

# “Global economic and technological challenges as determinants of human resource management transformation: A bibliometric analysis of research trends”

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## ARTICLE INFO

Kristina Kozova, Matej Huževka, Adriana Grenčíková and Valentinas Navickas (2026). Global economic and technological challenges as determinants of human resource management transformation: A bibliometric analysis of research trends. *Problems and Perspectives in Management*, 24(2), 59-73.  
doi:[10.21511/ppm.24\(2\).2026.05](https://doi.org/10.21511/ppm.24(2).2026.05)

## DOI

[http://dx.doi.org/10.21511/ppm.24\(2\).2026.05](http://dx.doi.org/10.21511/ppm.24(2).2026.05)

## RELEASED ON

Thursday, 16 April 2026

## RECEIVED ON

Sunday, 25 January 2026

## ACCEPTED ON

Monday, 06 April 2026

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## JOURNAL

"Problems and Perspectives in Management"

## ISSN PRINT

1727-7051

## ISSN ONLINE

1810-5467

## PUBLISHER

LLC "Consulting Publishing Company "Business Perspectives"

## FOUNDER

LLC "Consulting Publishing Company "Business Perspectives"



NUMBER OF REFERENCES

58



NUMBER OF FIGURES

5



NUMBER OF TABLES

0

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## BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"  
Hryhorii Skovoroda lane, 10,  
Sumy, 40022, Ukraine  
[www.businessperspectives.org](http://www.businessperspectives.org)

Type of the article: Research Article

Received on: 25<sup>th</sup> of January, 2026

Accepted on: 6<sup>th</sup> of April, 2026

Published on: 16<sup>th</sup> of April, 2026

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**Conflict of interest statement:**

Author(s) reported no conflict of interest

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# GLOBAL ECONOMIC AND TECHNOLOGICAL CHALLENGES AS DETERMINANTS OF HUMAN RESOURCE MANAGEMENT TRANSFORMATION: A BIBLIOMETRIC ANALYSIS OF RESEARCH TRENDS

**Abstract**

Recent global disruptions have substantially reshaped organizational environments and labor markets, including the COVID-19 pandemic, rapid diffusion of publicly accessible artificial intelligence technologies, accelerated digitalization of organizational processes and remote work, and geopolitical instability such as Russian-Ukrainian war. This study aims to map and analyze the structure of research on human resource management (HRM) transformation in the context of global economic and technological challenges. The analysis is based on bibliometric methods applied to WoS-indexed publications from 2020 to 2025, using keyword co-occurrence analysis, thematic clustering, and network visualization techniques. The dataset includes 1,248 scientific publications and 4,317 author keywords, indicating a rapid expansion of research on HRM transformation during the analyzed period. Five major thematic clusters were identified, with the largest cluster related to digital HRM, artificial intelligence, and algorithmic management, accounting for approximately 28% of publications. Research on sustainable and green HRM is the second-largest thematic area (21%), reflecting the growing importance of environmental and ESG-related organizational strategies. Studies on employee well-being, remote work, and crisis-driven HRM adaptation account for about 18% of the literature, highlighting the long-term organizational consequences of the COVID-19 pandemic. The results also reveal emerging yet underdeveloped research directions in AI-driven HR analytics, the ethical aspects of algorithmic decision-making, and HRM responses to geopolitical and economic instability. The findings demonstrate that contemporary HRM research is increasingly shaped by digital transformation, sustainability pressures, and global systemic crises, emphasizing the need for interdisciplinary approaches to understanding HRM adaptation in rapidly changing environments.

**Keywords**

digital HRM, artificial intelligence, green HRM, remote work, algorithmic management, bibliometric analysis, global challenges

**JEL Classification**

J24, M15, O33, O15

**INTRODUCTION**

Human resource management (HRM) is increasingly shaped by profound global economic, technological, and socio-political transformations that redefine the conditions under which organizations manage their workforce and sustain long-term competitiveness. The period 2020–2025 has been particularly turbulent, marked by multiple systemic shocks and structural shifts that have affected labor markets and organizational practices worldwide. The COVID-19 pandemic accelerated the digitalization of work and led to the rapid expansion of remote and hybrid employment models, fundamentally transforming

communication, collaboration, and managerial practices within organizations. At the same time, the public release and rapid diffusion of advanced artificial intelligence models and generative AI tools have initiated a new stage of technological transformation, enabling the development of AI-driven recruitment systems, automated HR analytics, and increasingly embedded intelligent decision-support tools. In parallel, geopolitical instability, including Russian-Ukrainian war, as well as demographic changes, labor migration, and supply-chain disruptions, have further intensified uncertainty in global labor markets and organizational environments. International organizations such as the European Commission, the World Bank, and the International Labor Organization emphasize that these developments significantly reshape employment structures, skills demand, and organizational management practices.

Under these conditions, HRM operates in a far more complex environment than in previous decades. Organizations are required to respond simultaneously to technological innovation, sustainability and ESG requirements, labor market shortages, and changing employee expectations regarding flexibility, well-being, and work-life balance. Consequently, HRM has become a strategic function that not only supports organizational performance but also contributes to resilience, workforce stability, and the adaptation of firms to rapidly changing external conditions. Recent academic research increasingly examines the transformation of HRM in response to these challenges, focusing on issues such as artificial intelligence in recruitment and decision-making, sustainable and green HRM practices, digitalization of organizational processes, and structural changes in labor markets.

Despite the growing body of research on these topics, the literature remains fragmented. It often concentrates on individual drivers of HRM transformation without systematically examining their interconnections or the overall structure of the emerging research field. This creates a need for a comprehensive mapping of scholarly discourse to identify dominant themes and potential research gaps. Bibliometric analysis provides an appropriate methodological approach to addressing this challenge by enabling the examination of publication trends, keyword relationships, and thematic clusters in the scientific literature.

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## 1. LITERATURE REVIEW

The transformation of HRM has become a central topic in contemporary management research due to the increasing complexity of the global economic, technological, and social environment. Modern organizations operate under conditions characterized by rapid technological change, sustainability pressures, labor market volatility, and growing expectations regarding employee well-being and organizational responsibility. These dynamics have led to a reconsideration of the role of HRM, shifting it from a primarily administrative function toward a strategic capability that supports organizational adaptability, innovation, and long-term sustainability (Harney & Collings, 2021; Kim et al., 2022; Minbaeva, 2021). In this context, HRM is increasingly viewed as a system that integrates organizational performance objectives with social, environmental, and human-centered outcomes, reflecting broader transformations in global economic governance and corporate responsibility (Kramar, 2022; Campos-García et al., 2024).

One of the most significant drivers of HRM transformation is the rapid diffusion of digital technologies and artificial intelligence, which has reshaped recruitment processes, workforce analytics, decision-making, and organizational coordination. Artificial intelligence technologies enable organizations to automate routine HR functions, analyze large volumes of employee data, and support evidence-based decision-making in talent management and workforce planning (Chowdhury et al., 2023; Trocin et al., 2021). The integration of algorithmic management and AI-driven HR systems has also generated new research streams addressing human-AI collaboration, organizational capability building, and the implications of algorithmic decision-making for employee autonomy and organizational performance (Arslan et al., 2022; Böhmer & Schinnenburg, 2023; Meijerink & Bondarouk, 2023). At the same time, concerns regarding algorithmic transparency, bias, and ethical decision-making have become increasingly prominent in the literature, highlighting the importance of responsible artificial intelligence in

HRM systems (Bujold et al., 2024; Langer & König, 2023; Rodgers et al., 2023; Tursunbayeva et al., 2022). Recent research also critically reflects on the conceptual assumptions underlying algorithmic management and calls for a more balanced understanding of human–algorithm interactions in HR decision-making (Lamers et al., 2024). The digital transformation of HRM also requires the development of new managerial competencies and technological capabilities, as HR professionals must increasingly manage data-driven systems and AI-supported organizational processes (Deepa et al., 2024; Zhang & Chen, 2024).

Another important research stream focuses on the relationship between HRM and sustainability, reflecting the growing influence of environmental, social, and governance (ESG) frameworks and the global sustainability agenda. Sustainable HRM emphasizes integrating environmental responsibility, employee well-being, and long-term organizational value creation into HR practices (Aust et al., 2020; Kramar, 2022). Green HRM practices have been shown to contribute to organizational environmental performance, stimulate green innovation, and support corporate social responsibility initiatives (Aftab et al., 2023; Gangi et al., 2021; Vázquez-Brust et al., 2023). Research also demonstrates that green HRM can significantly support sustainability transitions within organizations and higher education institutions, strengthening organizational commitment to environmental responsibility (Abbas et al., 2022). At the same time, green HRM strategies increasingly contribute to the implementation of corporate social responsibility both inside and outside the workplace, strengthening the integration of environmental and social objectives into organizational governance (Cerchione et al., 2025). These practices also influence employee behavior, organizational commitment, and innovative activities that support sustainability objectives (Gyensare et al., 2024; Ren et al., 2023; Shafaei & Nejati, 2024). However, the literature also highlights potential challenges related to organizational greenwashing and the negative effects of perceived inconsistencies between sustainability communication and organizational practices on employee performance (Li et al., 2022). Furthermore, sustainability-oriented organizational strategies increasingly interact with financial and governance out-

comes within ESG frameworks, reinforcing the strategic relevance of responsible HR practices (López-Cabarcos et al., 2023). Sustainable HRM also contributes to employee resilience, organizational identification, and job satisfaction, thereby strengthening organizations' capacity to respond to environmental and social challenges (Lu et al., 2023; Wojtczuk-Turek et al., 2024). Recent studies also highlight the growing importance of inclusive and identity-based approaches to green HRM that integrate social equity and environmental sustainability objectives (Ren & Chowdhury, 2025).

The transformation of HRM is also closely linked to broader labor market dynamics, including demographic change, workforce diversity, labor migration, and the aging workforce. These structural trends influence talent availability, organizational retention strategies, and the design of inclusive HR practices. Increasing migration flows and workforce mobility require organizations to develop capabilities to manage multicultural workforces and support migrant employees' performance and integration (Belu & Popescu, 2025; Bieńkowska et al., 2025). At the same time, the aging workforce has become an important challenge for HRM systems, requiring policies that support sustainable employability, knowledge transfer, and the continued engagement of older workers (Amarnani et al., 2025; Filipas et al., 2025). Research also highlights the influence of labor market participation patterns, gender inclusion, and workforce mobility on organizational HR strategies and labor market resilience (Peng & Li, 2025; Uribe Bohórquez & García Sánchez, 2023). These demographic transformations are often accompanied by concerns regarding brain drain and talent retention, particularly in developing or transitional economies, further reinforcing the strategic importance of HRM policies aimed at workforce stability and retention (Efthalitsidou et al., 2025; Isiaka, 2025).

Recent global crises have further accelerated the transformation of HRM practices and organizational priorities. The COVID-19 pandemic created unprecedented disruptions in labor markets, forcing organizations to rapidly implement remote work arrangements, digital collaboration tools, and new employee support mechanisms. These changes significantly affected em-

employee well-being, work–life balance, and organizational engagement, thereby reshaping HRM priorities and practices (Carnevale & Hatak, 2020; Cooke et al., 2021). Research on crisis-driven HRM transformation highlights the importance of resilience-oriented HR practices, including flexible work arrangements, employee recovery mechanisms, and psychologically supportive work environments (Kilroy et al., 2020; Minbaeva & Navrbjerg, 2023). In addition, the emergence of social and environmental crises has strengthened interest in data-driven HR analytics and strategic decision-making tools designed to enhance organizational sustainability and crisis resilience (Di Prima et al., 2024).

Alongside technological and social transformations, growing expectations regarding employee well-being, organizational responsibility, and inclusive workplace practices have further expanded the scope of HRM research. HRM systems increasingly focus on enhancing employee engagement, psychological well-being, and other essential components of sustainable organizational performance (Beltrán-Martín et al., 2023; Zhang et al., 2020). The development of socially responsible HRM practices, including work–family policies, inclusive employment practices, and attention to neurodivergent employees, reflects the broader shift toward human-centered organizational models (Heikkinen et al., 2021; Szulc et al., 2021). These approaches emphasize the importance of organizational identification, job satisfaction, and employee experience as key mechanisms linking HR practices to organizational outcomes (Malik et al., 2023; Palacios-Manzano et al., 2024). In addition, responsible HR practices play a critical role in supporting circular economy initiatives and sustainable supply chains by integrating environmental and social considerations into workforce management (Sawe et al., 2021; Mukhuty et al., 2022). Technological capabilities such as artificial intelligence, robotics, and smart technologies are increasingly integrated with sustainability-oriented HR strategies, strengthening the role of technology-enabled green HRM in supporting environmental objectives (Ogbeibu et al., 2024).

Given the growing complexity of HRM transformation processes, bibliometric approaches have

increasingly been used to map the intellectual structure and development of HRM research. Bibliometric analyses reveal the rapid expansion of research on sustainable HRM, digital HRM, and innovation-oriented HR practices across regions and academic communities (Faisal, 2023; Tiwari & Bahuguna, 2026). Studies examining HRM innovation and digital transformation highlight the emergence of interdisciplinary research connecting management, information systems, and sustainability studies (Ali & Fedorova, 2024; Zhang & Chen, 2024). Regional bibliometric analyses further demonstrate the diversity of HRM research agendas across global contexts, reflecting differences in institutional environments and labor market conditions (Arifin et al., 2024). Moreover, recent bibliometric studies on electronic HRM and digital HR ecosystems confirm the growing importance of digitalization, artificial intelligence, and analytics as key themes shaping contemporary HRM research (Pradhan & Roy, 2025).

The existing literature demonstrates that multiple interconnected forces, including technological innovation, sustainability pressures, demographic change, and global crises, drive HRM transformation. Despite the growing body of research addressing these issues, the literature remains fragmented and dispersed across thematic streams. Consequently, a systematic bibliometric analysis is required to identify the dominant research clusters and emerging directions in HRM studies. Such an approach enables comprehensive mapping of the field's intellectual structure and provides a clearer understanding of how global economic and technological challenges shape contemporary HRM research.

This study aims to identify and analyze the dominant research streams and thematic structures of human resource management transformation in the context of global economic and technological challenges during 2020–2025, including the COVID-19 pandemic, the rapid diffusion of artificial intelligence technologies, the digitalization of work and organizational relations, and geopolitical disruptions such as Russian-Ukrainian war, using bibliometric analysis to determine key research clusters and emerging research gaps.

## 2. METHODOLOGY

This study applies bibliometric analysis to examine research on the transformation of human resource management in the context of global challenges. The methodological procedure was designed to ensure transparency, replicability, and logical consistency.

### 2.1. Data source and search strategy

The Web of Science Core Collection database was selected as the primary source of scientific publications. This database was chosen due to its international recognition, quality control mechanisms, and suitability for bibliometric analysis.

The selection of the period 2020–2025 for the bibliometric analysis is methodologically justified by the unprecedented concentration of global economic, technological, and geopolitical disruptions, which have significantly influenced organizational management practices, particularly the transformation of HRM. During this period, organizations worldwide experienced a series of systemic shocks that fundamentally altered labor market structures, work organization, and managerial decision-making processes. The COVID-19 pandemic, which began in 2020, triggered a rapid, large-scale transition to remote and hybrid work models, forcing organizations to digitalize internal communication, collaboration, and performance management systems in a very short time. As highlighted in the reports of the European Commission, the World Bank, and the International Labour Organization, the pandemic accelerated digital transformation processes that would otherwise have taken years to unfold, making digital competencies, flexible work arrangements, and employee well-being central priorities for HRM systems. At the same time, the period after 2022 was marked by the rapid diffusion of advanced artificial intelligence technologies, particularly generative AI models that became widely accessible to the public and organizations. The emergence of these technologies enabled the development of AI-driven HR analytics, automated recruitment tools, algorithmic decision-support systems, and intelligent HR agents that support workforce planning, performance assessment, and talent management. These developments significantly expanded the role of digital technologies

in HRM. They stimulated new academic debates concerning algorithmic management, human–AI collaboration, and the ethical implications of automated decision-making in personnel management. In parallel, geopolitical instability and economic uncertainty further intensified the transformation of organizational environments. The full-scale Russian-Ukrainian war, which began in 2022, generated significant economic, energy, and migration-related consequences across Europe and globally, influencing labor mobility, workforce availability, and organizational resilience strategies. Combined with ongoing global supply chain disruptions and economic volatility, these factors underscore the importance of adaptive HRM practices to maintain workforce stability and organizational continuity in conditions of uncertainty. Consequently, the period 2020–2025 represents a unique phase in which multiple technological, economic, and geopolitical transformations occurred simultaneously, creating a new context for HRM development. Analyzing scientific publications produced during this timeframe, therefore, allows identification of the most recent research trends and emerging thematic directions that reflect how the academic community responds to these rapidly evolving global challenges.

A structured Boolean search string was developed to capture publications located at the intersection of human resource management and global challenges. The search query combined the term “human resource management” with keywords representing major transformation determinants:

*(“human resource management” AND (“global challenges” OR “megatrends” OR “future of work” OR “sustainability” OR “ESG” OR “artificial intelligence” OR “digital transformation” OR “Industry 4.0” OR “generational change” OR “migration” OR “labor market” OR “economic instability” OR “resilience” OR “well-being”))*

The initial search yielded 3,690 records.

### 2.2. Selection procedure

The selection procedure was documented using the PRISMA framework to ensure methodological transparency. After applying the time limitation to the period 2020 to 2025, the da-

taset contained 2,669 publications. Further selection by document type, retaining only scientific articles, reduced the sample to 2,314 records. Subsequently, a restriction to selected Web of Science categories, specifically management, business, industrial relations, labor, and economics, decreased the number to 1,305 publications. Another filter was the limitation to the SSCI index, which reduced the number of records to 742. After subsequent categorization by journal qualitative ranking (Q1 and Q2 based on Impact Factor), 449 records remained. The final step was the restriction to open-access publications, as a result of which the analyzed sample was reduced to 128 articles. These articles underwent abstract analysis, which identified 103 truly relevant studies, forming the basis for the bibliometric analysis. The remaining publications were classified as partially relevant or excluded from further analysis.

### 2.3. Data analysis

The final dataset of 103 articles was analyzed using VOSviewer software. The analysis focused on:

- publication trends over time,
- journal distribution,
- geographical concentration of research,
- keyword co-occurrence and thematic clustering.

Keyword co-occurrence analysis (Figure 1) was used to identify dominant research clusters and map the intellectual structure of the field. The minimum occurrence threshold was set to ensure analytical relevance and avoid marginal terms influencing cluster formation.

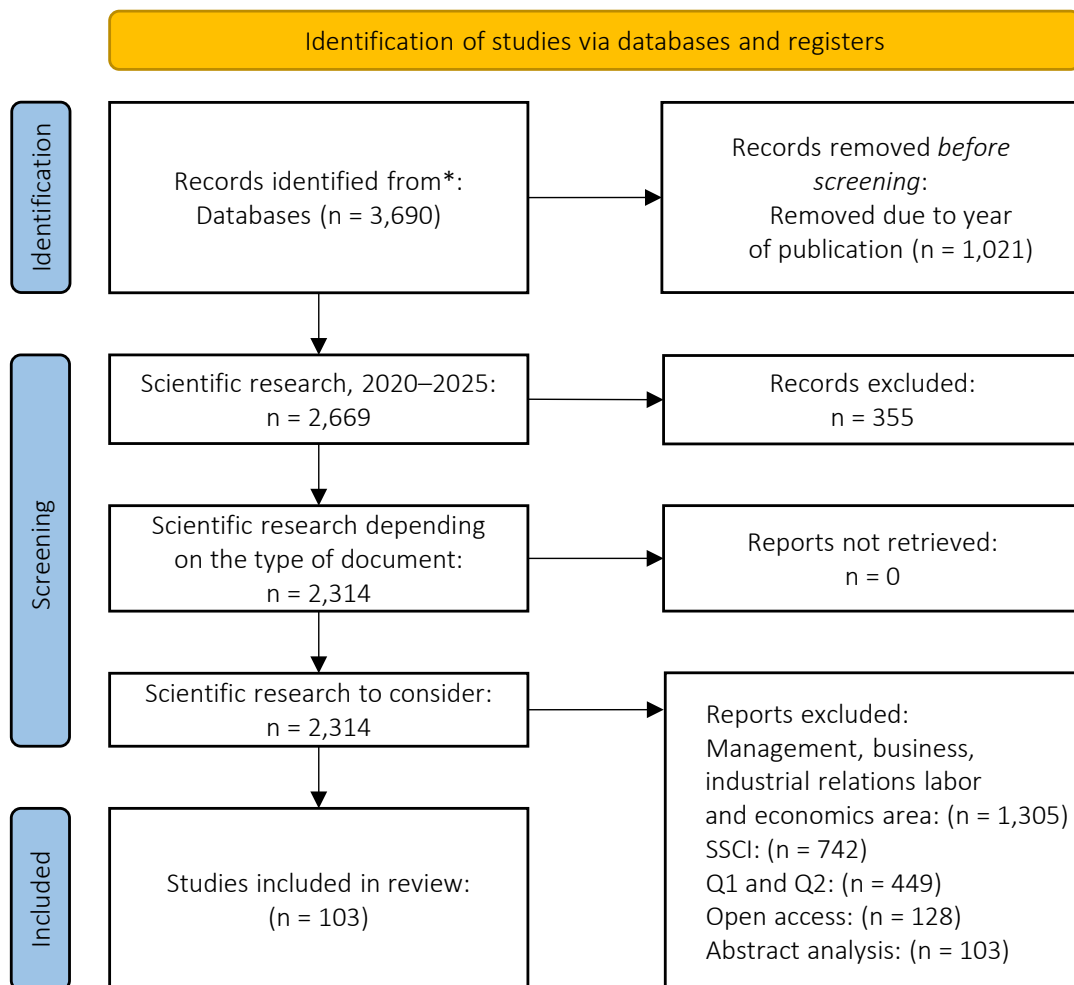


Figure 1. PRISMA analysis

The combination of structured database filtering, PRISMA-based selection, and bibliometric mapping allows for a systematic evaluation of current research development and ensures methodological reliability.

### 3. RESULTS

#### 3.1. Publication sources

The analysis of the publication base (Figure 2) showed that the issue of the impact of global challenges on human resource management is concentrated primarily in specialized, highly profiled journals. The highest number of publications was found in the Corporate Social Responsibility and Environmental Management journal (52 articles), indicating a strong connection between HRM and sustainability and social responsibility. This is followed by the International Journal of Human Resource Management with 45 publications, which represents one of the key periodicals in the field of HRM.

Significant representation is also held by the International Journal of Manpower (36 articles), the Employee Relations and Personnel Review (35 articles each), and Business Strategy and the Environment (32 articles), which reflects the interdisciplinary nature of research linking HRM with the areas of strategy, organizational studies, and

environmental issues. Other important periodicals include Human Resource Management and Human Resource Management Review (27 articles each), as well as the Human Resource Management Journal (23 articles). In the Asian context, the Asia Pacific Journal of Human Resources dominates (18 articles), which demonstrates the growing interest in studying this issue in developing and dynamically changing regions.

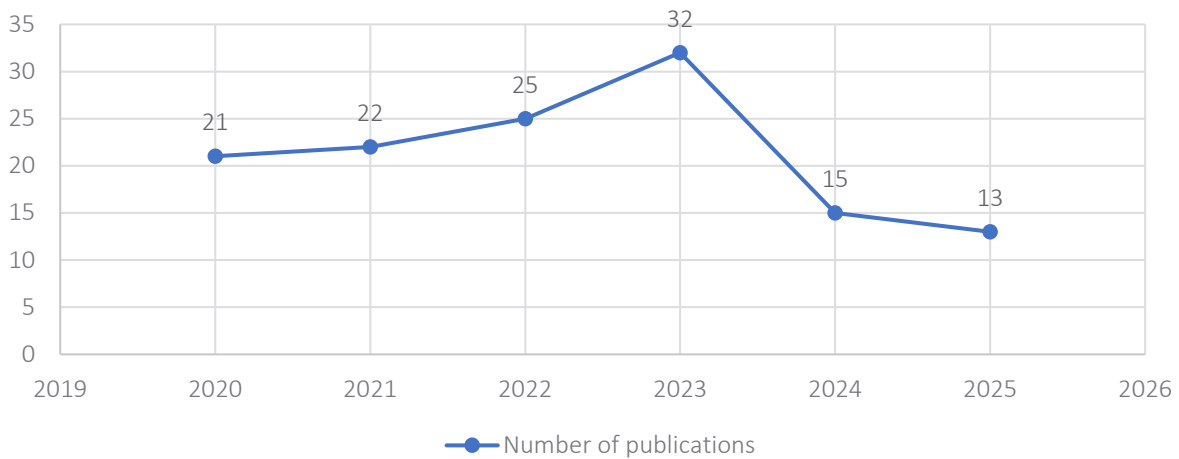
#### 3.2. Temporal development

The temporal analysis (Figure 3) of publications from 2020 to 2025 shows fluctuating but overall growing interest in the impact of global challenges on human resource management. In 2020, 21 publications were identified, and a year later, their number increased slightly to 22. A more significant increase occurred in 2022, when the number of publications reached 25.

The highest publication activity was recorded in 2023, with 32 publications, which can be interpreted as a response to the lingering effects of the COVID-19 pandemic, the acceleration of digital transformation, and the growing emphasis on sustainability and ESG principles in HRM. In 2024 and 2025, the number of publications decreased to 15 and 13, respectively, indicating a partial stabilization and a decline in publication interest. However, this development does not mean a loss of relevance; rather, it may reflect a natural shift to



Figure 2. Treemap of scientific journals



**Figure 3.** Frequency of publications, 2020–2025

other forms of research processing or a transfer of interest to related areas.

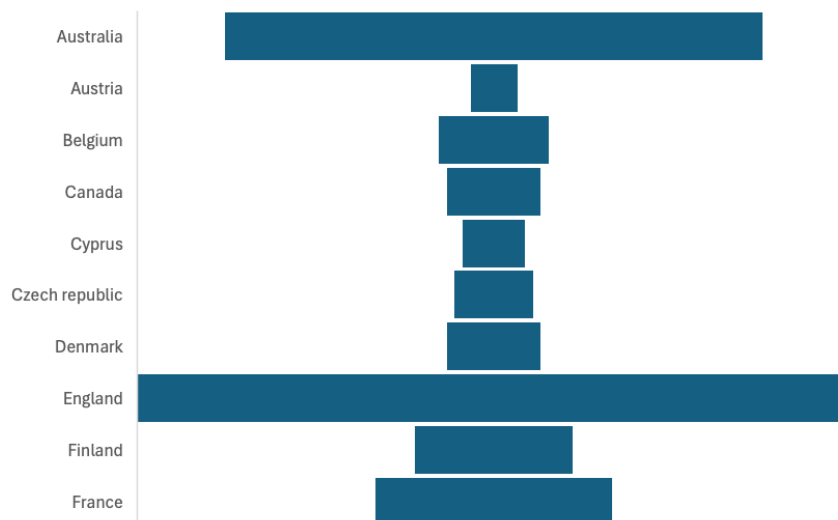
The temporal distribution of publication activity shows that the studied issue has, in recent years, established itself as an independent research area. The peak in 2023 and the subsequent stabilization of publication interest in 2024 and 2025 indicate that the topic of HRM in the context of global challenges is no longer just a response to short-term events (e.g., the pandemic) but has become a permanent and evolving part of academic discourse.

### 3.3. Geographical distribution

The analysis (Figure 4) indicates that the greatest publication interest in human resource manage-

ment in the context of global challenges is concentrated in Anglophone countries, especially England and Australia. These countries are leading centers of academic production, which can be explained by a strong tradition of research in HRM, as well as by links to broader discussions on sustainability, digital transformation, and the future of work.

Significant, although more moderate, publication interest is also evident in France and the Nordic countries, which are known for their emphasis on innovation and the social dimension of labor relations. A smaller but still visible representation is shown by countries such as Belgium, Canada, and Denmark. Conversely, the lowest publication activity is observed in countries such as Austria, Cyprus, and the Czech Republic, where the topic



**Figure 4.** Publication interest depending on the countries

of HRM in relation to global challenges is still less prevalent and represents rather a developing area of research.

### 3.4. Keywords and clusters

An important step in the bibliometric analysis is keyword mapping (Figure 5), which enables the identification of the main thematic areas of the studied issue. Based on the analysis in VOSviewer, the most frequently occurring terms were human-resource management (41 occurrences), performance (35), sustainability (23), work (18), artificial intelligence (13), innovation (12), technology (12), management (12), firm performance (10), and corporate social responsibility (9).

This frequency underscores the central role of human resource management in addressing global challenges. At the same time, key terms such as performance and sustainability demonstrate a strong focus on organizational performance and on their ability to respond to the demands of sustainability and social responsibility. The high occurrence of terms such as artificial intelligence, technology, and innovation, in turn, reflects the technological transformation and the growing role of digitalization in HRM.

The visualization through the keyword map also made it possible to identify three thematic clusters that document the main directions of current research:

- Cluster 1 – Sustainability and Strategic Performance (9 items): includes key terms such as corporate social responsibility, ethics, financial performance, firm performance, green HRM, innovation, organizations, strategic HRM, and sustainability. This cluster represents the connection of HRM with the themes of sustainability, social responsibility, and organizational performance.
- Cluster 2 – Technologies and Employees (9 items): consists of artificial intelligence, employee well-being, employees, engagement, HR practices, management, performance, technology, and well-being. The cluster reflects the emphasis on technological innovations and digital tools in HRM, as well as their impact on employees' satisfaction and engagement.
- Cluster 3 – Commitment and Work Environment (4 items): contains commitment, human-resource management, satisfaction, and work. This cluster represents the micro-level of HRM research, focusing on individual aspects such as job satisfaction, engagement, and employees' relationships with work.

The presented clusters provide a systematic overview of the main areas in which HRM and global challenges are most intensively researched, while also pointing to the interdisciplinary nature of the research – from the strategic and organizational

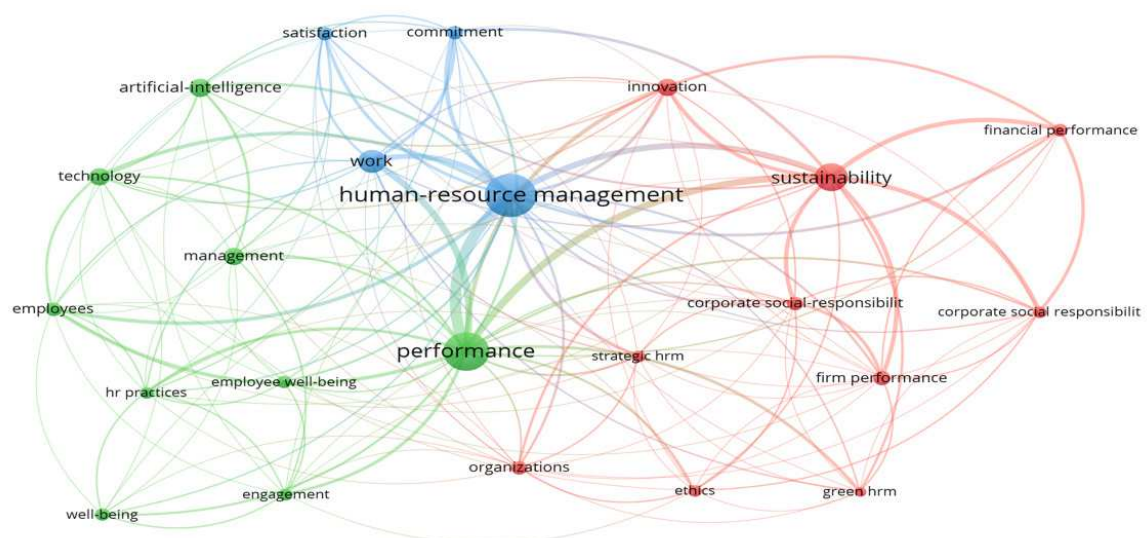


Figure 5. Keyword map

levels, through technological innovations, to the individual experiences of employees.

The results indicate that the studied issue is characterized by a high degree of interdisciplinarity, connecting the strategic, technological, and individual aspects of human resource management. Publication activity is concentrated in prestigious journals, with Anglophone countries strongly dominating. The keyword map revealed three basic clusters of research directions. These findings not only establish the field but also clearly indicate space for further exploration. The identified clusters reveal that, alongside the emphasis on sustainability, technologies, and individual factors, several themes remain insufficiently elaborated, offering opportunities for further research.

### 3.5. Identification of the research gap

Although the bibliometric analysis confirmed the growing interest in linking HRM to global challenges, it also showed that existing research is unevenly distributed. The greatest attention is devoted to sustainability, ESG, and technological innovations, while areas related to generational change, labor migration, labor market transformations, and socio-economic instability are addressed significantly less. However, these challenges represent key factors for the future development of HRM in the European and Slovak context.

The research gap, therefore, lies in the systematic interconnection of technological, social, and economic aspects with practical implications for human resource management. The lack of empirical studies focused on the adaptation of HRM to changing labor market and demographic conditions, as well as the limited attention devoted to regional specifics (e.g., Central and Eastern Europe), creates room for further research.

## 4. DISCUSSION

The bibliometric findings confirm that the transformation of human resource management is increasingly shaped by the intersection of technological innovation, sustainability pressures, and changing labor market conditions. The dominance of publications on sustainability and corporate social responsibility, particularly in jour-

nals such as Corporate Social Responsibility and Environmental Management, aligns with previous studies that emphasize the growing importance of sustainable HRM as a strategic organizational orientation. Earlier research has demonstrated that sustainability-oriented HR practices support environmental performance, organizational innovation, and employee well-being (Aftab et al., 2023; Vázquez-Brust et al., 2023). Similarly, the strong presence of sustainability-related keywords and the “Sustainability and Strategic Performance” cluster identified in this study supports the argument that HRM increasingly functions as a mechanism for integrating economic, environmental, and social objectives within organizational strategies (Kramar, 2022). These findings also align with studies showing that green HRM practices enhance employee engagement and sustainable behavior, reinforcing the role of HRM in achieving broader sustainability goals (Gyensare et al., 2024).

The results also highlight the growing significance of technological transformation and artificial intelligence within HRM research. The frequent occurrence of terms such as artificial intelligence, technology, and innovation, together with the formation of the “Technologies and Employees” cluster, confirms that digital transformation has become a central research theme in HRM scholarship. This observation corresponds with previous research indicating that AI-driven systems increasingly support recruitment, workforce analytics, and decision-making processes in organizations (Chowdhury et al., 2023; Trocin et al., 2021). At the same time, the literature emphasizes that the successful implementation of AI in HRM requires the development of organizational capabilities, including leadership, governance mechanisms, and human–AI collaboration frameworks (Böhmer & Schinnenburg, 2023; Meijerink & Bondarouk, 2023). The coexistence of technological and employee-related terms in the identified cluster further reflects ongoing academic debates regarding the dual effects of algorithmic management, which can simultaneously improve efficiency while raising concerns about transparency, autonomy, and ethical decision-making (Langer & König, 2023; Rodgers et al., 2023).

The third cluster identified in the analysis, focusing on commitment, satisfaction, and work environment, highlights the micro-level dimension of HRM transformation. This finding supports pre-

vious research emphasizing that organizational strategies related to sustainability or digitalization ultimately influence performance through employee-level outcomes such as engagement, well-being, and organizational identification (Beltrán-Martín et al., 2023). Studies on employee experience and socially responsible HR practices demonstrate that employee satisfaction and psychological well-being represent critical mechanisms linking HR practices to organizational performance (Zhang et al., 2020; Malik et al., 2023). The prominence of these themes in the bibliometric analysis suggests that contemporary HRM research increasingly recognizes the importance of balancing technological innovation and strategic organizational goals with the human dimension of work.

At the same time, the results reveal several underexplored areas that represent promising directions for future research. Although sustainability and technological transformation dominate the current academic discourse, topics related to labor migration, demographic change, and socio-economic instability remain relatively marginal in the analyzed literature. This observation is consistent with previous studies indicating that workforce mobility, aging populations, and regional labor market disparities represent emerging challenges for HRM systems that have not yet received sufficient scholarly attention (Belu & Popescu, 2025; Filipas et al., 2025). The limited representation of these themes in the bibliometric clusters suggests that future HRM research should adopt a more

comprehensive perspective that integrates technological, demographic, and socio-economic determinants of workforce management, particularly in regions experiencing structural labor market transformations.

This study has several limitations that should be acknowledged and may provide directions for future research. First, the bibliometric analysis was based exclusively on publications indexed in the Web of Science Core Collection and limited to open-access articles in Q1 and Q2 journals, potentially excluding relevant studies published in other databases or lower-ranked journals. Second, the analysis focused on the period 2020–2025, capturing the most recent phase of HRM transformation but not allowing a longer-term comparison of research development before the emergence of recent global disruptions. Third, bibliometric methods primarily reveal structural patterns and thematic relationships in the literature but do not provide detailed empirical insights into organizational practices. Future research could, therefore, expand the analysis by incorporating additional databases such as Scopus or Google Scholar, extending the time horizon, and combining bibliometric approaches with qualitative or empirical studies. In particular, further research should investigate underexplored areas identified in this study, including labor migration, demographic change, generational workforce dynamics, and regional differences in HRM adaptation, especially in emerging and transitional economies.

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## CONCLUSION

The purpose of this study was to examine the structure and development of academic research on the transformation of human resource management in the context of major global economic and technological challenges. In particular, the study aimed to identify the dominant research streams and thematic clusters related to HRM transformation during the period characterized by rapid digitalization, the diffusion of artificial intelligence technologies, the COVID-19 pandemic, and increasing geopolitical instability.

The analysis used bibliometric methods applied to publications indexed in the Web of Science Core Collection. After a PRISMA-based filtering procedure, 103 articles published in 2020–2025 were analyzed using VOSviewer to examine publication trends and keyword co-occurrence patterns.

The findings indicate a steady increase in research interest, with publications rising from 21 in 2020 to a peak of 32 in 2023. Keyword analysis identified three main thematic clusters: sustainability and strategic performance (9 terms), technologies and employees (9 terms), and commitment and work environ-

ment (4 terms). The most frequent keywords were human resource management (41 occurrences), performance (35), sustainability (23), work (18), and artificial intelligence (13). These results demonstrate that sustainability and digital transformation represent the two most influential directions in contemporary HRM research. The analysis also shows that topics such as migration, demographic change, and socio-economic instability remain comparatively underrepresented.

From a practical and policy perspective, the results suggest that organizations and policymakers should increasingly recognize HRM as a strategic instrument for responding to global challenges. HR policies should integrate technological innovation with employee-centered practices, ensuring that the adoption of artificial intelligence and digital tools supports workforce well-being and organizational trust. At the same time, sustainability-oriented HR practices should be strengthened to enhance organizational resilience and long-term workforce stability. Greater attention should also be devoted to demographic change, labor mobility, and regional labor market disparities, which represent emerging challenges for workforce management. Strengthening interdisciplinary research and evidence-based HR strategies will therefore be essential for supporting organizational adaptation in an increasingly uncertain global environment.

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## ACKNOWLEDGMENT

This paper was supported by the Agency for Research and Development Support based on the contract no. APVV-VV-MVP-24-0299 entitled “New trends in human resource management in the context of global challenges of the 21st century”.

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