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Mapping The Landscape: A Bibliometric And Systematic Review Of Green Human Resource Management Role In Achieving Sustainable Firm Performance

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Abstract
This study provides a comprehensive mapping and synthesis of the global research landscape on Green Human Resource Management (GHRM) and its role in achieving sustainable firm performance. Drawing on a systematic review and advanced bibliometric analysis of 504 peer-reviewed articles published between 2012 and 2025 from the Scopus database, the research evaluates publication trends, identifies leading authors, countries, and institutions, and reveals the thematic evolution within the field. Utilizing R Studio and Biblioshiny, the study visualizes collaboration networks and key keyword clusters, demonstrating that "environmental performance," "green human resource management," and "sustainability" are the most central themes in the literature. The findings highlight rapid growth in publication output, strong international collaboration, and the multidisciplinary nature of GHRM research, especially in Asia and emerging economies. However, the analysis also uncovers persistent gaps, including limited studies in developing country contexts and underexplored stakeholder perspectives. By providing a holistic synthesis of research trends, knowledge structures, and unresolved issues, this study offers valuable insights for scholars, practitioners, and policymakers, and proposes a strategic roadmap for future research. The review ultimately advances understanding of how GHRM practices can drive sustainable organizational outcomes and sets a robust agenda for subsequent investigation and practice in the sustainability domain.
Keywords: *Green HRM, sustainability, firm performance, bibliometric, systematic review, environmental performance*

INTRODUCTION

In recent years, sustainability has evolved into a cornerstone of organizational strategy, progressing well beyond regulatory compliance and becoming a critical determinant of long-term competitive advantage (Ali et al., 2024; Zhao et al., 2021; Yin, 2023). The intensifying impacts of climate change, escalating regulatory demands, and mounting stakeholder expectations have driven organizations worldwide to embed sustainability principles into their vision and operational practices (Zhao et al., 2021; Shobhana et al., 2022). Modern corporations are increasingly evaluated not only by their financial outcomes but also by their tangible contributions to environmental and social well-being (Ali et al., 2024; Sher & Nawaz, 2021; Allam & Mansour, 2024).

Within this paradigm, human resource management has emerged as a crucial internal engine for organizational sustainability. Strategic human resource systems play a pivotal role in shaping an environmentally responsible culture and empowering employees as agents of positive change (Shobhana et al., 2022; Annisa et al., 2024; Yin, 2023). Green Human Resource Management (GHRM), which involves the integration of environmental objectives into all facets of HR practices—from recruitment and selection to training, performance evaluation, and rewards—has demonstrated its potential to foster green behaviors and enhance organizational performance (Shobhana et al., 2022; Zhu, 2023; Din et al., 2023). The theoretical foundations of GHRM are deeply rooted in the Ability-Motivation-Opportunity (AMO) framework, the Triple Bottom Line, and the Resource-Based View, all of which underscore the strategic value of human capital in sustainable organizational outcomes (Jawaad et al., 2022; Sher & Nawaz, 2021; Adowah et al., 2025).

A growing body of empirical research consistently affirms that GHRM practices are positively associated with environmental performance, green innovation, and the development of pro-environmental organizational cultures (Al-Abbadi & Abu Rumman, 2023; Dilrukshi & Aluthge, 2024; Gichira et al., 2023). Investigations across multiple sectors reveal that targeted green training and incentives significantly influence employee engagement and firm-level sustainability performance (Gichira et al., 2023; Din et al., 2023; Albloush et al., 2022). Nevertheless, the scholarly landscape of GHRM remains highly fragmented, with much of the extant research confined to specific countries, industries, or organizational sizes, thus resulting in a dearth of generalizable knowledge and limited opportunities for cross-contextual learning and best practice diffusion (Sun et al., 2024; Gichira et al., 2023a; Wijesingha et al., 2020; Riaz et al., 2024).

Methodological diversity further compounds this fragmentation. Many studies continue to rely on single-country case studies, cross-sectional surveys, or qualitative narratives, making it challenging to build a cohesive global understanding of GHRM's contribution to sustainable performance (Jawaad et al., 2022; Alshuaibi et al., 2024; Gichira, Nkari, & Kaimenyi, 2023). Although several literature reviews exist, most are regionally focused or lack the systematic and bibliometric rigor necessary to comprehensively map the intellectual structure and thematic evolution of the field (Jawaad et al., 2022; Ali et al., 2024; Dilrukshi & Aluthge, 2024).

The absence of integrative and up-to-date reviews represents a critical impediment to theoretical and practical advancement in the field of GHRM. Without a holistic synthesis of research trends, leading authors, influential institutions, and evolving collaboration networks, the risks of research duplication and the slow diffusion of innovative practices are heightened (Annisa et al., 2024; Riaz et al., 2024; Allam & Mansour, 2024). For practitioners and policymakers, the lack of robust scholarly mapping may result in decisions grounded in incomplete or obsolete evidence, potentially undermining innovation and resource allocation (Albloush et al., 2022; Allam & Mansour, 2024; Dilrukshi & Aluthge, 2024).

The landscape of GHRM is becoming even more complex in the digital age. The integration of big data analytics, green digital learning, and technology driven HRM innovations remains an underexplored but critical area for amplifying organizational sustainability outcomes (Alshuaibi et al., 2024; Sun et al., 2024). Moreover, global disruptions such as the COVID-19 pandemic have underscored the need for resilient and adaptive HR strategies, yet few studies have systematically examined how GHRM responds to such unprecedented challenges (Din et al., 2023; Zhu, 2023).

In response to these complexities, recent scholarship has increasingly called for systematic, data-driven, and globally scoped analyses of GHRM. Bibliometric and systematic review methodologies have been recognized as essential for mapping publication trends, thematic clusters, and collaboration networks, thereby consolidating fragmented knowledge and clarifying research agendas for the future (Jawaad et al., 2022; Riaz et al., 2024; Ali et al., 2024). These approaches not only illuminate existing knowledge but also reveal critical research gaps and underexplored domains, providing a strategic roadmap for future inquiry and organizational practice (Annisa et al., 2024; Dilrukshi & Aluthge, 2024).

Despite such calls, there is currently no comprehensive, integrative review that combines advanced bibliometric mapping with systematic qualitative synthesis to chart the evolution of GHRM research and its linkage with sustainable firm performance on a global scale (Ali et al., 2024; Adowah et al., 2025; Riaz et al., 2024; Gichira, Nkari, & Kaimenyi, 2023). Existing reviews typically focus on narrower topics or specific regions, leaving important questions unanswered regarding dominant themes, leading research clusters, and innovative opportunities (Zhao et al., 2021; Wijesingha et al., 2020).

Addressing this gap, the present study seeks to provide the first integrated bibliometric and systematic review of the global landscape of GHRM and sustainable firm performance. By utilizing advanced tools such as VOSviewer and the PRISMA framework, this study comprehensively maps key contributors, institutional affiliations, collaboration patterns, and thematic evolution within the GHRM literature (Jawaad et al., 2022; Riaz et al., 2024; Alshuaibi et al., 2024). Through synthesizing major research trends, unresolved issues, and practical implications, this research also offers actionable recommendations for advancing both scholarly inquiry and policy development (Ali et al., 2024; Al-Abbadi & Abu Rumman, 2023; Annisa et al., 2024).

This novel and comprehensive approach is expected to make significant contributions to the intellectual structure and global dynamics of GHRM research. By filling major knowledge gaps and

highlighting emergent thematic frontiers, the study aims to support the development of more effective, innovative, and adaptable HR strategies for sustainability in diverse organizational contexts (Jawaad et al., 2022; Yin, 2023; Sun et al., 2024). Ultimately, the findings are poised to serve as an essential reference for scholars, practitioners, and policymakers seeking to embed GHRM principles at the core of sustainable business strategies worldwide (Ali et al., 2024; Allam & Mansour, 2024).

2. METHOD

2.1. Research Design

This study adopts a bibliometric and systematic review approach to comprehensively map and analyze the global research landscape of Green Human Resource Management (GHRM) and its role in achieving **sustainable** firm performance. The bibliometric analysis enables a quantitative assessment of research productivity, scientific collaboration, and the evolution of key thematic clusters over time. Meanwhile, the systematic review approach is employed to synthesize the main findings and identify critical research gaps. The review process is conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, thereby ensuring transparency, rigor, and reproducibility at each stage. The overall process is visually summarized in a PRISMA flow diagram (Figure 1).

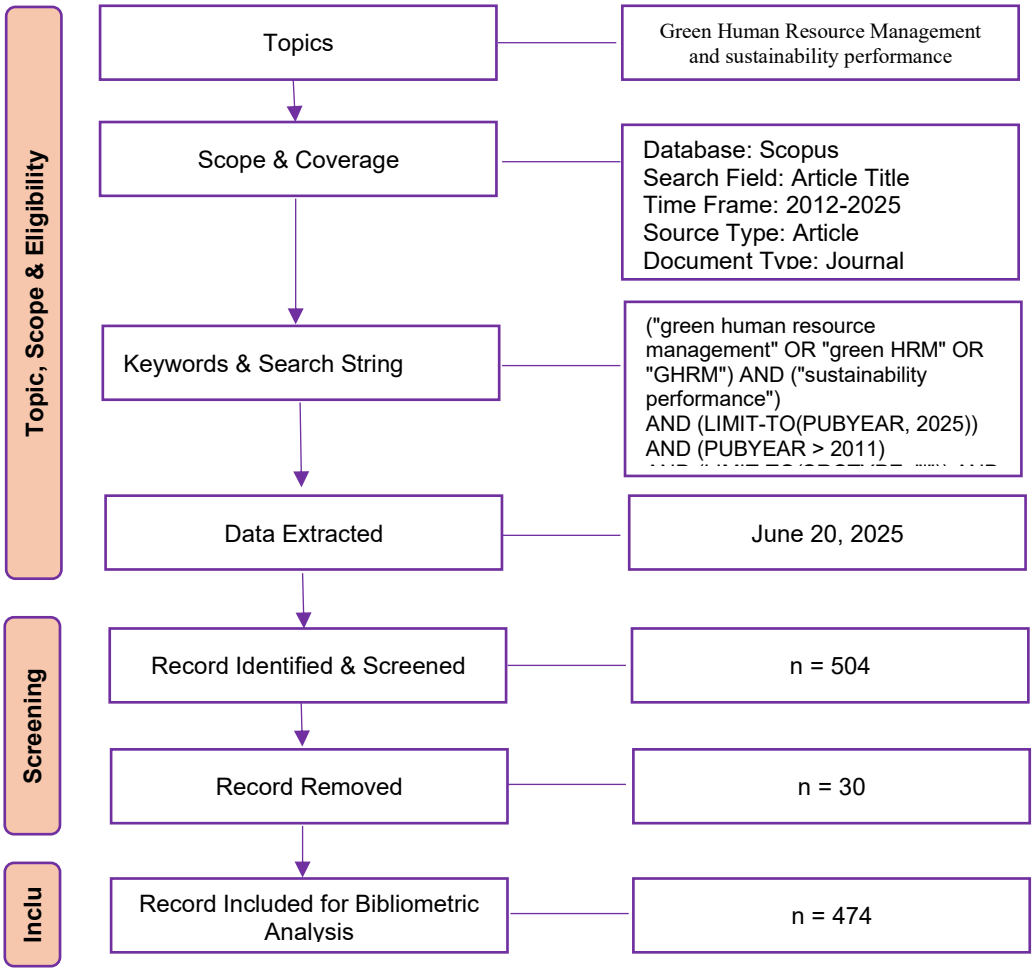


Figure 1. Flow diagram of the search strategy

2.2. Data Source and Search Strategy

The Scopus database was chosen as the sole data source for its comprehensive coverage of peer-reviewed literature, particularly in the fields of management and sustainability studies. The literature search was carried out on [insert date] and was limited to journal articles published between 2012 and 2025. To maximize the relevance and inclusivity of the results, the search employed the following keyword string:

TITLE-ABS-KEY (("Green Human Resource Management" OR "green HRM" OR "GHRM" OR "environmental human resource management" OR "sustainable HRM" OR "eco-friendly HRM") AND ("firm performance" OR "organizational performance" OR "company performance" OR "business performance" OR "sustainability performance" OR "corporate performance" OR "environmental performance" OR "economic performance" OR "social performance") AND ("role" OR "effect" OR "impact" OR "influence" OR "relationship" OR "contribution" OR "implementation" OR "practices")) AND (LIMIT-TO (PUBYEAR , 2025)) AND (PUBYEAR > 2011) AND (LIMIT-TO (SRCTYPE , "j")) AND (LIMIT-TO (LANGUAGE, "English")).

This comprehensive set of keywords was designed to capture the breadth of the GHRM literature, encompassing all relevant synonyms and dimensions of firm performance, as well as conceptual and practical terms related to the topic.

After applying these search parameters, the initial screening resulted in the retrieval of 504 journal articles that matched the scope of this study. Only peer-reviewed articles published in English were considered, in order to ensure the quality and international relevance of the data.

2.3. Inclusion, Screening, and Selection

The records obtained from the Scopus search were exported in CSV format and subsequently imported into R Studio for processing and further analysis. The titles and abstracts of all records were independently reviewed by two researchers to ensure alignment with the research objectives. Irrelevant, duplicate, or non-article records were excluded at this stage. Any disagreements regarding article inclusion were resolved through discussion and consensus. Full texts of potentially relevant articles were then examined in greater detail to confirm their eligibility based on the predefined inclusion criteria, which required that each study explicitly addressed the relationship between GHRM (or related concepts) and any dimension of firm, organizational, environmental, or sustainability performance. Following this thorough screening and eligibility assessment, a final set of 504 articles was included in the bibliometric and systematic analysis.

2.4. Data Extraction

For each of the eligible articles, relevant bibliographic metadata were systematically extracted. This included information such as the article title, author names, year of publication, journal name (along with volume and issue, where available), author affiliations and countries, abstracts, keywords, and citation counts. Additional variables such as references and funding information were also noted when available. The extraction process was conducted using the export function in Scopus, with all records reviewed and formatted for consistency within R Studio to facilitate robust analysis.

2.5. Analytical Procedure

The analytical process began with descriptive and bibliometric analysis using R Studio and the bibliometrix package. This stage focused on exploring annual publication trends, identifying the most productive journals, authors, and countries, and mapping the most frequently cited papers and key contributors in the field. Network analyses were performed to uncover collaboration patterns among authors and institutions, as well as to map keyword co-occurrence networks that reveal major research clusters and emerging themes. Citation and co-citation analyses were conducted to illuminate the intellectual structure and evolution of the research domain, and thematic mapping was used to trace how topics and research foci have shifted between 2012 and 2025.

In addition to quantitative mapping, a systematic review was performed, focusing on the most cited and thematically significant articles identified in the previous stages. This qualitative synthesis brought together conceptual frameworks, methodological approaches, and key empirical findings, while also highlighting inconsistencies, underexplored areas, and research gaps that require further investigation.

All analyses and visualizations—including publication trends, collaboration maps, thematic diagrams, and keyword networks—were generated using R Studio and its visualization tools, including ggplot2, bibliometrix, and biblioshiny. Graphs and tables were also exported to Microsoft Excel for refinement and presentation purposes.

2.6. Quality Control and Reproducibility

Throughout the entire process, all analytical scripts, search strategies, and screening procedures were carefully documented and archived to ensure transparency and reproducibility. Screening and selection were independently conducted by two researchers in accordance with the PRISMA

guidelines, with any discrepancies resolved through discussion. The analytical outputs and underlying codes are available upon request in a version-controlled repository, further enhancing the reliability and transparency of this research.

3. RESULT AND DISCUSSION

3.1. Overview of Research Activity on GHRM and Sustainable Firm Performance

The main findings of the bibliometric analysis, as summarized in **Table 1**, reveal that research on Green Human Resource Management (GHRM) and its role in achieving sustainable firm performance has grown rapidly between 2012 and 2025. A total of 474 documents were published across 236 journals, with an impressive annual growth rate of 32.55%, reflecting a surge of academic interest in this area. The research output involved 1,435 authors and demonstrated a strong culture of collaboration, with an average of 3.56 co-authors per article and 42.83% of publications resulting from international partnerships. The field's diversity is further illustrated by 1,068 unique author keywords, showing the wide-ranging themes under investigation. Furthermore, each document received an average of 49.72 citations, underscoring the significant scholarly impact of this body of work. The relatively young average document age of 2.53 years indicates that most research contributions are recent, supporting the view that this topic remains highly relevant and dynamic. Together, these results—presented visually in Figure 1 and summarized quantitatively in Table 1—highlight the robust growth, global collaboration, thematic diversity, and substantial influence of GHRM research within the broader sustainability and organizational performance literature.

Table 1. Overview of Research Activity

Description	**Results**
Main Information About Data	
Timespan	2012:2025
Sources (Journals, Books, Etc)	236
Documents	474
Annual Growth Rate %	32,55
Document Average Age	2,53
Average Citations Per Doc	49,72
References	0
Document Contents	
Keywords Plus (Id)	692
Author's Keywords (De)	1068
Authors	
Authors	1435
Authors Of Single-Authored Docs	30
Authors Collaboration	
Single-Authored Docs	36
Co-Authors Per Doc	3,56
International Co-Authorships %	42,83
Document Types	
Article	386
Book	5
Book Chapter	34
Book Chapter Article	1
Conference Paper	26
Conference Review	1
Editorial	2
Erratum	2
Note	1
Review	16

Source: Developed by authors using Biblioshiny.

3.2. Publication Trends from 2012 to 2025

As illustrated in **Figure 2**, the annual publication trends on Green Human Resource Management (GHRM) and sustainable firm performance show a marked and accelerating growth over the 2012–2025 period. In the early years (2012–2018), the number of published documents remained relatively low and stable, rarely exceeding 10 articles per year. However, a gradual increase is noticeable from 2019 onwards, with a significant surge occurring after 2020. This upward trajectory becomes particularly pronounced between 2021 and 2024, where the annual number of documents rose sharply, peaking at almost 140 publications in 2024. Although there is a slight decrease observed in 2025, the overall trend clearly demonstrates an exponential increase in research activity, reflecting both rising academic interest and the growing importance of GHRM in the context of sustainable firm performance. This pattern suggests that the field is currently experiencing a dynamic phase of expansion, likely driven by heightened global awareness of sustainability issues and the strategic role of human resource management in achieving organizational sustainability goals.

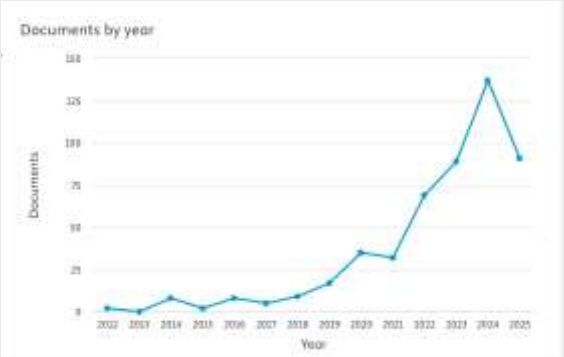


Fig 2. Publication Trends from 2012 to 2025

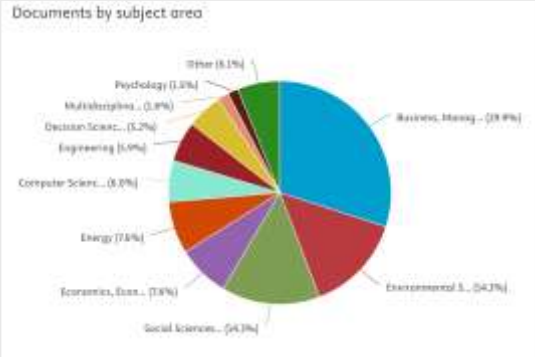


Fig 3. documents by subject area from 2012 to 2025

Source: Developed by authors using Scopus

Fig 3, The distribution of documents by subject area, as illustrated in Figure 6, reveals that research on Green Human Resource Management and sustainable firm performance is highly interdisciplinary. The largest proportion of publications (29.9%) falls under Business, Management, and Accounting, reflecting the core focus of GHRM within organizational and managerial contexts. Environmental Science (14.3%) and Social Sciences (14.3%) are also prominent, underscoring the importance of ecological and societal perspectives in this field. Notably, Economics, Econometrics, and Finance (7.6%) and Energy (7.6%) are well represented, highlighting the growing interest in the economic and resource-related implications of sustainable HRM practices. Additional contributions from Computer Science (6.0%), Engineering (5.9%), Decision Sciences (5.2%), and other fields indicate that topics such as digitalization, technological innovation, and decision-making processes are increasingly relevant. The presence of Psychology, Multidisciplinary studies, and a diverse "Other" category further demonstrates that GHRM and sustainability research draws on a wide array of disciplinary backgrounds, fostering a rich, multi-perspective approach to understanding and advancing sustainability in organizations.

3.3. Most Relevant Sources for GHRM and Sustainable Firm Performance Research

As shown in Figure 5 and detailed in Table 4, the dissemination of research on Green Human Resource Management and sustainable firm performance is concentrated within several leading academic journals. Sustainability (Switzerland) stands out as the most prolific source, publishing 30 articles on this topic, followed by the Journal of Cleaner Production with 21 publications. Other significant outlets include Corporate Social Responsibility and Environmental Management (12 articles), Environmental Science and Pollution Research (11 articles), and the International Journal of Manpower (11 articles), reflecting the interdisciplinary nature of the field. Additional notable sources, such as Benchmarking, the International Journal of Human Resource Management, and the International Journal of Sustainable Development and Planning, each contribute multiple publications, emphasizing both the HRM and sustainability management perspectives. The presence of journals like the Journal of Business Ethics and Business Strategy and the Environment further highlights the integration of ethical, environmental, and strategic considerations within this area of research. Overall, the wide range of journals publishing work in this field demonstrates both

the cross-disciplinary interest and the broad academic appeal of GHRM and sustainable firm performance, ensuring that new findings reach diverse scholarly and practitioner audiences.

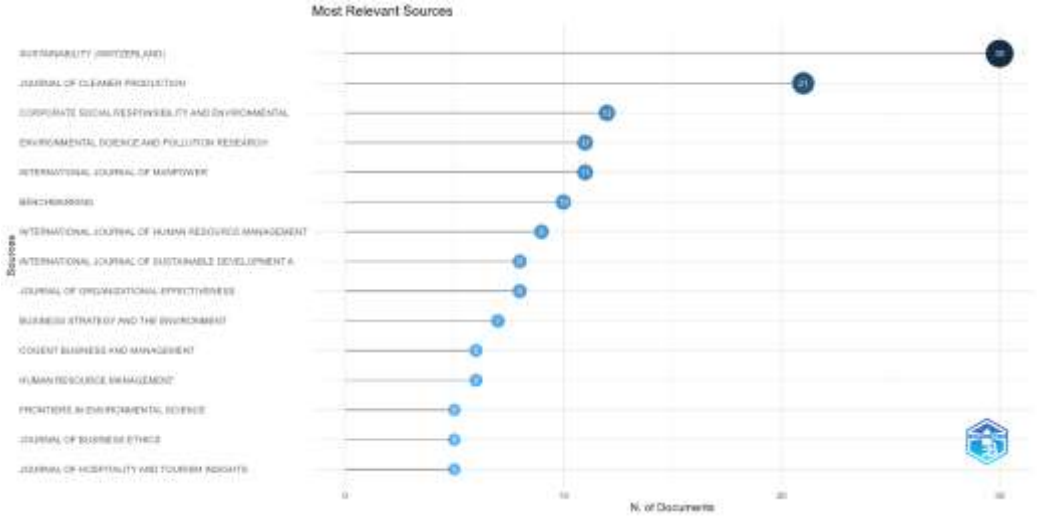


Fig 4. Most Relevant Sources from 2012 to 2025
Source: Developed by authors using Biblioshiny.

Table 2. Most Relevant Sources

Sources	**Articles**
Sustainability (Switzerland)	30
Journal Of Cleaner Production	21
Corporate Social Responsibility And Environmental Management	12
Environmental Science And Pollution Research	11
International Journal Of Manpower	11
Benchmarking	10
International Journal Of Human Resource Management	9
International Journal Of Sustainable Development And Planning	8
Journal Of Organizational Effectiveness	8
Business Strategy And The Environment	7
Cogent Business And Management	6
Human Resource Management	6
Frontiers In Environmental Science	5
Journal Of Business Ethics	5
Journal Of Hospitality And Tourism Insights	5
Asia-Pacific Journal Of Business Administration	4
Business Strategy And Development	4
Csr, Sustainability, Ethics And Governance	4
Heliyon	4
International Journal Of Hospitality Management	4
International Journal Of Innovative Research And Scientific Studies	4
Journal Of Environmental Planning And Management	4
Lecture Notes In Networks And Systems	4
Uncertain Supply Chain Management	4
Approaches To Global Sustainability, Markets, And Governance	3

Source: Developed by authors using Biblioshiny.

The Bradford zone analysis of sources, as detailed in Table 4, further clarifies the core journals driving scholarship on Green Human Resource Management and sustainable firm performance. The analysis identifies a distinct **Zone 1** consisting of highly productive journals, led by *Sustainability (Switzerland)*, which alone published 30 articles, followed by the *Journal of Cleaner Production* with

21, and *Corporate Social Responsibility and Environmental Management* with 12 publications. Additional journals in Zone 1 include *Environmental Science and Pollution Research*, *International Journal of Manpower*, *Benchmarking*, and *International Journal of Human Resource Management*, each contributing substantially to the field's literature. The cumulative frequency in Zone 1 demonstrates that a relatively small group of journals accounts for the majority of published research, reflecting a concentrated dissemination pattern typical of emerging and interdisciplinary fields. Moving into **Zone 2**, the number of articles per journal decreases, yet these sources such as *Business Strategy and Development*, *Heliyon*, and *Journal of Environmental Planning and Management* still provide valuable diversity and depth to the literature. This zone structure underscores both the importance of a central core of journals for visibility and scholarly influence, while also highlighting the expanding reach and interdisciplinary integration of GHRM and sustainability research across a wider array of academic outlets.

Table 4. Bradford zone analysis

Source	**Rank**	**Freq**	**CumFreq**	**Zone**
Sustainability (Switzerland)	1	30	30	Zone 1
Journal Of Cleaner Production	2	21	51	Zone 1
Corporate Social Responsibility And Environmental Management	3	12	63	Zone 1
Environmental Science And Pollution Research	4	11	74	Zone 1
International Journal Of Manpower	5	11	85	Zone 1
Benchmarking	6	10	95	Zone 1
International Journal Of Human Resource Management	7	9	104	Zone 1
International Journal Of Sustainable Development And Planning	8	8	112	Zone 1
Journal Of Organizational Effectiveness	9	8	120	Zone 1
Business Strategy And The Environment	10	7	127	Zone 1
Cogent Business And Management	11	6	133	Zone 1
Human Resource Management	12	6	139	Zone 1
Frontiers In Environmental Science	13	5	144	Zone 1
Journal Of Business Ethics	14	5	149	Zone 1
Journal Of Hospitality And Tourism Insights	15	5	154	Zone 1
Asia-Pacific Journal Of Business Administration	16	4	158	Zone 1
Business Strategy And Development	17	4	162	Zone 2
Csr, Sustainability, Ethics And Governance	18	4	166	Zone 2
Heliyon	19	4	170	Zone 2
International Journal Of Hospitality Management	20	4	174	Zone 2
International Journal Of Innovative Research And Scientific Studies	21	4	178	Zone 2
Journal Of Environmental Planning And Management	22	4	182	Zone 2
Lecture Notes In Networks And Systems	23	4	186	Zone 2
Uncertain Supply Chain Management	24	4	190	Zone 2
Approaches To Global Sustainability, Markets, And Governance	25	3	193	Zone 2

Source: Developed by authors using Biblioshiny.

3.4. The Top 10 Countries in GHRM and Sustainable Firm Performance Publications

As shown in Figure 3 and summarized in Table 2, the global research landscape on Green Human Resource Management (GHRM) and sustainable firm performance is dominated by contributions from several leading countries. Pakistan emerges as the most prolific country, producing 157 documents, followed closely by China with 144 publications and India with 128. Malaysia and Indonesia also show significant research activity, with 123 and 90 publications respectively, highlighting Southeast Asia as a key region for scholarly output in this field. The United Kingdom,

Saudi Arabia, and Italy represent major contributors from Europe and the Middle East, with 51, 44, and 39 publications, while Australia and France each contributed 35 documents. This distribution suggests that research on GHRM and sustainable firm performance is highly international, with a particularly strong presence in South Asia and East Asia, but also notable representation from Europe, the Middle East, and Australia. The wide geographic spread of research activity underscores the global relevance of GHRM as both an academic discipline and a practical approach to achieving sustainability in diverse organizational and cultural contexts.

Fig 5. Top 10 Countries in GHRM and Sustainable Firm Performance Publications
Source: Developed by authors using Biblioshiny.

Table 6. Top 10 Countries in GHRM and Sustainable Firm Performance Publications

Country	Freq
Pakistan	157
China	144
India	128
Malaysia	123
Indonesia	90
Uk	51
Saudi Arabia	44
Italy	39
Australia	35
France	35

Source: Developed by authors using Biblioshiny.

As shown in Figure 6 and Table 6, China emerges as the most prolific country for corresponding authors, accounting for 62 publications (13.1% of the total), with a notable emphasis on international collaboration—62.9% of Chinese articles involve multiple-country publications (MCP). Similarly, Pakistan and Malaysia demonstrate strong global engagement, as indicated by their high MCP percentages (70% and 71%, respectively), while France stands out with 88.9% of its output resulting from international partnerships. In contrast, India and Indonesia display a greater proportion of single-country publications (SCP), with MCP representing less than 20% of their total articles. These patterns highlight both the predominance of Asian countries in the research landscape and the diverse collaboration profiles among leading nations, underscoring the field's expanding international dimension and the pivotal role of cross-border partnerships in advancing scholarly productivity.

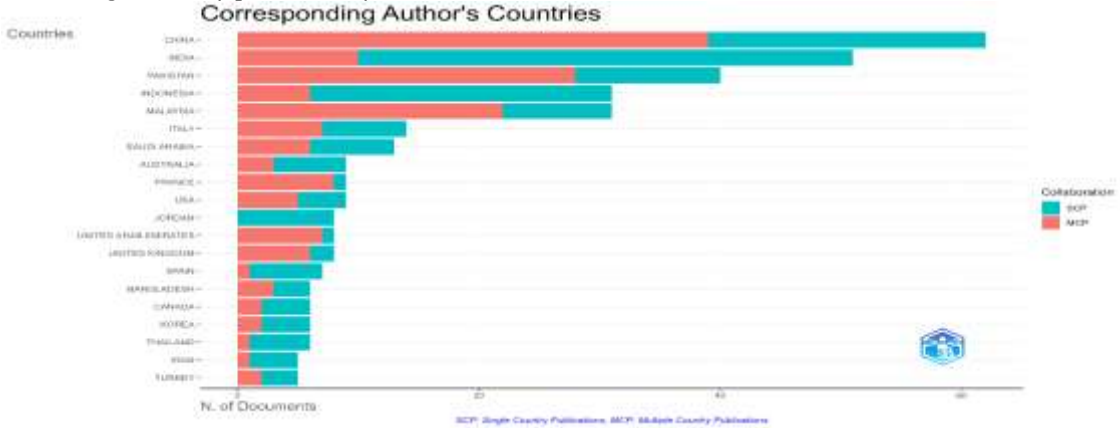


Fig 6. Corresponding authors Countries
Source: Developed by authors using Biblioshiny.

Table 7. **Corresponding authors Countries**

Country	Articles	Articles %	SCP	MCP	MCP %
CHINA	62	13,1	23	39	62,9
INDIA	51	10,8	41	10	19,6
PAKISTAN	40	8,4	12	28	70
INDONESIA	31	6,5	25	6	19,4
MALAYSIA	31	6,5	9	22	71
ITALY	14	3	7	7	50
SAUDI ARABIA	13	2,7	7	6	46,2
AUSTRALIA	9	1,9	6	3	33,3
FRANCE	9	1,9	1	8	88,9
USA	9	1,9	4	5	55,6

Source: Developed by authors using Biblioshiny.

3.5. Most Cited Countries in GHRM and Sustainable Firm Performance Research

As depicted in Figure 4 and detailed in Table 3, the impact of research on Green Human Resource Management and sustainable firm performance varies significantly across countries, as measured by total citations and average article citations. China stands out as the most cited country overall, with 2,815 total citations and an average of 45.4 citations per article, indicating both high productivity and broad influence. Pakistan follows closely with 2,528 citations, yet boasts a notably higher average of 63.2 citations per article, reflecting the strong academic impact of individual publications. The United Arab Emirates demonstrates exceptional influence with an average of 232.5 citations per article, despite a lower publication count, highlighting the outstanding visibility of select works from this country. Other countries such as Malaysia, Italy, and the United Kingdom also achieve high total and average citation numbers, with Italy, the UK, and Australia each surpassing 100 citations per article on average. Meanwhile, the United States, France, Canada, and Qatar each contribute a relatively smaller volume of papers but achieve remarkable citation impact, underlining the high quality and relevance of their contributions to the field. In contrast, countries such as Indonesia and Saudi Arabia, while active in terms of publication numbers, exhibit much lower citation averages, suggesting opportunities for increased scholarly recognition and engagement. Overall, these citation metrics reveal that both productivity and impact are geographically diverse, and that high-impact research in GHRM and sustainable firm performance is being produced across multiple continents, with certain countries emerging as clear leaders in terms of global academic influence.

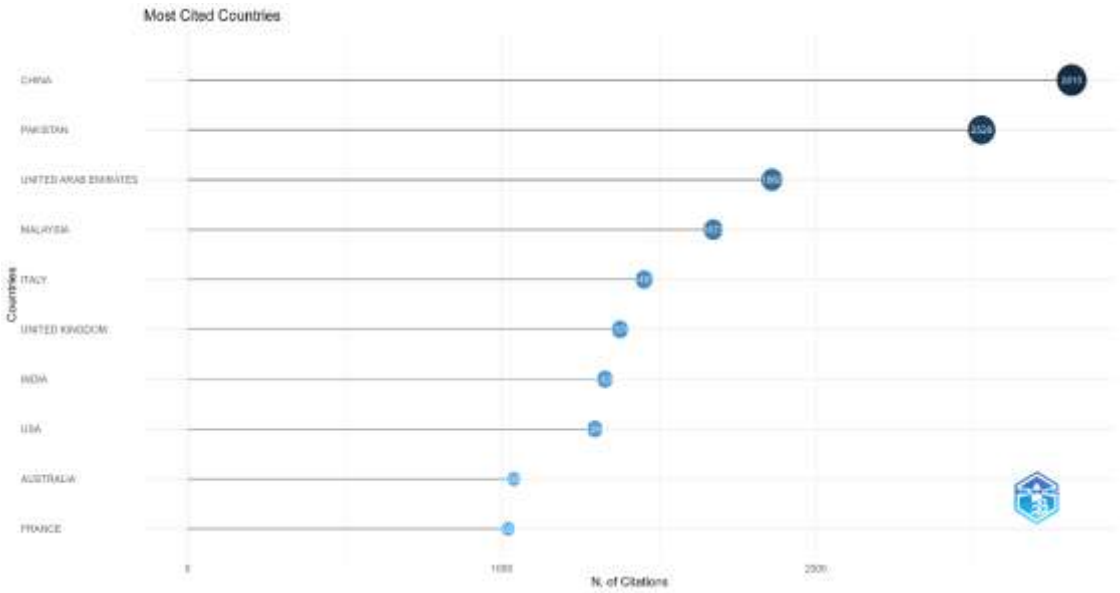


Fig 8. Cited Countries
Source: Developed by authors using Biblioshiny.

Table 8. Cited Countries

Country	TC	Average Article Citations
China	2815	45,40
Pakistan	2528	63,20
United Arab Emirates	1860	232,50
Malaysia	1673	54,00
Italy	1453	103,80
United Kingdom	1376	172,00
India	1328	26,00
Usa	1296	144,00
Australia	1038	115,30
France	1020	113,30

Source: Developed by authors using Biblioshiny.

3.6. Most Relevan Authors

Based on the bibliometric analysis presented in Figure 4 and Table 5, several key authors have made significant contributions to the advancement of research in this field. **Paille Pascal** stands out as the most productive author with ten publications, followed by **Nisar Qasim Ali** and **Yusliza Mohd Yusoff** with eight and seven documents, respectively. The fractionalized articles metric further indicates that leading authors such as **Paille Pascal** (4.15) and **Nisar Qasim Ali** (1.82) are frequently involved in collaborative and multidisciplinary research. These findings suggest that the intellectual structure of the field is shaped by a few central opinion leaders who serve as major hubs within research networks. Moreover, this strong collaborative tendency not only facilitates the dissemination of knowledge but also highlights opportunities for emerging scholars to engage in new collaborations and explore innovative topics within the discipline.

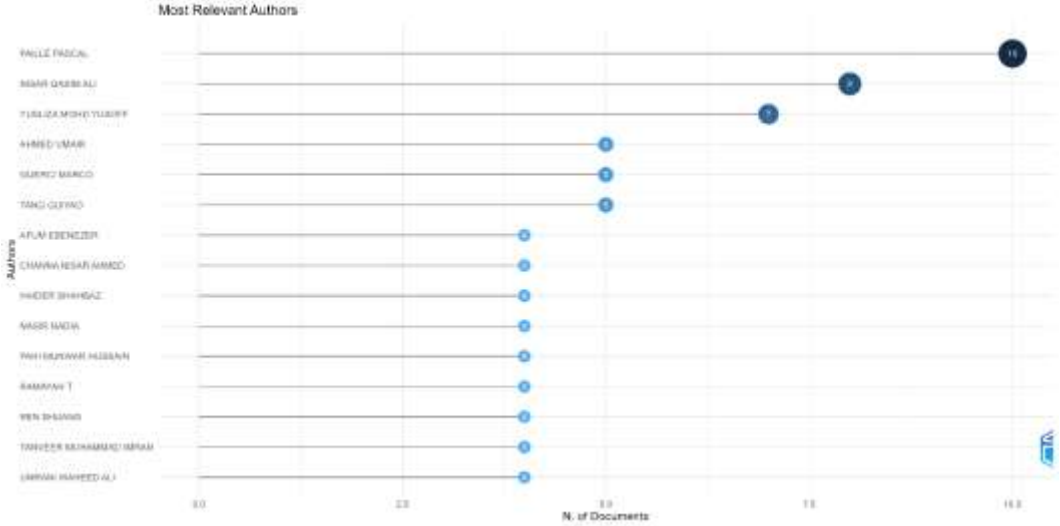


Fig 8. Most Relevan Authors
Source: Developed by authors using Biblioshiny.

Table 9. Most Relevan Authors

Authors	Articles	Articles Fractionalized
Paillé Pascal	10	4,15
Nisar Qasim Ali	8	1,82
Yusliza Mohd Yusoff	7	1,87
Ahmed Umair	5	0,88
Guerci Marco	5	1,50
Tang Guiyao	5	1,48
Afum Ebenezer	4	1,00
Channa Nisar Ahmed	4	0,78
Haider Shahbaz	4	0,70

Nasir Nadia	4	0,78
Pahi Munwar Hussain	4	0,68
Ramayah T	4	0,68
Ren Shuang	4	1,33
Tanveer Muhammad Imran	4	1,03
Umrani Waheed Ali	4	0,68
Zaman Syed Imran	4	0,95
Abbass Kashif	3	0,60
Abdelwahed Nadia Abdelhamid Abdelmegeed	3	1,08
Aftab Junaid	3	1,00
Agarwala Tanuja	3	1,50
Agyabeng-Mensah Yaw	3	0,67
Bazrkar Ardeshir	3	1,08
Bon Abdul Talib	3	0,83
Daddi Tiberio	3	1,00

Source: Developed by authors using Biblioshiny.

A review of Paille Pascal's publication and citation record reveals both the breadth and depth of his contributions to the field of green human resource management (GHRM) and organizational sustainability. His most highly cited work, "The Impact of Human Resource Management on Environmental Performance: An Employee-Level Study" (Journal of Business Ethics, 2014), has accumulated 704 citations, averaging an impressive 58.67 citations per year (TCpY). This landmark study underscores his role as a key thought leader, with significant influence on subsequent research. More recent publications, such as his 2020 article in the Journal of Cleaner Production, also demonstrate high impact, with 145 citations and a yearly average of 24.17, highlighting ongoing relevance and visibility in the field. Other works published between 2020 and 2025, while newer and thus accruing fewer total citations, nevertheless reflect continued innovation and engagement with current debates—ranging from meta-analyses of GHRM practices to editorial insights and novel methodological approaches, such as fuzzy set analysis in family business contexts. Overall, the citation metrics confirm that Paille Pascal's scholarship is both foundational and at the forefront of emerging discussions, reinforcing his status as a central and influential figure in GHRM literature.

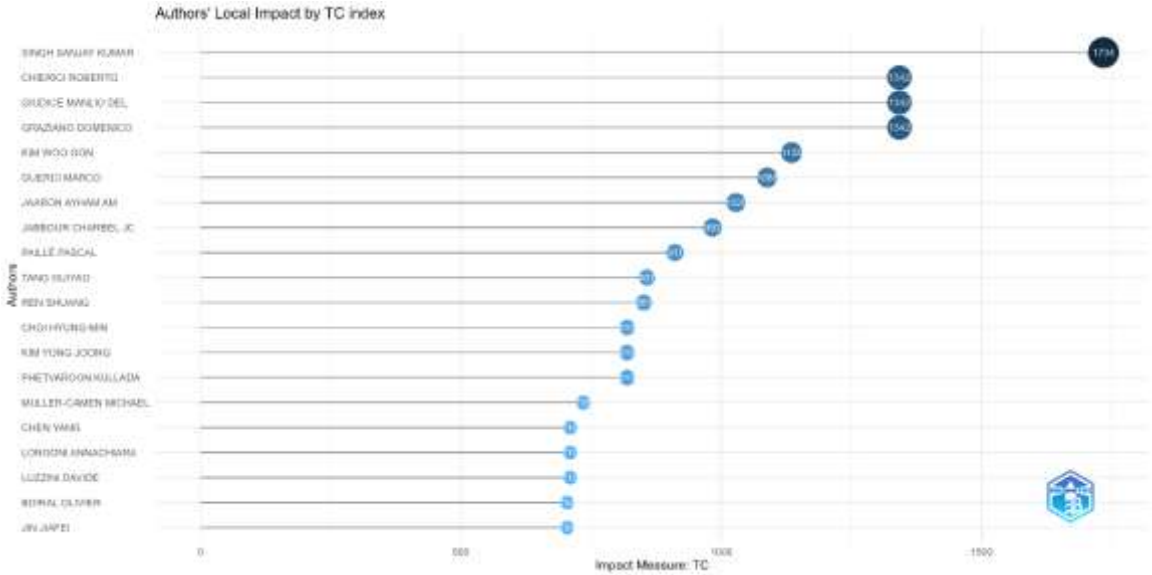
Table 10. Author and citation record reveals

Author	**year**	**Title**	**So**	**TC**	**TCpY**
Paillé Pascal	2025	Guest Editorial: Sustainable Human Resource Management And Organizational Performance: New Definitions, Navigating Tensions, And Global Insights	Journal Of Organizational Effectiveness	1	1
Paillé Pascal	2024	Green Human Resource Management In A Family Business Setting: A Fuzzy Set Approach	Entrepreneurship And Regional Development	1	0,5
Paillé Pascal	2024	Green Human Resource Practices For Individual Environmental Performance: A Meta-Review	Canadian Journal Of Administrative Sciences	1	0,5
Paillé Pascal	2024	Configurations Of Green Human Resources Practices For Environmental Sustainability; [Configurations De Pratiques De Ressources Humaines Vertes Pour La Durabilité Environnementale]	Revue De Gestion Des Ressources Humaines	0	0
Paillé Pascal	2023	How Do Ghrm Practices Influence Firms' Economic Performance? A	Journal Of Business Research	35	11,667

		Meta-Analytic Investigation Of The Role Of Gscm And Environmental Performance			
Paillé Pascal	2022	Green Behaviors In The Workplace: Nature, Complexity, And Trends	Green Behaviors In The Workplace: Nature, Complexity, And Trends	7	1,75
Paillé Pascal	2021	The Effect Of Green Hrm On Business Sustainability With The Mediation Role Of Pro-Environmental Behavior Green Human Resource Management Practices: Scale Development And Validity	Quality - Access To Success Asia Pacific Journal Of Human Resources	6	1,2
Paillé Pascal	2020	Greening The Workplace: Theories, Methods, And Research	Greening The Workplace: Theories, Methods, And Research	11	1,833
Paillé Pascal	2020	Leveraging Green Human Resource Practices To Achieve Environmental Sustainability	Journal Of Cleaner Production	145	24,167
Paillé Pascal	2014	The Impact Of Human Resource Management On Environmental Performance: An Employee-Level Study	Journal Of Business Ethics	704	58,667

Source: Developed by authors using Biblioshiny.

The "Authors' Local Impact by TC index" chart demonstrates that the field is heavily influenced by a select group of highly cited authors, with Singh Sanjay Kumar leading at 1,734 citations, followed by Chierici Roberto, Giudice Manlio Del, and Graziano Domenico, each with 1,342 citations. Other prominent contributors such as Kim Woo Gon, Guerci Marco, and Paille Pascal (911 citations) further reinforce the concentrated nature of scholarly impact within this area. This distribution suggests that the knowledge structure is anchored by a few central opinion leaders whose works serve as key references and significantly shape the research agenda. For emerging scholars, understanding and engaging with these highly cited authors is essential for both establishing a strong academic foundation and identifying future research opportunities within the discipline.



Source: Developed by authors using Biblioshiny.

Fig 9. Authors' Local Impact by TC index

Further bibliometric analysis, as shown in the table of author metrics, reveals notable differences in research productivity and impact among the leading authors. While Singh Sanjay Kumar leads in total citations (TC = 1,734) despite having only two publications and a modest h-index of 2, other authors such as Paille Pascal (h-index = 6, g-index = 10, m-index = 0.5, NP = 10, PY_start = 2014) and Nisar Qasim Ali (h-index = 8, NP = 8, m-index = 1.6, PY_start = 2021) demonstrate both sustained productivity and consistent scholarly influence over time. Authors like Guerci Marco and Tang Guiyao also display relatively high h- and g-indices, indicating a broader and more influential publication record compared to peers with high citation counts but low index values. The m-index values, which normalize productivity by career length, further suggest that some recent authors, such as Nisar Qasim Ali, are emerging rapidly as impactful contributors. Collectively, these metrics highlight that while citation counts underscore visibility, the h-index, g-index, and m-index provide a more nuanced understanding of an author's sustained influence, research consistency, and emerging trends within the scholarly community.

Table 11. Author metrics

Author	h_index	g_index	m_index	TC	NP	PY_start
Singh Sanjay Kumar	2	2	0,286	1734	2	2019
Chierici Roberto	1	1	0,167	1342	1	2020
Giudice Manlio Del	1	1	0,167	1342	1	2020
Graziano Domenico	1	1	0,167	1342	1	2020
Kim Woo Gon	2	2	0,286	1135	2	2019
Guerci Marco	5	5	0,417	1088	5	2014
Jaaron Ayham Am	2	3	0,222	1028	3	2017
Jabbour Charbel Jc	2	2	0,2	983	2	2016
Paillé Pascal	6	10	0,5	911	10	2014
Tang Guiyao	5	5	0,625	857	5	2018
Ren Shuang	4	4	0,5	851	4	2018
Choi Hyung-Min	1	1	0,143	819	1	2019
Kim Yong Joong	1	1	0,143	819	1	2019
Phetvaroon Kullada	1	1	0,143	819	1	2019
Muller-Camen Michael	3	3	0,3	735	3	2016
Chen Yang	2	2	0,167	710	2	2014
Longoni Annachiara	2	2	0,2	710	2	2016
Luzzini Davide	2	2	0,2	710	2	2016
Boiral Olivier	1	1	0,083	704	1	2014
Jin Jiafei	1	1	0,083	704	1	2014
Kramar Robin	2	2	0,167	656	2	2014
Chong Tao	1	1	0,143	636	1	2019
Roscoe Samuel	1	1	0,143	636	1	2019
Subramanian Nachiappan	1	1	0,143	636	1	2019
Zaid Ahmed A	2	3	0,25	619	3	2018
Nisar Qasim Ali	8	8	1,6	599	8	2021
Talib Bon Abdul	1	1	0,125	577	1	2018
E Jackson Susan	1	1	0,125	564	1	2018
Shah Syed Asim	2	2	0,4	547	2	2021

Source: Developed by authors using Biblioshiny.

The “Most Relevant Affiliations” chart indicates that King Faisal University leads in research productivity within this field, contributing 11 articles, followed closely by Islamic Azad University and Universiti Malaysia Terengganu, each with 10 publications. Other notable institutions, such as Edith Cowan University, An-Najah National University, and NEOMA Business School, also

demonstrate significant engagement, each producing between 7 and 8 articles. The presence of universities from diverse regions—including Malaysia, Indonesia, Pakistan, and China—reflects the global and multidisciplinary character of the research landscape. These findings suggest that research on this topic is not only concentrated among a select group of leading institutions but also benefits from broad international collaboration and participation, thereby enriching the knowledge base with perspectives from different academic environments.

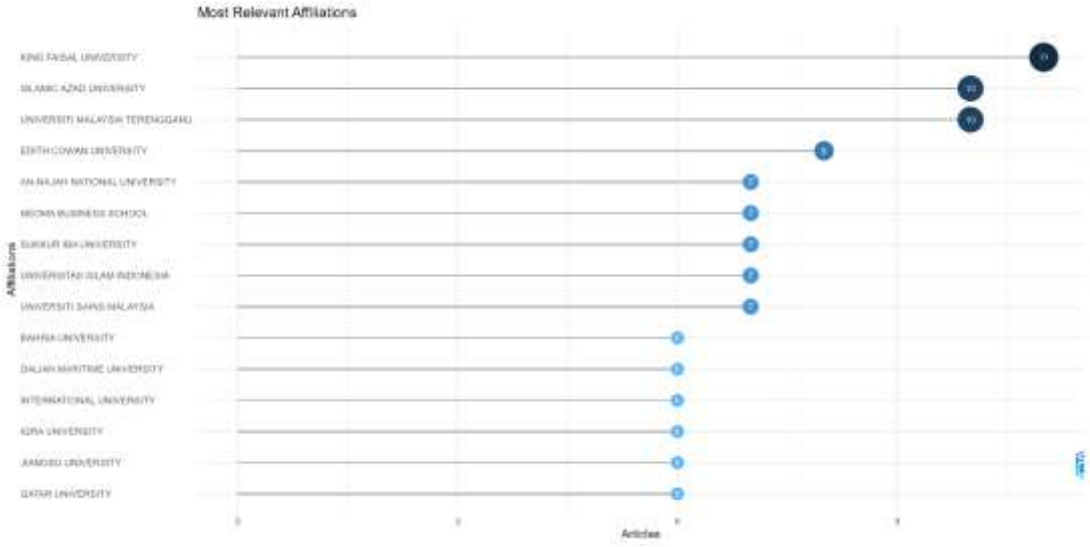


Fig 10. Most Relevant Affiliations
Source: Developed by authors using Biblioshiny.

3.7. Most frequent words

As illustrated in Figure 12, the most frequently occurring keywords within the analyzed literature are "environmental performance" (177 occurrences) and "green human resource management" (167 occurrences), indicating that these two topics represent the central themes of scholarly discourse in this field. Other prominent keywords such as "sustainability," "human resource," and "environmental management" further emphasize the strong research focus on integrating environmental objectives with human resource practices. The repeated appearance of variations like "green HRM," "human resource management," and the acronym "ghrm" also suggests a diversity of terminologies used to describe similar concepts, reflecting both the multidisciplinary and evolving nature of the topic. Collectively, the keyword analysis presented in Figure 7 and Table 7 highlights the dominant research streams and underscores the pivotal role of environmental and sustainability considerations in contemporary human resource management scholarship

Fig 11. Most Relevant Wordcloud
Source: Developed by authors using Biblioshiny.

Based on the mapping presented in the tree map Fig 12., the research landscape is distinctly dominated by key themes such as "environmental performance," "green human resource management," and "sustainability," which collectively account for the largest proportion of keyword

occurrences and visually occupy the most prominent space in the visualization. Other significant clusters, including "human resource," "environmental management," and "resource management," further illustrate the interdisciplinary character of the field. The presence of related topics such as "green innovation," "green economy," "corporate social responsibility," and "sustainable development" indicates that the discourse extends beyond traditional HRM concerns to embrace broader organizational, environmental, and economic perspectives. Additionally, the inclusion of emerging and context-specific keywords, such as "Pakistan," "hotel industry," "SMEs," and "employee engagement," reflects a growing interest in both regional and sectoral applications. Overall, the mapping highlights the centrality of environmental and sustainability issues within human resource management scholarship while also capturing the diversity and evolving nature of current research trends.

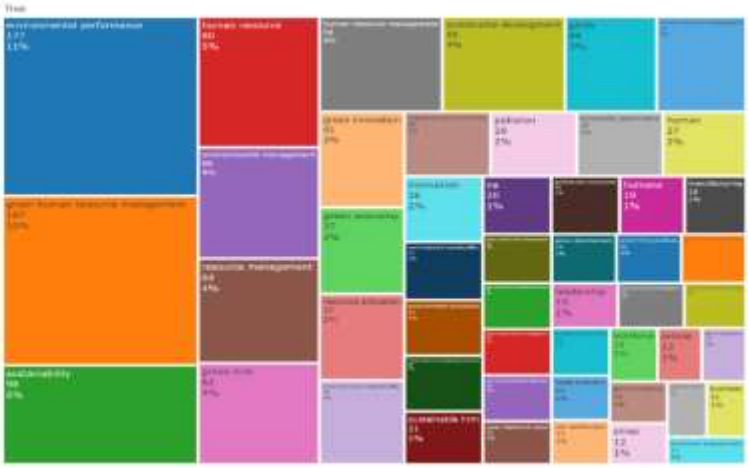


Fig 12. Research Landscape
Source: Developed by authors using Biblioshiny.

3.8. Co-occurrence networks

The keyword co-occurrence network demonstrates that "environmental performance" and "green human resource management" serve as the most central and interconnected nodes within the research landscape, functioning as the main hubs that link various sub-themes. The visualization clearly delineates two primary clusters, as indicated by the color coding, with one cluster emphasizing environmental management, sustainable development, and HRM practices (red nodes), and the other focusing on sustainability, resource management, and green innovation (blue nodes). The strong connections between these keywords reflect the multidimensional and integrated nature of the field, where environmental and sustainability objectives are deeply embedded within human resource strategies. Furthermore, the density of links and the overlap between clusters highlight the frequent cross-referencing and thematic synergy among studies, underscoring the ongoing convergence of research on sustainability, HRM, and organizational performance.

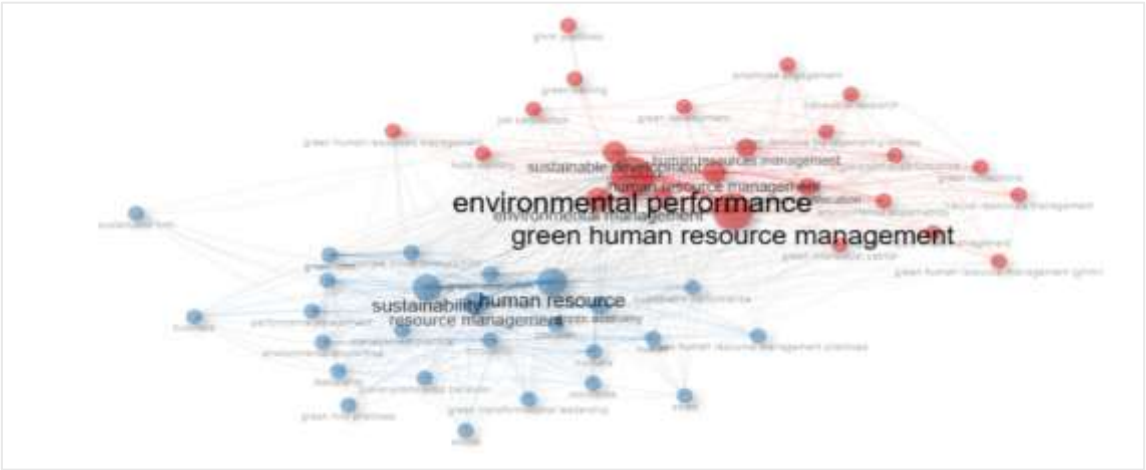


Fig 12. Co-occurrence networks
Source: Developed by authors using Biblioshiny.

Fig 13. Co-occurrence networks
Source: Developed by authors using Biblioshiny.

Based on the thematic evolution analysis presented in the strategic diagram, it is clear that themes such as human resource management, green development, sustainability, and green HRM occupy the upper right quadrant (motor themes). This positioning indicates that these topics are both highly relevant and central, serving as the primary engines driving research in Green Human Resource Management (GHRM). Their strong centrality and density underscore their pivotal role in shaping the intellectual structure and ongoing evolution of the field. The prominence of sustainability and green practices within HRM further highlights the increasing prioritization of environmental considerations in organizational strategies and policies.

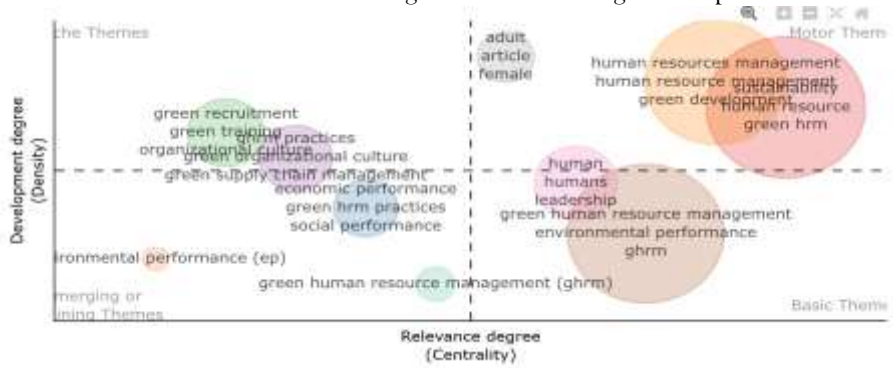


Fig 14. Thematic evolution analysis
Source: Developed by authors using Biblioshiny.

In contrast, themes such as green recruitment, green training, and organizational culture are situated in the upper left quadrant (niche themes). While these areas exhibit high internal development, their lower centrality suggests that they remain specialized topics—significant within specific research clusters but less integrated into the broader GHRM discourse.
Meanwhile, themes like environmental performance (EP) and green HRM practices appear in the lower left quadrant (emerging or declining themes). This positioning implies that these topics are either gaining momentum as new research frontiers or, conversely, are experiencing waning scholarly interest. Both scenarios point to potential opportunities for future research—either to advance nascent areas or to revitalize themes at risk of being overlooked. Finally, the lower right quadrant (basic themes) is characterized by foundational topics such as green human resource management, environmental performance, and leadership. These themes possess high centrality but lower density, reflecting their status as core references in the field. However, their relatively limited development suggests substantial room for further theoretical refinement and empirical investigation. Overall, this thematic mapping reveals the dynamic and multidimensional character of GHRM research, highlighting both well-established focal points and emerging opportunities that warrant deeper exploration in future studies.

4. DISCUSSION

4.1 Key Variables

The literature on Green Human Resource Management (GHRM) increasingly demonstrates that GHRM practices are central to achieving both environmental and broader sustainable performance goals. Empirical studies consistently show that GHRM—including green recruitment, green

training, and sustainability-oriented reward systems—directly enhances organizational environmental performance and stimulates employee green behavior (Paillé et al., 2014; Chaudhary, 2020; Hameed et al., 2020; Zibarras & Coan, 2015; Guerci et al., 2016). For example, Paillé et al. (2014) provided robust evidence that employee-level GHRM practices drive individual engagement in pro-environmental actions, while Hameed et al. (2020) established a positive link between GHRM and employees' environmental performance in various organizational settings.

A growing body of research also highlights the critical mediating and moderating roles of variables such as green innovation, green transformational leadership, and green organizational culture. Singh et al. (2020) found that green transformational leadership amplifies the effect of GHRM on green innovation, which in turn significantly improves environmental performance. Similarly, Rehman et al. (2021) and Aggarwal and Agarwala (2023) identified green innovation as a powerful mediator between GHRM and environmental outcomes, with green organizational culture acting as an essential contextual enabler.

In terms of strategic integration, the sustainable HRM framework posited by Kramar (2014) and expanded by Mariappanadar and Kramar (2014) reframes HRM not only as a tool for organizational competitiveness but as a multidimensional approach to balance economic, social, and environmental objectives. This perspective is further supported by empirical evidence from Zaid et al. (2018), who demonstrated that the synergy between GHRM and green supply chain management (GSCM) significantly enhances both environmental and economic dimensions of firm performance. Longoni et al. (2018) and Acquah et al. (2021) corroborate these findings by emphasizing the need for cross-functional environmental management and integration of green HRM and supply chain practices.

Meta-analyses and systematic reviews (Ren et al., 2018; Bahuguna et al., 2023) reinforce these themes, mapping the rapid evolution of GHRM research and identifying key directions for future work. These reviews note that recent studies increasingly explore the interplay between GHRM, leadership (Al-Swidi et al., 2021; Ahmad et al., 2021), organizational culture, digital transformation (Trujillo-Gallego et al., 2022), and other contextual variables in shaping environmental and sustainability outcomes.

Moreover, GHRM's impact is not limited to the private sector. Research by Mousa and Othman (2020) and Pinzone et al. (2019) demonstrates that green HR practices are also crucial in healthcare and educational institutions, affecting job satisfaction and pro-environmental behaviors in complex organizational settings.

The current research ecosystem therefore situates GHRM at the intersection of environmental management, innovation, and sustainable organizational development. The interconnections among GHRM, green innovation, leadership, and supply chain management collectively form a dynamic field with strong practical and theoretical implications for both scholars and practitioners (Singh et al., 2020; Zaid et al., 2018; Ren et al., 2018; Chaudhary, 2020; Rehman et al., 2021).

4.2. Theoretical Implications

Green Human Resource Management (GHRM) fundamentally reshapes the theoretical landscape of human resource management by embedding environmental and sustainability imperatives within its conceptual core. Traditional HRM frameworks typically prioritize organizational efficiency and productivity; however, GHRM extends these boundaries by integrating green values, policies, and practices that jointly target organizational and environmental outcomes (Kramar, 2014). This shift urges scholars to revisit established HRM theories and consider how constructs such as green transformational leadership and a supportive organizational culture can catalyze green innovation, thereby improving environmental performance (Singh et al., 2020; Al-Swidi et al., 2021).

Theoretically, GHRM research elucidates the mechanisms through which HRM practices shape employee engagement in pro-environmental behavior. For example, Paillé et al. (2014) and Chaudhary (2020) illustrate how GHRM functions as a mediator between organizational systems and individual-level environmental outcomes, thus enriching behavioral theories in organizational research. Moreover, the literature extends classic HRM and organizational behavior models by incorporating constructs such as green supply chain management and ethical leadership, positioning sustainability as a central driver of both motivation and organizational outcomes (Zaid et al., 2018; Ren et al., 2018).

Furthermore, GHRM challenges conventional paradigms of performance measurement by emphasizing the dual goals of economic and environmental sustainability. This perspective

encourages theoretical integration, for example, combining stakeholder theory and the resource-based view with green competencies and innovation frameworks (Longoni et al., 2018; Singh et al., 2020). The evolution of GHRM also prompts a re-evaluation of HRM's strategic role—not simply as an internal administrative function, but as an active driver of organizational transformation toward sustainability. This includes fostering green organizational cultures, supporting employee green behaviors, and embedding system-wide environmental responsibility (Kramar, 2014; Anwar et al., 2020).

In summary, the theoretical implications of GHRM research lie in its potential to advance integrated models that bridge HRM, environmental management, and innovation theories. By doing so, GHRM research not only broadens academic perspectives on organizational sustainability but also offers a robust foundation for future studies examining the role of human capital as a catalyst for enduring sustainable performance (Ren et al., 2018).

4.3. Practical Contribution

The adoption of Green Human Resource Management (GHRM) practices provides organizations with a strategic and actionable pathway for advancing both environmental and organizational performance. Embedding sustainability principles within core HR functions—such as green recruitment, environmentally oriented training, and the incorporation of green criteria into performance appraisal—enables firms to systematically develop a workforce that is not only environmentally conscious but also actively committed to realizing sustainability objectives (Paillé et al., 2014; Kramar, 2014; Chaudhary, 2020). Singh et al. (2020) emphasize that such integration of GHRM with green transformational leadership directly contributes to greater green innovation and significant improvements in environmental performance.

Operationalizing sustainability through GHRM turns abstract organizational goals into concrete, measurable actions at the employee level, ensuring that green initiatives permeate all business functions (Singh et al., 2020; Rehman et al., 2021). Empirical research has demonstrated that GHRM practices foster proactive employee participation in green behaviors—including energy conservation, waste reduction, and the adoption of eco-innovations in daily operations—which in turn improves both environmental and economic outcomes (Pinzone et al., 2019; Masri & Jaaron, 2017; Zaid et al., 2018). This employee-driven approach not only boosts environmental performance but also enhances employee satisfaction, organizational commitment, and the development of green organizational culture—factors linked to lower turnover and higher productivity (Anwar et al., 2020; Ren et al., 2018).

In addition, the integration of GHRM with broader sustainability strategies—such as green supply chain management and green intellectual capital—drives innovation and provides firms with a competitive advantage in markets increasingly oriented toward sustainability (Longoni et al., 2018; Nisar et al., 2021). For example, Singh et al. (2020) find that green transformational leadership, when supported by robust GHRM systems, not only enhances environmental outcomes but also stimulates the creation of new green products and services. Such synergies help organizations anticipate regulatory changes and stakeholder expectations while ensuring resource efficiency, cost savings, and reduced compliance risks (Zaid et al., 2018; Kramar, 2014).

Further, GHRM implementation supports the formation of a learning-oriented and innovative organizational climate, as demonstrated by Pinzone et al. (2019) and Ren et al. (2018). This climate enables companies to continuously improve their environmental performance, adapt to dynamic market requirements, and build stakeholder trust.

In summary, the implementation of GHRM transforms sustainability from an aspirational policy to operational reality. By equipping employees with the knowledge, motivation, and tools needed to drive sustainability, GHRM acts as a catalyst for organizational change, enabling companies to achieve their environmental goals, comply with emerging regulations, and enhance long-term competitiveness (Masri & Jaaron, 2017; Paillé et al., 2014; Singh et al., 2020; Zaid et al., 2018; Ren et al., 2018).

4.4. Future Research Directions

This review advances the understanding of Green Human Resource Management (GHRM) by clarifying its evolution, central mechanisms, and contributions to sustainable firm performance. However, several critical gaps remain that present valuable opportunities for further research.

First, there is a clear geographic and contextual imbalance in the GHRM literature. The majority of empirical studies have concentrated on manufacturing, hospitality, and large organizations in

Europe, China, and North America, while research in developing economies—such as those in Southeast Asia and Indonesia—remains limited (Masri & Jaaron, 2017; Nisar et al., 2021; Mousa & Othman, 2020). Addressing this gap, future research should explore GHRM in emerging markets, small and medium-sized enterprises (SMEs), and industry-specific contexts, as environmental challenges and institutional drivers may differ considerably (Ren et al., 2018; Singh et al., 2020). Comparative studies across countries and regions could help clarify how national culture, regulatory environments, and economic structures shape the adoption and effectiveness of GHRM practices (Kramar, 2014; Zaid et al., 2018; Ren et al., 2018).

Second, greater attention is needed to the mediating and moderating mechanisms underlying GHRM's impact on environmental and organizational outcomes. While many studies have confirmed the positive association between GHRM and environmental performance (Paillé et al., 2014; Singh et al., 2020; Rehman et al., 2021), there is a need to probe deeper into how factors such as green organizational culture, leadership styles (e.g., green transformational leadership), and employee engagement mediate or amplify this relationship (Singh et al., 2020; Al-Swidi et al., 2021; Chaudhary, 2020). Incorporating emerging drivers—such as digital transformation, big data analytics, and green innovation capabilities—can enrich theoretical models and reflect evolving organizational realities (Singh & El-Kassar, 2019; Imran et al., 2023; Ren et al., 2020).

Third, the role of stakeholders beyond the organization deserves more systematic exploration. Most GHRM research remains firm-centric, overlooking the influence of government agencies, NGOs, supply chain partners, and broader ecosystems in shaping green HR policies and advancing sustainability across value chains (Longoni et al., 2018; Zaid et al., 2018; Singh et al., 2020). Future work should adopt a multi-stakeholder perspective and consider how cross-sectoral collaboration and policy interventions drive or constrain GHRM adoption and impact (Ren et al., 2018; Paillé et al., 2020).

Fourth, ethical challenges and unintended consequences in GHRM implementation merit closer scrutiny. Concerns such as greenwashing, potential increases in employee stress due to heightened sustainability demands, and inequalities in access to green development opportunities are increasingly relevant (Kramar, 2014; Singh et al., 2020). Examining these complexities will help ensure that GHRM practices are both effective and equitable.

Finally, methodological innovation and international collaboration are vital for the next phase of GHRM research. Longitudinal, multi-method, and cross-cultural designs can capture dynamic processes and contextual variability (Ren et al., 2018; Bahuguna et al., 2023). Networks among scholars from diverse regions will be essential for building a comprehensive and globally relevant evidence base (Ren et al., 2018).

In summary, future GHRM scholarship should broaden its geographic and sectoral focus, deepen the analysis of mechanisms and stakeholder interactions, and address ethical implications to ensure that GHRM delivers genuine and inclusive sustainability outcomes in diverse contexts (Singh et al., 2020; Paillé et al., 2014; Kramar, 2014; Ren et al., 2018; Zaid et al., 2018).

5. CONCLUSION AND LIMITATIONS

This study presents a comprehensive bibliometric review of global research trends in Green Human Resource Management (GHRM) and sustainable firm performance from 2012 to 2025. The analysis of 474 publications across 236 journals demonstrates that the field has experienced rapid growth, especially in the last five years, with an annual publication growth rate of 32.55%. The results highlight the highly collaborative nature of the research community, as evidenced by an average of 3.56 co-authors per document and a high proportion (42.83%) of international co-authored papers. The diversity of research topics is also reflected in over 1,000 unique author keywords, illustrating the broad and multidisciplinary nature of GHRM scholarship.

The study also reveals the concentration of research output and impact in specific regions and journals. Countries such as Pakistan, China, India, Malaysia, and Indonesia emerge as leading contributors, while countries like Italy, the United Kingdom, and the United Arab Emirates stand out in terms of citation impact. Most research is published in a small group of highly productive journals, led by *Sustainability (Switzerland)* and *Journal of Cleaner Production*, which together account for a significant portion of the literature.

Despite these contributions, several limitations should be acknowledged. The bibliometric data were primarily sourced from the Scopus database, which, while comprehensive, may not capture all

relevant publications indexed in other databases or those published in non-English languages. As a result, some research, particularly from local or regional sources, may be underrepresented. Additionally, this study relies on quantitative indicators and does not provide in-depth qualitative insights into research content or theoretical development.

Future research should address these limitations by incorporating additional databases, considering non-English language publications, and applying qualitative approaches to complement bibliometric findings. Exploring underrepresented regions and sectors, and conducting comparative and interdisciplinary studies, will be crucial for further advancing the field of GHRM and its impact on sustainable firm performance.

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