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THE THEORETICAL FOUNDATIONS OF FUTURE DIRECTIONS OF ARTIFICIAL INTELLIGENCE IN HUMAN RESOURCE MANAGEMENT – A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

The evolving role of human resource management along side artificial intelligence is explored in this study. Organizations are more inclined towards emphasizing sustainability through long-term retention of employees in this era of digital transformation. Artificial intelligence and machine learning have subsumed almost all human resource functions which mandates this study further. A total of 86 articles were extracted from Scopus database and Biblioshiny along with VOS viewer software was employed to provide a comprehensive overview of the existing literature on this subject.

The findings revealed four major clusters that collectively represent the current body of knowledge, further supported by the analysis conducted through Biblioshiny. The study has also proposed an A-M-M-O framework that categorizes the mediators, moderators, and outcomes identified through cluster analysis. Furthermore, the research identifies a significant gap in theoretical foundations and the absence of a comprehensive conceptual framework explaining the integration of artificial intelligence into HR functions.

To address this gap, the study establishes the relevance of artificial intelligence in human resource management through the application of economic and sociological perspectives, including Human Capital Theory, Social Exchange Theory, and Job Embeddedness Theory. Additionally, the study identifies several emerging research areas that warrant further scholarly attention, such as predictive analytics, decision trees, random forests, employee engagement, job satisfaction, organizational performance management, and employee turnover.

KEYWORDS: *Artificial Intelligence, Employee Retention, Human Capital, Social Exchange and Emotional Intelligence*

INTRODUCTION

Artificial intelligence is a discipline that focuses on the intersectionality of psychology and computer science. It aims at enhancing the functionality and intelligence of computers, a phenomena which is visible in recent times in recent progresses of new softwares, hardwares, networking technologies, building new AI technologies and developing them. Artificial intelligence is the main reason of fear among human resources of being fired, though there are also various instances where AI as an aiding tool can actually help in retaining employees. Minimizing layoffs can follow as an outcome.

Employee retainment has emerged as the biggest challenge in recent times. Their disengagement and turnover has largely been affected due to their scare of being replaced by AI-driven Chatbots and robots. Machine learning has emerged as the main branch of artificial intelligence. There are both perceived risks and perceived advantages associated with artificial intelligence. AI has reduced the stress and strain of employees by maintaining large amounts of data at a single click. It can complete their tasks with very less efforts. In order to fortify the organization, AI has armed it with certain machine learning tools that may predict the risk of flight of employees. Graph neural networks,

logistic regression and decision trees can predict the future behavior of employees by studying their present activities. There is also an advantage of artificial intelligence that it can assist in maintaining an unbiased approach and contribute towards the principle of diversity, equality and inclusivity in giving equal consideration towards candidates of various stripes and conventions and does not discriminate unlike humans. This is the reason why companies will prefer artificial intelligence over human beings. Artificial intelligence is also a one time investment with only few repairs requiring overtime to maintain a good stead. This attribute is unlike human resources who require constant motivation and are also susceptible to forgetting things. AI recruiters can swiftly review the resume of all candidates without getting exhausted in the process. While there's a lot of focus on AI either as a threat or as a tool, less attention is given to the nuances of human AI collaboration.

AI is increasingly overtaking the role of facilitator increasing organizational efficiency, process of gathering knowledge gathering and making the organization competitive. literature surrounding artificial intelligence predominantly emphasizes how it is transforming the entire corporate landscape and overshadowing traditional organizational roles. AI has uprooted human intelligence by taking over its job. In the march of time, AI has now become capable of extracting relevant information and summarizing them, a talent which comes in handy in the field of human resource management. Identification of linguistic and conceptual trends is for decision making and tracing historical trends is the forte of AI. This is also in the nature of AI to make employees receptive and pliable to new skills, thereby resulting in their upskilling.

In the context of business, AI assists in setting up collaborative platforms that may include all departments and personnel wherein they get connected on the topic of their interests. AI is also instrumental in improving customer interaction and insights with businesses. This helps the business organizations gain insights on customer needs, feedback, any query or their user experience. This discussion mandates citing of few live examples of certain companies which have taken for data gathering. For instance, a home security firm might examine how customers engage with sensor panels, or B2B distributors could track patterns in order replenishment. These companies have a detailed understanding of the lifetime value of new active users and allocate resources accordingly. There is a scarcity of literature focusing on the concept of collaboration between humans and artificial intelligence. While much attention is directed towards AI as the assistance of human-machine interaction.

Some such cases are that of Alipay using voice-activated ordering and payments or Netflix that analyses viewing habits of its viewers and tailor-make all the content and creating dynamic user profiles are certain examples of companies using the talent of automation. Same goes with companies as Flipkart, Uber or Amazon that study their customer or user behavior extensively. They get behavioral insights from all digital interactions as clicking, browsing and viewing.

REVIEW OF LITERATURE

Artificial intelligence is a creation of computer and data systems that automate and perform tasks that typically requires human calibre. A field of computer science focused more on learning, reasoning, assessing data, understanding language and process vast amounts of data which is beyond the capacity of human beings. It can serve as an assistant to various human functions and also capable of being employed at various companies to coordinate their functions. As the time has marched, artificial intelligence has expanded and embraced every field of work so much so that in the current times it has gained the attention of scholarly fraternity. Vast amounts of literature can be witnessed on the usage of artificial intelligence. The use of artificial intelligence in predicting employee turnover or sustenance is also visible. Studies have also been conducted on the same. Random forest model, Adaboost, Support Vector Machines and Neural Network Algorithms have been used to predict the likelihood of an employee leaving the company (Paigude et al. 2023). AI techniques of machine learning and big data analysis are instrumental in predicting employee turnover and optimizing recruitment process (Azeem et al. 2024). There is also a mediating role of employee loyalty in the impact of artificial intelligence on employee retention. Artificial intelligence can directly impact retention by improving job satisfaction among the employees and their efficiency (Al-Ayed, 2025). Artificial intelligence also helps in promoting an egalitarian culture in companies as it enables the employees to choose the preferred position in the company and enables employers to hire the best candidate (Leao & Fontana, 2024). AI is also helpful in the context of talent acquisition in order to build a diverse workforce and thus promote diversity, equality and inclusion principle (Jora et al. 2022). The functions of employee engagement, performance management, onboarding, recruitment as well as workforce planning have gained extraordinary efficiency and automation can also be facilitated through AI-HRMS

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(artificial intelligence based human resource management systems). The real-time support of artificial intelligence speed up employee recruitment thus increasing fulfillment.

Even traditional or local businesses are increasingly broadening the "surface area" available either a danger or a mere tool, the complexities of human-AI collaboration receive less consideration. People and AI can combine to uncover valuable insights and enhance creativity, productivity and problem solving. AI and people have a symbiotic association in this context wherein both are benefitting from each other. This type of storytelling could significantly widen the discussion about AI's role within society. In the course of time, this has come into corporate attention that the use of artificial intelligence can also be smartly used in retaining employees. The study conducted here has conducted a systematic study of 86 articles spanning from 2004 to 2024 i.e. a period of 20 years has been taken into consideration. 40 renowned journals have published studies on artificial intelligence under various titles and fields covering 14 disciplines. The central idea of these researches is managing the talent of employees which also includes sustained training, development and performance appraisal of employees. This research is bibliographic by nature which unbundles the existing research patterns and has also generated fresh emerging drifts in the field.
In order to address the research gap concerning the role of artificial intelligence in enhancing employee retention, we have formulated the following research questions:
What patterns have surfaced in the literature on staff retention and artificial intelligence?
Which publications or sources are thought to be the most important and influential when it comes to employee retention and artificial intelligence?
Which writers have contributed the most to the field of artificial intelligence and employee retention?
Which top articles have a strong emphasis on employee retention and artificial intelligence?
What collaborative trends are seen among the authors of this field?
Which novel and developing fields of study have the potential to shape future lines of inquiry?

METHODOLOGY

KEYWORDS ANALYSIS

Keyword analysis involves pinpointing words necessary to produce a significant amount of secondary data. Diverse information on various viewpoints has been sought in this paper. AI has expanded a lot and is still expanding which is why this study navigates the past, present situation and the impending future of artificial intelligence. Upon reviewing the data, it can be concluded that artificial intelligence replaces human resources in numerous functions, although often this is viewed as a means of enhancement.

MATERIAL COLLECTION

Material collected for this study has examined the strength of artificial intelligence in retaining employees across all fields of work. As a preliminary step, we commenced our systematic literature review on cross-border acquisitions in July 2024. We collected materials using Scopus, recognized as the most extensive scientific database. Efforts were made to maintain the breadth of the study while capturing all pertinent topics and methods associated with assessing the impact of artificial intelligence on employee retention. Our search terms "facilitating employee retention" produced 86 results in 2024.

ESTABLISHING SEARCH TERMS

Within the very first step, keywords of "Artificial intelligence ("Sustainable HRM Practices" AND "Cost-Benefit Analysis" AND "Employee Engagement") were considered on July 23rd, 2024 which did not yield any research article The keywords were changed to generate more results suitable for bibliometric analysis. Keywords were later modified to "Sustainable HRM Practices" AND "Artificial Intelligence" which generated only 18 results. Keywords were evolved into "Artificial Intelligence" OR "AI and Sustainable HRM Practices" OR "Sustainability" on July 23, 2024 which yielded only 27 results. Filter criteria was maintained to be only academic paper and national and international conferences rather than newspaper articles. Inclusion criteria was maintained at Conference Proceeding, Book, Journal and Book series. After including above mentioned works, as many as 86 Scopus indexed research papers and conference papers were derived relevant to our work.

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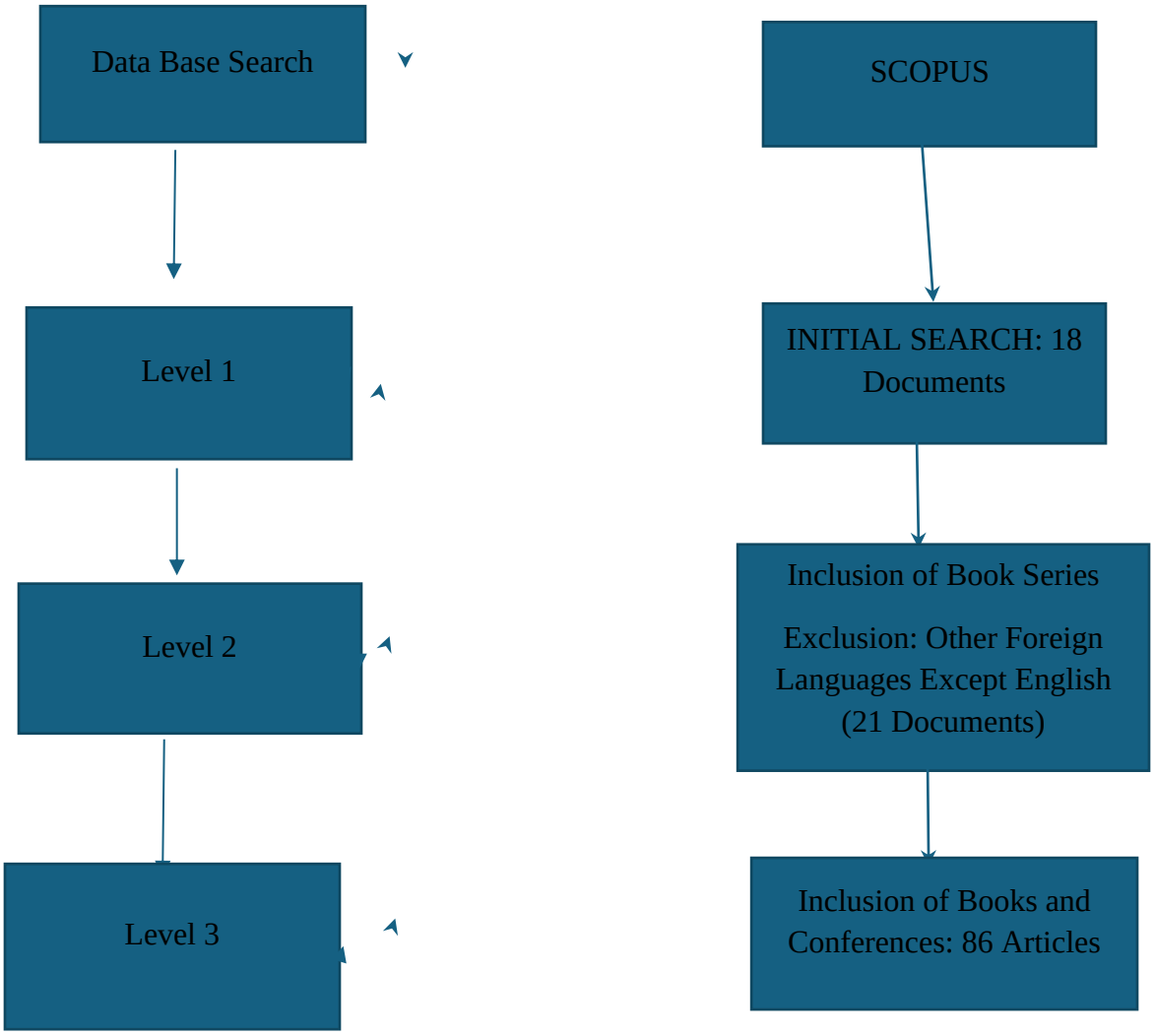


Figure 1: PRISMA Diagram for Selection of Articles for Role of Artificial Intelligence in Employee Retention

SEARCH CRITERIA

Initial search for this study was done on 23rd of July 2024 with a defined search string. The results then had to be expanded based on inclusion and exclusion criteria, and thus results were delimited. Four categorizations were thus followed to identify the most relevant research papers (Kumar S., Sureka R. & Colombage, 2019). The categorization of research papers was based on the relevance of available literature with the keywords "Artificial Intelligence" which is represented in blue in cluster diagram and has also been mentioned in the word cloud in the largest font in the middle. Red Cluster depicts all words related to machine learning, data analytics and human resource management. Green Cluster of cluster diagram majorly focuses on retainment of employees along with implementing artificial intelligence and its other branches in any organization.

THEMATIC MAP ANALYSIS CONDUCTED IN R SOFTWARE

To answer our research question 1, we have conducted a thematic analysis of all research works filtered based on relevance in R software which shows evolution of terms associated with artificial intelligence over the years. In the Word Cloud, these words can be classified into niche (very specialised and peripheral themes), motor (important and

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well devel oped themes for structuring a research field), emerging or declining themes (low-density themes). The basic themes are shown in the middle quadrant. It is followed by a temporal evolution of keywords along with concerned scholars and countries where research is being carried out covering a period from 2009 to 2024. The focus of researchers can be identified by the words received from Biblioshiny analysis in "R" software. Words that have evolved over time and which have some relevance to "artificial intelligence" are "decision making", "employee retention", "human resource management", "personnel training", "information management" and "machine learning." The researchers have used Keywords Plus to generate word frequency in Fig. 1 and Word Cloud in Fig. 5.

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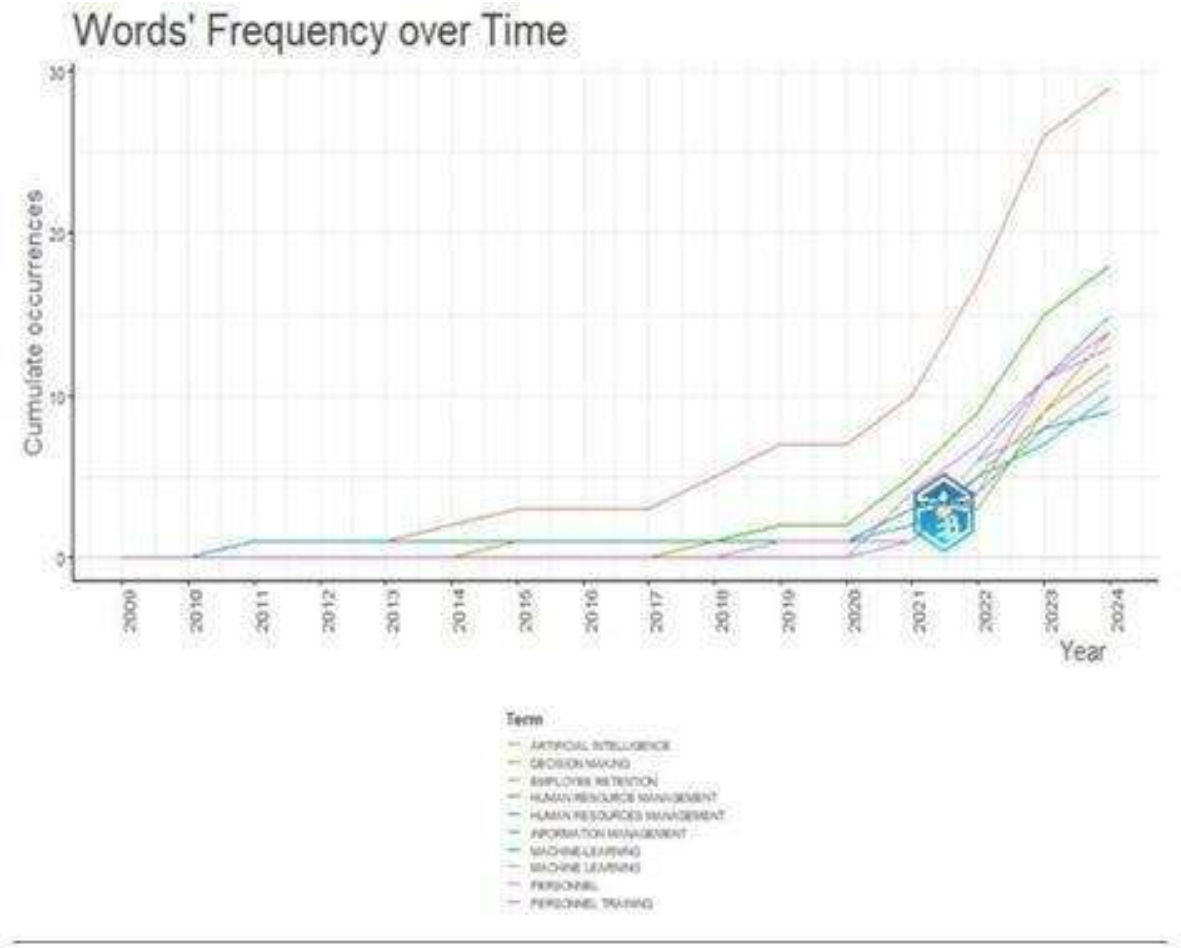


Fig 2: Word Frequency Diagram Depicting Evolution of Words Associated with Artificial Intelligence Over the Years

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Research question number 2 can be answered with the help of Fig. 2 and Fig. 3 received from Bibliography diagram. They consist of most local and global cited documents respectively. Most local cited references are also depicted in Fig no. 4. The article "Emotional intelligence or artificial intelligence– an employee perspective" have gained maximum citations and popularity among the scholars of artificial intelligence. This shows that the concept of human beings working along side artificial intelligence is gradually gaining more relevance. There is a huge concern among scholars' fraternity whether human resources will be overtaken by artificial intelligence. Hence, they are focusing more on collaboration between artificial intelligence and human resources. As the saying goes, technology is a good servant but a bad master, so this is the need of the hour to make technology subservient to human beings and not rule them in the long run. A minimum number of citations per article analysis was done to identify the most impactful article among all filtered data of 86 research papers and, Tambe P. has emerged as the author of the most influential article that has been published in the journal "California Management Review" having maximum citations at 6 of his 2010 work. The article by Capelli P., Tambe P. & Yakubovich V "Artificial intelligence in human resources management: Challenges and a Path Forward" focuses on the gap between promise and reality of artificial intelligence and human resources. Four techniques of data science have been identified in this. These techniques are utilized in HR practices. This article echoes more about how HR tasks can be simplified with the help of artificial intelligence. This research has enumerated a series of HR operations along with prediction task for each function. There is a considerable progress AI is making towards automobile industry, health industry, marketing, advertising and social media, though general purpose AI is still a longshot in any domain of human activity.

DERIVING EMERGED RESEARCH FRONTIERS THROUGH WORD CLOUD

Emerging themes earlier discussed have also been substantiated with the help of word cloud received from Biblioshiny analysis in R software. The clusters received from VOS Viewer analysis have further been strengthened by results received from R analysis. Word cloud has a word of different font sizes that depict their frequencies. In the word cloud, words are of different sizes based on their frequencies without revealing any linguistic meaning or relation among them. In this world, cloud "Artificial Intelligence", "Human Resource Management", and "Employee Retention" occur very frequently which is easily visible by their font size. In analysis results received from VOS Viewer, the researcher has received four clusters all consisting of words associated with artificial intelligence. Decision trees, random forest and machine learning models in cluster 1, big data and predictive analytics in cluster 2, artificial intelligence in cluster 3 and deep learning in cluster 4 are all words associated with artificial intelligence. This can also been seen in Word Cloud in Figure 5 where the word" artificial intelligence" is in a very large font. In all the clusters except cluster 4, words associated with "human resource management" are also visible. Due to its absence in cluster 4, the font size of "human resource management" is smaller than "artificial intelligence." This clearly shows that the field of human resources working in cooperation with artificial intelligence is an emerging field, a fact that can also been seen in Word Cloud represented in Figure 3. This answers the research question 6 of this study.

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Fig. 3: Research Frontiers Emerged Through Word Cloud

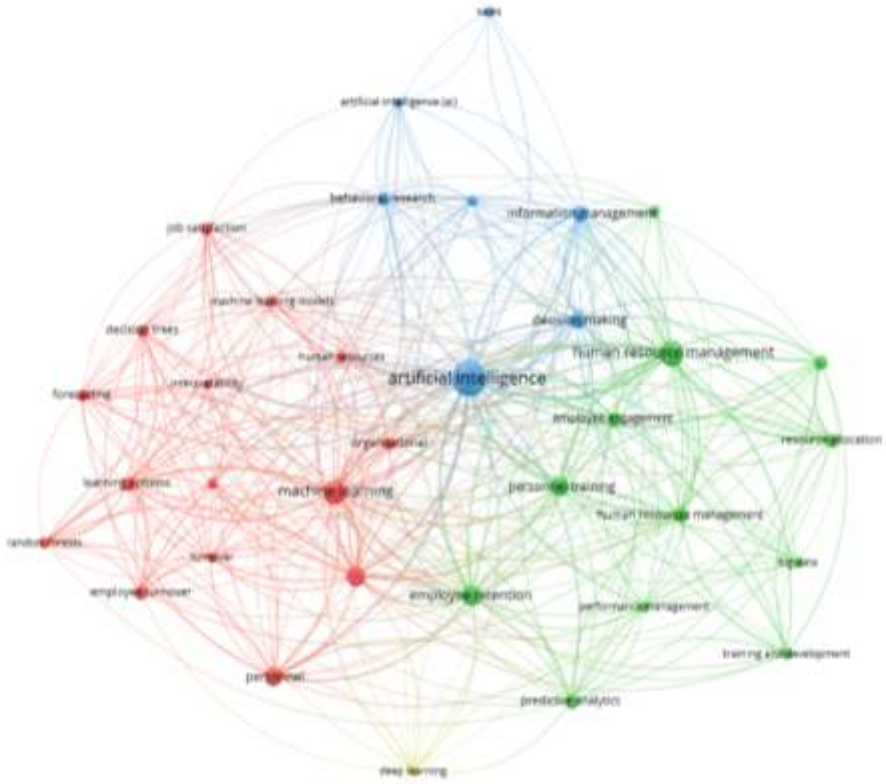


Fig.4: Cluster Diagram of Role of AI in HRM

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CLUSTER ANALYSIS

Cluster 1: Machine learning models of AI can forecast the retention rate of any employees and also assess their job satisfaction. This is the core of Cluster 1 i.e. the predictability of human resources. The cluster analysis of the literature utilized in this study underscores the collaborative dynamics between HR and AI. Currently, there is significant debate regarding the potential replacement of human resources by artificial intelligence. However, the literature identified in this research diverges from that notion. The central theme in this cluster is also grabbed by explainable AI which can forecast employee turnover beforehand. SHAPley Additive exPlanations is one of the examples which can predict and explain the reason behind employee turnover risks. Upper and middle level managers can gain a clear understanding on factors as salary, career growth or manager behaviour that is driving an employee's likelihood to leave.

Cluster 2: The sole focus of Cluster 2 was on employee retention as well as their performance management. AI also undertakes the training and development task of employees in an efficacious way. Studies indicate that artificial intelligence has a detrimental moderating effect. Employees who scored high on artificial intelligence did not outperform those who scored higher on emotional intelligence. Additionally, AI significantly influences the relationship between employees' emotional intelligence and their job outcomes. This research expands the AI dialogue that has mainly concentrated on technical and functional efficiency within organizations to explore its effects on both employee and organizational performance (Prentice et al. 2019). It is essential to also emphasize employee emotional intelligence instead of focusing solely on artificial intelligence. Insufficient attention to emotional intelligence can hinder employee engagement and retention. Employees are likely to leave a workplace where their emotional intelligence needs are disregarded. Despite AI's widespread presence in the business sector and its transformation of machine use in place of human roles, there remains considerable debate about substituting humans in such processes. Artificial intelligence does not appear to directly influence employee retention, contrary to what is observed with emotional intelligence.

Cluster 3: The central theme in Cluster 3 revolves around decision-making with the help of artificial intelligence grounded on the information managed by the tools of artificial intelligence. Scholars believe that the digitalization of the workplace requires greater engagement from employees; however, placing more emphasis on employee perceptions related to power, information, rewards, and knowledge sharing contributes to enhanced organizational resilience. The researcher suggests that high-involvement work systems foster a clearer understanding among employees regarding both power and various HRM practices (Mai et al., 2024). Different employees perceive knowledge sharing in varying ways. In this context, quality circles represent an example of employee engagement. This is also considered a high-involvement work practice, which has the potential to maintain organizational resilience.

Cluster 4: Deep Knowledge Deep learning has emerged as a key component of artificial intelligence in recent years. Deep learning is essential for storing client data and providing future services, especially in personal and service marketing. This data relates to the decisions and preferences of customers. Deep learning provides more impartiality and reduces bias in the hiring process for every position. It gets rid of human preconceptions and biases. This indicates that choosing the best candidates is made easier by deep learning. This implies that AI may be used to improve employee experiences, which will increase staff retention.

This conceptual framework describes how artificial intelligence (AI) contributes to employee retention. This integrates theoretical foundations and relevant AI tools with all human resource activities, HR strategies, and organizational outcomes. Academic writing, strategy development, and the use of HR technology can all benefit from this paradigm.

DISCUSSION: What are the Theoretical Foundations

The discussion above on the gathered research papers mandates a discussion on a gradual evolution occurring towards retaining employees with the help of AI. This literature shows that the scholarly community has understood the usage of AI for the benefit of mankind. With the other emerging research domains pertaining to HR and AI as role of this technique in personnel selection, recruitment or upskilling the employees, employee retention has also emerged in the same thread.

This section discusses the theoretical foundations of human-technical systems and the theoretical underpinnings of 'what leads the manager to induce training of human resource in the computational systems'. This study identified 5 AI domains that can become functional in retaining employees. Systematic literature review done in this study rests mostly on human resource strategies enhanced by artificial intelligence. Key functional areas that can prevent

employee retention are also included here. Employees are assets whose value can be increased through training, skill development and education. Human Capital Theory **e**mphasized investing in employee development to increase value and retention. Human Capital Theory combines both the disciplines of human resource management and economics. In Economics, Becker has also extended Human Capital Theory that weighed expected benefits received against expected costs. The Indian economy is continuously showing signs of turning into a knowledge-based economy which hinges strongly upon human resources. Becker has extended his domain of micro-economic analysis towards a wide range of human behavior and interaction. To first understand human capital, it needs to understand that it comprises skills, knowledge and experience possessed by an individual or population that can be converted into monetary value. Humans are the important building blocks of any organization as expounded by Mincer in his 'Mincer Equation'. Investment in human capital is a forward-looking investment and can be dubbed as the present value of future earnings. Investment in training human resources in the field of artificial intelligence is translated into the present value of future earnings. In the systematic literature review done above, Cluster 1 discusses explainable artificial intelligence that can predict the attrition of employees in near future or during their joining period. This explainable artificial intelligence can be learnt by top and middle level managers and can add to existing human capital as mentioned in Human Capital theory above. This action also becomes well suited to Mincer's Equation if manager invests in the training of top and middle level managers which can generate a human resource that can be retained for a longer period of time.

According to Mincer's Equation, "Earnings are a function of education and experience." In this case, education of employees in the techniques of artificial intelligence gives a rise in their earnings. In the logarithmic expression propounded by Mincer, investment in the training of employees in artificial intelligence can be denoted as (T). This 'T' coupled with their work experience (X) can give them an increase in their incomes. Income variations of employees can be witnessed due to their training and their own learnings across the industry.

Social Exchange Theory: Posits that positive organizational support (e.g., through personalized AI tools) increases employee commitment. Human social action stems from a cost-behavior analysis where individuals aim to maximize rewards. In the case of artificial intelligence, employees are inclined to learn it so that they can maximize their own rewards along with organizational rewards. This coincides with the cost-benefit analysis where employees in order to maximize their rewards are more forthcoming to learn new techniques of artificial intelligence.

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