Research and green human resource management: A bibliometric analysis

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Abstract In this study, the evolution of publications using the Scopus database was examined. Bibliometric networks are built and displayed using the VOSviewer software and Biblioshiny App package. A total of 587 articles have been selected for analysis from a pool of 639 documents filtered through the Scopus database during the period 2013–2023. Based on the keyword “Green Human Resource Management.”. The results of this study show that, between 2013 and 2023, many investigations regarding the development of environmentally friendly innovations were triggered by publications on the topic. This trend peaks in 2023, In the period from 2013 to 2023, there has been a significant increase in efforts to identify, develop, and implement Green Human Resource Management practices. This research has two main objectives: first, to contribute to the theoretical understanding of Green Human Resource Management through a light review. and second, to analyze the papers published in the period to identify key trends and developments in this field. Thus, this study aims to provide a more in-depth and thorough view of Green Human Resource Management as well as analyze the accumulated knowledge that occurred over the past decade. In the process of this investigation, a total of 587 papers related to Green Human Resource Management were carefully selected. Overall, this article aims to summarize the important developments that have taken place in Green Human Resource Management and provide readers with a solid insight into its important role in achieving future environmental and social sustainability goals.

Keywords: green human resource management, sustainability, environmental performance, bibliometric analysis, Biblioshiny App

1. Introduction

Economic growth in the last two centuries has represented the prosperity and longevity of mankind (Fachada et al., 2022). However, the impact of various industrial practices, reflected in pollution and the accumulation of waste and residues, is increasingly evident. Green human resource management can be defined as the alignment of HR practices with the environmental goals of an organization (Jabbour et al., 2022). Green human resource management has emerged as a new concept whose main objective is to preserve and safeguard natural resources affected by organizational activities (Hameed et al., 2023). Green human resource management is a relatively new concept that has gained popularity in recent years due to increasing awareness of environmental sustainability (Chen et al., 2022). Green human resource management (GHRM) is a human resource management approach that emphasizes aligning human resource management practices with organizational environmental policies (Veerasamy et al., 2023). The implementation of green human resource management practices can help organizations reduce their environmental impact, improve their environmental performance, and encourage sustainable development (Yusliza et al., 2021). To gain insight into the productivity, influence, and patterns of Green Human Resource Management, a bibliometric analysis of research trends in Green Human Resource Management was conducted. Bibliometric analysis is a quantitative method used to analyze scientific literature and identify research trends, patterns, and gaps (Aria & Cuccurullo, 2017). His analysis focuses on various aspects of interest that contribute to the characterization of the field of study, such as publications, journals, countries, languages, and authors.

The emergence of Green Human Resource Management is driven by the awareness that environmental sustainability and corporate social responsibility are not only problems for corporate boardrooms but also closely related to human resource management (Umrani et al., 2022). Green human resource management integrates environmentally friendly practices into various HR functions, including recruitment, training and development, compensation, and employee engagement (Nisar et al., 2023). It strives to ensure that organizations not only comply with environmental regulations but also actively contribute to environmental preservation and sustainable development (Jabbour CJ et al., 2023). This approach is rooted in the belief that employees are valuable assets in the pursuit of sustainability, as they play an important role in implementing eco-friendly practices and fostering an environmentally conscious workplace culture (Kuo et al., 2022).

The importance of Green Human Resource Management lies in its potential to create a win–win situation for organizations and environments (Praveen Kumar & Raja Shree, 2019). By adopting sustainable HR practices, organizations can
enhance their reputation, attract and retain top talent, and contribute to environmental preservation (Ren et al., 2020). Simultaneously, employees benefit from a healthier, more environmentally conscious workplace, encouraging job satisfaction and commitment (Setyaningrum & Muafi, 2023). As climate change and environmental concerns increase, businesses are under increasing pressure to demonstrate their commitment to sustainability (Fachada et al., 2022). Green human resource management (GHRM) offers a strategic approach for organizations to align their HR practices with environmental goals, reduce their carbon footprint, and minimize resource consumption (Luo et al., 2023). It emphasizes a proactive approach in which organizations are encouraged not only to reduce their environmental impact but also to make a positive contribution to environmental conservation.

Research in the field of green human resource management has steadily expanded over the years (Hameed et al., 2022). An analysis of the literature demonstrated a notable increase in the volume of publications, indicating the increasing enthusiasm for green human resource management as a research field (Shoaib et al., 2021). This growth shows the increasing recognition of green human resource management as an important element of sustainable business practices. Research in this field has evolved from the exploration of theoretical foundations to practical applications and implications for organizations (Ali et al., 2022). To gain a deeper understanding of the research landscape in Green Human Resource Management, it is important to identify the key authors and influential works that have shaped the field. Renowned researchers such as Jabbour, CJC, and Yusliza m.y. have made significant contributions to the green human resource management literature. Their work explored the relationship between HR practices and environmental sustainability, explaining potential synergies and challenges in implementing green human resource management.

The purpose of this bibliometric analysis is to identify and analyze the progress of comprehensive research conducted in the field of green human resource management from 2013 to 2023. Other GHRM bibliometric analyses were also conducted to evaluate and quantify various aspects of green human resource management practices and aid in understanding green human resource management studies. This analysis aims to highlight the work done in the field of green human resource management and provide readers with an overview of the effectiveness of green human resource management in various organizations.

A bibliometric analysis of Green Human Resource Management based on the Scopus platform was conducted to analyze the volume, improvement trends, worldwide distribution, major journals, pioneer authors, dominating countries, and dominating sectors in Green Human Resource Management. The analysis examined 587 documents from the Scopus database. The purpose of this study is to analyze the volume, increasing trends, worldwide distribution, major journals, pioneering authors, dominating countries, and dominating sectors in green human resource management.

In conclusion, bibliometric analysis of research trends in green human resource management provides insight into the current state of research in green human resource management and can help researchers identify research gaps and opportunities for future research. The analysis also highlights the importance of green human resource management in driving sustainable development and improving organizational performance. Aligning human resource management practices with an organization’s environmentally friendly policies can have a positive impact on the environment and society and improve the organization’s reputation and financial performance.

2. Literature review

Research in the field of green human resource management is still largely not based on a strong theoretical framework (Ren et al., 2018). In the literature that outlines the foundations of guiding theories, there is an assumption that in the context of organizations that are more oriented toward environmental sustainability, human resource management tends to transform into green human resource management (Niesten et al., 2017). Although the literature on strategic human resource management has developed from various theoretical perspectives, such as resource-based views, human capital theory, and behavioral approaches, research in green human resource management has tended to adopt more behavioral perspectives (Garg, 2020; Yusliza et al., 2021). Alternative theoretical foundations are also beginning to appear in the green human resource management literature. For example, (Ogabei et al., 2022) have integrated cognitive social information processing perspectives (Yusliza et al., 2021) and role behavior theory to explain the contribution of green human resource management to the achievement of environmental strategies by organizations. Stakeholder theory has broadened the scope of human resource management research by going beyond organizational boundaries to unearth pressures from consumers and regulatory stakeholders that affect GHRM deployment (Guerchi et al., 2016).

2.1. Basic Framework

Beyond the basic questions about the nature and conceptualization of Green Human Resource Management, a large number of studies have sought to shed light on the introduction, consequences, and potential of Green Human Resource Management, which is currently the focus of our conversation. Regarding the various theoretical approaches used in the green human resource management literature, a significant difference is the extent to which academics examine this phenomenon at different levels of analysis. The two most common levels of analysis in the empirical study of Green Human Resource
Management are phenomena at the employee (individual) level and phenomena at the organizational level. Some studies also cover phenomena at the group level. To gain a comprehensive understanding of Green Human Resource Management, a multilevel approach that considers phenomena at different levels of analysis may be needed. With these considerations in mind, we will provide a summary of the research exploring the preliminary, impact, and potential factors related to green human resource management.

2.2. Antecedents of Green Human Resource Management

Several studies expressly consider the precursor factors of Green Human Resource Management, focusing on studies that provide significant explanations regarding the impact of the external environment at the macro level, the organizational environment, and the individual characteristics of employees. The external environment of an organization can be explained by three factors, namely, the source of pressure, the source of guidance, and the source of consciousness. These three aspects often interact and collaborate, which in turn affects the design and effectiveness of GHRM. Within the framework of institutional theory, increased monitoring of pressures emanating from the external environment is likely to intensify, mainly due to increased media attention, cultural values, and the progress of civil society.

In the context of the Green Human Resource Management, national differences are particularly pronounced in different geographical regions, including the United States (US), as shown by (Haddock-Millar et al., 2016); Europe, as observed in studies (Gholami et al., 2016), (Harvey et al., 2013); Asia, as discussed by (Gholami et al., 2016) and (Roscoe et al., 2019); and South America, with research such as that conducted by (Ogbieiu et al., 2022; Teixeira et al., 2020). In addition to differences in regulations between countries, research also shows differences in people’s views of nature and the environment in different countries, such as China, Pakistan, India, and Malaysia, which differ from each other in their views compared to the US and Europe. In addition, differences in the main drivers and impacts of environmental problems on organizational activities have been observed among Germany, Britain, and North America (Ren et al., 2018).

The national context involves different types of differences, including laws and regulations, cultural values, models of economic development, and civil society situations (Pham et al., 2023). In other words, the range of conditions associated with sources of guidance, pressure, and awareness can vary greatly between countries and regions. Although convergence efforts in environmental regulation occur through the adoption of global agreements such as the Paris Agreement, which entered into force (United Nations Framework Convention on Climate Change, 2016.), as well as through the development of extensive certification and reporting frameworks such as the ISO 14000 environmental standard (Singh et al., 2015), significant differences in environmental legislation, regulation, and governance still exist, even in the Asia Pacific region. For example, although some countries in Asia apply stricter regulations against organizational activities that have the potential to damage the environment, citizens’ rights to a healthy environment have been included only in the national constitutions of several Asian countries, such as Indonesia, the Philippines, and South Korea (Boyd, 2014).

Organization-level antecedents, at the organizational level, have a widespread impact on the internal environment of an organization and summarize the factors affecting GHRM at the organizational and employee levels (Abdel-Maksoud et al., 2021). In the context of supporting Green Human Resource Management at the organizational level, (Ren et al., 2020) identified five key elements that play a role in aligning environmental sustainability in the design and implementation of Human Resource Management, namely, leadership, strategy, organizational culture, organizational structure, and reporting activities. These five elements act as contextual signals given to employees regarding the urgency, value, and importance of green human resource management. Research on corporate environmental practices also emphasizes the importance of organizational conditions as a factor driving pro-environmental initiatives such as green human resource management. Using a stakeholder theory framework, (Napathorn, 2022) identify several key antecedents of environmental orientation within organizations, including public concerns, regulatory pressures, competitive advantage, and top management commitment. These factors play an important role in shaping an organization’s awareness and willingness to implement green human resource management practices. However, to date, evidence is limited that these factors effectively explain or support the development and implementation of green human resource management policies and practices.

Employee-level antecedents: In addition to understanding the contributing factors that explain when, why, and to what extent companies develop human resource management systems to encourage environmentally friendly behaviors among their employees, several authors propose the need for a better understanding of individual differences in terms of these behaviors. Several studies exploring factors supporting environmentally friendly behavior at the employee level in the work environment have identified several individual attributes that have predictive value, including knowledge of the environment (EM), prudence, and moral reflectivity. At some level, demographic characteristics such as gender, age, education level, and income can also influence such behavior (Anderssson, 2013). In addition, environmental experience also plays a role in influencing eco-friendly behavior among employees (Ren et al., 2020). These individual characteristics can also have an impact on employee acceptance of Green Human Resource Management. Alternatively, the degree to which an organization employs individuals with these characteristics can increase pressure from the bottom up for the organization to respond to pressures from the external environment by adopting elements of the Green Human Resource Management system.
3. Materials and Methods

By implementing an advanced search strategy, the filtering process becomes more rigorous. This search focused on keywords, article titles, and abstracts by considering only documents in English. Only articles and journals were the subject of analysis. The illustration in Figure 1 illustrates how keywords are combined to achieve the desired search results. Data sources are an indispensable element when conducting bibliometric analysis. The literature review process consists of six distinct steps. The steps involved in conducting a literature review are as follows:

- **step 1**
  - Search for publications in the Scopus database with the keyword: "Green Human Resource Management or Green HRM".
  - The number of publications that appear according to keywords is 639 publications.

- **step 2**
  - Filtering publications with restrictions in the form of year, subject area, document type, publication stage, keywords, and language.
  - The final result of screening was 587 articles.

- **step 3**
  - Save the filtered file (export data) into CSV, RIS and BibTex format.

- **step 4**
  - Analyze search results on Scopus.

- **step 5**
  - Perform analysis with VOSviewer and Biblioshiny software with BibTeX file format.

- **step 6**
  - Make analysis conclusions.

**Figure 1 Research methods.**

This study used bibliometric techniques to analyze a collection of scientific articles and related publications on Trand Green Human Resource Management. The dataset includes articles from the Scopus database spanning ten years. Bibliometric analysis with a systematic approach to selecting articles with keywords in their titles or abstracts. Furthermore, the filtering results were saved in CSV file format and RIS and further analyzed using the Biblioshiny app and VOSviewer software. This study used a systematic approach to compile bibliometric analysis (Suryantoro et al., 2023; Uzkiyyah, N. U. et al., 2023).

Since this field of literature review is limited to Green Human Resource Management, the search results were refined as shown in Figure 1. The search results are exported from Scopus in BibTeX, CSV, and RIS file formats that include information such as abstracts, keywords, and article titles, as well as other elements. The BibTeX file is imported as a data source into the biblioshiny application for additional in-depth analysis. In addition to biblioshiny, VOSviewer is also used to analyze networks, including coauthor relationships and shared citations. Of the 587 papers selected, the oldest paper in the data source is from 2013, which shows research on Green Human Resource Management.

4. Results

4.1. Citations per year

A citation is an indicator that can be used to measure the impact and quality of a scientific publication (Aria & Cuccurullo, 2017). Figure 2 shows the citation trends from 2013 to 2023. The purpose of this image is to illustrate the development of citations in a particular field. This image can help us assess the impact and influence of published scientific works in the field. This image can also help us to identify important years or events that affect the number of citations in that field.

Figure 2 shows that the number of citations increased steadily from 2013 to 2021 and then jumped sharply in 2023. This shows that the field of green human resource management research with publication data has experienced significant development and recognition in recent years.

4.2. Publication per year

The figure is a line graph showing the number of documents published per year from 2013 to 2023. This graph is sourced from Scopus, a scientific database owned by Elsevier B.V. This graph shows that the number of published documents will continue to increase annually, peaking in 2023. This graph can be used to analyze trends and developments in scientific research in various fields.
The evolution of Green Human Resource Management-related publications in the last ten years, as illustrated in Figure 3, is impressive. Figure 3 illustrates a sustained upward trend from 2013 to 2023, peaking in 2023. Notably, even during the COVID-19 pandemic from 2019 to 2021, there was no decrease in the number of publications.

### 4.3. Documents per year by source

Figure 4 compares the number of documents for up to 10 sources. It is a line graph with several lines representing different sources. The x-axis represents the years from 2013 to 2023. The y-axis represents the number of documents. The sources are color coded and include Sustainability Switzerland, the Journal of Cleaner Production, the International Journal of Manpower, Environmental Science and Pollution Research, Corporate Social Responsibility and Environmental Management, Frontiers in Psychology, Business Strategy and the Environment, the International Journal of Human Resource Management, the International Journal of Sustainable Development and Planning, and Benchmarking. The line shows an overall increase in the number of documents for all sources during the year. Figure 4 can be used to analyze publication trends in the fields of sustainability, environment, and human resource management. This image can help us to determine which sources are the most active and productive in the field.

Figure 4 provides an overview of publications on various topics over 10 years, and most of the publications come from various sources. Sustainability Switzerland ranked first with 52 publications, followed by the Journal Of Cleaner Production with 35 publications, the International Journal Of Manpower contributed to 26 publications, Environmental Science And Pollution Research 21 publications, Corporate Social Responsibility And Environmental Management 17 publications, Business Strategy
And The Environment 15 publications, Frontiers In Psychology 13 publications, the International Journal Of Human Resource Management 13, the International Journal Of Sustainable Development And Planning 12 publications, and Benchmarking with 11 publications. The findings of this analysis show that Sustainability and the Journal Of Cleaner Production are the most prominent sources of publications on eco-friendly innovations. These journals can be useful resources for researchers and practitioners interested in exploring recent developments in the field of green human resource management.

Figure 4 Top 10 Research Publication Sources. Source: Scopus database.

4.4. Three-Field plot

Bibliometrics is a research approach that relies on statistical analysis and quantitative methods to identify patterns underlying the work available in the literature. This method is useful in the context of mapping science because its empirical contributions can help describe a broad, complex, and possibly controversial field of research (Aria & Cuccurullo, 2017). In addition, biblioshiny, which is a web interface for bibliometrics, is used to generate three-dimensional graphs depicting author productivity by applying Lotka’s Law. In addition, biblioshiny applications are also used to create word clouds based on the most frequently used keyword. Three-field plots are used to describe the flow of information between authors with AU codes (middle field), publication sources with SO codes (left field), and keywords with DE codes (right field). For the purpose of better visualization, only 12 entities from each field were considered in this analysis.

Figure 5 Three-field plot (Left Field: Sources of Publication; Middle Field: Author; Last Field: Keywords) constructed using the Biblioshiny app.
Figure 5 shows that the majority of the articles in this study are related to "Green Human Resource Management", and most of these articles are published in the "Journal Of Cleaner Production". Authors Jabbour CJC and Yusliza MY dominate with the highest number of articles in the field of Green Human Resource Management. In addition, 'Sustainability' is the second largest area, followed by "Environmental Performance", where more research articles are published.

4.5. Author productivity through Lotka’s Law

This figure shows the relationship between the number of documents written by an author and the percentage of authors who have written. It is used to measure the productivity of writers in a particular field. The black dotted line shows the theoretical relationship between the number of documents written and the percentage of authors who have written that many documents according to Lotka's Law. The blue line shows the actual relationship between the number of documents written and the percentage of authors who have written that many documents in a given field. The purpose of this image is to compare the actual productivity of the writer with the productivity of the writer expected under Lotka’s Law.

![Author Productivity through Lotka's Law](image)

Table 1 Author Productivity Through Lotka’s Law.

<table>
<thead>
<tr>
<th>Documents written</th>
<th>N. of Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1255</td>
</tr>
<tr>
<td>2</td>
<td>177</td>
</tr>
<tr>
<td>3</td>
<td>56</td>
</tr>
<tr>
<td>4</td>
<td>18</td>
</tr>
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<td>5</td>
<td>12</td>
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<tr>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Scopus database.

The concept of 'Lotka's law of scientific productivity' proposed by Gawade, (2023) explains that in a given scientific field, only approximately 6% of all authors will be able to produce more than 10 articles. The data in Table 1 and illustrated in Figure 6 show that approximately 22% of the authors involved in this study were able to create more than one article in that field. This illustrates that the distribution of author productivity is consistent with the concept of Lotka’s Law.

4.6. Total author production over the time period

The figure below is a dot graph showing the production of various authors over time. These graphs are useful for visualizing the production of various authors over time and determining whether there are trends or patterns. The x-axis represents the year, and the y-axis represents the author. The dot size represents the number of articles written by the author in that year. The chart is titled "Production Over the Time". This graph has a legend that explains the size of the point. The production of leading authors of all time is the output of biblioshiny applications, which give researchers a view of the period.
when those authors published their work. Figure 7 shows the data processed using the bibliometrix biblioshiny R tool, illustrating the production of the top authors from 2013 to 2023. This image specifically highlights prominent authors from 2013 to 2023.

The results of the analysis revealed that the first researcher to be named the first-best author on the Green Human Resource Management research theme was Jabour Cjc in 2023. The number of Green Human Resource Management publications will continue to increase from 2013 to 2023, and the top author will be Yusliza MY. These findings prove that research on the topic of 'human resource management' continues to grow significantly every year.

4.7. Word cloud of titles using the Biblioshiny App

Figure 8 is a scatter plot showing the most relevant words in a text and the number of relevant words. The purpose of this image is to help you understand the main themes and topics in a text. Figure 9 is a word cloud that displays terms related to green human resources management. A word cloud is a way to visualize the frequency or importance of words in a text (Aria & Cuccurullo, 2017). Larger words are more often or more important than smaller words are. Larger words are more often or more important than smaller words are. This chart uses a blue-and-white color scheme. The x-axis represents the number of occurrences of a word in a text. The y-axis represents the most relevant words in the text. This graph has blue circles representing the data points. The words on the y-axis include “green human resources management”, “environmental performance”, “sustainability”, “green innovation”, “environmental management”, “green motivation”, “green human resources management”, and “sustainable performance”. This graph has a legend in the upper right corner indicating that the blue circle represents the number of occurrences of words.
We analyzed the top 10 relevant keywords in Figure 8. According to our statistical analysis, the keyword "green human resource management" appears most often, followed by "environmental performance" and "green HRM". These words correspond to the search terms used in our research. Figure 9 shows that the green human resource management research keywords still had weak coverage from 2013 to 2023. With a visual representation of the R Biblioshiny Bibliometrix package, words/phrases with higher volume and keyword density are displayed in a larger, more prominent font. Because of this, more visualized information can be obtained from the Keywords cloud.

4.8. Most relevant affiliations

Figure 10 is a bar graph from Scopus comparing the number of documents for multiple affiliates. This graph is a tool for analyzing the number of documents produced by various affiliates.

Figure 10 shows that, with 587 publications, Green Human Resource Management experienced an increase in the number of publications over the last 10-year period. Universiti Sains Malaysia and The Superior University, Lahore, came in first with 19 articles and in second place with 18 publications, namely, Universiti Malaysia Terengganu, followed by Universidade Estadual Paulista Júlio de Mesquita Filho and Montpellier Business School with 14 publications.
4.9. Country’s production of research articles

Figure 11 is a world map showing the scientific production of different countries. The purpose of this map is to show the scientific output of different countries. The scientific output is the number of scientific publications produced by researchers from a country in reputable journals. This map uses blue with varying degrees of darkness to show the level of scientific production of each country. The darker the blue color is, the greater the degree of scientific production. The map also has the title "Country Scientific Production" and a logo in the lower right corner (Aria & Cuccurullo, 2017).

![Country Scientific Production](image)

**Figure 11** Country’s Production of Research Articles.

<table>
<thead>
<tr>
<th>Country</th>
<th>Documents</th>
<th>Country</th>
<th>Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
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</tr>
<tr>
<td>United Kingdom</td>
<td>47</td>
<td>United States</td>
<td>33</td>
</tr>
</tbody>
</table>

Table 2. Top 10 Countries Contributing to Articles on Human Resource Management.

Source: Scopus database.

Table 2 shows the countries that have published the most articles on the topic. China has published 139 articles, which makes it the country that publishes the highest number of articles. Pakistan ranked second with 117 articles. This shows that research on human resource management. This trend is apparent for China, as it is the world’s largest exporter. Figure 11 shows that there are still many countries that have not been involved in this topic.

4.10. Cocitation network of the authors

Figure 12 shows a network visualization, which is a type of data visualization that shows how various nodes (in this case, names) are connected. The purpose of this image is to show the relationships among the various names and how they relate to each other. This network visualization is created using VOSviewer, software for creating network visualizations. VOSviewer can be used to analyze and visualize bibliometric data, such as publication data, citations, or keywords. By using VOSviewer (Aria & Cuccurullo, 2017).

Figure 12 shows the authors' visualization network and their coauthor relationships analyzed using VOSviewer. Here, we can obtain some information from this image. The most cited author is Jabbour Cjc, which has the most green nodes. He has strong relationships with the other authors in the cluster. The author who works the most with Jabbour Yusliza m.y. has the second largest blue node. The most isolated author is Iqbal. J, which has light blue nodes of small size.

4.11. Bibliometric analysis of the keywords

The image you submit is a network visualization of the relationships among various terms related to green human resource management. This image is used to understand the interrelationships between various concepts and how they relate to each other. The function of this image is as follows. Figure 13 helps identify important terms related to green human resource management.
management, such as "sustainable development", "green practices", "environmental performance", and "green economy". This image helps reveal how the terms are interrelated in the network by using color, size, and distance between vertices to indicate their group, importance, and proximity, respectively. These images can help find patterns, trends, gaps, or anomalies in networks, which can provide new insights or ideas for research or practice (Aria & Cuccurullo, 2017).

Figure 12 Co-Citation Network of the Authors in the Collected Sample.

Figure 13 Co-occurrence keyword analysis of 578 articles.

Bibliometric analysis of keywords in human resource management publications. The size of the nodes indicates the frequency of occurrence. Figure 13 is a network visualization of terms related to human resource management. It is a representation of the relationship between various terms and concepts in this field. Human resource management. The terms in Figure 13 are represented as vertices, and the relationships between them are represented as edges. The nodes are colored according to their clusters, with different colors representing different clusters. The font size represents the frequency of occurrence proportional to the degree of occurrence, with larger nodes representing more central terms in the network. Some of the terms included in the network are "environmental performance", "sustainable development", and "green creativity".
5. Discussion

From our current research, 639 publications on Green Human Resource Management indexed in the SCOPUS core database were analyzed. The published literature covers Green Human Resource Management. As the most commonly used keyword, "green human resource management" has made the most remarkable contribution to this important area. Over time, the issue of green human resource management will become very important in the future. This article illustrates the growing focus on Green Human Resource Management in the business world, organizations, and society at large. In the period from 2013 to 2023, there was a significant increase in efforts to identify, develop, and implement environmentally sound human resource management practices.

This research has two main objectives: first, to contribute to the theoretical understanding of Green Human Resource Management through a comprehensive literature review; and second, to analyze the papers published in the period to identify key trends and developments in this field. Thus, this study aims to provide a more in-depth view of green human resource management and analyze the accumulated knowledge that has accumulated over the past decade. A total of 587 papers related to green human resource management were carefully selected for this investigation. Overall, this article aims to summarize the important developments that have taken place in green human resource management and provide readers with solid insight into its important role in achieving future environmental and social sustainability goals.

6. Final considerations

To understand developments and trends in green human resource management, bibliometric analysis has provided valuable insights. The results of this analysis identified the key contributions of research in Green Human Resource Management, highlighted the most influential research, and outlined key trends that have developed in the last 10 years. Green human resource management research has grown rapidly, with an increasing number of publications reflecting global attention given to environmental and sustainability issues. This review also reflects the evolution of related research from an initial focus on the basic concepts of GHRM to more in-depth research on the implementation and impact of GHRM practices in organizations. This research shows that Green Human Resource Management is a dynamic and diverse domain, with contributions from various disciplines. In addition, the study identified specific trends, such as the important role of leadership and organizational culture in influencing green human resource management practices. There has also been a shift toward cross-country and comparative research, which allows for a better understanding of how national contexts affect Green Human Resource Management implementation. In conclusion, this bibliometric analysis provides a comprehensive view of research developments in green human resource management, which is an important discipline that will continue to play a role in driving organizations toward more environmentally friendly practices. Future research in green human resource management will continue to explore the complexity of the relationship between human resource management and environmental sustainability, focusing on practical practices that support environmental goals and overall organizational success.

6.1. Limitations and suggestions for future research

Despite this, some limitations are still inevitable. The literature review is still limited to the "Scopus" database, which is why future researchers are advised to use other databases, such as Microsoft Academic, Dimensions, Web of Science, PubMed, Crossref, and Europe PMC. The articles used were only English-language articles, so most non-English-language articles were excluded. Given that searches are conducted using "keywords" (green human resource management and green HRM) used in publications, it is possible that multiple articles covering the same topic but using different keywords were not included in the study. Therefore, future research should focus on using in-depth analysis to gather a wealth of background information, enabling more thorough research and facilitating comparisons in bibliometric studies.

Ethical Considerations

Not Applicable.

Conflict of Interest

The authors hereby declare that there are no conflicts of interest associated with the authorship of this article.

Funding

The current review does not receive any financial support or sponsorship.

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Wijaya and Qamari (2024)

