Journal of Engineering Science and Technology
Special Issue on ISCoE2022 Vol. 18, No. 4 (2023) 20 - 29

DIGITALIZATION OF HUMAN RESOURCE MANAGEMENT: A BIBLIOMETRIC ANALYSIS

ABDUL KHOLIK[1, 2,*], MUHAMMAD RENDI RAMDHANI[1], ZAHRA KHUSNUL LATHIFAH[1], R. SITI PUPU FAUZIAH[1], SAIFUL BAHRI1, H. HAMURDANI1

[1]Universitas Djuanda, Indonesia
[2]Muhammadiyah University Jakarta, Indonesia
*Corresponding Author: abdul.kholik@unida.ac.id

Abstract

The purpose of this research seeks to map research trends on digitalization in human resource management (HR) by collecting and analysing 11,502 articles from 2014 to 2023. The method in this study was carried out by collecting international publication metadata sourced from the database Scopus with the help of the application Publish or Perish and then carried out a bibliometric analysis with the use of the VOSviewer application. Results Study shows that the development of research publications related to technology-based HR from 11,502 papers in the 2014-2023 period has increased significantly, occurring in 2022 is the most publications with a percentage of 23%. Based on subject areas most related to digitalization of HR namely social science with 19%. This shows that there is significant interest in understanding the social aspects related to the application of technology in HR. Based on topic visualization using VOSviewer, there are research topics related to HR as well as many items that have no relation to the theme of HR such as cloud computing, until this becomes a research gap in further research. This study highlights the results of bibliometric analysis in providing information on research trends in the digitization of HR. This bibliometric is expected to provide information to help and become a reference for researchers who conduct and determine other research topics related to the digitalization of HR.

Keywords: Bibliometric. VOSviewer, Digitalization, Human resources, Management.

1. Introduction

Technological progress is always accompanied by the existence of human resources [1]. This is considering that the existence of technology without humans will be in vain [2]. In today's digital era, technology has brought major changes in many ways, including in the field of human resource management (HR). Consequently, digital transformation impacts the way HR functions are fulfilled through the use of digital tools and applications to innovate processes, make decisions, and solve problems. To anticipate the current industrial era 4.0, it is necessary to carry out digital-based HR transformation through various innovations in the field of HR management which are an important key in facing the era of disruption. In addition to technological adaptation, structural changes in processes, and human resource capacity building [3]. Digitization HR management refers to the use of information technology and systems in managing HR aspects in terms of strategies, policies, and practices in an organization to make it more effective and efficient [4-6]. Digital technology helps organizations increase their productivity by maximizing their most valuable asset, namely people. Various benefits of digitization in HR management, namely going paperless, employee self-service applications, automation in motion, recruiting through the corporate's website or social media, employee analytics, and digital culture [7]. With digitalization, the HR management process becomes automated, transparent, centralized, and efficient [8].

At present, several previous studies discussing digitalization or the use of technology in HR management have been carried out, such as the impact of emerging technologies on work [3], Digital HR [9], the analysis of HR information systems in the process of recruitment, promotion, and employee demotion [10]. Digital-based HR [11], digitization of the bureaucracy through the development of Smart ASN [12], A strategic approach toward digitalization initiatives in the banking and financial technology (FinTech) Industry in Indonesia [13], exploring HR digital transformation in the digital [14], and the role of digital human resource technology [15]. But so far, researchers have not yet found a study of bibliometric analysis of digitization HR published in Scopus-indexed journals. Therefore, further research is needed regarding the bibliometric analysis of digitization HR to provide an overview of the development study done so far. Bibliometrics is a scientific study that has existed since the 1980s and is included in the field of library science, but over time this knowledge can be applied and studied in all fields [16].

The purpose of this study is to map research trends related to the digitalization of HR by collecting and analysing 11,502 articles from 2014 to 2023 from the Scopus database. The novelty of this research is the research on the digitalization of HR from the perspective of bibliometric analysis.

2. Methods

The research method used in this research is bibliometric analysis with three stages, first data collection, second data selection, and third data analysis using the help VOSviewer application [17-20]. VOSiewer is a computer program used to visualize bibliometric maps. The text mining function can be used to visualize a network or co-relation in an article citation [21-25]. The explanation of these stages is as follows: First stage: Publication data was retrieved from the Scopus database from

2014-2023 with the help of Publish or Perish. The keywords used in data collection are digitization, technology, and HR. Second Stage: Data selection was conducted to obtain data that met the criteria, namely publications in the form of journal articles that have been cited. Based on these criteria, 11,502 articles were obtained. Third Stage: The results of the data obtained through the Publish or Perish search, then analysed using the VOSviewer application to assist bibliometric analysis by visualizing the results of Network, Overlay, and Density Visualization.

3. Results and Discussion

3.1. Publication development

The development of the publication of 11,502 papers can be seen in Fig. 1 which illustrates trends and statistics regarding the number of articles published in scientific journals during the 2014-2023 time period.

Figure 1 visualizes trends and statistics related to the number of articles that have been published in the 2014-2023 time period relating to aspects of HR that have a relationship with the use of technology. This figure contains information that helps illustrate the evolution and progress that has taken place in the field of technology-based HR. Based on Fig. 1, it can be seen that there has been a significant increase in the number of published articles. Occurring in 2022 is the most publications with a total of 2,632 publications (23%) which may reflect increased interest in and focus on applying technology in HR. In addition, this image also provides information about the distribution of journal articles in various subfields or topics related to technology-based HR. For example, there may be an emphasis on topics such as e-recruitment, technology-based performance management, data analysis of Human Resources, or the use of a HR information system. The information presented can provide useful insights for researchers, practitioners, and academics in understanding trends, innovations, and research contributions in this field. Thus, the development of these publications can become a source of inspiration and reference for further research, collaboration, and practice development related to the digitalization of HR in the future.

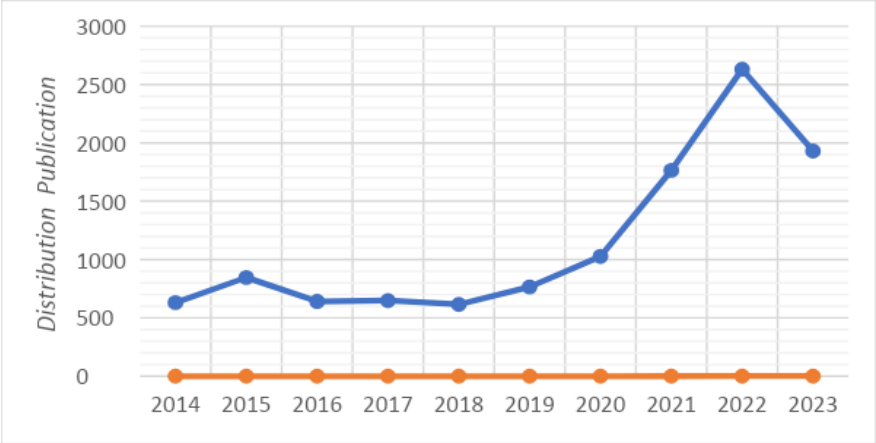

Fig. 1. Development of publication.

3.2. The highest publisher based on the number of publications

The following is a list of the highest publishers that have published a large number of publications related to technology-based HR, which can be seen in Fig. 2.

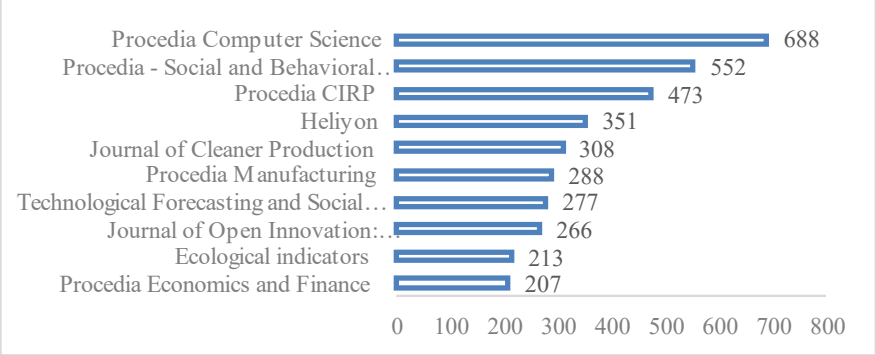

Fig. 2. Highest publisher.

Figure 2 is a visual representation that provides information about most journals based on the distribution of published publications in the context of technology-based human resources. It can be seen that several publishers have contributed to the publication of technology-based management information systems. This is a valuable resource as a reference for academics or other researchers who are interested in studying or conducting research on a particular topic, especially technology-based HR.

3.3. Subject Areas

Based on the database *ScienceDirect* from 2014 to 2023, there are several subject *areas of* research related to technology-based HR. The data provides an overview of the percentage of contributions to the overall research conducted, which can be seen in Fig. 3.

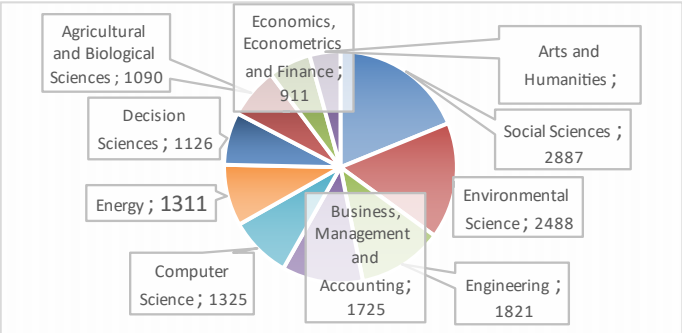

Fig. 3. Subject areas of research.

Based on Fig. 3, the data illustrates the percentage contribution of each subject to the total research conducted in the 2014-2023 period, providing insight into the concerns and focus of research in this field. Researches within the 2014-2023

period related to technology-based HR have diverse subjects, as recorded in the database Science Direct. The data shows the distribution of subject areas of research conducted. Within that period, there were several categories of subjects that dominated the research conducted. Overall, studies conducted in the 2014-2023 period related to technology-based HR cover various subjects and disciplines. This reflects the complexity and significance of using technology in HR and the need to understand the various social, environmental, technical, and economic aspects associated with its application.

3.4. Topic visualization using VOSviewer

VOSviewer is a software tool used to create maps based on network data and to visualize and explore those maps. In visualizing the topic, it is divided into three namely, Network Visualization, Overlay Visualization, and Density Visualization.

3.4.1. Network visualization

Based on the results of Network Visualization, it can be seen that there is a relationship between each term or keyword. Network visualization results using VOSviewer from a dataset of 11,502 predefined papers. Network Visualization describes the interrelationships between these entities in a complex network. Through visual analysis, it can reveal emerging patterns and trends, as well as relationships that might not be apparent at first glance. By paying attention to patterns and relationships within Network Visualization, can identify groups of keywords that are interrelated or often appear together, as shown in Fig. 4.

Topics related to human resource-based management Network Visualization It can be seen that the item HR has relationships with items other. To show the relatedness of the item HR is more clearly presented in Table 1.

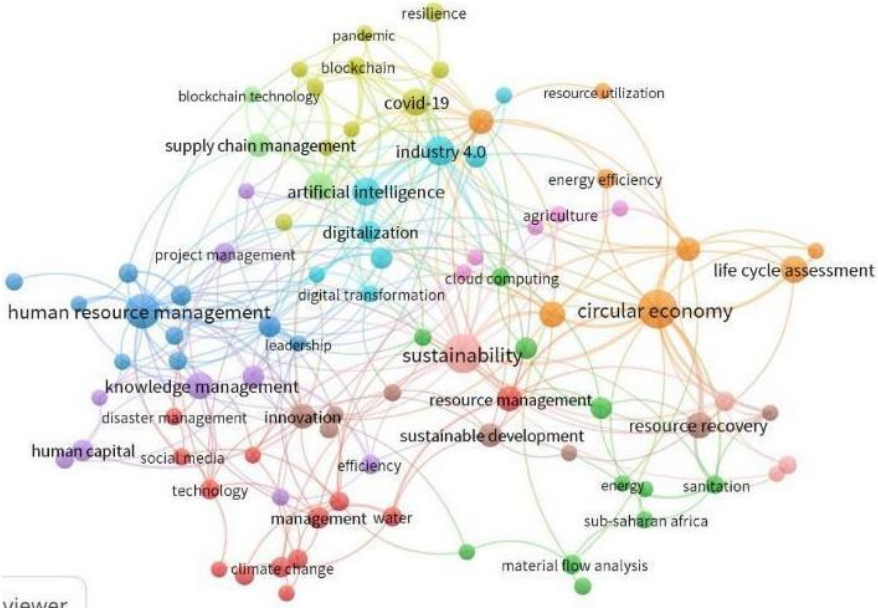

Fig. 4. Network visualization.

Table 1. Classification of links HR visualization.

No.	Items	Cluster	Links	Total Link Strength	Occurrences
1	HR	3	22	28	32
2	Corporate Social Responsibility	3	3	5	5
3	Training	3	7	9	9
4	Human resource	3	7	8	8
5	Decision-making	3	1	1	6
6	Performance	3	18	20	11
7	Leadership	3	9	9	5
8	Higher education	3	5	5	5
9	Knowledge management	5	9	10	18
10	Social capital	5	5	5	5
11	Human resources	5	11	14	10
12	Innovation	8	15	19	15
13	Resource management	1	9	11	15
14	Technology	1	8	8	8
15	Management	1	6	7	11
16	Social media	1	4	5	6
17	Sustainability	10	27	36	42
18	Talent management	6	5	5	5
19	Digitalization	6	10	14	10
20	Artificial intelligence	6	15	21	19
21	Industry 4.0	6	15	25	21
22	Security	4	6	6	5
23	Pandemic	4	6	7	5

3.4.2. Overlay visualization

Appearance Overlay Visualization as in Fig. 5, can be seen as a trend dominant in research from year to year and identify changes or patterns that emerge over time. Based on overlay visualization, the keywords are located cluster yellow is an item that is often used in current research topics. Meanwhile on cluster purple in colour are items that have mostly been used as topics of previous research based on the time span shown in Overlay Visualization. Result of Overlay Visualization it provides valuable insights for researchers and practitioners in understanding developments and research focus. By looking at the yellow clusters that represent the most frequently used current research topics, we can identify the trend and issues that are currently receiving major attention in the field of study. This helps in determining research directions and priorities. On the other hand, cluster purple colour indicates items that are mostly used as topics of previous research. This information is useful in seeing the development of research from time to time. By knowing which items are used less frequently today, we can see how research has progressed and identify areas that may need more exploration in new studies. Based on these, Overlay Visualization provides a clear and comprehensive visual view of changing trends and patterns in research from year to year. This helps researchers explore new findings, identify relevant research directions, and provides a basis for making better decisions in planning future research.

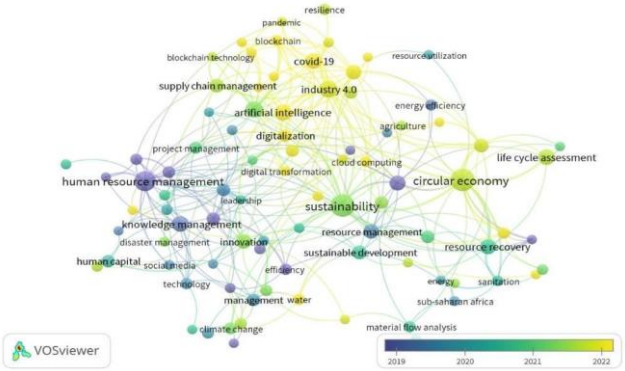

Fig. 5. Overlay visualization.

3.4.3. Density visualization

In Fig. 6, density visualization provides information about the items that are most often used as research topics. In this visualization, the darker the colour and the redder it is, it shows that a lot of research has been done on this topic. Conversely, the more faded the visible colour, indicating that related research is still rarely done. This provides an interesting opportunity for us. By looking at items that are rarely done, they can identify areas of research that have not been widely explored. In this case, items with a lighter colour may indicate topics that still have room for further research. Using this visualization as a reference, we can direct their attention to topics that are not yet widely studied. This provides an opportunity to explore new research areas, generate discoveries, and broaden understanding in various fields of knowledge. Plus, visualization density can also provide views on research trends. If there are several items with very dark and red colours, this may indicate an issue or topic that is currently hot and of great interest to researchers. Researchers can use this information to determine research directions and follow emerging trends.

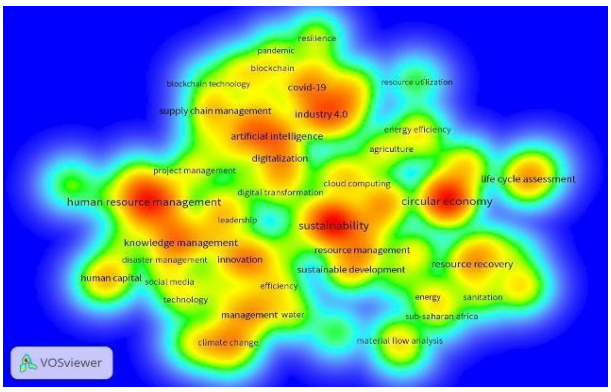

Fig. 6. Density visualization.

Density Visualization Fig. 6 provides a useful visual overview of the extent to which research has been carried out on various topics. This provides an opportunity for researchers to explore research areas that are still rarely done and also pay

attention to emerging research trends. By using this information, it is hoped that further research can be carried out to broaden knowledge and understanding in various fields of science. Finally, this study gives additional data for the use of bibliometric in giving research trend, as discussed in other reports [26-31].

4. Conclusion

The development of research publications in the Scopus database related to the digitalization of HR from 11,502 papers in the 2014-2023 period has increased significantly, especially in 2022. This research data shows that research on the digitalization of HR management is carried out by various fields of science, one of which is social science. This shows that there is considerable interest in understanding the social aspects related to the application of technology in HR.

Acknowledgments

We acknowledged Djuanda Reborn and Chancellor of Universitas Djuanda.

References

1. Magayanes, S.Q. (2022). Daraga human resource development center: creating changes and conquering challenges. *ASEAN Journal of Educational Research and Technology*, 1(1), 17-38
2. Rachmawati, M.; and Sukrisna, C. (2022). Revitalization of human resources through digitalization. *Journal of Social Sustainability Management*, 2(2), 25-29.
3. Parry, E.; and Battista, V. (2019). The impact of emerging technologies on work: a review of the evidence and implications for the human resource function. *Emerald Open Research*, 1(5), 5-14
4. Dixit, P. (2017). Digitalisation-an emerging trend in human resource practices. *Imperial Journal of Interdisciplinary Research*, 3(4), 2134-2138.
5. Strohmeier, S. (2020). Digital human resource management: A conceptual clarification. *German Journal of Human Resource Management*, 34(3), 345-365.
6. Thite, M. (2022). Digital human resource development: where are we? Where should we go and how do we go there?. *Human Resource Development International*, 25(1), 87-103.
7. Stegaroiu, C.E. (2020). Digitalization of process in hr for and againts. *Economy Series*, 4(1), 116-121.
8. Pushpalatha, S.; and Pandian, R.D. (2021). Digitalized human resource and its perseverance in HR operations. *International Journal of Science Technology and Management*, 10(2), 12-27.
9. Aggarwal, V.; and Sharon, S.D. (2017). Digital human resource management. *Gyan Management*, 11(2), 23-27.
10. Adriani, W.Y.; and Handoko, D. (2023). Analysis of human resource management information systems in the process of recruitment, promotion and demotion of employees of the diniyyah putri Lampung education foundation (YPDPL). *SEAT: Journal of Software Engineering and Technology*, 3(1), 5-10.

11. Pradana, R. A.; Pitaloka, D.; Rukmana, I. L.; and Gunawan, A. (2023). Digital based human resource management: Skills and roles in the digital age. *Comserva*, 2(9), 1806-1817.
12. Khaeromah, S.; Yuliani, F.; and As'ari, H. (2021). Digitalization of bureaucracy through the development of smart ASN at regional office XII BKN Pekanbaru. *El-Riyasah Journal*, 12(2), 140-158.
13. Santoso, W.; Sitorus, P.M.; Batunanggar, S.; Krisanti, F.T.; Anggadwita, G.; and Alamsyah, A. (2021). Talent mapping: a strategic approach toward digitalization initiatives in the banking and financial technology (FinTech) industry in Indonesia. *Journal of Science and Technology Policy Management*, 12(3), 399-420.
14. Zhang J.; and Chen, Z. (2023). Exploring human resource management digital transformation in the digital age. *Journal of the Knowledge Economy*, 14(1), 1-17.
15. Jani, A.; Muduli, A.; and Kishore, K. (2023). Human resource transformation in India: examining the role digital human resource technology and human resource role. *International Journal of Organizational Analysis*, 31(4), 959-972.
16. Rohanda, R.; and Winoto, Y. (2019). Bibliometric analysis of collaboration levels, author productivity, and article profiles of information and library studies journals for 2014-2018. *Pustabiblia: Journal of Library and Information Science*, 3(1), 1-9.
17. Abouzid, M.; Główka, A.K.; and Karaźniewicz, M. (2021). Trend research of vitamin D receptor: Bibliometric analysis. *Health Informatics Journal*, 27(4), 1–14.
18. Busro, B.; Mailana, A.; and Sarifudin, A. (2022). Islamic education in international publications: Bibliometric analysis on the Scopus database. islamic education: *Journal of Islamic Education*, 10(2), 413-426
19. Nandiyanto, A.B.D.; Biddinika, M.K.; and Triawan, F. (2020). How the bibliographic dataset portrays the decreasing number of scientific publications from Indonesia. *Indonesian Journal of Science and Technology*, 5(1), 154-175.
20. Soegoto, H.; Soegoto, E.S.; Luckyardi, S.; and Rafdhi, A.A. (2022). A bibliometric analysis of management bioenergy research using vosviewer application. *Indonesian Journal of Science and Technology*, 7(1), 89-104.
21. Li, J.; Lei, L.; and Cheng, L. (2020). Mapping evaluation, appraisal and stance in discourse (2000–2015): A bibliometric analysis. *Glottotheory*, 10(1-2), 31-55.
22. Herawati, P.; Utami, S.B.; and Karlina, N. (2022). Bibliometric analysis: Development of research and publications regarding program coordination using VOSviewer. *Journal of Pustaka Budaya*, 9(1), 1-8.
23. Al Husaeni, D.F.; and Nandiyanto, A.B.D. (2022). Bibliometric using VOSviewer with publish or perish (using google scholar data): From step-by-step processing for users to the practical examples in the analysis of digital learning articles in pre and post covid-19 pandemic. *ASEAN Journal of Science and Engineering*, 2(1), 19-46.
24. Al Husaeni, D.N., and Al Husaeni, D.F. (2022). How to calculate bibliometric using VOSviewer with Publish or Perish (using Scopus data): Science

education keywords. *Indonesian Journal of Educational Research and Technology*, 2(3), 247-274.

25. Boudlaie, H., Kenarroodi, M., Ebadi, H., & Bahmani, A. (2021). Digital human resource management: An approach to creating organizational agility in the public sector in the digital economy era (A study on the public sector banking network in Iran). *Journal of Public Administration*, 13(4), 766-785.
26. Nandiyanto, A.B.D.; Biddinika, M.K.; and Triawan, F. (2020). How bibliographic dataset portrays decreasing number of scientific publication from Indonesia. *Indonesian Journal of Science and Technology*, 5(1), 154-175.
27. Hamidah, I.; Sriyono, S.; and Hudha, M.N. (2020). A bibliometric analysis of covid-19 research using VOSviewer. *Indonesian Journal of Science and Technology*, 5(2), 209-216.
28. Al Husaeni, D.N.; Nandiyanto, A.B.D.; and Maryanti, R. (2023). Bibliometric analysis of special needs education keyword using VOSviewer indexed by google scholar. *Indonesian Journal of Community and Special Needs Education*, 3(1), 1-10.
29. Al Husaeni, D.N.; and Nandiyanto, A.B.D. (2023). A bibliometric analysis of vocational school keywords using VOSviewer. *ASEAN Journal of Science and Engineering Education*, 3(1), 1-10.
30. Mulyawati, I.B.; and Ramadhan, D.F. (2021). Bibliometric and visualized analysis of scientific publications on geotechnics fields. *ASEAN Journal of Science and Engineering Education*, 1(1), 37-46.
31. Al Husaeni, D.F.; and Munir, M. (2023). Literature review and bibliometric mapping analysis: Philosophy of science and technology education. *Indonesian Journal of Multidiciplinary Research*, 3(2), 219-234.