

Green Human Resource Management: A Bibliometric Analysis

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Abstract: *Green Human Resource Management has become a buzzword in management circles. The reason is that the whole world is moving toward green initiatives. This study explored the literature on Green Human Resource Management using bibliometric analysis. Identified research objectives are to identify the main topics and present dynamics in the arena of Green Human Resources; to make recommendations for future research direction. In total, 471 publications published between 2008 and 2022 related to Green Human Resource Management were identified in the SCOPUS database. The literature is analyzed quantitatively using Biblioshiny software and analyzed highly cited papers qualitatively. Accordingly, this study found that Green Human Resource Management should be further explored using different techniques, countries and methods. This study explores 14 years of literature and suggestions for further research implications.*

Keywords: *Human Resource Management; bibliometric analysis; Green; Green Human Resource Management*

JEL Classification: *M10, M12, M54*

Introduction

Ahmad (2015) states that Human Resource Management (HRM) is an essential faction of management that deals with the most valuable assets of an organization, which is human resources (p.13). According to Khan and Muktar (2020), the Human Resource Management researchers explored how HRM can contribute to green outcomes and invented the term Green Human Resource Management. Yong et al. (2020) state that Green Human Resource Management practices can help get organizations to align business strategies with the environment. Zhao and Huang (2022) point out that Green Human Resource

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Management practices and green innovation lead to higher levels of sustainable business performance. Opatha (2019) presented a Green Human Resource Management bundle that comprises job design, job analysis, human resource planning, recruitment, selection, induction, training, performance evaluation, rewards management, discipline management, health and safety management, and labor relations. Iddagoda et al. (2020) defined Green Human Resource Management as the integration of HRM practices within organizational goals of environmental Sustainability. There are two research objectives of this study. The first research objective is to identify the main topics and present dynamics in Green Human Resources Management. Making recommendations for future research direction is the second research objective.

Methodology

Research in the field of Green Human Resource Management (GHRM) was the focus of this bibliometric study. Only those studies that specifically addressed the topic of GHRM were included in our review. Scopus database (<https://www.scopus.com/>) was chosen as the database for this study. Scopus is the world's largest abstract and citation database, containing information on over 84 million items from over 7,000 publishers and 17.6 million author profiles (Elsevier, 2022). Scopus is a citation database that covers many different sorts of papers, but for this investigation, the researchers of the study were only interested in the first versions of publications. The studies conducted other than English were also eliminated from our review. In the end, 471 files were chosen for this statistical examination. The SCOPUS database discovered 471 publications related to GHRM, including 393 (83.4 percent) original research articles, 35 (7.43%) conference proceedings, 22 (4.67 percent) review articles, 13 (2.76 percent) book chapters, and the remainder are other forms of publications such as books, conference reviews, Erratum, Notes, etc.

Complete bibliographic information for each publication found in the search was exported as a Scopus BibTex file and imported into the reference management software packages Bibliometrix and Biblioshiny. Open-source R programs like Bibliometrix and Biblioshiny are utilized. With Bibliometrix, you may process and analyze data from the whole scientific literature. The online data analysis platform Biblioshiny is based on the original Bibliometrix code (Aria and Cuccurullo, 2017). Biblioshiny provides a user-friendly web interface for relevant bibliometric and visual analysis.

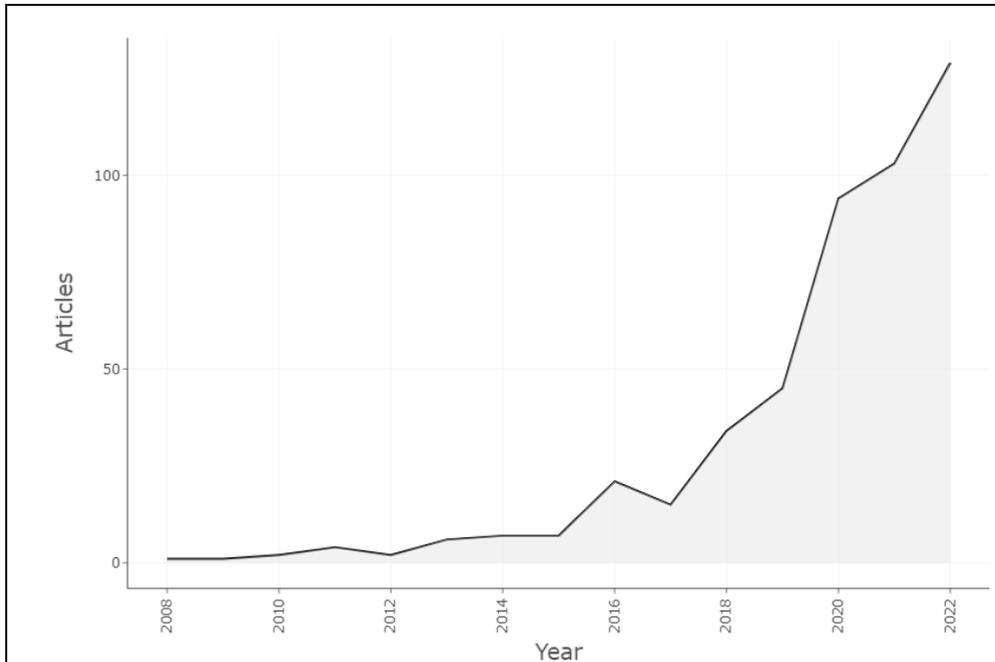
Number of publications (NP), H-index, m-index, total citations and g-index computations indicated the most influential authors and journals. The h-index, which is based on a list of the author's most frequently cited works, is a dimensionless number that attempts to describe the quantity, quality, or effect of a certain author's academic publications. The h-index shows that an author has authored h articles, each of which has received h or more citations (Bormmann and Daniel, 2007; Choudhri, Khan and Cohen, 2015). An alternative to

the h-index, the m-quotient (or m-index) is calculated by dividing a person's h-index by the number of years from their first publication. The number of citations an article receives is one way to measure how influential it has been on other works. The top g articles receive an average of g citations, which is the definition of the g-index as a number or cited g² or more times)

Publication Trend

Figure 1 and Table 1 depict the publication trend in Green Human Resource Management from 2008 to 2022. The findings presented here indicate a continuous increase in annual growth rates in GHRM publications. The highest annual growth rate was registered in 2013 and 2016 (200%), the second highest in 2018 (134%) and the third highest in 2020 (109%).

Figure 1. Publication Trend



Source: Own calculation

Table 1. The Feature of the Dynamics of the Annual Publications

Year	Annual Number of Articles	Annual relative growth (%)
2008	1	
2009	1	0.00
2010	2	100.00
2011	4	100.00
2012	2	-50.00
2013	6	200.00
2014	7	16.67
2015	7	0.00
2016	21	200.00
2017	15	-28.57
2018	34	126.67
2019	45	32.35
2020	94	108.89
2021	103	9.57
2022	129	25.24

Source: Modified Output based on Biblioshiny

Country-wise Analysis

This section analyzes the most productive and impactful countries in GHRM. Fifty-six countries and regions have made essential contributions in the last few decades. Table 2 reveals that the United Kingdom, China, Malaysia, Brazil and USA are the top five countries with high citations. Five Emerging economies (China, Malaysia, Brazil, India, and Pakistan) are in the top 10 list of highly cited countries. As the most productive country in this sector, Malaysia has authored 213 articles but is the third country according to citations (964). Five papers published by Sri Lanka have four citations in the SCOPUS database.

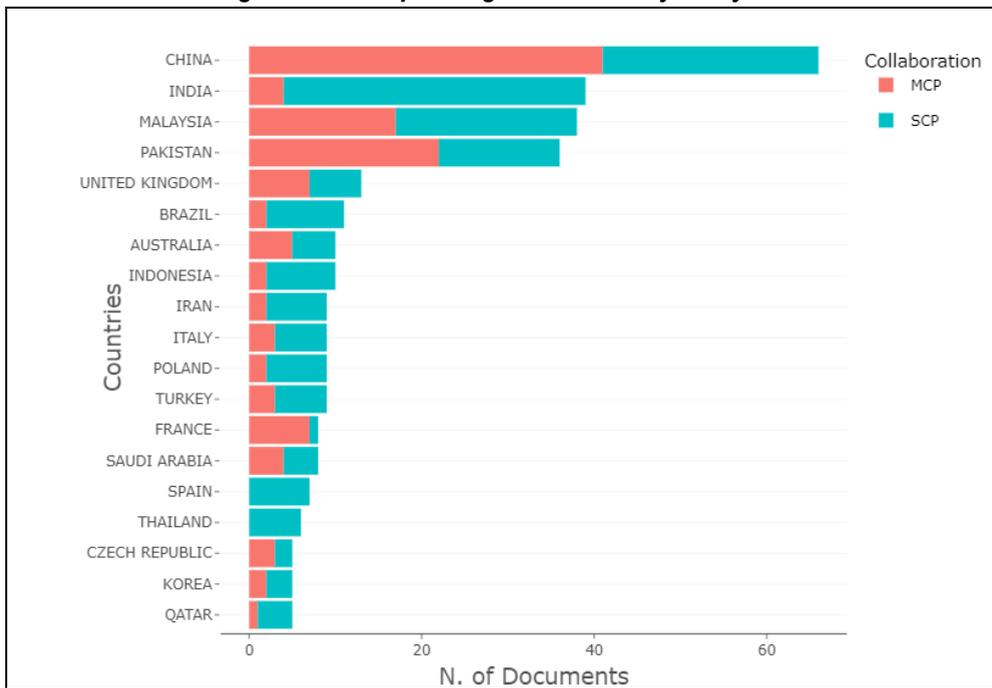
Table 2. Publications by Country

Country	Number of Publications	TC	Average Article Citations
United Kingdom	66	1455	111.92
China	211	1407	21.32
Malaysia	213	964	25.37
Brazil	68	943	85.73
USA	31	868	173.60
India	149	715	18.33
Pakistan	169	706	19.61
France	34	514	64.25
Italy	30	509	56.56
Australia	47	409	40.90

Source: Modified Output based on Biblioshiny

MCP stands for Multiple Countries Publication and indicates, for each country, the number of articles for which there is at least one co-author from a different country; hence, it quantifies the level of international cooperation between nations. Single Country Publication refers to works with a single author listed as the corresponding author from a single country. According to the corresponding author country analysis, the highest number of corresponding author publications by China is 66 publications and 41 of them are multi-country publications. Secondly, India has 39 publications but only four multi-country publications. Multiple country collaboration rate¹ is highest in China (0.621), second by Pakistan (0.611) and third by the United Kingdom (0.538)

Figure 2. Corresponding author country Analysis



Source: Output based on Biblioshiny

The database contains 471 documents that were published in 199 sources. Table 3 highlights the journals with the highest number of citations. 28% of the publications identified are published in these journals. Journal of Cleaner Production has the most cited

¹ MCP Ratio=SCP/MCP

publications and highest number of publications, with 2788 citations for thirty-four documents published since 2015. The second highest cited source is Sustainability, with 463 citations for 26 documents.

Table 3. Source Analysis

Journal	h_index	g_index	m_index	TC	NP
Journal of Cleaner Production	24	34	3	2788	34
Sustainability (Switzerland)	13	21	1.857	463	26
International Journal of Manpower	11	20	3.667	435	22
Corporate Social Responsibility and Environmental Management	9	12	1.8	520	12
International Journal of Human Resource Management	9	10	0.9	926	10
Benchmarking	8	10	1.143	285	10
Business Strategy and The Environment	5	6	1.25	394	6
Cogent Business and Management	4	5	0.5	213	5
Journal of Business Ethics	4	4	0.444	589	4
Asia Pacific Journal of Human Resources	3	3	0.6	306	3

Source: Modified Output based on Biblioshiny

Authors with the Most Productivity

Among the authors of GHRM, the most cited are listed in Table 4. It reveals that Jabbour CJC was the highest cited author with 1862 citations with 16 publications. Chiappetta Jabbour CJ and Guerci M are two authors who received more than 500 citations.

Table 4. Author Analysis

Element	h_index	g_index	m_index	TC	NP	PY_start
Jabbour CJC	14	16	1.167	1862	16	2011
Chiappetta Jabbour CJ	8	9	1.333	748	9	2017
Guerci M	6	6	0.857	639	6	2016
Teixeira AA	6	7	0.545	259	7	2012
Yusliza M-Y	6	8	1	453	8	2017
Chaudhary R	5	5	1	184	5	2018
Pham NT	5	7	1	372	7	2018
Ramayah T	5	6	1.25	420	6	2019
Renwick DWS	5	7	0.417	485	7	2011
Yong JY	5	7	0.714	363	7	2016

Source: Modified Output based on Biblioshiny

Wordcloud

The Figure shows a word cloud of the most commonly used terms in articles on Human resource management. Next, "Sustainability" was the second most often used word, followed by "green human resource management" and "human resource management practices," which were also close behind.

The word cloud shows words in varying sizes based on the number of times they appear. The positioning of words is a little erratic, but the most prominent words are placed in the middle because of their size.

Figure 3. Wordcloud



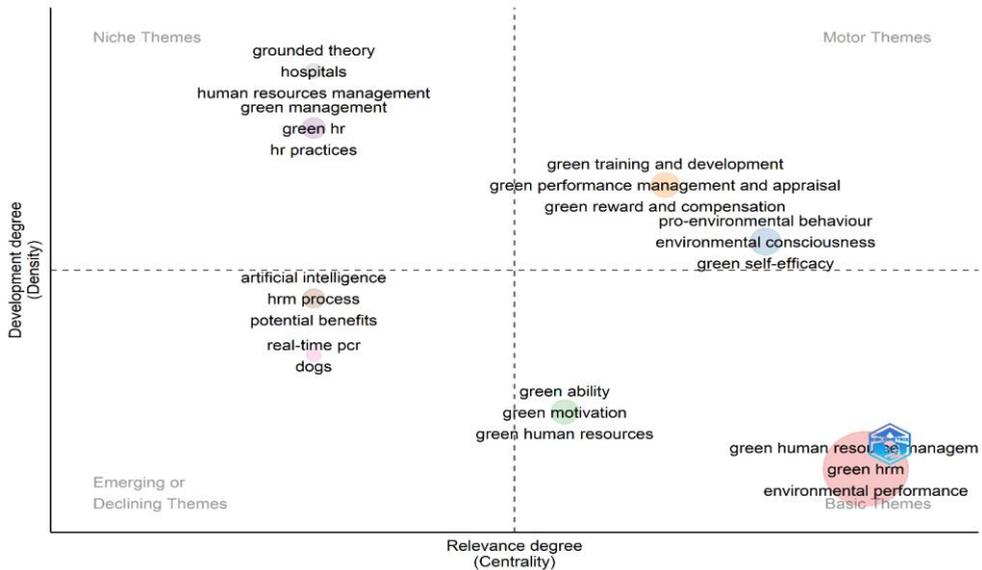
Source: Output based on Biblioshiny

Four topological zones were used to create a theme map (Figure 4). The author's keywords were evaluated in this study using Biblioshiny software.

Motor themes in the upper right quadrant have a high density and centrality, indicating their importance for future research. These topics include "green training and development," "green performance management and appraisal", "green reward and compensation", "pro-environmental behaviour", "environmental consciousness," and "green self-efficacy" to some extent, should be further researched in light of this. There are a few under-represented topics in the top left quadrant, such as "grounded theory," "human resource management," "green management", "green HR," and "hospitals" that, despite their low centrality, are areas of rapid development.

Topics such as "artificial intelligence", "HRM processes", "potential benefits", and "real time PCR" were found in the lower left quadrant, which had a low centrality and density, indicating a declining trend in use. Finally, the lower right quadrant contains basic themes, which are indicated by high centrality but low density; these subjects are significant for research as broad issues and include "green ability," "green motivation", and "green human resources", "green human resource management", "green HRM", and "environmental performance" integrated with GHRM.

Figure 4. Thematic Map



Source: Output based on Biblioshiny

Cluster Analysis

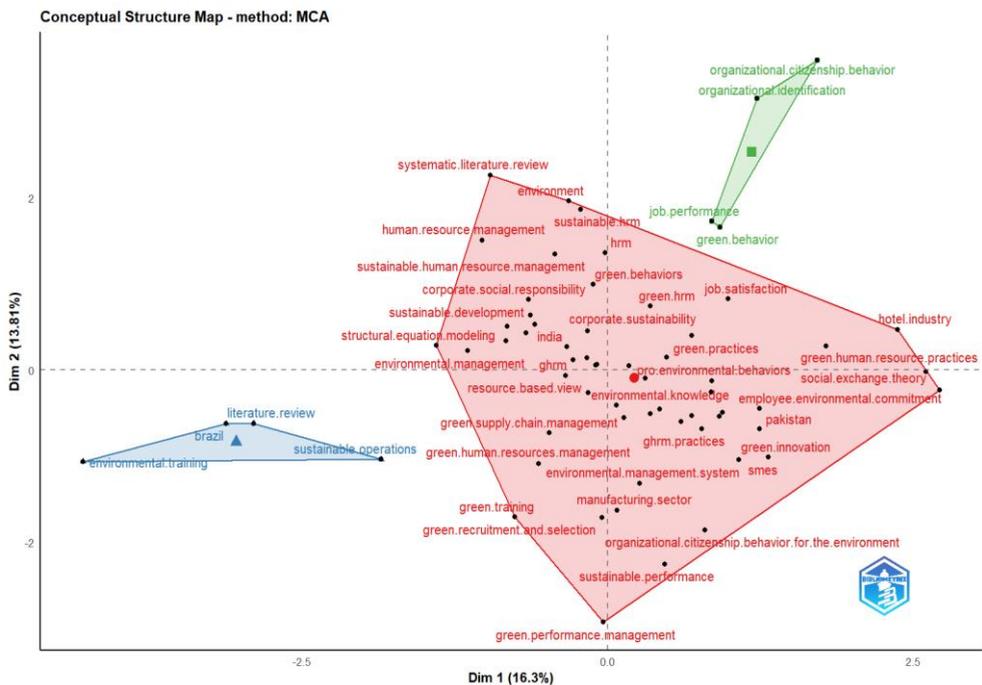
Cluster analysis in bibliometrics uses statistical methods to compress the complicated keyword network into smaller groupings based on the frequency of simultaneous occurrence of two keywords (Ding, 2011). This research employs a hierarchical clustering technique. Clustered keywords are first classified, and then the two clusters with the most significant degree of similarity are joined to create a new massive cluster. Afterwards, the new cluster is united into a cluster that shares the most similarities with the original. This process is repeated until all individuals have been merged into one group. The sociological method known as "multiple correspondence analysis" (MCA) is widely employed (Xie *et al.*, 2020).

An understandable two-dimensional (or three-dimensional) graph that employs plane distance to indicate the similarity between keywords is formed by compressing big data sets

with several variables into a low-dimensional space. Keywords close to the center suggest that they have garnered much attention recently. The research topic or the transition to other topics narrows as you get closer to the boundary (see Figure 4) (Mori, Kuroda and Makino, 2016).

Cluster analysis falls into three broad categories. The first is concerned with green HRM and sustainable performance. This cluster concerns sustainable HRM, job satisfaction, green behavior, environmental management system, organizational citizenship behavior for the environment, environmental knowledge, supply chain management, green training, green innovation, green recruitment and selection, corporate Sustainability and corporate social responsibility. In addition, this cluster consists of studies conducted in India and Pakistan. There are studies conducted in the hotel industry, manufacturing sector and SMEs. This cluster used theories including the resource-based view and social exchange theory. Finally, this cluster consists of systematic literature reviews and structural equation modeling analyses. The second cluster consists of environmental training and sustainable operations conducted in Brazil. The third cluster consists of organizational citizenship behaviors, organizational identification, job performance and green behavior.

Figure 5. Conceptual Structure Map



Source: Modified Output based on Biblioshiny

Table 5 is a list of the most often cited publications. The research content presented in these papers is mainly related to literature analysis and the relationship between HPWP and performance and turnover. Data was gathered using a questionnaire survey based on primary data in these studies except for two literature reviews.

Jackson et al. (2011) state that the leading organizations worldwide are moving to environmentally friendly activities. Jackson et al. (2011) further state that Human Resource Management should play a supporting role in these initiatives. In their study, Kim et al. (2019) unearthed a research gap of Human Resource Management in hotels' environmentally friendly management. Kim et al. (2019) point out that Green Human Resource Management increases organizational commitment, eco-friendly behavior among the employees, and hotels' environmental performance. Since there is an increasing trend of eco-friendliness in Human Resource Management practices, Jabbour (2013) highlighted the importance of environmental training in his study. Jabbour (2013) mentions that environmental training aims to train employees to take environmental action.

According to Jabbour and Jabbour (2016), Green Human Resource Management (GHRM) and Green Supply Chain Management (GSCM) are renowned subjects in the areas of operations management (OM) and human resource management (HRM). The subject of environmental Sustainability and greening organizations is increasingly present in managerial agendas, causing a green uprising in traditional, established disciplines, such as human resources and operations management, according to Jabbour and Jabbour (2016). Singh et al. (2019) studied the theories of ability-motivation-opportunity theory and resourced-based theory. In this, Green innovation and environmental performance identified how green human resource management interacts with the linkages between green innovation, green transformational leadership and environmental performance.

The nomological network/conceptual framework of Paillé et al. (2013) study consists of variables such as internal environmental concern, strategic human resource management, organizational citizenship behavior and environmental performance. Paillé et al. (2013) found that the internal environment fully mediates the relationship between strategic human resource management and environmental performance. Further, they found that internal environmental concern moderates the effect of strategic human resource management on organizational citizenship behavior. Renwick et al. (2013) presented a case of environmental management and human resource management research. Renwick et al. (2013) contribute threefold: to map the terrain of this field; outline some avenues for potential further study in Green Human Resource Management; to survey and draw together the Human Resource Management elements of environmental management.

Dumont et al. (2017) created their instrument or the measure for the construct of Green Human Resource Management. Dumont et al. (2017) highlighted the fact that Green Human Resource Management has a direct and indirect influence on the role of green behavior.

Tang et al. (2018) mention that previous studies on Green Human Resource Management are mainly based on theoretical or qualitative studies. Tang et al. (2018) highlighted the importance of having valid measurements/instruments for Green Human Resource Management. Their study identified five dimensions: green recruitment and selection, green performance management, green training, green pay and reward, and green involvement. Zaid et al. (2018) conducted a quantitative study. According to Zaid et al. (2018), green supply chain management practices and Green Human Resource Management positively affect sustainable performance combined or coordinated.

Table 5. Key Points of Literature

Author	Year	Key points
Singh, Del Giudice, Chierici, and Graziano,	2020	Leadership plays a significant role to impact on the Human Resource Management practices
Kim, Kim, Choi and Phetvaroon	2019	- Green Human Resource Management increases organizational commitment and eco-friendly behaviour among the employees - Green Human Resource Management enhances environmental performance in the hotel.
Tang, Chen, Jiang, Paillé and Jia	2018	Presented five dimensions of Green Human Resource Management. They are; 1. green recruitment and selection, 2. green performance management 3. green training 4. green pay and reward 5. green involvement
Zaid, Jaaron and Bon	2018	Green supply chain management practices and Green Human Resource Management have a positive effect on sustainable performance in a joint manner
Dumont, Shen and Deng	2017	- Presented an instrument or a measure for Green Human Resource Management - Green HRM both, directly and indirectly, influenced in-role green behaviour - Green Human Resource Management impacts both employee in-role and extra-role workplace green behaviour
Jabbour and Jabbour	2016	Identified research gap – integration of two contemporary subjects of HRM and supply chain management has not been studied
Paillé, Chen, Boiral and Jin	2013	The present research was to link human resource management and environmental management in the Chinese context
Renwick, Redman and Maguire	2013	A case of environmental management and human resource management research
Jabbour	2013	Highlighted the importance of environmental training
Jackson, Renwick, Jabbour, and Muller-Camen	2011	Progressively, leading organizations around the world are beginning to move to environmentally friendly activities

Source: Modified Output based on Biblioshiny

Conclusion

Using data from Scopus, the author analyzed 471 articles from 200 to 2020 that were all published in the Electronic Library. Over time, both the number of publications and the number of citations has increased steadily. There are 1128 authors from 56 countries included in the database. In addition, there were 471 documents and 83% consisted of scientific articles. A mere 16.6% of all research papers were written by the top 10 authors. Most notably, the works of Jabbour CJC, Chiappetta Jabbour CJ and Guerci M are the highly cited authors with over 600 citations. India was found to have the highest levels of SCP dominance, while China, Pakistan and the United Kingdom exhibited the highest levels of MCP dominance. The article by Renwick et al. from 2013 has been cited 645 times. The study has limitations due to the fact that only the Scopus database was included in the bibliometric analysis. It is better to conduct bibliometric analysis using the Web of Science database and Google Scholar Database.

References

- Ahmad, S. (2015) 'Green Human Resource Management: Policies and practices', *http://www.editorial-manager.com/cogentbusiness*, 2(1), p. 1030817. Available at: <https://doi.org/10.1080/23311975.2015.1030817>.
- Bornmann, L. and Daniel, H.D. (2007) 'What do we know about the h index?', *Journal of the American Society for Information Science and Technology*, 58(9), pp. 1381–1385. Available at: <https://doi.org/10.1002/ASI.20609>.
- Choudhri, A.F., Khan, N.R. and Cohen, H.L. (2015) 'Understanding Bibliometric Parameters and Analysis', *Radiographics*, 35, pp. 736–746. Available at: <https://doi.org/10.1148/rg.2015140036>.
- Ding, Y. (2011) 'Scientific collaboration and endorsement: Network analysis of coauthorship and citation networks', *Journal of Informetrics*, 5(1), pp. 187–203. Available at: <https://doi.org/10.1016/j.joi.2010.10.008>.
- Dumont, J., Shen, J. and Deng, X. (2017) 'Effects of Green HRM Practices on Employee Workplace Green Behavior: The Role of Psychological Green Climate and Employee Green Values', *Human Resource Management*, 56(4), pp. 613–627. Available at: <https://doi.org/10.1002/HRM.21792>.
- Elsevier (2022) *Content - How Scopus Works - Scopus - | Elsevier solutions*. Available at: <https://www.elsevier.com/solutions/scopus/how-scopus-works/content> (Accessed: 16 August 2022).
- Iddagoda, A., Abraham, R. and Chinta, R. (2020) 'THE EFFECTS OF GREEN ENERGY ON ECONOMIC DEVELOPMENT, AND GREEN HUMAN RESOURCE MANAGEMENT ON NONGREEN WORK OUTCOMES IN SRI LANKA', *Journal of International Finance and Economics*, 20(4), pp. 13–28. Available at: <https://doi.org/10.18374/JIFE-20-4.2>.
- Jabbour, C.J.C. (2013) 'Environmental training in organisations: From a literature review to a framework for future research', *Resources, Conservation and Recycling*, 74, pp. 144–155. Available at: <https://doi.org/10.1016/J.RESCONREC.2012.12.017>.
- Jabbour, C.J.C. and De Sousa Jabbour, A.B.L. (2016) 'Green Human Resource Management and Green Supply Chain Management: linking two emerging agendas', *Journal of Cleaner Production*, 112, pp. 1824–1833. Available at: <https://doi.org/10.1016/J.JCLEPRO.2015.01.052>.
- Jackson, S.E. et al. (2011) 'State-of-the-Art and Future Directions for Green Human Resource

- Management: Introduction to the Special Issue', <http://dx.doi.org/10.1177/239700221102500203>, 25(2), pp. 99–116. Available at: <https://doi.org/10.1177/239700221102500203>.
- Khan, M.H. and Muktar, S.N. (2020) 'A bibliometric analysis of green human resource management based on Scopus platform', <http://www.editorialmanager.com/cogentbusiness>, 7(1). Available at: <https://doi.org/10.1080/23311975.2020.1831165>.
- Kim, Y.J. *et al.* (2019) 'The effect of green human resource management on hotel employees' eco-friendly behavior and environmental performance', *International Journal of Hospitality Management*, 76, pp. 83–93. Available at: <https://doi.org/10.1016/j.ijhm.2018.04.007>.
- Mori, Y., Kuroda, M. and Makino, N. (2016) 'Multiple Correspondence Analysis', in *Nonlinear Principal Component Analysis and Its Applications. SpringerBriefs in Statistics*. Springer, Singapore, pp. 21–28. Available at: <https://doi.org/10.1007/978-981-10-0159-8>.
- Opatha, H.H.D.N.P. (2019) *Sustainable Human Resource Management: Expanding Horizons of HRM*. Available at: <https://www.researchgate.net/publication/330421801> (Accessed: 16 August 2022).
- Renwick, D.W.S., Redman, T. and Maguire, S. (2013) 'Green Human Resource Management: A Review and Research Agenda*', *International Journal of Management Reviews*, 15(1), pp. 1–14. Available at: <https://doi.org/10.1111/J.1468-2370.2011.00328.X>.
- Singh, S.K. *et al.* (2019) 'Green innovation and environmental performance: The role of green transformational leadership and green human resource management'. Available at: <https://doi.org/10.1016/j.techfore.2019.119762>.
- Tang, G. *et al.* (2018) 'Green human resource management practices: scale development and validity', *Asia Pacific Journal of Human Resources*, 56(1), pp. 31–55. Available at: <https://doi.org/10.1111/1744-7941.12147>.
- Xie, H. *et al.* (2020) 'A bibliometric analysis on land degradation: Current status, development, and future directions', *Land*, 9(1). Available at: <https://doi.org/10.3390/LAND9010028>.
- Yong, J.Y., Yusliza, M.Y. and Fawehinmi, O.O. (2020) 'Green human resource management: A systematic literature review from 2007 to 2019', *Benchmarking*, 27(7), pp. 2005–2027. Available at: <https://doi.org/10.1108/BIJ-12-2018-0438/FULL/XML>.
- Zaid, A.A., Jaaron, A.A.M. and Talib Bon, A. (2018) 'The impact of green human resource management and green supply chain management practices on sustainable performance: An empirical study', *Journal of Cleaner Production*, 204, pp. 965–979. Available at: <https://doi.org/10.1016/j.jclepro.2018.09.062>.
- Zhao, W. and Huang, L. (2022) 'The impact of green transformational leadership, green HRM, green innovation and organizational support on the sustainable business performance: evidence from China'. Available at: <https://doi.org/10.1080/1331677X.2022.2047086>