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TRANSFORMATIONAL HRM: HUMAN RESOURCES MANAGEMENT RESEARCH TRENDS IN THE COVID-19 PERIOD 2020-2024

[1]Ferda Alper Ay & [*2]Jolita Vveinhardt

[1] Sivas Cumhuriyet University Faculty of Health Sciences,
Department of Health Management, Sivas, 58140, Türkiye.
[2] Vytautas Kavolis Transdisciplinary Social and Humanities Research Institute,
Vytautas Magnus University, Donelaicio St. 52, LT-44246, Kaunas, Lithuania.
[*]Corresponding author: jolita.vveinhardt@vdu.lt

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ABSTRACT

Background and Purpose: The COVID-19 crisis has accelerated shifts in HRM, creating urgent needs for research on organizational adaptability, employee well-being, and digital transformation.This study aimed to identify prevailing research topics, the most influential authors and institutions as well as to reveal existing gaps and outline future research directions.

Methodology: The study was conducted employing the bibliometric analysis and using the Scopus database. 848 scientific articles published in 2020-2024 were selected. Keyword co-occurrence, collaboration networks and other analysis methods were used to identify the most frequently studied topics, the most influential scientists and institutions, and the geographical distribution of research.

Findings: The study revealed five main clusters of HRM research: digitalization and HRM, response to the COVID-19 crisis, communication and pandemic challenges, human health and work styles, and digital transformation. Short-term challenges of the COVID-19 pandemic were more often analyzed rather than long-term strategies related to the impact of digital transformation on employee motivation and organizational environment. The geographic analysis revealed a disproportion of research: authors from the USA, China and India dominated scientific publications, while other regions were less represented, which may limit the globality and applicability of research in other countries.

Contributions: The study contributes to scientific literature by providing a systematic view of HRM research during the pandemic and revealing under-researched areas, such as long-term consequences of digital transformation and change in organizational culture. At the practical level, the findings will help organizations to develop more sustainable and systematic HRM strategies that would ensure not only prompt response to crises but also long-term employee engagement and organizational resilience.

Keywords: Human resources management, COVID-19, digital transformation, remote working, resilience.

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1.0 INTRODUCTION

While organizations today face increasing challenges and uncertainties related to climate change, economic downturns and political instability, the COVID-19 pandemic has led to a different type of organizational trials and problems (Carnevale & Hatak, 2020). Global business regulations have been increasing, and the COVID-19 pandemic has been acting as a catalyst (Vecchi et al., 2021). The COVID-19 epidemic has affected people and societies in many sectors, such as health, economy, politics, tourism, and education (Altundağ, 2021). It has also impacted financial and economic activities of businesses, industries and countries, hurting their financial results (Goldstein et al., 2021; Obrenovic et al., 2024).

Researchers have increasingly focused on the effects and consequences of the pandemic. The pandemic has led to different practices in human resource management, depending on business activities (António & Rita, 2021; Amankwah-Amoah et al., 2021; Vecchi et al., 2021; Aydan & Ceylan, 2023). Studies on HRM have focused mostly on challenges of the pandemic, strategies for security measures, practices, and recommendations for the new normal (Shen et al., 2020; Carnevale & Hatak, 2020; Kaushal & Srivastava, 2021; Hamouche & Chabani, 2021).

The COVID-19 pandemic has also changed HRM practices in businesses, such as the way of planning and doing work, the number of personnel, security, and motivation (Adikaram et al., 2021; Collings et al., 2021; Campion et al., 2021). The COVID-19 pandemic significantly affected many sectors, increasing the importance of the central role of HRM activities and practices for organizations (Collings et al., 2021; Aydan & Ceylan, 2023). Although the

emergence of this new reality has caused different problems for businesses and entrepreneurs, it has also opened up new opportunities.

To fully exploit these opportunities and mitigate future risks, it is important to have a good understanding of how HRM practices were changing during the pandemic, which policies have proven to be most efficient and how organizations can increase their resilience during the crisis. Bibliometric analysis plays a key role in this context, as it allows us to identify key research trends, prevailing themes, emerging challenges, and existing research gaps (Faisal, 2023; Wang et al., 2022). Furthermore, bibliometric analysis allows to combine quantitative and qualitative aspects in certain fields of literature (Baker et al., 2020; Deikus & Vveinhardt, 2024a). This provides a better understanding of the context and topics of research and also allows to avoid the "Matthew effect", when popular publications are cited more just because they are cited by well-known scholars (Kraus et al., 2020).

To date, there have been several bibliometric studies that examined HRM in the context of COVID-19. Sachdeva et al. (2024) focused on existing HRM practices during the pandemic, Nurimansjah (2023) expanded the understanding of the impact of the pandemic on HRM practices, technology integration and the importance of sustainability. In addition, valuable insights were provided by Jati (2023), who quite extensively covered trends in the growth of publications, cited authors, most popular research topics, and the most important keywords in the context of the pandemic. However, most attention was paid to HRM in the health services sector; i.e., it was more of a niche analysis. Similarly, Munna et al. (2023) centred on HRM trends in the public sector, while Stanca and Tarbujaru (2022) focused on work-related stress.

Although these significant studies were conducted, they did not provide a comprehensive picture of HRM research during and after the pandemic, as they examined individual areas (healthcare, public sector, work-related stress) or analysed only certain aspects, such as short-term organizational adaptation measures or individual psychosocial factors. There is a lack of a systematic approach that would allow to understand the overall field of HRM research in the context of the pandemic, to identify dominant research directions, the most influential authors, the main scientific journals and institutions that were shaping this domain. Furthermore, existing studies do not sufficiently reveal how the HRM discourse was changing in the long term, what topics remained relevant after the pandemic and what concepts dominate today's research. Therefore, in order to ensure a consistent understanding of the development of the HRM subject and to help organizations make data-based decisions in the face of future challenges, a more extensive and deeper analysis is needed, covering both the retrospective of changes that occurred during the pandemic and their long-term consequences.

Systematic bibliometric analysis is needed to comprehensively fill these gaps and provide a structured overview of HRM research in the context of the pandemic. Such approach will not only help identify key research trends and influential contributions but will also provide valuable insights into a wider evolution of the discourse on HRM during and after the COVID-19 crisis. Therefore, this article aims to conduct bibliometric analysis of HRM studies in the context of the pandemic through the following research questions:

Q1: How was the growth trend in HRM studies changing during the pandemic period?
Q2: Which are the most cited studies and leading authors in research on HRM in the context of the pandemic?
Q3: Which countries, journals, documents, and organizations are most cited in research on HRM in the context of the pandemic?
Q4: What are the trending concepts and thematic studies in research on HRM during the pandemic?
Q5: What keywords are still actively used in HRM studies related to the pandemic? Which keywords stand out?

The implications of this study are manifold. First, it contributes to the academic literature by providing a comprehensive retrospective of HRM research during the pandemic, highlighting how the scholarly discourse was evolving and what themes dominated in different periods. Second, it helps to understand what conceptual changes have taken place in this field. Third, this study will benefit managers, HR professionals and policy makers in organizations since it provides data-based insights. Finally, this research goes beyond analysing HRM changes in the context of the pandemic and evaluates their long-term consequences, allowing to understand how the experience of the pandemic has transformed the paradigm of human resource management. This provides organizations with the opportunity not only to respond to crises but also to proactively develop resilient and sustainable HRM strategies grounded on empirical research data.

2.0 RESEARCH DESIGN

Employing bibliometric analysis, this study aims to examine HRM activities during the COVID-19 period. Bibliometric analysis is an effective method for evaluating research trends and scientific networks in different research disciplines (Zhang et al., 2019). It helps to understand the development process and trends in a field over the years. It is a quantitative

method that combines both performance analysis and science mapping of scientific studies (Van Eck et al., 2010; Guleria & Kaur, 2021; Lim et al., 2022). Performance analysis is used to identify the most influential articles, authors, and countries contributing to the field. Science mapping, on the other hand, helps determine the relationships between research components (Donthu et al., 2021; Hoedemakers et al., 2023). Bibliometric analysis guides current and emerging researchers in a particular domain (Zhang et al., 2019). It significantly contributes to the expansion of the field by synthesizing past research findings in a certain field (Yiğit & Çakmak, 2023).

Yu and Wu (2021) emphasize that bibliometric analysis methods such as VOSviewer and CitNetExplorer are effective only when working with reliable and widely recognized sources. In this study, bibliometric analysis was performed employing the Scopus database that was selected due to its extensive scope and reliability (Bahrul et al., 2024; Lim et al., 2022). Using this database, unreviewed or methodologically questionable sources that may affect the reliability of research results can be avoided, and its scope and quality allow to obtain more accurate and comprehensive results than some other databases (Bahrul et al., 2024).

Some studies suggest that Scopus is a right choice in exploring the field of HRM. For example, a study by Mongeon and Paul-Hus (2015), comparing Web of Science (WoS) and Scopus, demonstrated that Scopus had a wider selection of journals in the field of social sciences, including HRM, while WoS was more focused on natural and technical sciences. In addition, Scopus indexes a larger number of journals, including regional and niche publications, and more often includes open access publications in the field of HRM, allowing researchers to find more free articles. A more recent study has shown that about 99,11% of journals indexed in WoS are indexed in the Scopus database, but the latter has a wider coverage of journals in the social sciences field (Singh et al., 2021).

The data were delimited and downloaded from the selected database for bibliometric analysis. Information about obtaining the data is given in Figure 1.

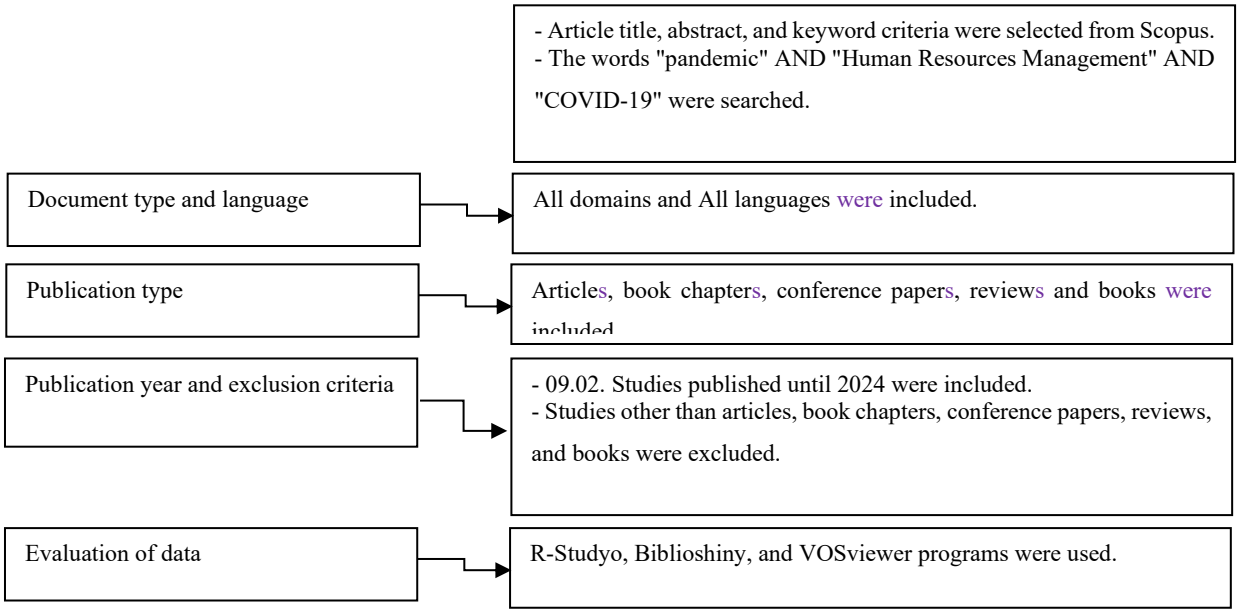


Figure 1: Selection and evaluation of data from the Scopus database

As shown in Figure 1, the data for the study were downloaded on February 9, 2024. In the first stage of data scanning, "pandemic" AND "human resources management" AND "COVID-19", which were selected according to the "title-abstract-keywords" criterion each time, were searched in Scopus. Initially, 869 documents related to studies on HRM during the pandemic were found. In the second stage, irrespective of the language of the document, studies in all languages were included and limited to articles, book chapters, conference papers, reviews, and books. Studies related to all fields (such as business administration, engineering, and social sciences) were included. Ultimately, 848 studies were considered suitable for further analysis.

To ensure the quality of research and the reliability of data, only peer-reviewed sources – articles, book chapters, conference papers and review articles – were selected for the analysis. These sources meet academic standards, since they are peer-reviewed prior to publication, which ensures their methodological and theoretical validity (Ninkov et al., 2021). Preprints were excluded from the analysis, because they may lack reliability ensured by the peer-review process. They may contain unreliable data and methodological flaws, and their inclusion could bias the results of the analysis. In addition, preprints are often later updated or revised, which can make comparability of data more difficult.

These studies were ranked according to the highest citation area. As stated in Scopus, these were documents on HRM in the context of the pandemic, issued between 2020 and 2024.

In this bibliometric study, research downloaded from Scopus regarding the interaction between HRM studies during the pandemic period was comprehensively examined. The data

for bibliometric analysis were evaluated and visualised employing VOSviewer software (Van Eck & Waltman, 2017). Additionally, R Studio was used for selecting the bibliometric library (Aria & Cuccurullo, 2017), and the Biblioshiny tool was employed for performing analyses.

3.0 RESULTS

3.1 Bibliometric analysis results of HRM studies during the pandemic

Basic Information in the Database

Descriptive analyses were conducted for the data downloaded from Scopus. The basic information of the data is shown in Figure 2.

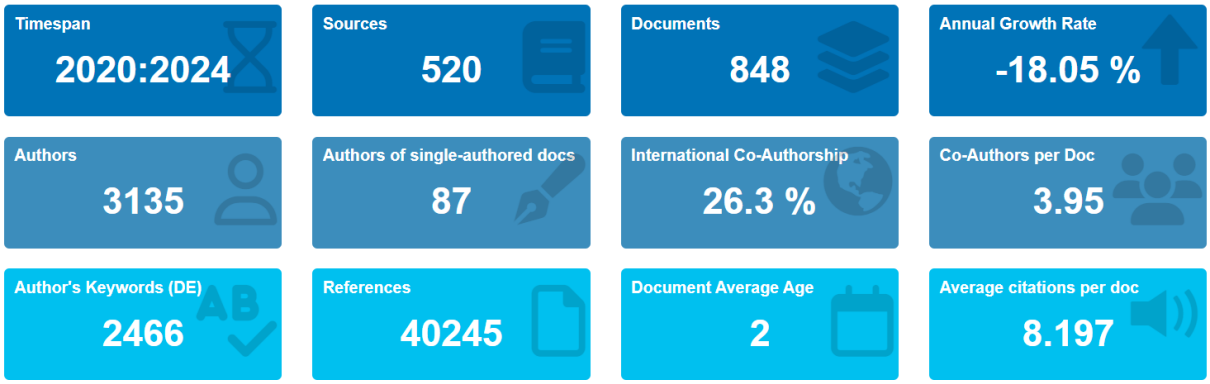


Figure 2: Main information

Figure 2 shows that between 2020 and 2024, the Scopus database contained 848 publications on HRM research during the pandemic from 520 sources (journals, books, etc.). While publications are decreasing by 18.05% annually, each document receives an average of 8.197 citations, and the average age of documents is 2 years. Out of 3135 authors, eighty-seven publications were published as single-author papers. In terms of collaboration, 26.3% of authors were international co-authors.

Trend in HRM Publications during the Pandemic over Time

Figure 3 shows the trend of HRM studies during the pandemic between 2020 and 2024.

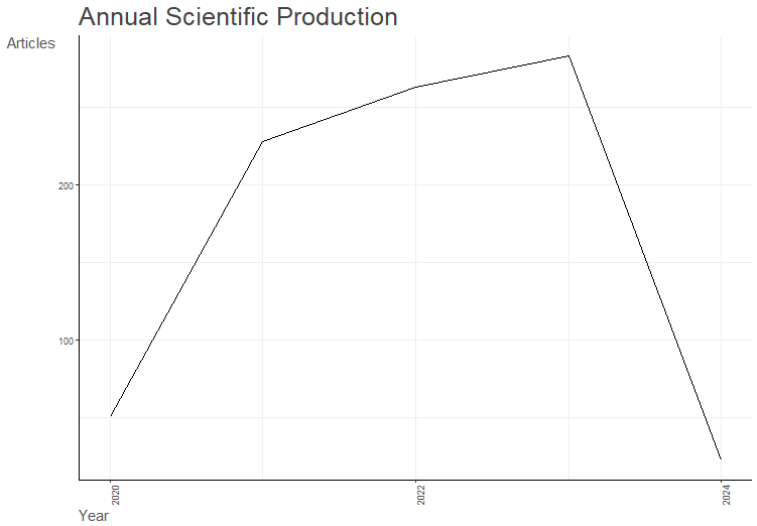


Figure 3: Distribution of HRM studies by year during the pandemic

As shown in Figure 3, researchers' interest in HRM studies worldwide during the pandemic varies from year to year. As to the number of publications, 23 publications were published in 2024; 283, in 2023; 263, in 2022; 228, in 2021; and 51, in 2020. The number of studies (283) related to HRM during the pandemic particularly increased in 2023. However, when the rate of increase in the number of studies was examined, it was found that the highest increase had occurred in 2021. Although in 2022 and 2023 the number of studies increased, the rate of growth seems to have slowed down. Since the number of studies for 2024 is not yet final, no evaluation has been made.

Annual Average Citation Status

Figure 4 shows the distribution of citations regarding HRM studies during the pandemic between 2020 and 2024.

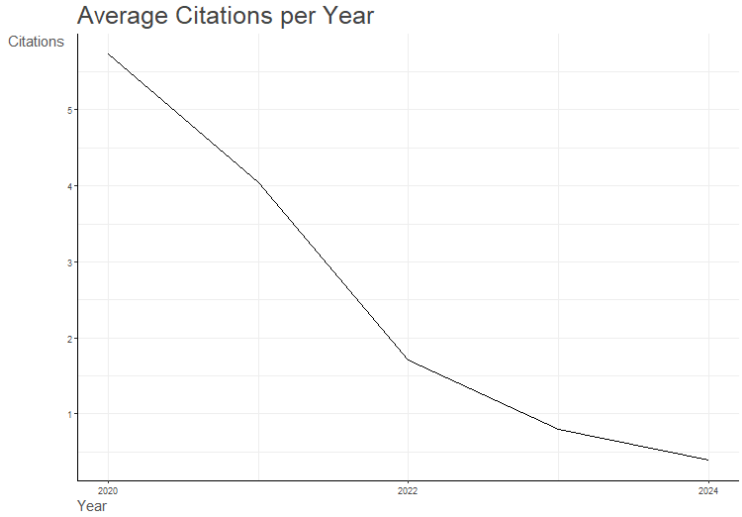


Figure 4: Annual average citation trend of HRM studies during the pandemic

Figure 4 shows a decrease in the number of references to HRM studies over the years. The average total number of citations per document by year is 0.39 in 2024, 0.8 in 2023, 1.71 in 2022, 4.04 in 2021, and 5.73 in 2020. In HRM research during the pandemic, the average number of citations per study was highest in 2020.

Visualization of the Three-Area Graph of Publications

The parameters (country, author, and keyword) were set in the Biblioshine software, and the most important parameters are shown in Figure 5.

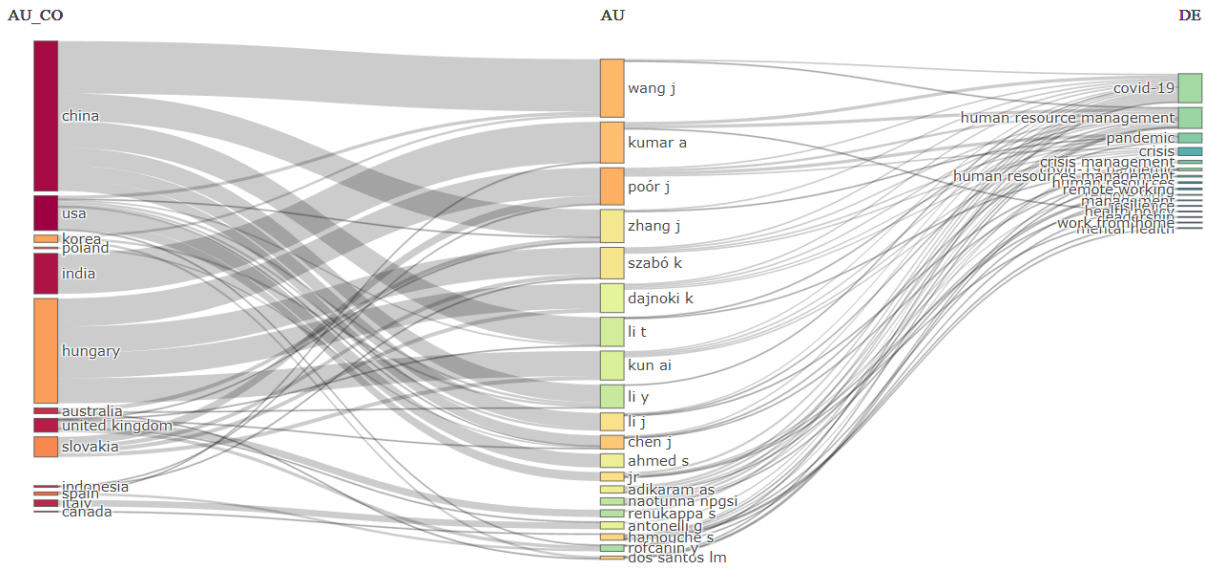


Figure 5: Sankey Diagram for country, author, and keyword

In Figure 5, the Sankey chart and the "country, author, and keyword" criteria were selected from the software, and the most important results were obtained based on the size of the boxes. According to these results, the lead author in the studies is "Wang J.", the leading keyword is "Covid-19", and "China" is identified as the leading country.

This result reflects not only a significant contribution of Chinese researchers to the field of research on COVID-19 in the context of HRM but also the country's focus on pandemic management strategies and decisions related to worker safety.

The diagram also enables us to envisage some trends in international collaboration. For example, strong links are clearly visible between researchers in the United States and the United Kingdom as well as between China and other Asian countries. These connections show that scientific research was not limited to local contexts but also acquired a global nature, which could have helped to create more universal HRM practices applicable in different cultural and economic settings.

Finally, it is important to note that "Covid-19" was the most frequent keyword, but other important keywords, such as "remote working", "organizational behavior" or "employee well-being" did not form strong associations with most authors or countries. This may indicate that although the topics of digital transformation and employee well-being were important, they were not sufficiently integrated into main research flows or that research on these topics was more fragmentary and less international.

Most Productive Journals

Table 1 lists top 20 sources of publications related to HRM studies in the pandemic corpus.

Table 1: The most efficient resources according to the h-index of HRM studies during the pandemic

Source	h_index	TC	Number of documents	PY_start
1.BMJ OPEN	6	438	35	2020
2.SUSTAINABILITY (SWITZERLAND)	6	148	17	2020
3.FRONTIERS IN PSYCHOLOGY	5	97	11	2021
4.INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	4	64	6	2020
5.SCIENCE OF THE TOTAL ENVIRONMENT	4	314	5	2021
6.ADMINISTRATIVE SCIENCES	3	26	6	2021
7.ENERGIES	3	32	4	2021
8.HUMAN FACTORS	3	109	3	2020
9.HUMAN RESOURCE MANAGEMENT	3	31	3	2022
10.HUMAN SYSTEMS MANAGEMENT	3	73	8	2020
11.INTERNATIONAL JOURNAL OF HOSPITALITY MANAGEMENT	3	356	3	2021
12.JOURNAL OF ENGINEERING, DESIGN AND TECHNOLOGY	3	79	3	2022
13.KYBERNETES	3	74	8	2021
14.PERSONNEL REVIEW	3	78	4	2022
15.PROCEDIA COMPUTER SCIENCE	3	23	5	2021
16.SAFETY SCIENCE	3	186	3	2021
17.TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE	3	49	4	2022
18.TELEMEDICINE AND E-HEALTH	3	44	4	2021
19.ACADEMY OF STRATEGIC MANAGEMENT JOURNAL	2	11	4	2021
20.ACM INTERNATIONAL CONFERENCE PROCEEDING SERIES	2	8	7	2020

Based on Table 1, the Bmj Open (8), Sustainability (Switzerland) (6), and Frontiers in Psychology (5) journals are among the top three most productive sources in terms of h-index citations and the number of documents. According to the total citation order, Bmj Open (438), International Journal of Hospitality Management (356), and Science of the Total Environment (314) journals received the most citations.

Most Important Author, Organization, Country, and Citation Status

Table 2 shows the most efficient authors, organizations, countries, and most cited countries in HRM studies in the worldwide pandemic corpus.

Table 2: The most important authors, organizations, countries, and their citation status in scientific studies

Authors	**N**	**Organizations**	**N**	**Countries**	**N**	**Most Cited Countries**	**N**
POÓR J	6	NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH	30	USA	406	USA	1019
WANG J	6	UNIVERSITI KEBANGSAAN MALAYSIA	15	CHINA	272	CHINA	606
KUMAR A	5	UNIVERSITY OF MARYLAND SCHOOL OF MEDICINE	15	INDIA	225	INDIA	547
CHEN J	4	THE HONG KONG POLYTECHNIC UNIVERSITY	14	UK	188	UNITED KINGDOM	443
DOS SANTOS LM	4	THE FIRST AFFILIATED HOSPITAL OF ZHENGZHOU UNIVERSITY	11	ITALY	106	IRAN	343
HAMOUCHE S	4	THE UNIVERSITY OF BRITISH COLUMBIA	11	AUSTRALIA	100	CANADA	295
JR	4	TOKYO MEDICAL AND DENTAL UNIVERSITY	11	INDONESIA	100	UNITED ARAB EMIRATES	293
LI J	4	UNIVERSITY OF JOHANNESBURG	11	PORTUGAL	100	ITALY	268
SZABÓ K	4	UNIVERSITY OF TURIN	11	GERMANY	92	SWEDEN	198
ZHANG J	4	HOMI BHABHA NATIONAL INSTITUTE	10	MALAYSIA	88	HONG KONG	197

As shown in Table 2, 3135 authors contributed to HRM studies during the pandemic. Among the most important authors, Poór J and Wang J are in first place with 6 articles, Kumar A is in second place with five articles, and Chen J, Dos Santos Lm, Hamouche S, Jr, Lı J, Szabó K, and Zhang J are in third place with 4 articles.

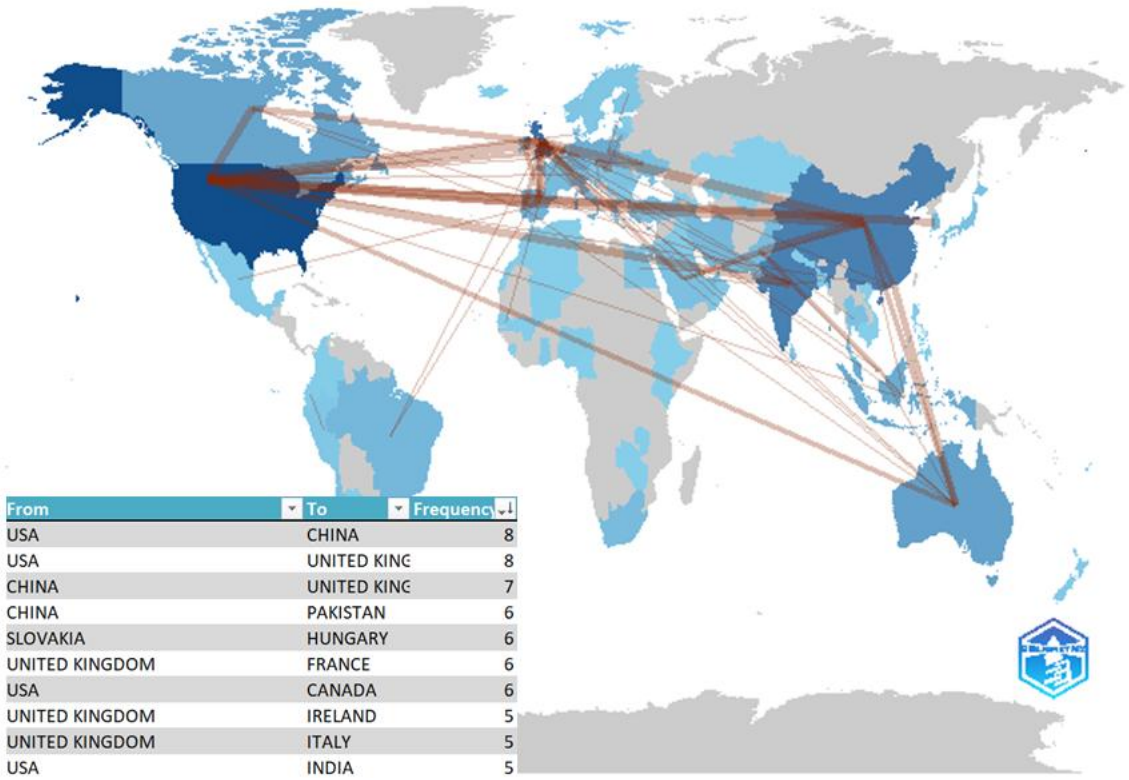
The examination of publication outputs of the organizations affiliated with authors contributing to HRM studies during the pandemic shows that the most productive organization is the National Institute of Environmental Health, with 30 publications. With 15 publications, the University of Kebangsaan Malaysıa and the University of Maryland, School of Medicine are in second place. Hong Kong Polytechnic University ranks third with 14 publications.

Among the most productive countries in HRM studies during the pandemic, the USA ranks first with 406 articles, China ranks second with 272 articles, and India ranks third with 225 articles.

Among countries with the largest number of citations in HRM studies during the pandemic, the USA ranks first with 1019 citations, China ranks second with 606 citations, and India ranks third with 547 citations. Accordingly, the USA, China, and India were the most productive and most cited countries in HRM studies during the pandemic.

Most Collaborating Countries

The collaboration map of the countries collaborating most in HRM studies during the pandemic in various publications is shown in Figure 6.



From	To	Frequency
USA	CHINA	8
USA	UNITED KING	8
CHINA	UNITED KING	7
CHINA	PAKISTAN	6
SLOVAKIA	HUNGARY	6
UNITED KINGDOM	FRANCE	6
USA	CANADA	6
UNITED KINGDOM	IRELAND	5
UNITED KINGDOM	ITALY	5
USA	INDIA	5

Figure 6: Country collaboration map

As shown in Fig. 6, thick lines on the collaboration map of countries show countries that collaborate most. The map shows that among the most collaborative countries, the USA-China rank first with 8 articles, USA-UK rank second with 8 studies, and China-England rank third with 7 studies.

Most Influential Articles

Ten most influential articles with the highest number of total citations (TCs) are shown in Table 3.

Table 3: Most influential articles

Paper	DOI	Total Citations	TC per Year	Normalized TC
CARNEVALE JB, 2020, J BUS RES	10.1016/j.jbusres.2020.05.037	546	109,2	19,05
KAUSHAL V, 2021, INT J HOSP MANAGE	10.1016/j.ijhm.2020.102707	345	86,25	21,38
SHEN J, 2020, ENVIRON POLLUT	10.1016/j.envpol.2020.115291	167	33,4	5,82
AZIZI MR, 2021, HELIYON	10.1016/j.heliyon.2021.e07233	152	38	9,41
LASALVIA A, 2021, BMJ OPEN	10.1136/bmjopen-2020-045127	152	38	9,41
SHARMA HB, 2021, SCI TOTAL ENVIRON	10.1016/j.scitotenv.2021.149605	149	37,25	9,23
DING X, 2021, IEEE REV BIOMED ENG	10.1109/RBME.2020.2992838	147	36,75	9,11
DAS AK, 2021, SCI TOTAL ENVIRON	10.1016/j.scitotenv.2021.146220	142	35,5	8,80
HAQUE MS, 2021, J ENVIRON CHEM ENG	10.1016/j.jece.2020.104660	119	29,75	7,37
BENNETT P, 2020, BMJ OPEN	10.1136/bmjopen-2020-043949	114	22,8	3,97

Table 3 shows that the most influential article entitled "Employee adjustment and well-being in the era of COVID-19: Implications for human resource management", published by Carnevale and Hatak (2020) in the Journal of Business Research, was cited 546 times.

This article is followed by the article "Hospitality and Tourism Industry amid the COVID-19 Pandemic: Perspectives on Challenges and Learnings from India", published by Kaushal and Srivastava (2021) in the International Journal of Hospitality Management, with 345 citations and ranking second.

The article published in the Environmental Pollution Journal "Prevention and Control of COVID-19 in Public Transportation: Experience from China", written by Shen et al. (2020), with 167 citations, ranked third.

The most influential articles presented in Table 3, identified in HRM studies during the pandemic, emphasized the following topics:

1. Carnevale and Hatak (2020) focused on the impacts and challenges of COVID-19 on HRM activities.
2. Kaushal and Srivastava (2021) focused on the challenges and learning experienced in the hospitality and tourism industry. Among the prominent themes in his qualitative study, he identified important themes such as the necessity of multiskill diversity of employees, hygiene, sanitation, HRM, continuity, and being prepared for unexpected situations.
3. Shen et al. (2020) emphasized the importance of strengthening staff training and management as strategies for epidemic prevention, control, and precautions in public transportation areas.

4. Azizi et al. (2021), by extracting a bibliography of 15 studies from different databases, determined that managers should benefit from strategies such as better working conditions, talent management, and flexibility.
5. Lasalvia et al. (2021), in their study examining the burnout levels of healthcare professionals, suggested improving the mental well-being of employees.
6. Sharma et al. (2021), focusing on the impact of the COVID-19 pandemic on the UN Sustainable Development Goals, examined the development of waste management-focused green jobs and green recovery promotion to achieve these goals.
7. Ding et al. (2021) examined technologies and systems for coping with the crisis experienced during the COVID-19 period and developed recommendations for management personnel, medical personnel safety, and practices in hospitals.
8. Das et al. (2021) reported a substantial increase in and instability in the processing and recycling of healthcare waste due to the spread of the COVID-19 virus. Correct management practices, solid waste management strategies, challenges, personnel responsibilities, and solutions are discussed to prevent the virus from spreading further.
9. Haque et al. (2021) focused on the negative effects of the COVID-19 epidemic on the environment. They made suggestions to help different professional groups, especially healthcare personnel, with planning and development for waste management.
10. Bennett et al. (2020), in qualitative research on healthcare workers' experiences working with COVID-19, focused on themes such as difficulties experienced, power hierarchy and inequality in the healthcare system, and the sacrifice of staff.

The topics of these studies reflect not only influential trends in HRM discourse but also regional challenges that researchers from different countries have focused on. The themes ranged from improving working conditions in the healthcare sector (Italy, UK) (Lasalvia et al., 2021; Bennett et al., 2020) and ensuring psychological support and employee well-being (USA, Switzerland, UK) (Carnevale & Hatak, 2020; Bennett et al., 2020) to crisis management in specific sectors such as tourism (India) (Kaushal & Srivastava, 2021), public transport (China) (Shen et al., 2020), waste management (Sweden, Bangladesh) (Das et al., 2021), and the impact of technological innovation on HRM processes (China) (Ding et al., 2021).

Since these studies are among the most cited, the topics examined by the representatives of these countries had a significant impact on the development of HRM discourse. This has laid the foundations for further scientific work and practical HRM solutions. In this context, it is important that HRM research directions were formed not only according to local needs but

also had a global impact, setting the directions of HRM development in the future, in the post-pandemic period.

Conceptual Structure Map

The conceptual structure map created based on keywords in HRM studies during the pandemic period is shown in Figure 7.

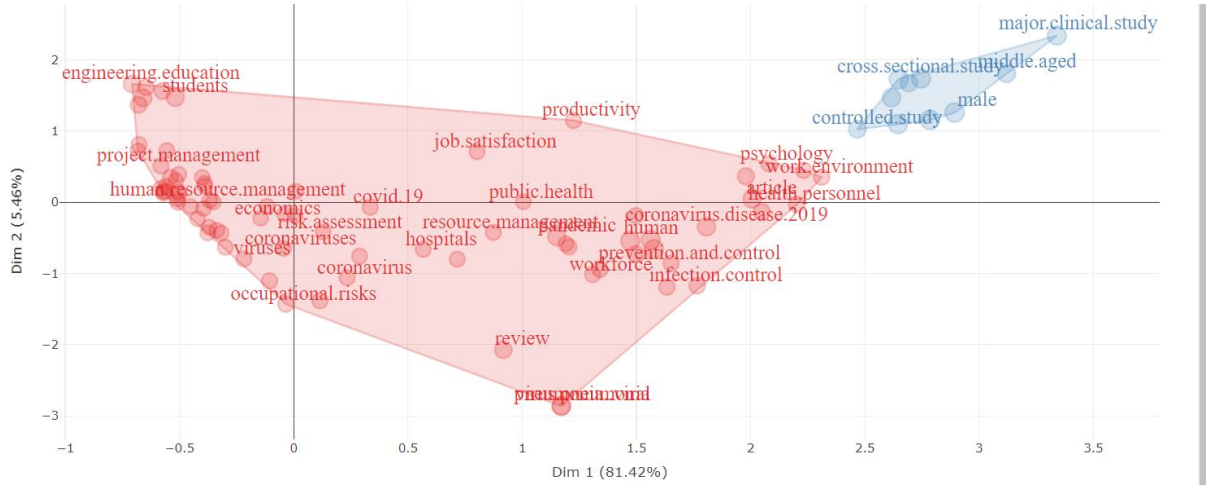


Figure 7: Conceptual structure map

When examining the conceptual structure map based on the keywords in Figure 7, the concepts related to HRM research during the pandemic are grouped under two factors.

The first dimension (red) contains “human resource management”, “COVID-19”, “pandemic”, “human”, “pandemics”, “coronavirus disease 2019”, “article”, “project management”, “health care personnel”, “resource management”, “students”, “sars cov 2”, “epidemiology”, “surveys”, “workers”, and “decision”, with words such as “making”, “e-learning”, “health care”, “hospitals”, “knowledge management”, “mental health”, “employment”, “information management”, “job satisfaction”, “waste management”, “leadership”, “human resources”, and “personnel training”.

The second dimension (blue) consisted of the following words: “adult”, “female”, “male”, “cross-sectional study”, “controlled study”, “questionnaire”, “cross-sectional studies”, “middle-aged”, “surveys and questionnaires”, and “major clinical study”.

Thematic Map

In thematic maps, the increase in centrality measures the degree of correlation between different themes, while density of the map measures consistency between nodes (Kemeç & Altınay, 2023). Thematic screening of publications related to HRM studies during the

pandemic was conducted using bibliometrics and authors' keywords to identify the main research topics of the field. Figure 8 shows the thematic map of the keywords of studies related to HRM during the pandemic.

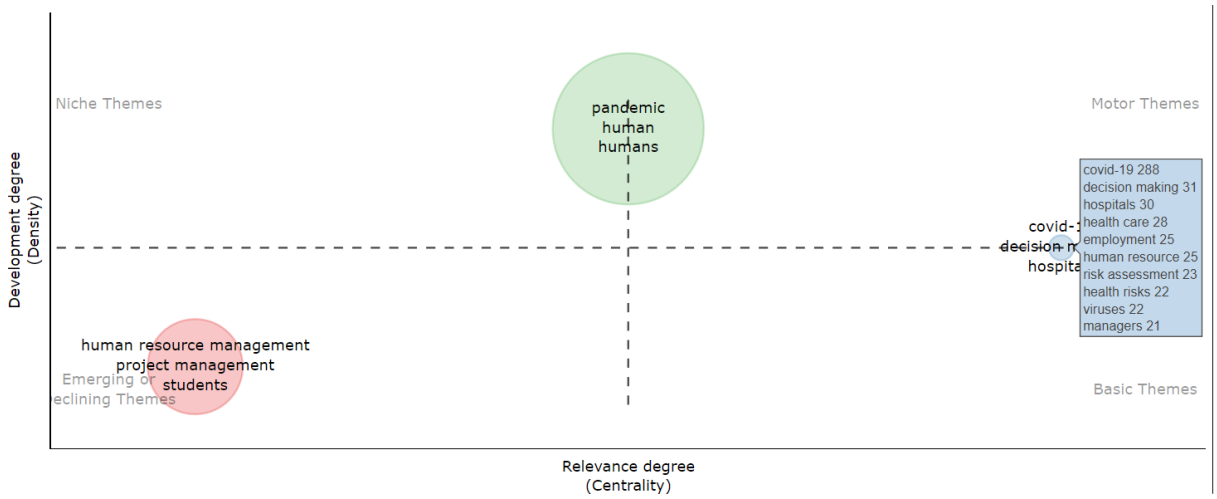


Figure 8: Thematic map by keywords

Based on Figure 8, three theme clusters emerged according to keywords in scientific studies on HRM in the context of the pandemic. The first cluster (blue) shows the engine and core theme sets.

The most commonly used themes are "motor themes", which are both central and widespread, and the "basic themes" group (blue cluster), which have high density and low centrality: "COVID-19", "decision making", "health care", "hospitals", "employment", "job satisfaction", "waste management", "leadership", "human resources", "risk assessment", "workplace", "health risks", "sustainable development", "managers", "public health", "occupational risks", "crisis management", "risk management", "economics", and "social media".

The green cluster, also containing the niche theme group and motor themes, which were more productive in previous periods but have weakened in their ties to the subject over time, and where the density has decreased even though the centrality is high, consists of words, such as "pandemic", "human", "coronavirus disease 2019", "article", "adult", "female", "health care personnel", "male", "resource management", "SARS-CoV-2", "epidemiology", "mental health", "cross-sectional study", "controlled study", "qualitative research", "questionnaire", "cross-sectional studies", "telemedicine", "health personnel", "occupational health", "personnel management", "psychology", "workforce".

The red cluster shows "disappearing and emerging themes", which are both low density and low centrality themes and have low connection and relevance to other words, and consists of words, such as "human resource management", "project management", "students", "surveys", "workers", "e-learning", "knowledge management", "personnel training", "engineering education", "learning systems", "virtual reality", "case studies", "construction industry", "condition", "behavioral research", "remote work", "well-being", "current", "performance", "resource allocation", "software design", "uncertainty", "information systems", "virtual team", "artificial intelligence", "social networking (online)", "forecasting", "knowledge-sharing", "supply chains", "budget control", "digital storage".

Trending Topics. The trends in the number of HRM studies related to the pandemic from 2020 to 2023 are presented in Figure 9.

Figure 9: Trending topics

Figure 9 shows that between 2020 and 2023, "COVID-19" (301), "human resource management" (142), and "the COVID-19 pandemic" (67) are the trending topics most studied by authors. The most popular topic in the first and second quarters of 2022 and the third quarter of 2023 was "digital transformation". In addition, the most popular topics in the first quarter of

2022 and in the second and third quarters of 2023 were "resilience", "job satisfaction", "working from home", "communication", "COVID-19", "HRM", "job performance", "employee engagement", and "training additionally".

Cloud Map and Tree Map

In Figure 10, the tree map and cloud map created according to the keywords of the authors of HRM studies in the pandemic are shown together.

Figure 10: Cloud map of keywords and tree map

The rectangle sizes in the Tree Map in Figure 10 reveal that "COVID-19" has the highest usage rate of 27% (blue rectangle), the usage rate of "human resource management" is 13% (orange rectangle), and the one of "the COVID-19 pandemic" is 5% (green rectangle). Figure 10 shows that the cloud map was created based on the keywords of the authors in HRM studies during the pandemic.

The most frequently used words in the cloud map are: "COVID-19", "human resource management", "COVID-19 pandemic", "pandemic", "crisis management", "remote work", "human resources management", "management", "crisis", "digital transformation", "digitalization", "remote working", "mental health", "resilience", "well-being", "health policy", "innovation", "job satisfaction", "leadership", "work from home", and "burnout".

While some sectors, such as healthcare, have actively adopted technological innovation (Ding et al., 2021), and organizations' HRM strategies have been restructured to include virtual learning and automated processes (Azizi et al., 2021), the overall focus on digital transformation has remained limited. This is also confirmed by the distribution of keywords: "digital transformation", "artificial intelligence" or "telemedicine" were rarely mentioned, accounting for no more than 1% of all analyzed keywords.

These results demonstrate that although the pandemic has stimulated the adoption of technological solutions in the field of HRM, the development of digital competencies on a wider scale has not been a top priority in HRM research. For example, the study by Burlea et al. (2023) has found that the COVID-19 crisis did not have a direct and positive impact on the development of employees' digital skills. Thus, although HRM research during the pandemic period partly reflected digital change, this topic was not explored in depth.

Co-occurrence Keyword Analysis

As shown in Figure 11, at least ten keyword criteria were set in the VOSviewer software with the co-occurrence and author keyword options for the co-occurrence analysis of keywords. Common research themes consisting of keywords repeated at least ten times were obtained. Thus, the keywords allowed to identify 5 clusters, 32 items, 190 networks, and 548 total relationship networks.

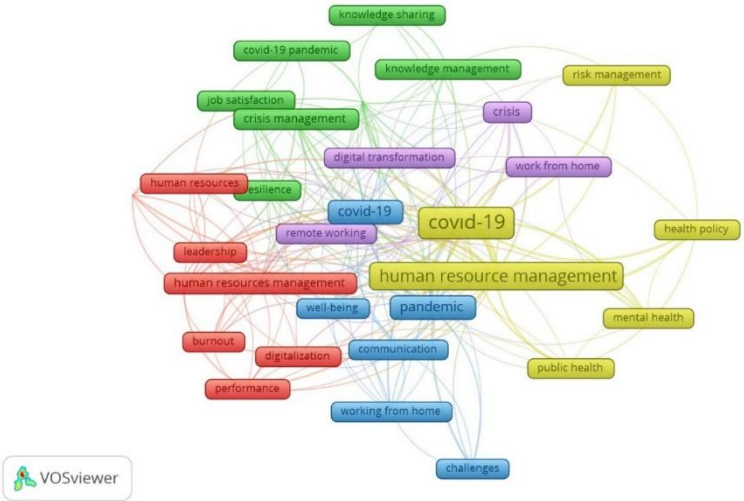


Figure 11: Network map of the most used keywords

Figure 11 shows that the keywords that are most commonly used and attract much attention from authors consist of five clusters.

First cluster (red): in this cluster, the words "human resources", "human resources management", "digitalization", "leadership", "management", "performance", "burnout", "telework" were most used by the authors. These words focus on digitalization and human resources management.

Second cluster (green): in this cluster, the words "crisis management", "COVID-19 pandemic", "knowledge management", "knowledge sharing", "remote work", "resilience", and "job satisfaction" were most commonly used by the authors. These words can be used to address the COVID-19 crisis and human resource practices.

Third cluster (blue): in this cluster, the words "communication", "COVID-19", "challenges", "pandemic", "well-being", and "working from home" are used. These words can be referred to as communication with employees and difficulties of the pandemic.

Fourth cluster (yellow): in this cluster, the words "COVID-19", "risk management", "health policy", "human resource management", "public health", and "mental health" were used. This cluster can be named human health and risk management and human resources practices.

Fifth cluster (magenta): in this cluster, the words "COVID-19 pandemic", "crisis", "digital transformation", "remote working", and "work from home" were used. This cluster can be referred to as digital transformation and ways of working.

In addition, overlay analysis was performed by selecting at least five keyword criteria with the co-occurrence and author keyword options in VOSviewer software, as shown in Figure 12.

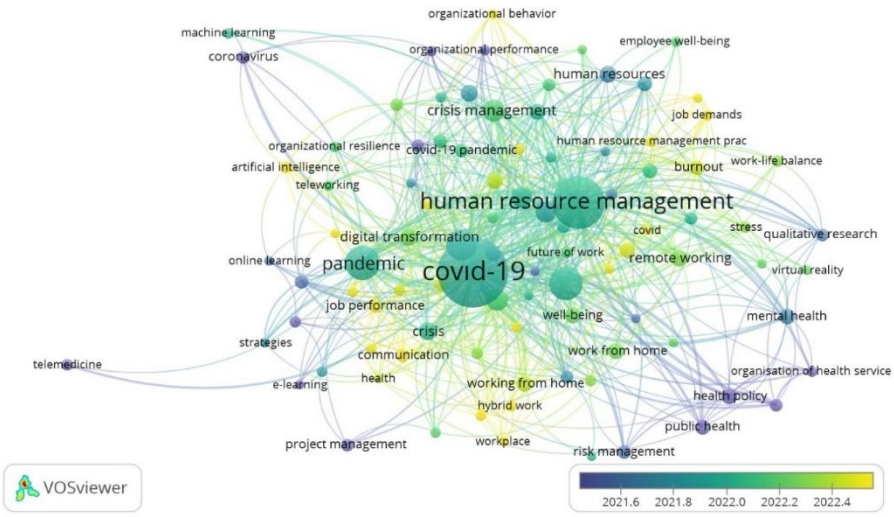


Figure 12: Use of keywords over time

As shown in Figure 12, 10 clusters, 694 networks, and 1241 total relationship networks were identified in the keywords. According to the figure, keywords such as “working from home”, “communication”, “hybrid work”, “remote working”, “organizational behavior”, “job dementia”, and “digital transformation” are the words used by authors in 2022 and later (yellow colour).

This suggests that the importance of digital transformation in HRM research was evaluated relatively late, even though the pandemic started as early as 2019. In the first years of the crisis, researchers focused on urgent problems, such as employee well-being, crisis management and organizational resilience, while the impact of digital solutions on HRM practice became more relevant only later. The late dominance of keywords such as “digital transformation” or “hybrid work” suggests that digitalization processes might have been assessed retrospectively rather than as an urgent priority area at the beginning of the pandemic.

4.0 ANALYSIS AND DISCUSSION

Since traditional human resources management is insufficient in some aspects, the human resources management information system (HRMS) continues to develop according to age requirements. From a systems theory perspective, the human resources information management system requires taking part in different functions unique to each company (Hao, 2020). The necessary conditions and consequences of the COVID-19 epidemic have accelerated the continuous development of HRMS.

Although previous studies have analysed HRM changes during the COVID-19 pandemic, this bibliometric analysis distinguishes itself by its systematic and global approach. It combined more than 800 scientific sources from the Scopus database, providing the opportunity to identify not only dominant research topics but also the most influential authors and organizations. The revealed research trends can help both scholars and practitioners to better understand how the pandemic has changed HRM strategies and methods and what lessons from the pandemic still need to be evaluated.

The pandemic has not only promoted digital transformation in HRM activities but has also highlighted structural changes, such as automated employee selection, distance learning, and virtual workgroups. The question is whether these changes will become long-term trends or whether organizations will return to traditional models. The answer may not be as optimistic as one might wish.

On the one hand, in the analysis of co-occurrence of keywords, it was determined that common research themes consisted of five clusters. These include digitalization and HRM,

coping with the COVID-19 crisis and human resource practices, communication and pandemic challenges, human health and human resource practices, digital transformation, and working style clusters. These clusters show that the authors focus more on human resources management and studies in these five clusters. These findings are supported by research and show that there are issues of greater interest and importance for future researchers (Kılıç-Kırılmaz, 2021; Amankwah-Amoah et al., 2021; Cahyadi et al., 2022; Hamouche et al., 2023).

In the co-occurrence analysis of keywords, keywords such as "working from home", "communication", "hybrid work", "remote working", "organizational behavior", "job demands", "digital transformation" were the most used words by the authors in 2022 and later. Accordingly, recent research has focused mostly on businesses successfully managing the remote working process and ensuring effective communication between working styles, job demands, and employees. These results are supported by previous results (Akbaş Tuna & Çelen, 2020; Hamouche & Chabani, 2021; Hamouche et al., 2023), which revealed that flexible working styles and practices implemented during the pandemic will continue in the new normal.

On the other hand, topics, such as e-learning, remote working, virtual reality and Industry 4.0 suggest that although these topics were relevant at the beginning of the pandemic, they might not have had a lasting impact on HRM discourse. Furthermore, judging by the themes examined, scholars first sought to understand sudden changes and only later began to delve into long-term HRM strategies, such as hybrid work models or implementation of technological solutions. Research focused mainly on quick fixes and the health sector, due to which the opportunity to delve deeper into long-term HRM challenges, such as organizational culture, employee skill development, or the sustainability of digital transformation was missed.

Some organizations have also responded similarly. For example, Yu and Wu (2021) found that organizations often lacked a long-term strategy and a systemic approach. They responded to current challenges but did not assess how changes in digital transformation, remote working would affect employee well-being, motivation and long-term organizational culture. Overall, our research results show that although digitalization is mentioned among keywords, its central position in the research field was weak. That is, researchers might have insufficiently reflected long-term challenges and opportunities of digital changes in the HRM context.

The results of the study also reveal certain geographical and citation limitations. First, the focus on China, the USA and India shows that these countries were dominant in terms of both publications and citations. Meanwhile, other regions (e.g., Europe, Africa, South

America) were underrepresented in HRM research in the context of the pandemic. It is noteworthy that articles by Chinese and Indian scholars were among five most cited even while the pandemic was still ongoing (Ayoko et al., 2021).

The high number of citations in 2020 and the decline in subsequent years show that studies published at the beginning received the most attention. This may indicate a first-mover advantage effect, where early papers were more frequently cited due to the lack of information at the beginning of the pandemic. It is possible that researchers tended to rely on the already known and frequently cited sources, which might have inhibited the emergence of new perspectives and lesser-known researchers ("The Matthew effect").

Research institutions with the highest number of publications (e.g., National Institute of Environmental Health, University of Kebangsaan Malaysia) may exhibit limited diversity of research. This may indicate that the HRM research field has been shaped by a small group of scholars and their institutions, resulting in the lack of more diverse approaches and methodologies. The frequent use of cross-sectional and controlled studies might have limited the opportunities to assess the long-term consequences of the pandemic. Cross-sectional studies often provide only a snapshot view that does not allow to analyse the dynamics of change or long-term trends (Ruspini, 1999; Wang & Cheng, 2020). Furthermore, although qualitative research (e.g., interviews, case studies) are mentioned, they were not dominant. This may result in a lack of a deeper understanding of the experiences of organizations and employees during the pandemic.

Thus, assessing the lessons of the pandemic, researchers should pay more attention to foresight studies, which would help identify future trends and risks. This would allow not only to respond to current changes but also to contribute to proactive preparedness of organizations. In the meantime, organizations need to invest in risk management and crisis prevention mechanisms, including scenario planning, employee training, and application of technologies to various operational models. For example, Zaman (2023) believes that in the future, in addition to technological changes, organizations will need to implement programmes focused on the psychological and physical health of employees in order to increase their resilience to stress and uncertainty, develop managers' abilities to effectively manage change and communicate with their teams, strengthening organizational resilience.

Addressing challenges of digital transformation, new opportunities for HRM practitioners who design talent management and employee experience improvement programmes are provided by artificial intelligence (AI). AI applications are being used to streamline recruitment processes, to develop better employee training through adaptive

learning platforms, and to improve performance management systems (Anwer & Chitrao, 2023). For example, AI can analyze employee data to identify skill gaps and recommend targeted training programs, this way promoting continuous professional development and career growth (Sooraksa & Nawakitphaitoon, 2023). This change not only helps retain talented employees but also ensures that employees feel valued and supported.

Finally, HRM plays a critical role in responding to changing business demands. With its increasing importance during the pandemic, businesses should be aware that HRM is of central importance for businesses in every period (Alper Ay, 2022; Aydan & Ceylan, 2023; Collings et al., 2021). HRM-supported flexibility and agility determine the success of businesses (Hamouche & Chabani, 2021). Businesses should adopt a more humane approach to employee-focused HRM practices when managing crises (Adikaram et al., 2021). During crises, organizations should support their employees and protect their physical and psychological health (Kılıç-Kırılmaz, 2021), as well as pay attention to the safety of employees and the prevention of workplace violence (Vveinhardt et al., 2021). Businesses must not only adapt to changing conditions but also be more responsive to employees' needs, including spiritual and religious needs (Aman et al., 2021; Deikus & Vveinhardt, 2024a, 2024b; Vveinhardt & Deikus, 2023, 2025), which have not received much attention from researchers in the context of the pandemic of HRM change.

This bibliometric study is limited to studies in the Scopus database on the interaction between HRM studies during the pandemic. Although this is one of the most widely used academic databases, future research could extend the analysis by including data from WoS or Google Scholar. Additionally, the “Dimensions” search engine, which is considered a promising alternative to traditional academic databases (Singh et al., 2021), could be included, this way increasing the scope of results and comprehensiveness of the study.

In the database, “article, book chapter, conference paper, review, and book” were included in the study, and the documents were published between 2020 and 2024. Biblioshiny and VOSviewer analysis methods were used. Studies, notes, and letters published on preprint websites were excluded. Future researchers can benefit from different databases, produce more comprehensive results, and make use of different visualization and analysis methods. Since the study includes research in all fields, future studies can examine research on a sector basis or investigate it in more specific scientific fields.

5.0 CONCLUSION

The COVID-19 pandemic has not only revealed the limitations of traditional HRM systems but also prompted a more rapid development of human resource management information systems in response to new organizational needs. The bibliometric analysis of this study has shown that the pandemic has become a catalyst in the field of HRM, creating both challenges and opportunities. The identified key research trends and the most influential authors and institutions not only provided valuable insights into the impact of the pandemic on personnel management strategies but also outlined future directions for HRM research.

During the pandemic, HRM practices had to be adapted to the challenges of digital transformation. Automated employee selection, distance learning and virtual work groups became an integral part of work practices. However, these changes were more of a tactical response to the pandemic than a strategic transformation. The topic of digitalization, often emphasized in the academic literature, has not been fully exploited in the HRM discourse, leaving unanswered questions as to whether digital initiatives in the field of HRM will become a long-term trend or just a temporary solution. This highlights the necessity to develop research that would explore long-term implications of digital transformation in the context of organizational culture and employee experience. Both researchers and HRM practitioners should pay more attention to a systematic and integrated approach to human resource management systems. These systems should not only be a tool for prompt response to crisis situations but also a proactive tool that helps organizations to create long-term value and adapt to constantly changing labour market and organizational conditions.

HRM research during the pandemic was dominated by topics such as remote working, communication and employee health. Although these aspects were critically important during the pandemic, there has been insufficient conceptual analysis of how these factors can affect long-term organizational dynamics and employee engagement. It has been noted that research was often limited to health sector analysis and short-term solutions, with insufficient consideration of other sectors or a longer-term perspective. This suggests that future research should not only expand sectoral analysis but also delve into longer-term HRM developments, such as organizational culture change, employee skill development, and sustainability of digital transformation.

The regional imbalance in HRM research suggests that less attention has been paid to some countries around the world, which may limit universality and applicability of research in different cultural or organizational settings. Therefore, research covering a wider regional

context needs to be promoted to ensure that HRM practices are adapted across various organizations and cultures.

By providing comprehensive information, this study can contribute to the future understanding of HRM. The research findings can supplement future researchers' understanding of the depth and importance of existing knowledge and future trends in the field of HRM studies. It can contribute to organizations, HRM managers and researchers taking a proactive look at shaping future ways of working and carrying out HRM functions. Crises such as COVID-19 can create a rising star, meaning that crises can create opportunities for some organizations. This study reveals several gaps in the literature, and it can contribute to crisis management by helping individuals be prepared for different crises. This study can be beneficial to the creation of topics that require in-depth analysis of HRM practices. Researchers can identify new research directions and develop coauthorship collaborations.

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