

Mapping The Intellectual Landscape of Green Human Resource Management: A Bibliometric Analysis of Sustainable Organizational Practices

Dr. Ruchi Singh Maurya ^{1*}, Dr. Namrata N. Khatri ²

¹ Assistant Professor, Department of Business & Industrial Management, VNSGU, Surat, Gujarat, India

² Assistant Professor, Department of Business & Industrial Management, VNSGU, Surat, Gujarat, India

*Corresponding author E-mail: rlmaurya@vnsgu.ac.in

Received: September 18, 2025, Accepted: October 21, 2025, Published: October 26, 2025

Abstract

This study uses bibliometric analysis to map the global research landscape of Green Human Resource Management (Green HRM) from 1998 to July 2025. Unlike prior reviews that covered short time spans or mixed data from multiple databases, this study offers the long-term, Web of Science exclusive analysis capturing nearly three decades of Green HRM research. It examines publication trends, influential authors, key journals, thematic clusters, and emerging topics using descriptive statistics, heat maps, keyword co-occurrence networks, and thematic mapping. The analysis reveals steady growth in Green HRM research, with a notable surge after 2015. Early studies emphasized systems and processes, while more recent work has shifted toward employee-focused and sustainability-driven themes such as green leadership, pro-environmental behavior, and corporate social responsibility. By consolidating fragmented findings, this study clarifies the intellectual structure and evolution of Green HRM and highlights future directions for scholars and practitioners seeking to align HR strategies with sustainability goals.

Keywords: Bibliometric Analysis, Green HRM, Keyword Co-occurrence, Thematic evolution, VOSviewer

1. Introduction

As concerns about climate change and environmental issues are growing worldwide, more organizations are integrating sustainability into their core strategies and operations [1]. A key development in this area is Green HRM, which seeks to integrate HR policies with environmental goals [2]. Green HRM includes practices like green recruitment, environmental training, sustainable performance reviews, green compensation, and encouraging employees to participate in eco-friendly initiatives [3], [4], [5]. Together, these efforts aim to promote eco-friendly behaviors among employees [6], build a green company culture, and boost both ecological and social performance.

Over the last 20 years, interest in Green HRM has surged, making it a crucial area of study in both sustainability and HRM research. Initially, studies were mostly theoretical, looking at how HRM and environmental management intersect [7], [8], [9], [10]. More recent research has taken a practical approach, linking Green HRM practices to outcomes like environmental performance, organizational citizenship, green innovation, and competitive advantage [11], [12], [13].

However, the field of Green HRM research is still somewhat fragmented and not fully mapped out. One notable issue is the tendency of prior reviews to cover relatively short time frames, typically a decade or two, which limits the ability to comprehensively track the field's long-term development and evolution trajectory. These limitations highlight the need for a comprehensive and longitudinal bibliometric analysis to capture the growth, intellectual structure, and thematic evolution of Green HRM research. In response to these, the present study adopts a focused bibliometric approach to offer a more systematic and holistic understanding of Green HRM scholarship. It analyzes Green HRM studies from 1998 to July 2025 using the Web of Science database. By using bibliometric techniques, this study maps out the intellectual structure, highlights key contributors and journals, and examines the thematic clusters that have influenced Green HRM research over nearly 30 years. This study is guided by the following research questions:

RQ1: How has the volume and growth trajectory of Green HRM research evolved in the Web of Science database from 1998 to July 2025?

RQ2: Who are the most influential authors and journals contributing to the development of Green HRM scholarship during this period?

RQ3: What are the predominant themes and conceptual clusters that have shaped Green HRM research, and how have these themes evolved?

RQ4: What emerging topics and future research directions can be identified within the Green HRM literature based on bibliometric thematic and keyword analysis?

2. Review of Literature

Green Human Resource Management (Green HRM) has evolved from a niche concept to a mainstream research domain as organizations increasingly integrate sustainability into workforce policies and business strategies [14]. Early literature focused on conceptualizing what it means to “go green” in HR by developing frameworks for integrating environmental objectives into traditional HR functions such as recruitment, training, performance management, and compensation [15], [16], [17], [18]. However, despite this foundational progress, the field remains conceptually fragmented. Researchers have used overlapping terms such as environmental HRM, sustainable HRM, and eco-friendly HR practices, while proposing varied frameworks without converging on unified theoretical foundations. This has resulted in inconsistencies in how Green HRM is defined, operationalized, and measured across studies.

Subsequent research has extended this perspective by exploring how Green HRM influences green organizational culture, employee engagement, environmental performance, and corporate reputation [19], [20]. Recent empirical studies further demonstrate links between Green HRM practices and organizational outcomes such as innovation, sustainability performance, and competitive advantage [21], [22], [23]. However, despite these advances, the field continues to exhibit conceptual and terminological fragmentation. Scholars employ varied definitions, theoretical models, and operational measures, making it difficult to consolidate findings or establish cumulative knowledge. For instance, some studies emphasize HR policies as tools for environmental compliance, while others focus on behavioral motivation for pro-environmental actions [5], [18]. To address this fragmentation and clarify intellectual structures, researchers have increasingly used bibliometric methods to map the thematic evolution of Green HRM.

Table 1 provides a summary of prior bibliometric studies on Green HRM, highlighting their objectives, data sources, time periods, number of documents analyzed, main metrics, and key findings. The table illustrates that earlier bibliometric work often focused on short-term periods and specific regions, with limited attention to long-term trends or the evolution of thematic clusters. For example, Mehta (2024) [24] used Scopus data from 2015–2021 and identified China as a dominant contributor, while Fachada et al. (2022) [25] analyzed Web of Science publications from 2010–2020 and noted rapid growth but conceptual immaturity. Other studies, such as Doan & Wu (2025) [26], examined collaboration networks and keyword co-occurrence, highlighting emerging topics like green innovation and employee behavior. Collectively, these studies demonstrate the increasing scholarly interest in Green HRM but also reveal fragmentation in methodological approaches, metrics used, and geographic coverage, reinforcing the need for a comprehensive, longitudinal analysis of the field.

Table 1: Summary of Prior Bibliometric Studies on Green HRM

Author(s) & Year	Data-base Used	Time Period Covered	No. of Documents	Focus / Metrics Analyzed	Key Findings / Themes
Mehta (2024) [27]	Scopus	2015 – 2021	176	Trends in authors, publications, journals, citations, and keyword co-occurrence	GHRM emerging; China dominant; key authors and journals identified
Doan & Wu (2025) [26]	Web of Science	2006 – 2024	284	Publication trends, thematic clusters, and collaboration networks	Steady rise post-2016; green innovation, behavior prominent; underexplored areas
Siva Rama Krishna et al. (2024) [28]	Scopus	2011 – 2022	135	Interplay of green behavior and health (SDGs), keyword co-occurrence	Linked green behavior to sustainable health, policy, and marketing focus
Fachada et al. (2022) [25]	Web of Science	2010 – 2020	143	Keyword co-occurrence, bibliographic coupling, and conceptual stage analysis	Rapid growth but conceptual immaturity; four thematic clusters
Shah et al. (2024) [29]	WoS + Scopus	2002 – 2022	595	Descriptive metrics, network mapping	Publications doubled; emerging themes: CSR, innovation, circular economy
Bahuguna et al. (2022) [14]	Web of Science	2005 - June 2021	247	Evolution mapping, prolific authors, keywords	Recent traction has mainly been in limited HR practices and regions
Khan & Muktar (2020) [30]	Scopus	2008 -2020	147	Global trends, key authors, and sectors	Increasing worldwide interest; pioneer authors identified
Faheem et al. (2024) [31]	Scopus	2014 – 2023	46	GHRM and green innovation relationships	Strong association; key journals and countries identified

Source: Authors' Creation

2.1 Research Gap

Despite the growing number of bibliometric reviews, no study has conducted a comprehensive longitudinal study spanning nearly three decades to fully map the intellectual evolution and thematic development of Green HRM research. This lack of extended temporal coverage limits understanding of how Green HRM has matured conceptually and practically over time. The present study addresses this clear gap by offering a systematic and focused bibliometric analysis covering 1998 - July 2025 exclusively from the Web of Science database, providing novel insights into the field's long-term trajectory and emerging directions.

3. Methodology

This study employed a bibliometric research design to systematically map the intellectual structure and thematic evolution of the Green HRM literature. The bibliometric approach was selected because it enables an evidence-based examination of publication trends, key contributors, and conceptual linkages within the field over time [32].

3.1 Data Source and Search Strategy

The Web of Science (WoS) Core Collection was chosen as the primary data source given its comprehensive coverage of high-quality, peer-reviewed journals relevant to Green HRM. A structured search query was developed using keywords and phrases such as “Green human resource management,” “Green HR,” and “Sustainable HR practices.” The search was applied to topic fields including title, abstract, author keywords, and Keywords Plus to ensure thorough retrieval of important documents.

3.2 Inclusion and Exclusion Criteria

To maintain data quality and relevance, only articles published between 1998 and July 2025 were included, allowing capture of the full evolution of Green HRM scholarship from its inception to recent developments over three decades. The search was limited to journal articles, review papers, and conference proceedings published in English. After careful screening, a total of 288 publications were finalized for analysis.

3.3 Data Analysis

The analysis proceeded in multiple stages. First, descriptive analysis was conducted using MS Excel to map publication trends, growth trajectory, and citation patterns (addressing RQ1 and part of RQ2). Second, to explore the thematic structure, keyword frequency data were extracted and used to build heatmaps in Power BI, enabling a visual assessment of keyword density and cluster-level themes (addressing RQ3). Finally, VOSviewer was employed to conduct bibliometric network analysis, including keyword co-occurrence, co-authorship collaborations, and co-citation networks, with temporal overlay visualization to distinguish between foundational and emerging themes (addressing RQ2, RQ3, and RQ4).

3.4 Analytical Framework

Keyword co-occurrence analysis identified focal research themes and their interconnections. Thematic clustering revealed the underlying intellectual framework of the field. Temporal overlay visualizations illustrated how Green HRM research has evolved, transitioning from foundational concepts to newer, cutting-edge topics. This integrated bibliometric approach delivered both quantitative metrics and visual insights into the growth trajectory, knowledge architecture, and future research directions within Green HRM.

4. Research Findings

4.1 Publication Trend over Time

This section addresses Research Question 1 by examining the volume and growth trajectory of Green HRM research within the Web of Science (WoS) database from 1998 to July 2025. As shown in Fig. 1, the publication trend reveals a clear upward trajectory over this period. The field began modestly, with only a few sporadic publications each year between 1998 and 2007, typically ranging from one to four articles annually.

Starting around 2008, a gradual increase became apparent, with annual outputs steadily gaining momentum. The years between 2015 and 2019 marked a significant phase of growth, as the number of publications rose from 9 in 2015 to 24 by 2019, reflecting growing academic interest in sustainability-focused HR practices.

A pronounced surge occurred in 2021, when 42 publications were recorded, the highest in the period, followed by 37 in 2022 and 32 in 2023. This pattern indicates heightened scholarly attention to Green HRM as an essential aspect of organizational sustainability. Although the number of publications slightly declined to 32 in 2024 and 19 (based on data available up to July) in 2025, the overall trend illustrates that Green HRM has evolved from a nascent, intermittently explored topic in the early 2000s to a rapidly expanding and increasingly relevant research domain.

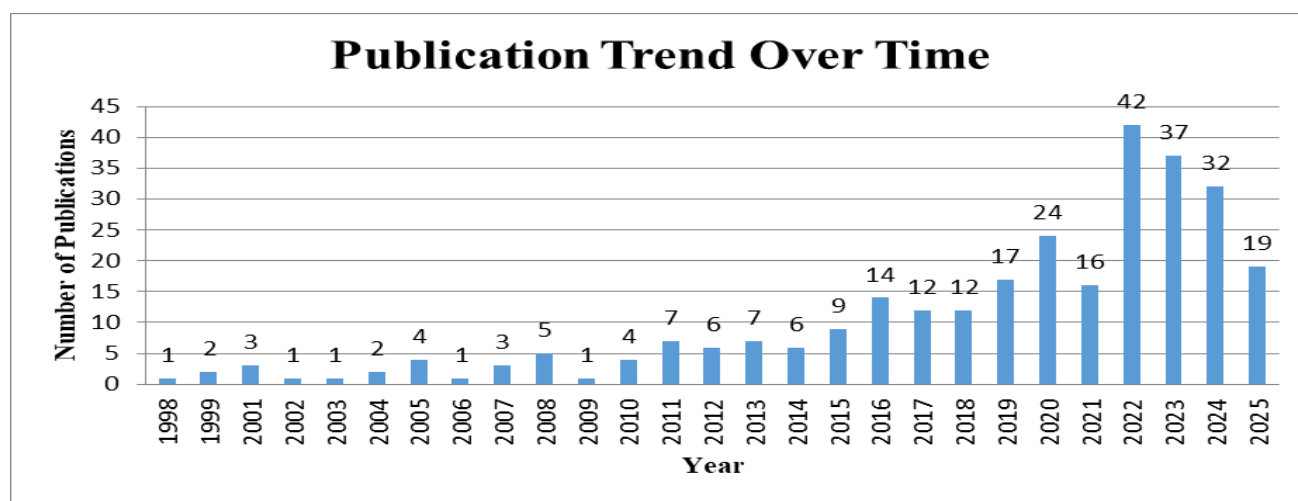


Fig. 1: Publication Trend Over Time

4.2 Influential Authors and Journals

This section addresses Research Question 2 by analyzing the top 15 most influential authors and journals contributing to the development of Green HRM scholarship during the study period.

Fig. 2 reveals that among the top 15 cited authors, Gupta, Lav, Jain, Raj, and Vaszkun, Gabor collectively lead with the highest citation count of 1,434. They are followed by Singh, Sanjay Kumar, and Del Giudice, Manuel, who have accumulated 1,123 citations. Other prominent contributors within the top 15 include Dumont, Jenny; Shen, Jie; Deng, Xin (798 citations); and El-Kassar, Abdul-Nasser and Singh, Sanjay Kumar (770 citations).

Turning to the top 15 journals in Fig. 3, the analysis shows that Technological Forecasting and Social Change stands out as the most influential journal, with 3,707 citations. It is followed by the Journal of Business Ethics (2,680 citations), Tourism Management (2,351), and the International Journal of Manpower (2,171). Additional key journals include IEEE Communications Surveys and Tutorials (1,595 citations) and the International Journal of Operations & Production Management (1,305 citations).

This distribution demonstrates that highly cited Green HRM scholarship appears not only in traditional HRM journals, such as Human Resource Management (1,166 citations), but also in interdisciplinary and sustainability-focused journals, highlighting the cross-disciplinary nature of the field.

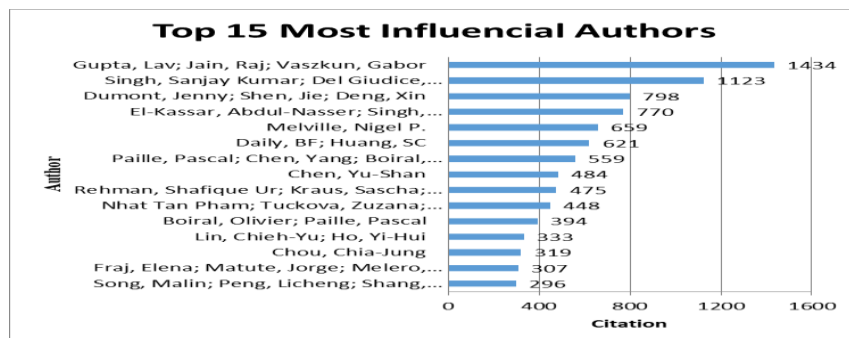


Fig. 2: Top Influential Authors

Source: Authors' Creation



Fig. 3: Most Influential Journals

Source: Authors' Creation

The co-authorship network in Fig. 4 highlights major collaborative groups and how they have evolved. Two key clusters stand out: first, the group led by Ren, Shuang, and colleagues, which represents a well-established and growing research team with increasing collaboration; and second, a newer cluster emerging between 2020 and 2025, consisting of Singh, Sanjay Kumar, El-Kassar, Abdul-Nasser, and Chierici, Roberto. This newer group exhibits strong connections internally and focuses increasingly on sustainable organizational practices. The color gradient of the nodes, transitioning from blue to yellow, visually represents the temporal progression of contributions, emphasizing the dynamic and interconnected nature of the global Green HRM research community.

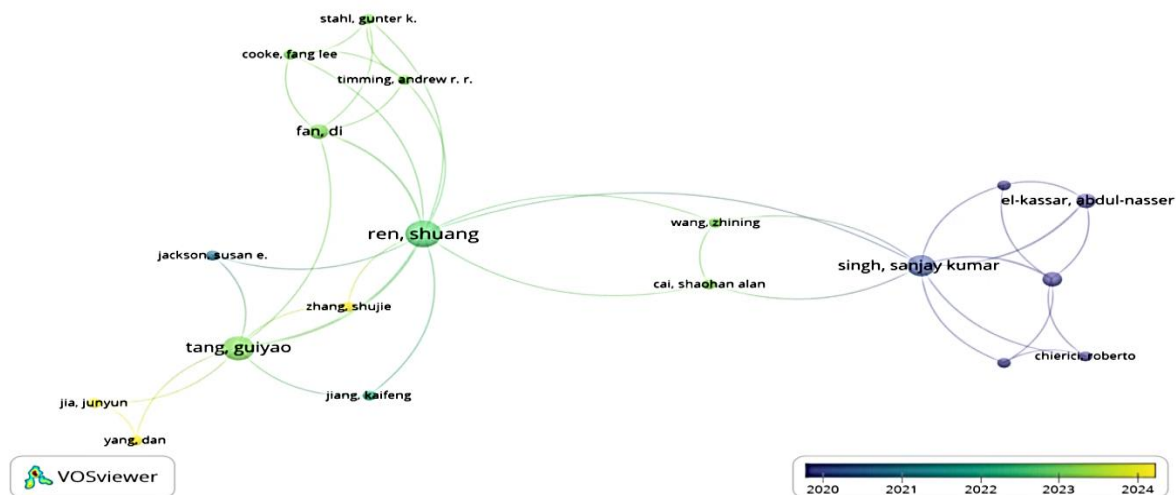


Fig. 4: Co-authorship Network

Source: Authors' Creation

4.2.1 Thematic Clusters and Their Evolution

This section addresses Research Question 3 by exploring the predominant themes and conceptual clusters that have shaped Green HRM research and their evolution over time. The cluster-level heatmap in Fig. 5 reveals four broad thematic clusters: The Core Concepts cluster includes foundational terms such as green HR practices, environmental management, and sustainable HR systems. This cluster has been consistently prominent since the early years and remains highly relevant today, highlighting its ongoing centrality in the field. The Employee Focus cluster emphasizes themes like green employee behavior, commitment, and training. These themes gained traction after 2010, signaling a pivot toward understanding individual-level behaviors and their role in fostering sustainability. The Organizational Outcomes cluster links Green HRM to organizational performance, innovation, and competitive advantage. Post-2015, these topics saw increased attention, reflecting growing interest in strategic and business implications of Green HRM; The Sustainability cluster connects Green HRM research to broader environmental and corporate sustainability goals. Its prominence rose notably after 2018, aligning Green HRM more closely with global sustainability agendas and emphasizing its role within wider environmental efforts.

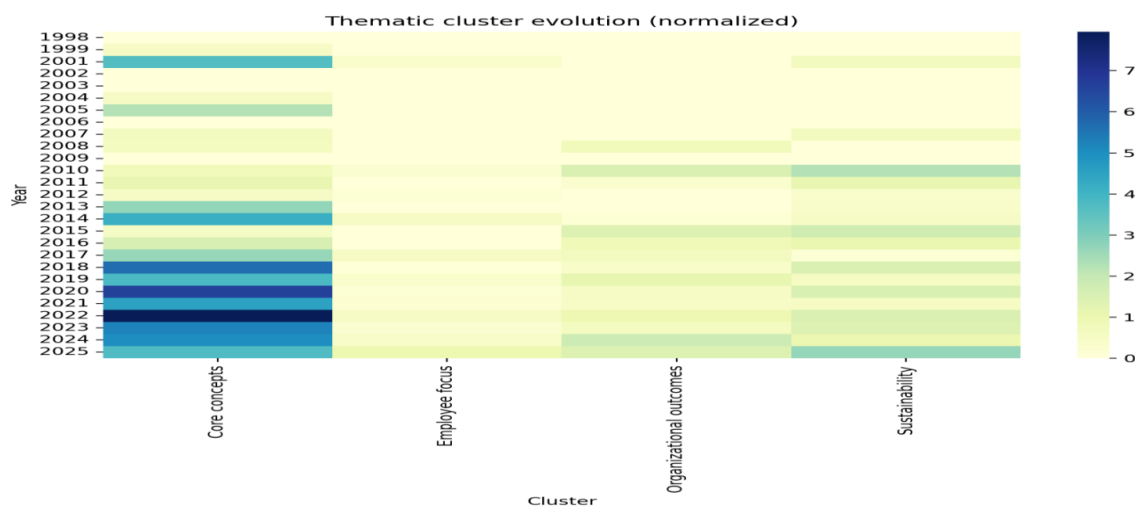


Fig. 5: Heatmap illustrating annual publication counts per thematic cluster

Source: Authors' Creation

The cluster-level heatmap depicts the absolute volume of publications in each thematic cluster across the years. It shows that while Core Concepts has dominated in terms of publication counts and has grown substantially since 2018, other clusters, particularly Sustainability and Employee Focus, have gradually expanded their publication output since 2015. Organizational Outcomes has also shown a modest but steady rise, indicating increasing attention to the strategic value of Green HRM.

The normalized heatmap in Fig. 6 illustrates the relative thematic intensity (0–1) of clusters per year. Early research (1998–2010) concentrated almost exclusively on Core Concepts, whereas later years (2015–2025) exhibit thematic diversification, with Employee Focus, Organizational Outcomes, and Sustainability gaining relative prominence. This pattern signifies a shift from establishing conceptual foundations toward exploring applied, outcome-oriented, and sustainability-driven research themes.

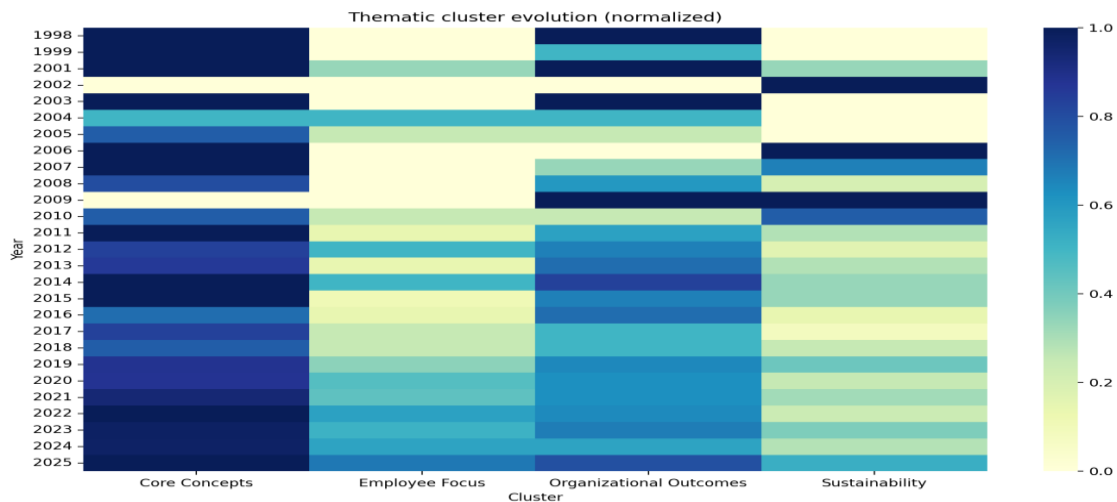


Fig. 6: Normalized heatmap (0–1) showing relative thematic intensity over time

Source: Authors' Creation

Fig. 7 presents a density visualization of keyword co-occurrence patterns in the Green HRM literature. Two prominent clusters are identified:

Management-Process-Resource Cluster - encompassing keywords such as management, system, process, development, resource, and innovation, this cluster represents the field's foundational focus on operational and systems-driven aspects of Green HRM. It highlights how early research primarily emphasized HR processes, structural design, and resource allocation for sustainability integration.

Employee-Theory-Behavioral Cluster - including employee, theory, leadership, green HRM, CSR, and OCBE, this cluster reflects the field's shift toward behavioral, theoretical, and people-centric dimensions. It underscores the growing emphasis on employee engagement, pro-environmental behavior, and the development of organizational culture to support sustainability.

Fig. 8 illustrates the network visualization of keyword co-occurrence relationships, offering a complementary perspective. Central nodes such as management, process, system, and resource confirm the foundational backbone of Green HRM research. Emerging keywords like green HRM, CSR, leadership, and sustainability occupy peripheral but increasingly prominent nodes (yellow and green shades), indicating their rising importance since 2021. Bridging terms such as innovation, development, and theory connect the two clusters, signaling a transition toward integrative, interdisciplinary, and practice-oriented research.

Together, Figures 7 and 8 reveal a clear evolution in Green HRM scholarship from foundational, systems-oriented studies to more complex, employee-focused, and sustainability-driven themes. These insights highlight the field's conceptual maturation and identify emerging areas for future research, such as behavioral mediators, green leadership, and cross-sectoral applications, directly addressing RQ3 and RQ4.

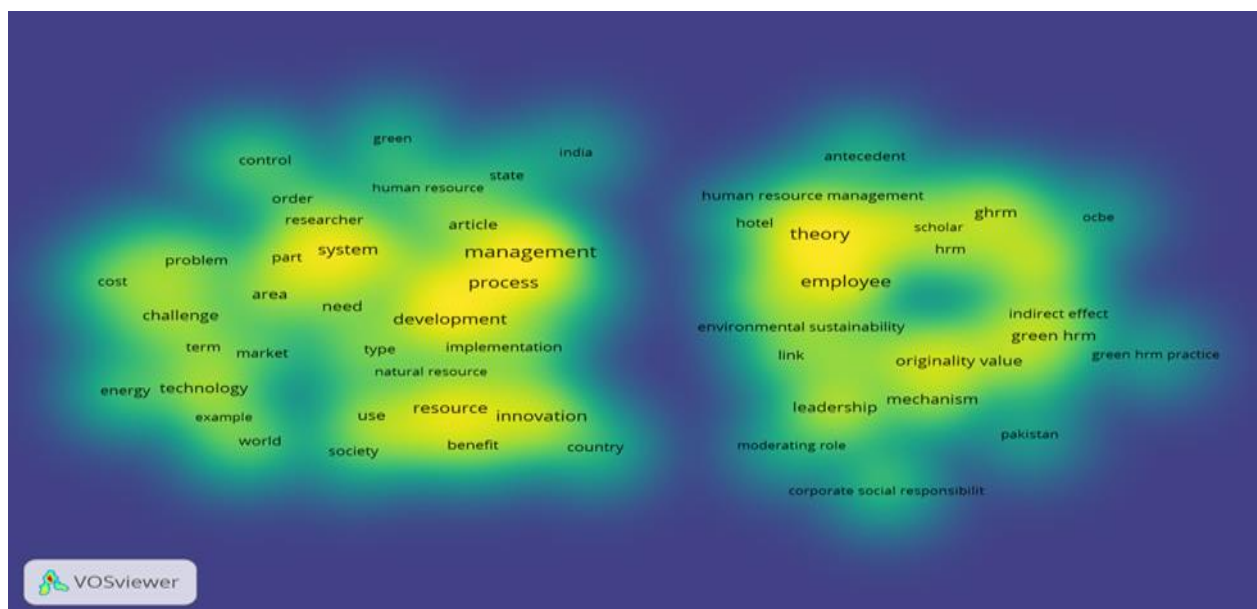


Fig.7: Keyword Co-occurrence Density Map

Source: Authors' Creation

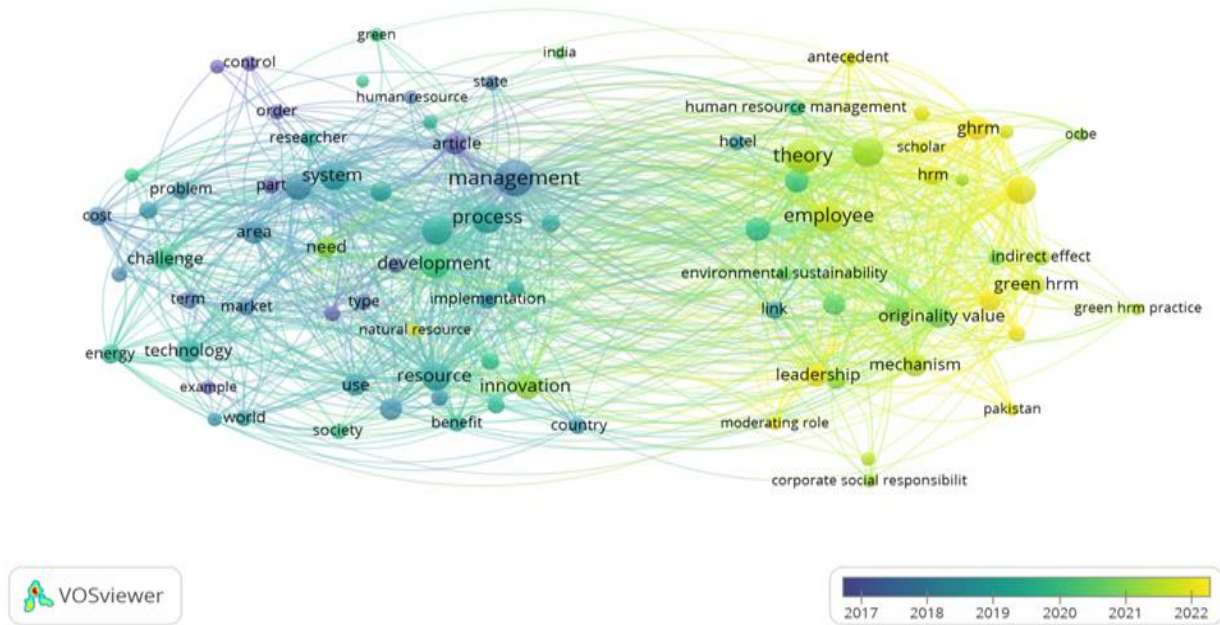


Fig.8: Keyword Co-occurrence Network Visualization

Source: Authors' Creation

5. Discussion

5.1 Thematic Evolution of Green HRM Research

The combined evidence from the heatmaps and keyword co-occurrence network reveals a clear thematic shift in the Green HRM literature. Earlier research (pre-2010) was concentrated mainly around broad environmental concerns, such as waste reduction and environmental management systems, often disconnected from HR-specific strategies. This early operational orientation positioned Green HRM within the larger domain of environmental management rather than as an HR function.

Between 2010 and 2015, the field entered a transition phase marked by the rise of sustainability as an anchor theme and the emergence of research linking environmental practices with performance outcomes. During this period, keywords like performance, management systems, and innovation became more prominent, signaling the first steps toward exclusively integrating HRM with organizational sustainability goals.

From 2015 to 2022, the literature experienced rapid growth and thematic consolidation. HRM constructs became the central lens, and employee-focused research surged, highlighting green leadership, engagement, and pro-environmental behavior. Sustainability continued as a cross-cutting foundation that integrated ecological and social concerns into HR strategies. The network maps during this period show increasingly dense interconnections, reflecting the maturation and diversification of the field.

While bibliometric data from 2023–2025 show a slight dip in output (likely due to indexing delays), the trajectory reveals strengthening of employee-level and sustainability-oriented themes, with emerging interest in CSR and indirect behavioral mechanisms (such as green organizational citizenship behavior). Overall, the field has shifted from a narrow systems-based orientation to a behavioral, integrative, and strategic perspective.

These findings extend prior reviews. Fachada et al. (2022)[25] positioned Green HRM in Stage 2 (concept augmentation) of Reichers and Schneider's model [33], highlighting conceptual immaturity. Our longitudinal mapping demonstrates thematic consolidation and growing employee-level emphasis. Similarly, Mehta (2024)[24], Khan and Muktar (2020)[30], Shah et al. (2024) [29], and Doan and Wu (2025)[26] documented field growth; this study builds on that evidence by showing how growth coincides with thematic diversification and integrative approaches.

5.2 Intellectual and Collaborative Landscape

Co-authorship and bibliometric network maps reveal two prominent collaborative clusters that have shaped recent thematic development. The first, anchored by a set of long-standing contributors, shows sustained productivity over time and a steady influx of new collaborators (indicated by temporal color shifts). The second is a more recent, tightly connected cluster that has contributed to emergent topics in sustainable organizational practices. These patterns suggest that the field's thematic advances are driven not only by individual authors but by evolving collaborative networks and cross-cluster linkages.

This view complements prior findings: Bahuguna et al. (2022)[14] identified concentrated intellectual structures in earlier periods; our network overlays indicate that those structures are becoming more interconnected and dynamic, with newer collaborators bridging previously separate topic areas. Mehta (2024) [24] identified core contributors and high-impact authors; author-level analyses here corroborate those central nodes while also highlighting the entry of newer research actors who help propagate emerging themes.

5.3 Emerging Topics and Future Directions

The bibliometric mapping in this study highlights several emerging thematic directions within the Green HRM literature. While foundational concepts such as green HR practices, environmental management, and sustainable HR systems continue to dominate, newer keywords and clusters appearing more frequently after 2021 indicate a notable thematic shift. Research is increasingly moving from a sys-

tems-oriented and operational focus toward employee-centric and behavioral dimensions. Terms related to employee behavior, engagement, and training are gaining prominence, reflecting growing interest in the micro-level mechanisms through which Green HRM influences sustainability outcomes. This behavioral turn is accompanied by the rising visibility of constructs such as leadership, CSR, and organizational citizenship behavior for the environment (OCBE), which are beginning to appear as newer nodes in the co-occurrence network. In parallel, themes linking Green HRM to innovation and organizational performance are also becoming more prominent, suggesting a stronger strategic orientation within the field. Collectively, these patterns point to an ongoing thematic broadening, as the field transitions from early concept-building toward more integrative and outcome-oriented approaches.

Building on these emerging trajectories, several promising avenues for future research can be identified. First, theory-driven multilevel models could be developed to examine how Green HRM practices operate simultaneously at the individual, team, and organizational levels. Second, longitudinal and intervention-based studies are needed to move beyond cross-sectional designs and establish causal relationships between Green HRM practices and organizational outcomes. Third, future work should explore the role of behavioral mediators and moderators, such as green leadership, psychological green climate, and green motivation, to explain how HR practices translate into employee pro-environmental behaviors. Fourth, there is scope to advance the measurement of Green HRM by developing and validating robust scales for constructs such as green employee behavior, green training effectiveness, and sustainable HR systems. Finally, comparative studies across sectors and organizational contexts could help identify the boundary conditions under which Green HRM practices are most effective. Taken together, these directions can deepen theoretical understanding, improve methodological rigor, and strengthen the practical relevance of Green HRM scholarship.

6. Implications

For researchers and academicians, this study points out key gaps and shows that Green HRM is moving beyond just describing practices to building strong, theory-based explanations. Future work can focus on developing models that explain how specific green HR practices influence employee behaviors like creativity and engagement, as well as the psychological factors that link these practices to organizational success. Using long-term and experimental research designs will help establish clear cause-and-effect relationships. The clustering of leading authors also highlights the opportunity for more collaboration across institutions and countries to unite fragmented research and boost collective knowledge.

For HR practitioners, the findings reinforce that Green HRM is no longer just an operational task but a strategic, employee-focused approach to sustainability. HR leaders should move beyond isolated initiatives like green hiring or training, and instead build integrated systems that embed sustainability throughout the employee lifecycle. For example, hospitality firms have successfully combined green training, green performance management, and employee involvement practices, which resulted in enhanced employees' voluntary green behavior [12], while manufacturing organizations have linked sustainability initiatives to operational efficiency [34], [35]. Cultivating green organizational cultures, fostering sustainable leadership, and linking HR practices to measurable environmental results can strengthen employee commitment and boost organizational competitiveness.

For policymakers and institutions, this study underscores how environmental sustainability is becoming central to HRM. This growing trend calls for policies that encourage the adoption of green HR systems, such as sustainability-linked certifications, funding for capacity-building, and incorporating environmental performance into labor and corporate governance standards. Understanding this trend will help shape future policies that support organizations in embedding environmental goals within workforce management.

7. Conclusion

This study provides a thorough bibliometric review of Green HRM research from 1998 to July 2025 based on the Web of Science database. Using statistics, heatmaps, and network maps, it shows how the field has evolved from early studies focused on operational processes to recent work that centers on employees and sustainability. It also identifies key authors, journals, and collaborative groups, highlighting a clear shift toward more strategic and interdisciplinary approaches. The findings enhance understanding of the intellectual landscape and emerging themes in Green HRM. Limitations include reliance on Web of Science and English-language publications, potentially omitting relevant studies from other databases or languages. Future research could adopt multi-database approaches, integrate bibliometric and systematic review methods, and leverage citation and altmetric data to track research impact. Overall, this study not only maps the growth of Green HRM research but also provides a strategic guide for scholars and practitioners to advance sustainable HR practices.

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