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BIBLIOMETRIC ANALYSIS ON GREEN HUMAN RESOURCE MANAGEMENT (AN OVERVIEW OF THE 10-YEAR GLOBAL RESEARCH TRENDS)

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Abstract

This study analyses the increase in scientific article publications in the domain of green human resource management from 2014 to 2024. This study reviews 336 of the 430 scientific articles classified under the open access publication category in the Scopus database. VOSviewer was employed to analyze the research using a bibliometric methodology. Between 2014 and 2024, a substantial increase in the quantity of scientific articles was observed. The science mapping conducted includes an analysis of the most influential articles, the most commonly utilized keywords, journals, countries, and institutions with the highest article and citation counts, as well as the most collaborative nations. The results signify that green human resource management should be a priority for business leaders, researchers, and journals with open access publications in the fields of green human resource management or environmental science, to enhance both sustainable business practices and the body of knowledge.

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INTRODUCTION

In recent decades, global emphasis has been on the notion of sustainable development (SD), formally introduced in the Brundtland Report of 1987. This concept is recognized globally and is included in the 2030 Agenda for Sustainable Development Goals (SDGs) established in 2015, consisting of 17 SDGs that address economic, social, and ecological dimensions. To attain these objectives, nations globally are adopting environmental, social, and ethical responsibilities, leading numerous organizations to implement sustainability practices that foster alignment between business operations and environmental sustainability (Lyulyov et al., 2024).

Different departments within organizations are systematically adopting the "go green" philosophy. By implementing green human resource management (GHRM) practices, organizations cultivate the environmental responsibility culture among employees. GHRM influences employee behaviour, commitment, and performance regarding sustainability, bolstered by green policies. The implementation and promotion of environmentally friendly behaviours among employees can further augment the organization's commitment to sustainability, thereby reducing resource consumption, minimizing carbon emissions, and improving environmental and management performance (Tahir et al., 2024).

GHRM is a strategy that assists organizations in attaining financial, social, and environmental goals. Historically, traditional HR policies solely facilitated the attainment of financial objectives, resulting in outcomes that were limited to mere numerical metrics. Through GHRM, the organization emphasizes product development and the implementation of innovative processes and policies, leading to enhanced productivity and organizational compliance. In this context, HR managers play a crucial role in enhancing employee awareness by fostering a green movement, advocating for more conscientious resource utilization, and ensuring organizational accountability to future generations (Coelho et al., 2024).

In recent decades, researchers and practitioners have attempted to understand the concept of GHRM by conducting studies focused on organizational contexts that respond to environmental challenges. Several studies attempt to examine the role of green human resource management in supporting sustainability through bibliometric analysis, whereas previous studies were based on narrative studies, conceptual papers, and model development. Although the GHRM literature is rapidly growing, based on findings, very few studies offer a comprehensive bibliometric analysis (Mehta, 2024).

This study also emphasizes the importance of open access publication, especially in this study which focuses on GHRM literature. Findings show that despite the burgeoning quantity of open access publications on GHRM, the field remains in its nascent stages. The open access publication movement seeks to transform the global framework of scientific publishing to facilitate free online access to scientific papers. In recent decades, numerous countries, financing bodies, and institutions have established protocol to

advance open access, exemplified by the Max-Planck-Gesellschaft in Germany and other organizations that initiated the global OA 2020 initiative, as well as the collaboration between the United Nations Educational, Scientific, and Cultural Organization (UNESCO) and the Confederation of Open Access Repositories (COAR) resulting in the UNESCO/COAR Open Access Joint Statement (Zhang et al., 2022).

Therefore, this study is meant to fill the void in GHRM literature over the past decade by employing bibliometric analysis for science mapping. Referring to the study by Siddique et al. (2024), science mapping encompasses an analysis of the attributes of previous literature and the evolution of science within these domains. Bibliometric analysis is an examination of scientific literature aimed at identifying research trends and development within a specific field. The principal steps encompass data acquisition from pertinent databases, data cleansing, refinement, and the application of diverse bibliometric techniques to generate significant insights (Passas, 2024). This bibliometric analysis seeks to enhance the existing literature on GHRM by investigating trends, contemporary topics, research issues, and future research trajectory.

Therefore, this review intents to investigate the following inquiries:

1. The growth rate of publication of in the field of GHRM.
2. The articles that are the most cited.
3. The most used keywords in the field of GHRM?
4. Journal publishers, country and institutes that have the largest amount of publication and citation in the field of GHRM?
5. The future research agenda in the field of GHRM?

As a result, this study contributes to the identification of the most influential authors, covering previous research and new insights for future studies. This study also analyses relevant issues and research trends chronologically. The database used includes 336 Scopus articles from the year 2014 to the year 2024.

METHOD

Literature Search

This bibliometric analysis employs literature sources acquired from the Scopus Database. A singular literature search guarantees data consistency and uniformity, resulting in high-quality data (Yang et al., 2022). This method assists researchers in classifying scientific articles related to a research topic by analysing and categorizing scientific literature based on specific criteria (Papademetriou et al., 2023). This literature review encompasses studies on GHRM from January 1, 2014, to November 24, 2024. The query utilized to investigate literature pertaining to GHRM is as follows:

TITLE-ABS-KEY ("green human resource management" OR "green human resource management practice" OR "sustainable human resource management" OR "sustainable

human resource management practice") AND (LIMIT-TO (SRCTYPE , "j")) AND (LIMIT-TO (OA , "all")) AND (LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English"))

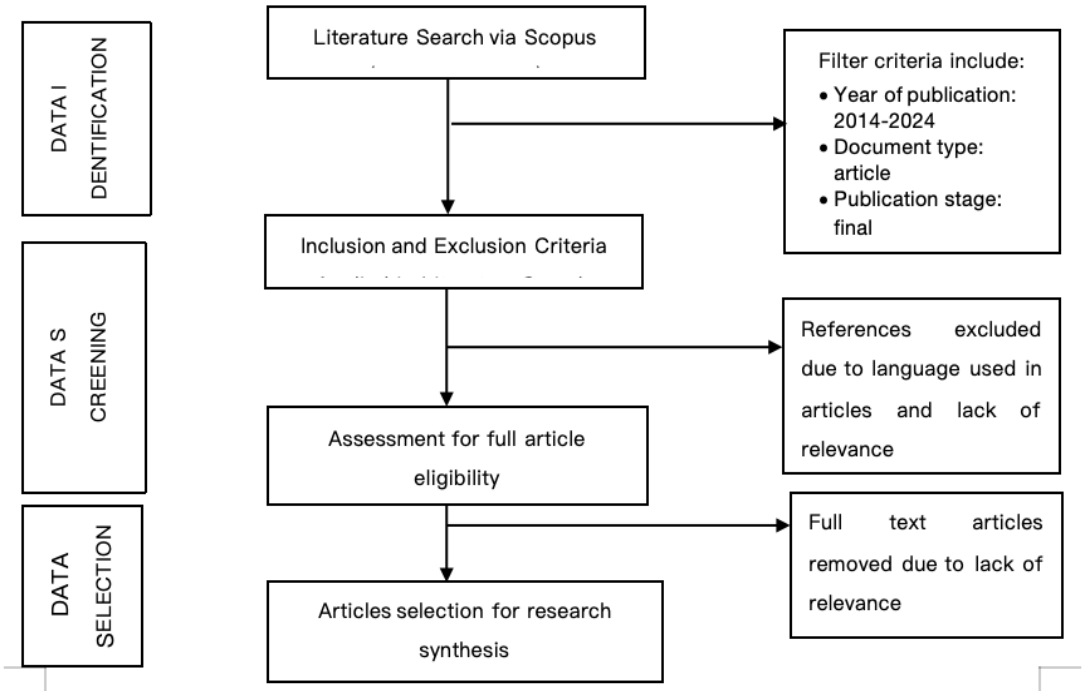
Literature Search Criteria

The inclusion criteria for this study are: 1) articles addressing green human resource management, 2) articles authored in English, 3) articles accessible in full text, 4) articles published between January 1, 2014, and November 24, 2024, 5) open access articles. This analysis selected open access publications as inclusion criteria to examine the quantity of scientific journals and articles that provide free access to readers. To advance open access to academic literature for everyone and to facilitate the fulfilment of the Sustainable Development Goals (SDGs) (Muth & Lopez, 2021).

The exclusion criteria for this study are: 1) articles not centred on green human resource management, 2) non-English language journal articles, 3) academic publications that are not journal articles, 4) closed-access articles.

Data Cleaning and Processing

The gathered articles are subsequently evaluated according to inclusion and exclusion criteria. After reviewing the complete text of the article, of the 430 collected articles, 55 did not satisfy the inclusion criteria, resulting in 375 articles remaining. Consequently, following the evaluation of the articles, 39 were eliminated, leaving 336 articles.



Picture 1. Flow Diagram of Research

Source: authors' creation

Data Analysis

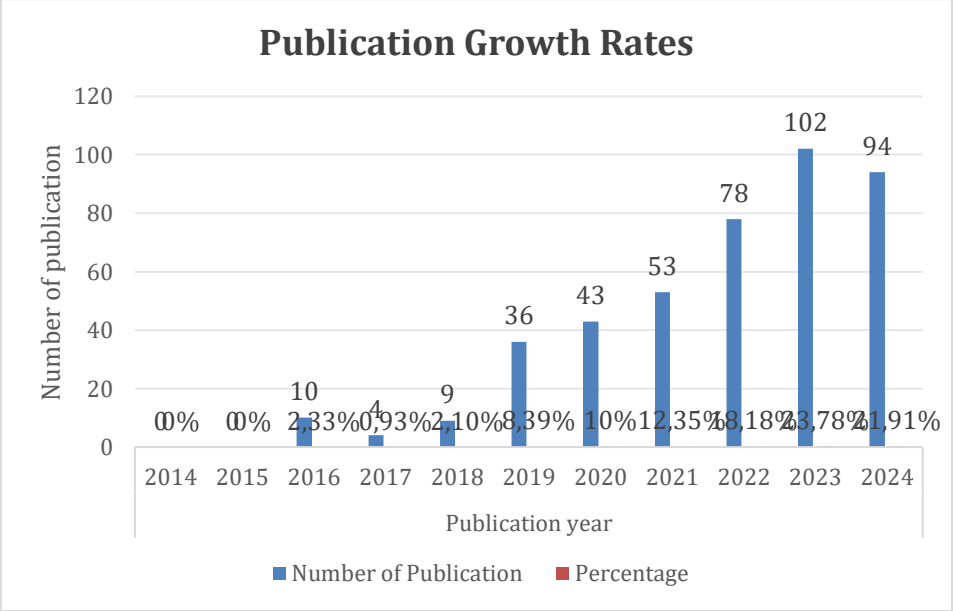
Subsequent to data selection, researchers employ VOSviewer to create and visualize bibliometric networks, facilitating the development of analytical perspectives and offering insights into research trends and emerging domains of GHRM. This study utilizes VOSviewer features such as co-occurrence, citation, and bibliographic coupling (Centre for Science and Technology Studies Leiden University, 2024). Co-occurrence is employed to identify terminology that may appear in conjunction. This occurs within the confines of a document. Citations in this instance can be utilized in bibliometric analyses to establish relationships that will subsequently be represented as graphs. The fundamental model of citation relationships can manifest as direct citation, co-citation, and bibliographic coupling (Kleminski et al., 2022).

RESULTS AND DISCUSSION

This analysis reviews the literature on GHRM from the past decade, employing search filters such as publication year, type of document, stages of publishing process, source type, language, and type of journal access. This analysis addresses the previously articulated research questions by examining studies that explore: 1) the overview of publication growth rate illustrating the dynamics of GHRM-related publications from 2014 to 2024, 2) the most prevalent keywords in GHRM literature, 3) the journals, countries, and institutions that generate the highest volume of GHRM research with significant citation counts, 4) the most cited articles along with their respective research titles pertinent to GHRM literature, and 5) the prospective research agenda for GHRM literature.

A compendium of research on GHRM by year

The researchers examined the developing trend in green human resource management literature by reviewing research documents based on the year of publication. Figure 1 illustrates that 430 publications were generated in the Scopus database from 2014 to 2024. In the decade's total publications, the most significant growth rate was observed in 2023, with 102 articles (23.78%). Nonetheless, the proliferation of publications in the domain of green human resource management diminished in 2024, specifically totalling 94 articles (21.91%). During 2014 and 2015, the publication rate was at its nadir, with no open access articles published in the domain of green human resource management.



Picture 2. Publication growth rates
Source: authors' creation

Most cited articles in the field of GHRM

Table 1 below presents a summary of the most cited publications, particularly concerning green human resource management. The article titled "Green Human Resource Management as a Tool for the Sustainable Development of Enterprises: Polish Young Company Experience," published in 2018, has received the highest number of citations, totalling 458. An article titled "Green HRM, Environmental Awareness and Green Behaviours: The Moderating Role of Servant Leadership," published in 2022, has received 327 citations.

Table 1. Most impactful articles

No.	Authors	Title	Citations
1	Bombiak, E. & Marciniuk-Kluska, A. (2018)	Green human resource management as a tool for the sustainable development of enterprises: Polish young company experience	458
2	Darvishmotevali, M. & Altinay, L. (2022)	Green HRM, environmental awareness and green behaviours: The moderating role of servant leadership	327
3	Stankeviciute, Z. & Savaneciene, A. (2018)	Designing sustainable HRM: The core characteristics of emerging field	137
4	Khan, M. H. & Muktar, S. N. (2020)	A bibliometric analysis of green human resource management based on Scopus platform	68
5	Zahrani, A. A. (2022)	Team creativity and green human resource management practices' mediating roles in organizational sustainability	12

Source: authors' creation

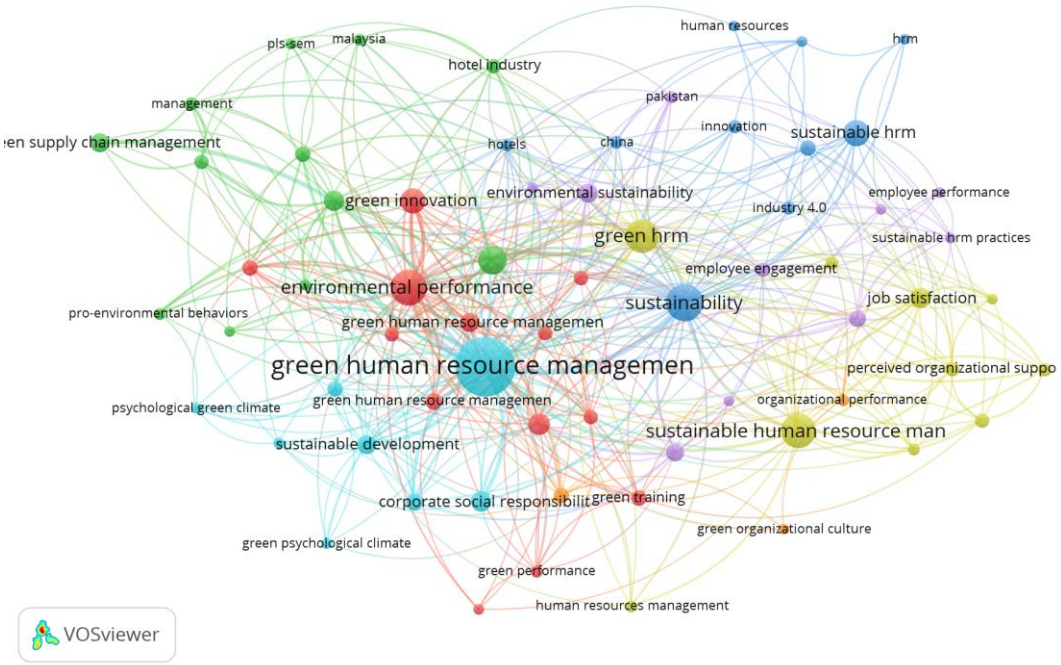
Top keywords in the field of GHRM

Keywords are essential in bibliometric analysis (Tirado-Kulieva et al., 2022)**.** Applied linguistics theory posits that bibliometric analysis seeking profound insights, particularly for an in-depth understanding of research trends, necessitates the judicious selection of keywords by the authors. The selection of keywords is crucial in articulating the subject of the research article (Pearson, 2024). VOSviewer is a software application designed to construct and visualize bibliometric networks. This network may encompass journals, researchers, or specific publications, and can be established through citations, bibliographic coupling, co-citation, or co-authorship relationships. VOSviewer provides a text processing capability which facilitates the construction and revelation of co-occurrence networks of particular terminology obtained from academic literature (Centre for Science and Technology Studies Leiden University, 2024)

Table 2. Most used keywords in the field of green human resource management

Author Keywords	Total Publications
Green Human Resource Management	132
Sustainability	52
Environmental Performance	48
Sustainable Human Resource Management	45
Green HRM	41
GHRM	30
Sustainable HRM	25
Green Innovation	23
Green Human Resources Management	17
Job Satisfaction	16
Sustainable Performance	15
Sustainable Development	14
Environmental Sustainability	14
Green Human Resource Management Practices	14

*Source**:** authors' creation*



Picture 3. Visualisation of Author Keywords Using VOSviewer
Source: authors' creation

The image above depicts a thematic map. The map includes keyword analysis, a facet of network analysis that generates information crucial for the research domain. The image above depicts the network of author keywords. The co-occurrence of authors' keywords is illustrated using VOSviewer. Each circle in the graph represents the co-occurrence condition. The broader the circle, the more frequently the keywords co-occur. Circles of identical hue represent clusters of keywords, while the lines linking the circles illustrate the relationships among the keywords (Papademetriou et al., 2023).

The most common keywords used in the GHRM literature can be divided into seven clusters.

1. **Cluster 1 (red colour)** elucidates the correlation between "environmental performance and green human resource management". This suggests that green human resource management aids organizations in enhancing environmental performance by fostering environmental concern and commitment (Sumiati et al., 2024). Organizations must establish responsible business practices that cultivate environmentally conscious employees, thereby benefiting business, society, and nature (Abedelrahim et al., 2024).
2. **Cluster 2 (green colour)** connects to the subjects of "GHRM" and "pro-environmental behaviours." This underscores the significance of GHRM in cultivating environmentally sustainable behaviour among employees.

This suggests that companies ought to implement GHRM practices that emphasize sustainability to enhance green behaviour in the organization (Alherimi et al., 2024).

3. **Cluster 3 (blue colour)** pertaining to the linkage between "green human resource management" and "corporate social responsibility". Green human resource management is essential in enhancing and reinforcing the company's CSR program by confirming that sustainability and social responsibility are comprehensively orchestrated and incorporated into all facets of the company's affair and way of conduct (Mering, 2024).
4. **Cluster 4 (yellow colour)** denotes subjects pertaining to the fundamental connection between "green human resource management" and "sustainable human resource management". Green human resource management is fundamentally based on sustainable business practices that encompass resource activities aimed at explicitly addressing the company's environmental and ecological effects. Green human resource management is fundamentally connected to the organization's environmental policy and employees' ecological conduct, emphasizing on the necessity of aligning human capital with environmental goals. Green human resource management represents an all-encompassing strategy for sustainable human resource management (Alherimi et al., 2024).
5. **Cluster 5 (purple colour)** pertains to "green human resource management" and "environmental sustainability." Green human resource management enables organizations to attain environmentally sustainable objectives. This practice promotes the adoption of an Environmental Management System, resulting in enhanced environmental performance for organizations. Green human resource management facilitates the implementation of green rewards and green performance management practices that align employee behaviour with corporate objectives, thereby enhancing accountability and promoting environmental sustainability through conservation initiatives (Din et al., 2024).
6. **Cluster 6 (cyan colour)** demonstrates the correlation between “green human resource management” and “sustainable development.” Green human resource management enhances collective benefits by enabling employees to engage with the common good. These public goods influence sustainable development in both social and ecological dimensions (Järlström et al., 2024).
7. **Cluster 7 (yellow colour)** related to the subjects of "green human resource management" and "job satisfaction". Green human resource management encompasses various aspects and functions, one of which is green training. This involves environmental training initiatives designed by the company

to enhance employee awareness and knowledge regarding environmental issues, foster a positive mindset, and encourage proactive engagement in addressing environmental challenges. This training program can demonstrate the company's support to enhance employee job satisfaction (Ramachandaran et al., 2024).

According to the above analysis, it can be concluded that cluster 3 (blue colour) suit best with the current conditions and current research trends. The cluster indicates the relationship between green human resource management and Corporate Social Responsibility (CSR). Studi oleh Alshahrani & Iqbal (2024) confirmed this finding where it is mentioned that green human resource management and CSR are concepts that have a close relationship and both concepts consider the impact of the company's operations on the environment and society. Aukhoon et al. (2024) acknowledged that the relationship between green human resource management and CSR is an important subject and relevant to sustainable business practices. Green human resource management practices are considered capable of facilitating the internalization and demonstration of environmentally friendly behaviour by employees, resulting in significant knowledge related to the fundamental mechanisms through which CSR can initiate this process, ultimately impacting employee behaviour oriented towards sustainable business.

Top journals

Table 3 presents a compilation of journals that generated the highest number of publications on green human resource management from 2014 to 2024. The "Sustainability Journal (Switzerland)" is at the forefront with 126 published articles and 3,694 citations. “Business Strategy and The Environment” ranks second in its journal category with a total of 1,297 citations. “Administrative Science,” “International Journal of Environmental Research and Public Health,” “International Journal of Manpower,” and “SAGE Open” were ranked lowest in publication volume, with a total of 5 articles each. “Problems and Perspectives in Management” is ranked lowest in citations, accumulating a total of 42 citations.

Table 3. Most impactful journals

Journals	Area of Research	h-Index	Ranking by Scimago	Documents	Citations
Sustainability (Switzerland)	Environmental Science	169	Q1	126	3694
Cogent Business and Management	Business, Management and Accounting	44	Q2	13	272
Business Strategy and The Environment	Business Management and Accounting, Environmental Science, Social Sciences	147	Q1	12	1297
Frontiers in Psychology	Psychology	184	Q2	12	187
International Journal of Sustainable Development and Planning	Energy, Environmental Science, Social Sciences	23	Q3	12	64
Heliyon	Multidisciplinary	88	Q1	11	47

Uncertain Supply Chain Management	Business, Management and Accounting, Decision Sciences	33	Q2	10	65
Frontiers in Environmental Science	Environmental Science	77	Q2	8	134
Problems and Perspectives in Management	Business, Management and Accounting, Decision Sciences, Social Sciences	30	Q2	7	42
Administrative Sciences	Business, Management and Accounting	35	Q2	5	51
International Journal of Environmental Research and Public Health	Environmental Science, Medicine	198	Q2	5	187
International Journal of Manpower	Business, Management and Accounting	73	Q1	5	318
SAGE Open	Arts and Humanities, Social Sciences	60	Q1	5	93

Source: authors' creation

Institutions with highest number of publication and citation

According to the aforementioned findings, the College of Business at Abu Dhabi University excels in the category of institutions with the greatest number of publications and citations, specifically 3 documents and 1478 citations. Montpellier Business School has a total of 3 publications and 512 citations. The Department of Management Studies at Girne American University is ranked lowest among the top five most impactful institutions, with a total of 19 citations.

Table 4. Most impactful institutions

Institutions	Country	Documents	Citations
College of Business, Abu Dhabi University	United Emirates Arab	3	1478
Montpellier Business School	France	3	512
School of Management, Shandong	China	3	267
Department of Business Management, Universitas of Barishal	Bangladesh	3	32
Department of Management Studies, Girne American University	United States	3	19

Source: authors' creation

Countries with highest number of publication, citation, and research collaboration

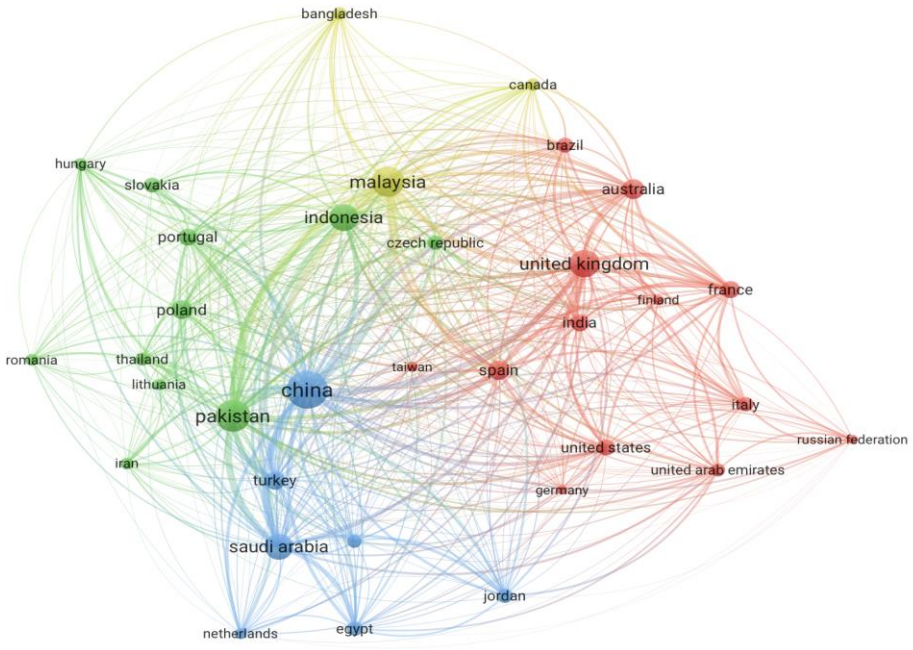
According to the aforementioned data, ten countries generate the highest number of journal articles and citations in this discipline. China generates the largest quantity of journal articles, totalling 83 documents. Pakistan ranks among the top three most prolific countries related to publications, with a total of 59 documents, yet it has the lowest citation count, totalling 1983 citations. During the past decade, the United Kingdom has recorded the highest number of citations, totalling 4,477. Turkey holds the lowest quantity of journal articles, totalling 261 citations.

Table 5. Most impactful countries

Country	Documents	Citations
China	83	3318
Pakistan	59	1983
Malaysia	53	2059
United Kingdom	44	4477
Indonesia	42	532
Saudi Arabia	39	1272
Australia	23	1581
Poland	21	550
Spain	22	923
Turkiye	20	261

Source: authors' creation

Green human resource management comprises four clusters: cluster 1 (red), cluster 2 (green), cluster 3 (blue), and cluster 4 (yellow). The cluster comprises a consortium of nations that cooperate in authoring journal articles pertaining to green human resource management, with the size of each country's circle reflecting the volume of published articles.



Picture 4. Research collaboration between countries
Source: authors' creation

CONCLUSIONS AND SUGGESTIONS

For the last decade, the literature concerning green human resource management has exhibited a rise in the volume of open access publications. Scientific mapping conducted from 2017 to 2023 indicates a substantial rise in the volume of publications. The article titled "Green Human Resource Management as a Tool for the Sustainable Development of Enterprises: Polish Young Company Experience," published in 2018,

has the highest citation count, totalling 458 citations. The predominant buzzword in scientific literature concerning green human resource management is particularly associated with sustainability (Awais-E-Yazdan et al., 2024; Lin et al., 2024) and environmental performance (Abedelrahim et al., 2024; Altassan, 2024; Gazi et al., 2024; Sarfo et al., 2024). By analysing emerging research clusters, scholars can identify journals, nations, and institutions that generate the highest volume of scientific articles in the domain of green human resource management, the citation counts of these articles, and the countries exhibiting the most research collaboration. The Sustainability Journal (Switzerland), specializing in environmental science, is the preeminent publisher, having released 126 articles that collectively garnered 3,694 citations since 2014. In the realm of institutions, the College of Business at Abu Dhabi University in the United Arab Emirates ranks highest in impact, with a total of 3 documents and 1,478 citations. China emerged as the most productive, influential, and collaborative nation, producing 83 documents and garnering 3,318 citations.

Despite the expanding green human resource management literature, the quantity of scientific articles published in open access journals remains inferior to that in closed access journals. It is anticipated that future researchers and journal managers will advocate for open access publications that are available to readers without financial, legal, or technical impediments. This agenda aligns with SDG principles by emphasizing an open access philosophy on knowledge that fulfils quality education (SDG 4), industry, innovation, and infrastructure (SDG 9), and partnerships for the goals (SDG 17). Ultimately, the academic community in developing nations must also advocate for open access journals, not solely those in developed nations (Yun et al., 2022).

This study enriches the existing literature and provides various detailed directions and guidelines for future research. This study offers a bibliometric analysis that provides keyword analysis, citation analysis, and bibliographic coupling analysis. The keyword analysis is conducted in the form of clusters where the most significant topic in the field of green human resource management is the relationship between green human resource management and CSR. In terms of bibliographic coupling, the United Kingdom has the most influential research in the field of green human resource management, while China has the highest number of studies.

However, this research presents several limitations, for example, this article only uses open access articles from the Scopus database and does not use other databases such as Web of Science and others. Then, this article does not use research in other forms such as conference proceedings and books. This research also focuses on a single perspective of bibliometric analysis. Consequently, the following are proposed research agendas that may facilitate a more holistic research perspective:

1. **Quantitative research**

   Based on a study by Din et al. (2024), the notion of green human resource management (GHRM) has obtained considerable traction over the past several

years. Nonetheless, the research connecting carbon neutrality, Green Human Resource Management (GHRM), and environmental performance remains significantly constrained. Consequently, an alternative research methodology, including survey-based quantitative research, is required to address the research gap.

2. **Dimension of green aspects**

   Alhermi et al. (2024) highlighted the incorporation of sustainable practices that enhance environmental welfare and promote employee growth. This study emphasizes the significance of organizations in prioritizing Green Human Resource Management strategies, both via HR functions and by fostering a culture of environmental commitment. These sustainable practices can be optimized by investigating additional facets of environmental considerations that influence employee awareness and adaptability. For instance, examining the influence of workplace ambiance, managerial or supervisory roles, financial conditions, and social determinants on employees' environmentally sustainable behaviour.

3. **Multigroup analysis**

   Martínez-Falcó et al. (2024) coined the role of employee well-being and work involvement in mediating the nexus between green human resource management and sustainable performance in Spanish wineries. In this variable relationship framework, control variables such as age, size, and product's specific geographical origin are employed to ensure the accuracy of the cause-and-effect relationship. The study proposes that further investigation could perform a multi-group analysis to uncover potential variations in the proposed research model based on the aforementioned factors.

4. **Longitudinal research**

   A study by Hassanein et al. (2024) investigated green human resource management and employee retention in the United Arab Emirates' hotel sector, employing green innovation as the mediating variable. This study is cross-sectional where it can minimize generalizability. Subsequent research may employ a longitudinal approach to evaluate the company's performance or competitiveness across various time intervals.

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