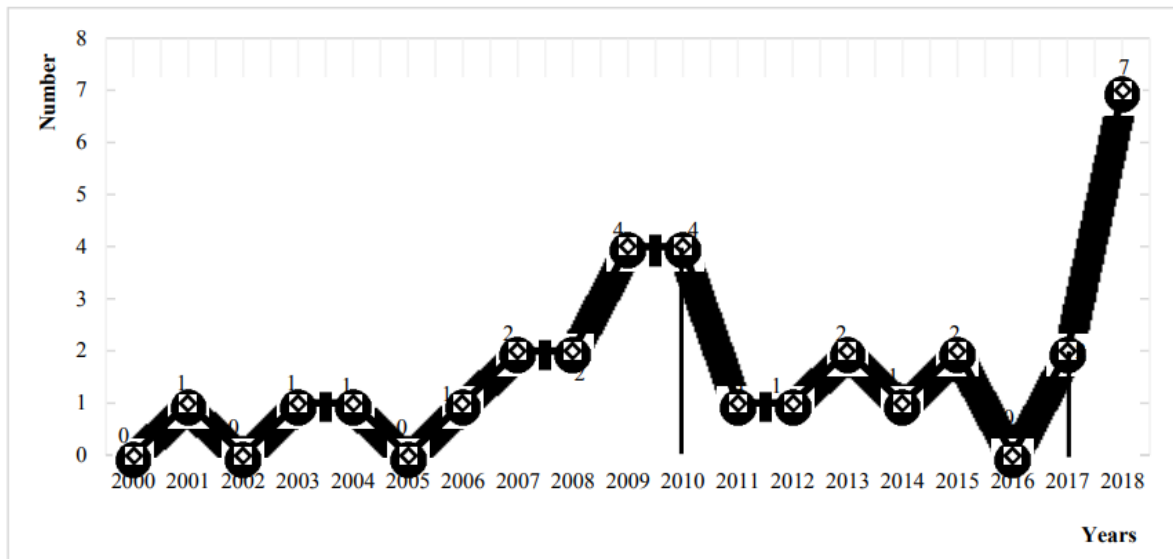
There were total of 32 papers uncovered as a consequence of the investigation. Twenty-three of the totals are "Neural network or ANN and Human resources" articles; these articles use a wide range of ANNs, including Fuzzy, Radial Basis Function, Elman, and Feed-Forward, among others. The remaining five are classified as "artificial intelligence" (AI), "artificial intelligence and Human Resources" (HR), "artificial intelligence and recruitment," (AI and HR), and "artificial intelligence and recruitment and selection" (AI and HR). As a result, 71.8% of the articles studied include some kind of artificial neural network use in HR. This sample represents a cross-section of HR goals that have been implemented using an AI-powered solution. During this time period, the tool is used to aid in the areas of management, team estimation, recruitment and selection, employability in recruitment and selection, recruitment (the first step in the selection process, consisting of a series of procedures for attracting candidates from a variety of curriculum offerings, according to job/function criteria), turnover, corporate education and training, human resource performance measurement, development (HRD), quality of life at work, and employability.

There are three prominent examples of the aforementioned themes in use. The first area of interest is the employment of AI in Management, which accounts for a quarter of the sample. The application for Team Estimate comes in at a close second with a total of 15.62 percent. Thirdly, Recruitment and Selection was highlighted (12.5% of the sample) for its potential applications. As seen in the first table below.

Distribution of the AI application of HR topics during the years (2000-2018).

Application in HR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
Management								1		1	3			1		1			1
Team Estimate							1			1	1			1		1			
Recruitment & Selection		1																	3
Employability/R&S					1					1									1
Recruitment																			2
Turnover										1									1
HR Performance								1						1					
Measurement																			
Corporate Education																			
/training									1			1							
Development (HRD)									1										
Management by																			
Competencies				1															
Quality of life at work															1				
Employability																			1

In terms of temporal context, a rise in interest in studying the topic from 2000 to 2010 is seen in Fig. 1.



Number of Artificial Intelligence publications applied to Human Resources in B-on.

Number of Artificial Intelligence publications applied to Human Resources in B-on, Fig .2

One explanation for this expansion is the rise in the number of studies conducted on the topic of artificial intelligence, which has many practical and theoretical applications across a wide range of fields. One publication in 2001 using Recurrent ANN (RNN) AI, applied in HR, "A neural network modelling on human resource talent selection," confirms the role of AI in R&S as a decision support system; this work was published in the "First Decade," or between 2000 and 2010. During the same time frame, other articles such as "A HRD Evaluation Method Based on BP Neural Network," "Enterprise Human Resource Management Outsourcing Decision-Making Model Based on BP Neural Network," and "The Study of Enterprise Human Resource Evaluation Research Based on Neural Network" elaborate on the RNN-type AI applied to HR, but with a focus on management.

The years 2009 and 2010 have the most publishing activity. Seventy-five percent of all research in 2010 was used in human resource management, or the use of AI to aid in making decisions. The period from 2011 to 2017 (hence referred to as the "Period of Reduction") shows a decline in HR-related IA works. This raises the issue of what may have caused this decline. About one-third of all AI studies in HR deal with the topic of management. Additionally, 22.2% is used in team size calculation, which provides backing for businesses with a large number of employees.

The study on the university human resources risk management based on RBF neural network and the research on the human resource intelligence system based on knowledge are two prominent examples of current work in the field of artificial intelligence in HR management. The need assessment also revealed an unexpected uptick in interest in studying the topic in 2018. Publications during this "Growth Period" (7 out of 32) attest to the fact that this time frame was productive. More than four publications in that time range have not been reported in any year before. Also crucial is an examination of how changes in automation and artificial

intelligence have altered the focus of HR studies. During this time frame, 71.4% of studies were conducted with the intention of aiding businesses in the areas of employee selection and recruiting.

Using examples from the recruitment business, the article "Applying artificial intelligence: implications for recruitment" explains how AI has advanced and how it may be used to benefit both the sector and its customers. Furthermore, the study "Making Better Job Hiring Decisions using "Human in the Loop" Techniques" helps cement this concept by claiming that companies believe competitive advantage may be gained via employing the greatest personnel, but that this advantage is difficult to reproduce by rival companies. As a result, the use of AI systems to R&S enables significant cost and time savings. The Turnover theme accounts for 14.3% of the applications, while 14.3% of the applications deal with topics connected to employability, such as finding and keeping a job.

Artificial intelligence applied to HRM practices:

As an intangible resource that is difficult for rivals to replicate, human capital may provide a significant competitive advantage for any business (Kearney & Meynhardt, 2016). Due to economic, political, social, and notably technical developments, human resource management has become a strategic trend in organisations (Jatobá et al. 2019). Strategic positioning is still sluggish and may be troublesome (Poba-Nzaou et al., 2020), and not all departments have accepted their new roles.

In these situations, adapting to the introduction of new technologies like AI is essential (Michailidis, 2018). AI's purpose at a company is to make the HR department more effective and efficient by increasing the speed and precision of the different management procedures (Nankervis et al., 2021). Integrating a data gathering process into a plan for organisational and economic efficiency is a goal of human resource management (HRM), and IA will make this possible by facilitating an understanding of and control over the process (Varma et al., 2022). Organisational HRM (Abdeldayem and Aldulaimi 2020; Nawaz 2020; Qamar et al. 2021; Yahia, et al. 2021) consists of six sub-functions: (1) talent search and recruitment; (2) training and development; (3) performance analysis; (4) career development; (5) compensation; and (6) staff turnover. Qamar et al. (2021) demonstrated the following methods through which AI has been incorporated into HRM-agnostic organisations.

Expert systems are computer programmes that organise large amounts of specialised information into logical frameworks for the purpose of addressing complex issues and facilitating the creation of comprehensive information systems. Human resource management (Malik et al. 2022) makes extensive use of it in areas including remuneration, recruiting, and workforce management.

Fuzzy logic: This method has found application in a variety of academic disciplines (Salmerón and Palos-Sánchez, 2019). Human resource management uses discrete ranks with numerical values between zero and one. No membership is indicated by a value of 0, and full membership by a value of 1. Fuzzy logic may use these data sets to predict outcomes and reduce guesswork in decision-making, according to research (Kimseng et al., 2020). As early as 2000, it was being utilised for things like employee hiring and resource planning (Qamar et al. Artificial neural networks are a software programme that uses a simplified model of how

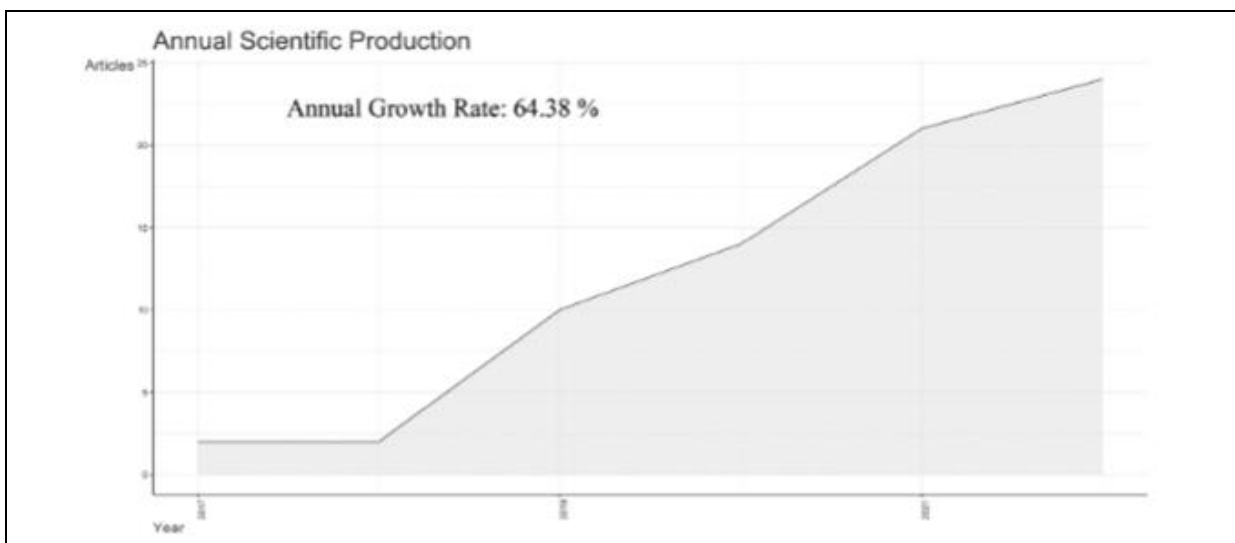
the human brain functions to achieve similar results. To mimic the way humans learn, its design incorporates a process element, a layer, and a network (Huanget al., 2006). It is widely employed in the areas of selection, recruiting, and performance management of employees (Qamar et al., 2021).

Data mining is the process of discovering useful information that has been buried. Using it, businesses may turn actionable insights and patterns into a strategic advantage (Huang et al., 2006). Since 2006, HRM has made use of data mining, primarily in the areas of candidate selection, employee appraisal, and talent development. A genetic algorithm is a method for finding the best answers to mathematical problems by simulating natural processes like reproduction, mutation, and gene crossing. Workforce planning and employee performance assessment are two of its primary applications (Zhang et al., 2021). Machine learning, as defined by Rab-Kettler and Lehnervp (2019), is the process by which a machine acquires knowledge without being explicitly taught. Several studies confirm that HR managers and turnover prediction may both benefit greatly from the application of machine learning indecision making (Hamilton and Davison 2022).

Assessment of all literature till 2022-2023 in AI and HRM practices:

At first look, the low number of publications in the subject of AI in HRM (about one paper per year) suggests that this area is still in its infancy. However, as can be seen in the figure shown below, this will be a hot issue in the near future.

The exponential development in the past five years of the number of papers published each year is indicative of the current level of research and emerging trends. There has been a rise in curiosity in the relationship between AI and HR as its use and relevance in both fields continues to expand (Jatobá et al., 2019). In 2017, only two articles addressed the ideas in a linked fashion; this number climbed to ten in 2019. At a compound annual growth rate of 64.38 percent, AI is clearly on track to become one of the most important technological advances of the next century (Qamar et al., 2021).



Annual Scientific Production. Fig 3

Analysis of Conceptual Structures

Knowledge Structures

It refers to the overarching ideas, recurring patterns, and developing tendencies within the scientific field. According to Mori et al. (2014), multiple correspondence analysis (MCA) is a method that assists in the analysis of categorical data by breaking down huge sets of variables into more manageable subsets in order to synthesise the information contained in the data. In order to do this, the data are condensed into a space with a low dimensionality, which then leads to the formation of a graph that is either dimensional or three-dimensional and makes use of planar distance to show the degree of similarity between terms. There are three distinct categories or clusters of information that are emphasised here.

(1) Cluster 1 : In this first grouping, the artificial intelligence technologies that are currently being used in HRM are discussed, with an emphasis on big data and machine learning. According to Caputo et al. 2019, big data allows for the rapid analysis of enormous volumes of diverse data originating from a variety of sources, which ultimately results in a stream of information that can be put into practise. This may help decision-making processes. In the field of machine learning, the availability and diversity of data during the last ten years have facilitated an increase in both its usage and its capacity to be applied (Hamilton and Davison 2022). This sort of learning gives computers the capacity to learn (Soleimani et al. 2022), as well as the ability to imitate human abilities (Bolander 2019). Learning machines are able to draw lessons from the context in which they are operating and apply those lessons to new environments. There are a lot of organisations that employ this kind of algorithm, despite the fact that they don't completely implement AI in their HRM systems (Nankervis et al. 2021).

(2) Cluster 2: It is the practise of using information and communications technologies (ICTs) to entice prospective candidates, maintain those candidates' interest in the organisation throughout the selection process, and influence the employment decision they ultimately make (Johnson et al. 2021). According to Pillai and Sivathanu (2020), the acquisition of talent has become an essential job for HR managers, and businesses are going to considerable lengths in order to entice the most qualified candidates. According to van Esch and Black (2019), the acquisition of talent has shifted from being a strategic HR activity to a priority for the company. Because the foundation of competitive advantage has switched from physical assets to intangible assets, the strategic relevance of human capital has increased, and as a result, it has become the primary driver. The skill gap that currently exists in the labour market has heightened the need of investing in human capital. The conventional way of looking for applicants was a procedure that was known to be both time-consuming and expensive. On the other hand, thanks to recent technology developments and the rise of digital recruiting, it is now a lot less difficult and more affordable. In addition, as the majority of today's society is spending a growing amount of time in the digital world, businesses that wish to attract and recruit talented individuals need to do it in the digital realm (Black and van Esch 2021).

(3) Cluster 3: This cluster proposes a far more "futuristic" view of HR, one that encompasses the full digitization of all HR services as well as the usage of robotics in day-to-day operations. While electronic human resource management stands out in its use of technology to facilitate HRM processes such as recruitment, selection, training, performance

management, human resource planning, compensation, etc. (Johnson et al. 2021), electronic human resource management also stands out in its use of technology to facilitate human resource planning. It is possible to obtain better control over performance and over the behaviour of workers via the use of ICTs, resulting in higher strategic and operational effectiveness in management. The use of robots in human resource management is also notable. According to future predictions given by Stanley and Aggarwal 2019, in 20 years, robots will be in charge of making certain analytical judgements that are now being made by human managers. However, people will continue to be in charge of jobs such as creativity. Social structure: The co-authorship network is the most popular kind of this type of network (Aria and Cuccurullo 2017). It illustrates how authors or nations are connected in a particular study topic. Black and van Esch and McNeese and Schelble are the writers that stand out for having the most number of articles that they have co-authored together. There is a significant amount of collaboration between writers in the production of articles, and very few publications are the work of a single author. This is the case despite the fact that the majority of publications are authored. The United States of America is the nation that participates in the most international cooperative efforts, as measured by the total number of such endeavours.

Conclusion:

New technological conveniences are introduced and improved upon on a regular basis. This is consistent with the current market environment, which encourages and celebrates process management and people management practises aimed at making the organisation economically sustainable and distinguishable from the competitors.

In light of this fact, this paper makes theoretical progress in the study of the development of AI in the field of human resources. distinct writers and academic institutions produce distinct facets of the issue, as shown by the articles and proceedings investigated in the current study. The reasons, goals, strategies, artificial intelligence tools, and HR-related applications all differ. This scattered conduct lends credence to the idea that there may be no group, or at least no consistent school of thought. The rationale is that various writers who have written extensively on the topic may be found within the sample. In addition, there are dramatic shifts in the total number of scholarly investigations throughout the course of history. Initial data suggest steady expansion consistent with the first decade of AI's rise in the academy. However, the studies published in the subsequent seven years do not advance the field or show how the issue or its writers have evolved. The sudden uptick in activity towards the conclusion of the sample period suggests that curiosity for the topic has returned. It is widely held that applying AI to HR has not yet led to a theoretical departure or created a new conceptual area. The conclusion drawn from this is that interdisciplinary teams consisting of engineers and HR experts, as well as technological researchers and HR specialists, may help to fortify this framework.

This is because all of the studies that were discovered were written by engineers. Last but not least, new research is needed to supplement what has already been done; this includes pinpointing the root reasons of research reduction behaviour and laying out specific avenues of inquiry into the topic at hand. The study's limitations include its reliance on a small sample size and its failure to conduct a qualitative investigation of the variables that may have

contributed to the decline in interest in research throughout the specified time period. It is feasible to list qualitative analysis of data from the years 2000-2010 in order to bring up the reasons and probable link with slowness in the latter era as a proposal for future research. In addition, to broaden the scope of possible scientific output, 2018 verification work on the use of AI research in HR has shown the need of doing more work in this area. In addition, you need to learn how the topic might contribute to the development of organisations in the future.

The Impact of AI on the Labour Market Recruiters in HR have a lot on their plates, from scheduling interviews to physically sifting through applications. If their organisations utilise software or automated resume checkers, human resources professionals may find AI useful as a personal assistant. Applicants may get the answers they need whenever it's most convenient for them by using a messaging service to automate conversations regarding particular recruitment or job queries. In-person, through video chat, or by phone while maintaining the candidate's competence. Using AI to Improve Human Resources Companies are always on the lookout for improved methods of human resources management.

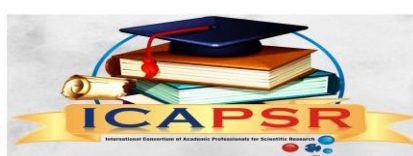
Artificial intelligence (AI) has not only changed HR's function in the hiring process but also made it much more efficient. Technology-based tests of prospective employees are one method of eliminating unqualified candidates from the running for a position. A resume parser reads the candidate's résumé and makes the information it extracts available in several formats.

The present state of research and developing trends may be gauged by looking at the exponential growth in the number of papers published annually over the previous five years. As AI becomes more prevalent in business, more people are interested in how it relates to human resources.

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Correspondence Author

Dr. Saurabh Pratap Singh Rathore

Director

International Consortium of Academic
Professionals for Scientific Research, New Delhi
rathoresaurabhsingh@gmail.com



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