

Research Hotspots and Trends of Digital Human Resource Management at Abroad based on CiteSpace

Chunhua Han

School of Anhui University of Finance and Economics, Bengbu, China

Abstract

Now is the era of digital economy, digital technology has injected new evolutionary impetus into the practice and research of human resource management, but at the same time, managers and scholars are also faced with the challenge of how to integrate digital technology with the organization's human resources and play its positive role. In order to explore the current research status of digital human resource management, this paper takes the digital human resource related literature of Web of Science database from 2008 to 2024 as the research object, and uses CiteSpace software to sort out the collected literature. Through the analysis of the general trend, core authors and keywords, it is found that the research of digital human resource management is in the preliminary exploration stage. Future research on digital human resource management can be carried out on the basis of existing research, including theoretical research, multi-perspective research, malpractice research and Chinese localization research.

Keywords

Digitization; Human Resources; Research Hotspot; Research Trend; CiteSpace; Visualization.

1. Introduction

With the rapid development of the digital economy, emerging information technologies such as the internet, big data, cloud computing, and artificial intelligence have become new drivers of high-quality economic growth in China. An increasing number of traditional enterprises are adapting to the trends of the digital economy, continuously promoting organizational transformations toward digitalization, automation, and intelligentization. Digital transformation and digital operations have emerged as prevailing trends and focal topics within today's economic and social landscape[1]. Academic research on digital transformation has predominantly concentrated on themes such as business models, innovation in industry formats, technological change, business intelligence, and digital marketing, while comparatively less attention has been given to human resource management. In reality, the process of enterprise digital transformation ultimately requires the realization of business innovation through changes in employees' cognition and behavior. Consequently, the leadership role of personnel and human resources in digital transformation warrants deeper investigation and discussion. Therefore, it is essential to explore digital human resource management within the context of digital transformation.

The digital transformation strategy empowered by technology aims to further enhance the efficiency and quality of human resource management, aligning it with the developmental trends of the digital economy. Digital technologies have rendered organizational activities more efficient and rapid, establishing new modes of control, coordination, and collaboration[2]. They also facilitate the integration of digital intelligence tools such as artificial intelligence (AI) and robotics into organizational interaction networks[3-5], thereby redefining HR management paradigms. As a frontrunner among emerging technological forces, AI is advancing swiftly-

transforming the human experience while gradually permeating the workplace-posing significant challenges to traditional human resource management practices[6]. In the digital era, enterprises encounter numerous opportunities and challenges, rendering conventional HR management models increasingly inadequate for meeting contemporary developmental demands.

When multiple positions within an enterprise are empowered by digital technologies, significant transformations in employee roles, performance metrics, and capabilities to accomplish tasks are inevitable. Subsequently, human resource management (HRM) will evolve into a digitalized management paradigm, giving rise to new demands aligned with digital HRM practices. Digital human resource management has become a focal point of interest and research within both academic and practical domains, with most studies remaining superficial, primarily concentrating on the surface-level integration of "digitalization + HRM"[7]. Despite the rapid development of artificial intelligence across various sectors, its application within organizational management, particularly in HRM, remains ambiguous. Moreover, existing research exhibits a fragmented landscape, lacking comprehensive overviews of the current status and future trajectories of digital HRM, with insufficient systematic reviews and syntheses. In response, this paper conducts a visualized analysis of relevant international literature on digital HRM, utilizing knowledge graphs to integrate and summarize current research hotspots. Additionally, it analyzes future research directions, aiming to elucidate emerging trends and guide subsequent scholarly endeavors in the field.

2. Materials and Methods

2.1. Data Sources

The literature for this study was retrieved from the Web of Science (WoS) database. An advanced search was conducted within the Web of Science Core Collection, utilizing thematic keywords such as "digital," "digitalization," "digital transformation," "artificial intelligence," "big data," "blockchain," "cloud computing," and "algorithm" in combination with the keyword "human resource management." The search period was set from January 2008 to December 2024, yielding a total of 786 publications. Subsequently, the search results were manually screened: irrelevant records such as book reviews, conference abstracts, and editorials were excluded. The remaining articles were assessed based on their abstracts to determine relevance to the research topic, resulting in the removal of unrelated studies. Ultimately, 226 articles pertinent to digital human resource management were selected for subsequent visual analysis.

2.2. Research Tools and Methodology

Utilizing CiteSpace 6.3.1 software, bibliometric data were imported for analysis. Parameter settings included: time slicing from 2008 to 2024 with a one-year interval, a threshold set at the Top 50 most cited references, and network pruning conducted using the Pathfinder algorithm. This approach facilitated the construction of a knowledge map of digital human resource management research, which was subsequently interpreted and analyzed to reveal emerging trends and key themes.

3. Data Analysis

3.1. Trends in Publication Volume within the Digital HRM Domain

Variations in publication volume provide a direct indicator of the developmental trajectory within a given field. Historical publication data reflect the theoretical maturity and the research growth rate in digital human resource management. As illustrated in Figure 1., international research efforts in this domain commenced around 2008, with a subsequent upward trend. It was not until 2018 and 2019 that scholarly output became more substantial. From 2020 to

2022, the number of publications experienced an overall increase, reaching a peak of 90 articles in 2023, after which growth plateaued. Nonetheless, the overall trend remains upward compared to previous years. This pattern is primarily driven by the premise that technological advancements are critical drivers of organizational efficiency in human resource management. The rapid development and integration of computer hardware and software technologies have led to the widespread and deep application of information technology across various enterprise management functions[8]. Consequently, enterprise human resource management has transitioned into a digital era, necessitating organizational adaptation to digital human resource management practices. Figure 1.

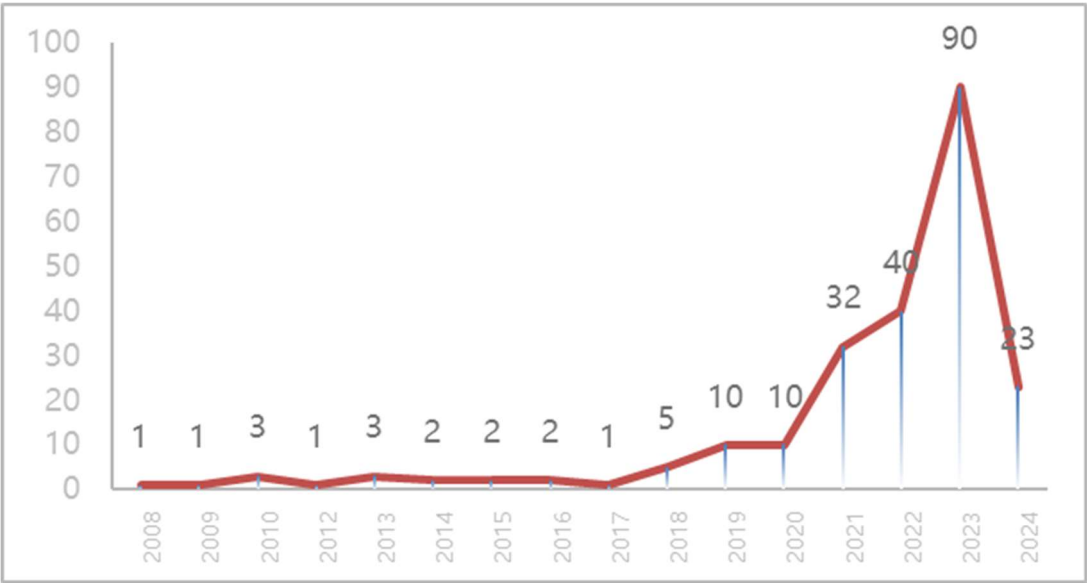


Figure 1. Publication volume

3.2. Analysis of Author Collaborations in the Field of Digital HRM

based on Figure 2 and Table 1, reveals the core researchers and their collaborative networks. Cooke and Fang Lee are the most prolific authors, each with five publications, and they maintain collaborative relationships with other scholars. Most authors have published one or two papers, with only a subset engaging in cooperative research. Currently, there is no dominant core author group exerting significant influence within the field. This indicates a relatively dispersed research landscape in digital human resource management. As technological advancements continue, the digital transformation of HR practices will become an imperative for organizations. Correspondingly, scholarly inquiry into digital HR management is expected to deepen, leading to a proliferation of research outcomes that will support practical implementations of digital HR strategies.

Table 1. Author

Frequency	Year	Author
5	2022	Cooke, Fang Lee
2	2023	Ammirato, Salvatore
2	2022	Bartram, Timothy
2	2023	Behl, Abhishek
2	2021	Budhwar, Pawan

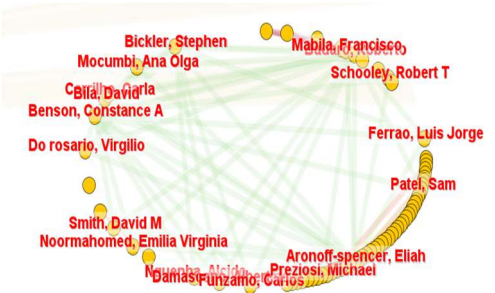


Figure 2. Author

3.3. Analysis of Institutional Collaboration in the Field of Digital HRM

Through CiteSpace reveals a visual map of cooperative relationships among research entities. The leading foreign institutions by publication volume are the Indian Institute of Management (IIM System) with eight papers, Royal Melbourne Institute of Technology (RMIT) with five, the University of Turin with four, and the University of London, Macquarie University, University of Salerno, and Sapienza University of Rome, each with three publications. International research efforts frequently involve cross-institutional collaboration, with core institutions demonstrating closer cooperative ties. However, a substantial research collaboration network has yet to emerge, indicating that while global scholarly activity in digital human resource management is expanding, it remains fragmented without a dominant institutional research consortium.

Table 2. Institution

Frequency	Year	Institution
8	2022	Indian Institute of Management
5	2019	Royal Melbourne Institute of Technology
4	2019	University of Turin
3	2023	University of London
3	2019	Macquarie University

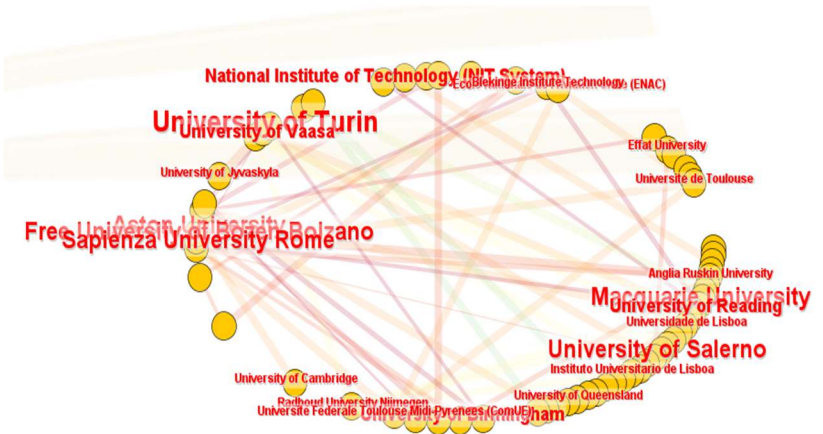


Figure 3. Institution

3.4. Analysis of Keyword Co-occurrence in the Field of Digital HRM

Keywords represent a highly condensed summary of the article's content, reflecting the core themes of the literature. This study constructs co-occurrence networks by selecting the top 10% most frequently appearing keywords within each annual time segment. The font size corresponds to the frequency of occurrence, indicating the prominence of specific topics. The

high-frequency keywords include human resource management, performance, impact, model, innovation, management, challenge, technology, future, system, big data, and knowledge.

Table 3. Keyword

Frequency	Year	Keyword
61	2014	human resource managemen
47	2013	management
41	2012	performance
31	2016	impact
28	2009	technology

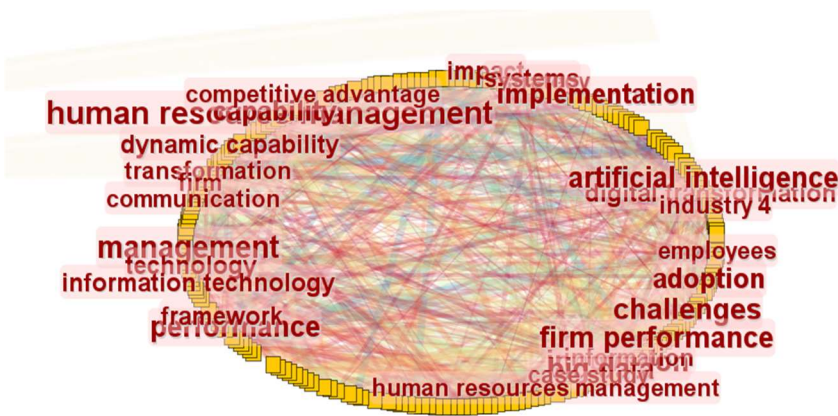


Figure 4. Term

3.5. Analysis of Keyword Clustering in the Field of Digital HRM



Figure 5. Cluster view

To gain a clearer understanding of the research hotspots in the domain of digital HR management, this study employs CiteSpace to conduct a co-occurrence keyword clustering analysis. The clustering map of keywords reveals distinct research focus areas within the field. As shown in Figure 5, there are thirteen clusters, each labeled with keywords from the co-occurrence network. The cluster identifiers are numbered #0, #3, etc., where higher numbers indicate clusters with fewer keywords, and lower numbers correspond to larger clusters

containing more keywords. Most of the links within the map are intra-cluster; however, some inter-cluster connections also exist. Notably, clusters #1, #5, #6, and #9 exhibit a high degree of co-citation, suggesting strong thematic interrelations among these research directions.

3.6. Analysis of Timeline in the Field of Digital HRM

Figure 6 depicts thirteen clusters, each labeled with keywords from the co-occurrence network. These keywords are arranged according to their respective years of emergence within their clusters, illustrating the developmental trajectory of keywords over time. It is evident that research on the digitalization of human resource management (HRM) commenced around 2008. Since 2018, scholarly attention and investigations in digital HRM have significantly increased, with the emergence of numerous hotspot keywords.

Throughout the evolution of HRM research and practice, technological advancements-such as information technology, management information systems, digital technologies, and algorithms-have consistently been focal points of scholarly concern regarding their influence on HRM activities and processes[9]. The integration and application of artificial intelligence in enterprise HRM practices have spurred a series of notable research questions[10]. Additionally, a proliferation of inter-keyword connections, including both intra-cluster and inter-cluster linkages, has been observed from 2018 onward, indicating an explosive trend. This pattern reflects a recent characteristic of HRM research: a convergence of "technological enhancement," "application development," and a human-centric approach[11]. Consequently, digital transformation is conceptualized not merely as a technological solution but as a systemic engineering effort necessitating interdisciplinary collaboration. This underscores that current priorities in digital HRM research lie in fostering cross-disciplinary partnerships, as evidenced by the extensive network of keyword associations.

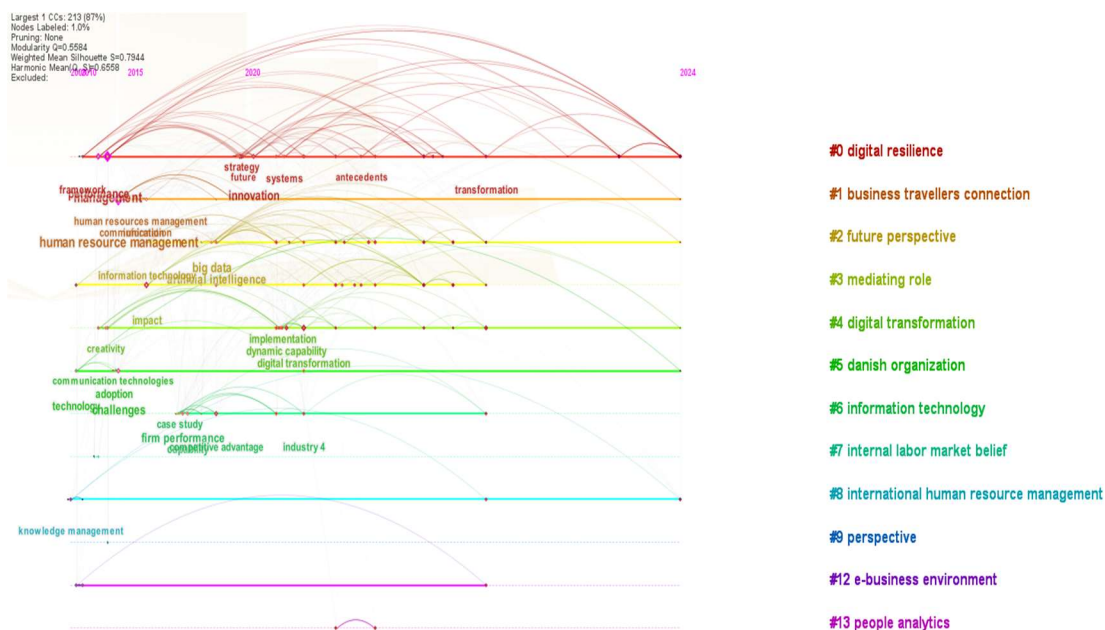


Figure 6. Timeline

4. Conclusion and Limitation

This study utilizes CiteSpace software to conduct a comprehensive review of research in digital human resource management (HRM). Initially, the overall trend of digital HRM is analyzed by summarizing publication output as an indicator of research development. From 2008 to 2017, the volume of publications related to digital HRM remains relatively limited; however, a gradual

increase in research activity is observed from 2018 onward, with further growth in publications through 2020 to 2024. Subsequently, a visualized network of core authors and institutions provides an overview of the current research landscape. Furthermore, through keyword co-occurrence, clustering analysis, and timeline mapping, the existing scholarly focus is summarized. Key themes identified include human resource management, performance, impact, models, innovation, technology, challenges, future trends, systems, big data, and knowledge-all highlighting the international research priorities in this field.

The analysis indicates that research on digital HRM is still in an exploratory phase, with increased scholarly attention beginning around 2018; however, the influence of individual publications requires further enhancement. Clustering analysis reveals that current studies primarily focus on the application of digital technologies in HRM, particularly artificial intelligence, exploring opportunities and challenges these innovations present. Overall, scholars concur that digital HRM has the potential to confer sustainable competitive advantage to organizations. Nonetheless, associated risks must also be addressed. Future research is expected to expand in scope and diversify in methodology, increasingly enriching the understanding of digital HRM and its organizational implications. If you follow the “checklist” your paper will conform to the requirements of the publisher and facilitate a problem-free publication process.

The limitations of this study are analyzed from two perspectives. First, the research solely employed the Web of Science database to examine global trends in digital human resource management (HRM) research, which inherently restricts the scope and quantity of data analyzed, potentially leading to minor discrepancies between the findings and actual developments. Future research could incorporate the China National Knowledge Infrastructure (CNKI) database to further explore the domestic landscape and trends within digital HRM, thereby promoting the advancement of digital HR practices in China. Second, the study's limitations primarily stem from the restricted scope of retrieval databases and the focus on visualization analysis of publication volume, authorship, institutional affiliations, and keywords. Consequently, there exists a possibility of incomplete literature retrieval.

Looking ahead, research on digital HRM can be advanced through several avenues. Firstly, constructing theoretical frameworks specific to digital HRM is essential, as, in the digital era, organizational phenomena have become increasingly diverse due to technological advancements, rendering traditional theories insufficient. Developing new theories tailored to digital HRM is necessary to better explain organizational management practices. Secondly, while existing studies emphasize the impact of digital technologies on HR functions, future inquiries should examine stakeholders' attitudes-such as organizational leaders, HR practitioners, and employees-and their perceptions of digital HRM from varied perspectives. Thirdly, given that current research indicates both advantages and drawbacks of digital HRM, in-depth exploration into effective strategies for mitigating associated challenges is warranted. Lastly, compared to international counterparts, domestic research on digital HRM commenced relatively later. Future studies should integrate China's cultural context and policy environment to foster localized approaches to digital HRM development.

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