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Article

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Review

Green Human Resource Management: A Bibliometric Analysis

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Abstract: Despite the growing attention which green human resource management (GHRM) has been gaining, the field is still remarkably young, and conceptual clarity is yet to be attained. A bibliometric review of GHRM from 2010 to 2020 was conducted on the Web of Science and analyzed using the VOSviewer software package, version 1.6.16 developed by Van Eck and Waltman (Leiden, The Netherlands). The results show the exponential growth of this topic, although there seems to be no consensus regarding its definition, conceptualization and measurement. Concerning its conceptual development, GHRM seems to currently fit the second stage of development (evaluation and augmentation) of Reichers and Schneider's three-stage model of the evolution of constructs. Future research seems to point in the direction of establishing the barriers separating GHRM from other human resource management topics, defining green practices and determining the antecedents and consequences of GHRM.

Keywords: green human resource management; bibliometric analysis; sustainability; green practices; corporate social responsibility

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1. Introduction

The economic growth of the last two centuries has represented prosperity and longevity for humanity. However, the impact of various industrial practices, reflected in pollution and the accumulation of waste and residues, is increasingly evident (IPCC 2018; Jackson et al. 2011). Climate change represents a new set of challenges, altering competitive and regulatory spheres, indirectly through global policy efforts to curb carbon emissions, and directly as a means of combating the unravelling consequences of extreme weather events (IPCC 2018). By invoking unprecedented changes in socio-economic systems, climate change makes it urgent for society to prepare and adapt in the face of new contingencies (Winn et al. 2011). With increasing regulatory and public pressure, more and more business entities are proactively implementing practices and strategic changes, such as investing in low-CO_2 technologies and renewable energy, in order to transition to environmental sustainability (González-Benito and González-Benito 2006; IPCC 2018).

The multidisciplinarity required to reduce organizational environmental footprints challenges the vision that this theme is restricted to environmental sciences, causing new fields of study to emerge in the areas of social research and management (Shrivastava and Berger 2010). In this sense, several related topics have been increasingly emphasized: corporate social responsibility (CSR), environmental management (EM), business ethics, socially responsible consumption and sustainability strategies, among others (Schuler et al. 2017; Shrivastava and Berger 2010).

One topic increasingly referred to in the literature in addressing environmental challenges is green human resource management (GHRM) (Ari et al. 2020; Renwick et al. 2016;

Singh et al. 2020). The first work that interconnects human resource management (HRM) and environmental management (EM) concerns the book by Wehrmeyer (1996), entitled: "Greening People: Human Resources and Environmental Management". The author first characterizes this type of HRM as "green", which later became established in the literature as GHRM. GHRM is sometimes used interchangeably with sustainable human resource management (Gholami et al. 2016). Nevertheless, sustainable HRM (Kramar 2014) is a broader concept in its approach, referring to the Triple Bottom Line (Correia 2019): the simultaneous consideration of people, planet and profit. GHRM focuses, in turn, on the ecological dimension of organizational activities (Ren et al. 2018). Ren et al. (2018) define GHRM as "phenomena relevant to understanding relationships between organizational activities that impact the natural environment and the design, evolution, implementation and influence of HRM systems" (p. 10).

HRM can thus be conceptualized as the organizational tool that integrates human beings into environmental sustainability through a set of practices which are focused on human resources and are transversal to the different functions of an organization (Martínez-del-Río et al. 2012; Renwick et al. 2013). This is implicit throughout the employee life cycle, from hiring to exit (Benn et al. 2015; Jabbour et al. 2010; Zibarras and Coan 2015). Green practices often referred to by the literature are, according to Benevene and Buonomo (2020), training and development, performance management and appraisal, reward systems and recruitment and selection. Green teams are also a frequent green practice (Jabbour 2013).

Regarding the theoretical foundations of GHRM, the abilities, motivation and opportunities (AMO) model (Harrell-Cook et al. 2001) predominates as a guiding compass for these practices. Performance therefore results from the interaction of employees' ability to perform tasks (competencies), willingness to perform (motivation) and opportunities to act on environmental sustainability (opportunities) (Renwick et al. 2013). Additionally, the resource-based theory is a widely used theoretical framework when integrating HRM with other organizational areas, such as green supply chains (GSC) (Jabbour and Jabbour 2016).

GHRM contributes to reducing energy and natural resource consumption (Opatha and Arulrajah 2014), reducing travel (Opatha and Arulrajah 2014), building a sustainable work environment (Opatha and Arulrajah 2014), reducing CO_2 emissions (Mehta and Chugan 2015) and promoting a sustainable culture and lifestyle in society (Jabbour and Jabbour 2016; Milliman 2013). In addition to reducing environmental impacts, GHRM contributes to employee development, wellbeing, health and satisfaction (Ari et al. 2020; Ehnert 2009) by enhancing employees' creativity and capacity for change (Shipton et al. 2012) and attracting and retaining skilled employees due to the sustainable image of the organization in the community (Jabbour and Jabbour 2016; Renwick et al. 2013, 2016).

Considering the growing attention and relevance GHRM has been attaining, this study aims to map the literature through a bibliometric analysis that provides a reflection on the evolution of GHRM during the period 2010–2020. Bibliometric analysis refers to the use of statistical tools that allow for a quantitative analysis of scientific production (Ellegaard and Wallin 2015). By focusing on different aspects of interest that contribute to the characterization of a field of study, such as publications, journals, countries, languages and organizations, they introduce a quantitative rigor to the subjective assessment of the literature (Ellegaard and Wallin 2015; Zupic and Čater 2015). With the current digital age, new metrics have been developed (download statistics, page ranks . . .) that allow for analyzing scientific production in a multitude of ways (Ellegaard and Wallin 2015). These bibliometric methods have the potential to introduce a systematic, transparent and reproducible review process, improving the quality of reviews. They are a useful tool in literature reviews by guiding the researcher to the most influential works and mapping the research field, buffering the subjective bias. They also allow researchers to base their findings on aggregated bibliographic data produced by other scientists, whether that be through citation, collaboration or writing (Zupic and Čater 2015). The analysis of this aggregate data allows researchers to explore the field's structure, the social networks and the main topics (Zupic and Čater 2015).

The bibliometric analysis will be supported in this work by the visualization of similarities (VOS) mapping technique of the VOSviewer software package. Thus, the main objectives of this study are: (1) to identify literature streams; (2) to map the topics studied; (3) to observe and analyze the temporal evolution of the construct; and (4) to identify the stage of development of the construct as a useful tool for the professional community and not just an academic tool for bibliometricians.

The next section of this paper is the method where the steps required to collect and analyze the data are discussed. Then, the results section is divided into the data collected from the keyword search and from the bibliometric maps, describing the results obtained from both methods. Finally, the conclusion section reinforces the objectives of the paper, the main findings as well as the limitations of the study, and suggests future research directions on GHRM.

2. Method

To meet the stated objectives, a sample of publications from the Web of Science (WOS) produced between 2010 and 2020 was used. The WOS was selected because it brings together the journals with the highest impact in the social sciences (Crossan and Guatto 1996), namely in the SSCI (Social Sciences Citation Index) and the ESCI (Emerging Sources Citation Index).

The first step consisted of a descriptive survey of all publications of the last decade (2010–2020) of the WOS, through a keyword search with the term "green human resource* management". This was the keyword with the highest number of associated publications, by comparison with the keywords "GHRM", "green HRM" or "green hr", i.e., the sample of these last three keywords was already included in the chosen keyword "green human resource* management" sample. The choice of the selected time period (2010–2020) was reinforced by the fact that the first article in WOS with the selected keyword dates back to 2011 (Jackson et al. 2011). The search was restricted to SSCI and ESCI, since the former belongs to the WOS Core Collections and the latter gathers journals under final evaluation to integrate them. The search engine criterion was "TOPIC", allowing for recognizing the keyword in the (1) title, (2) abstract, (3) author's keywords and (4) "keyword plus", a tool that expands the search engine by including articles in the WOS with a significant frequency of the term being in the titles of the bibliographic references.

Then, in the second step, the sample was analyzed using VOSviewer. The visualization of bibliometric networks, often referred to as the "mapping of science", constitutes an advanced tool in the analysis of bibliometric networks. Visualization software packages, such as VOSviewer, represent an advance in the analysis of these networks by allowing a large volume of data to be processed (Van Eck and Waltman 2014). The spatial representation of bibliometric networks includes different types of analysis, from keyword co-occurrence networks to co-citation and co-authorship networks (Van Eck and Waltman 2010, 2014). The VOSviewer maps are considered distance bibliometric maps, that is, the distance between two items reflects the strength of their relationship: a small distance indicates a strong relationship and vice versa (Van Eck and Waltman 2010). In this way, the identification of groups of related items is facilitated (Van Eck and Waltman 2010).

Similarly, to the procedure adopted by Bellucci et al. (2020), the bibliometric maps used in this study were from the keyword co-occurrence network, which depicts the proximity of the keywords in the sample, as well as bibliographic coupling, representing the relationship between the publications in the sample based on the bibliographic references they share. While the first is aimed at mapping potential lines of research in GHRM, the second is intended to identify the main topics that build them. As we will see later in the results, the two maps complement each other, allowing us to perform a joint analysis.

The analysis of the keyword co-occurrence network determines the frequency with which terms are repeated in the sample. This analysis results in a map illustrating the interrelationships between the conceptual structures of the sample under study (Zupic and Čater 2015). The size of the circle and the links are proportional to the frequency

in the sample and the strength of the keywords' relationship with others, respectively. More central terms show more links with different clusters. The bibliographic coupling of publications measures the similarity between two articles from the references they share (Kessler 1963). The smaller the distance between two items, the more references they share and, therefore, the more content they share (Li and Hale 2015). The size of the spheres is proportional to the citations received in WOS. Thus, the intention is to identify the intellectual structure of GHRM. Finally, to achieve the last objective of this paper—identify the development stage of the GHRM construct—the three-stage model of the evolution of constructs, developed by Reichers and Schneider (1990), was adopted as a framework. In line with this model, constructs, from their introduction to their acceptance into mainstream literature, evolve according to a predictable and developmental sequence that follows three main phases: (1) introduction and elaboration; (2) evaluation and augmentation; and (3) consolidation and accommodation (Reichers and Schneider (1990)). In the discussion section, the three stages of the model are described, as is the one that fits into the current stage of development of the GHRM field.

The step-by-step method of the current paper is described in Figure 1.

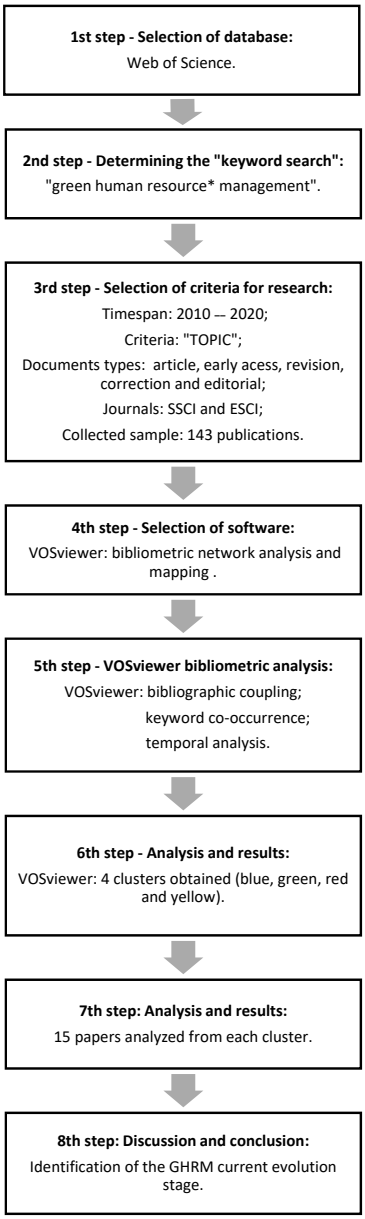

Figure 1. Workflow of this Bibliometric Review.

3. Results

The results are divided into two sections: firstly, a characterization of the keyword search sample is presented, and secondly, the VOSviewer bibliometric maps are highlighted.

3.1. Keyword Search

The keyword search conducted on 19 January 2021 resulted in a total of 143 publications. Of the 143 publications, 127 (88.81%) are empirical articles, 14 (9.79%) are literature reviews, one is (0.69%) a correction article and one (0.69%) an editorial.

3.1.1. Evolution of the Number of Publications

Figure 2 depicts the evolution of the number of publications per year between 2010 and 2020. The highest volume of publications occurred in the year 2020 (N = 68), which represents 47.55% of the sample.

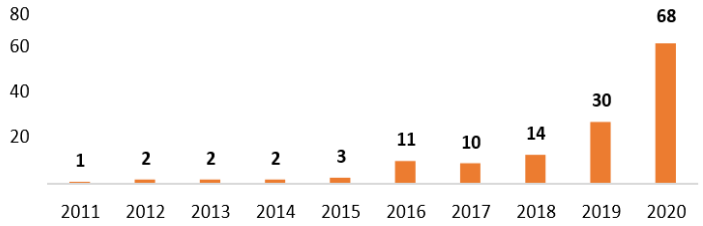

Figure 2. Evolution of the Number of Publications per Year.

3.1.2. Evolution of the Number of Citations

The 143 publications present a total of 3445 citations (see Figure 3). Of note is the evolution curve, which depicts an almost non-existent scientific dialogue at the beginning of the decade, transitioning to a marked growth from approximately 2017.

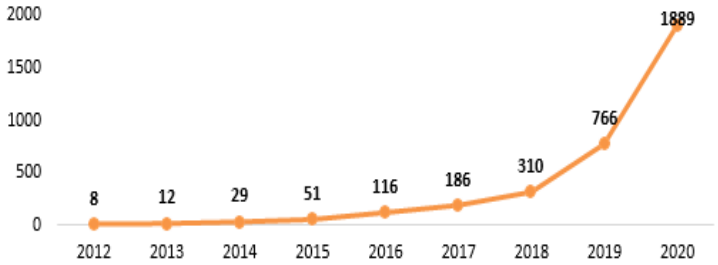

Figure 3. Evolution of the Number of Citations per Year.

3.1.3. Authors Affiliation

The scientific production related to GHRM is mainly represented by China, Malaysia and England (Table 1). Please note that the table only includes the ten most active authors' affiliations.

Table 1. Authors affiliation.

Countries/Regions	Record Count	% of 143
China	30	20.979%
Malaysia	24	16.783%
England	22	15.385%
France	20	13.986%
Brazil	18	12.587%
India	17	11.888%
Pakistan	17	11.888%
Australia	13	9.091%
Italy	10	6.993%
USA	9	6.294%

3.1.4. Most Cited Publications

According to WoS criteria "Highly cited papers", these are the most-cited publications (Table 2).

Table 2. Highly cited publications.

Title	Authors	Year	Journal *	Number of Citations	Subject Area
1. Green Human Resource Management: A Review and Research Agenda.	Renwick et al.	2013	IJMR	331	Business & Economics.
2. The Impact of Human Resource Management on Environmental Performance: An Employee-Level Study.	Paillé et al.	2014	JBE	178	Psychology Business & Economics.
3. Green Human Resource Management and Green Supply Chain Management: linking two emerging agendas.	Jabbour and Jabbour	2016	JCP	158	Science & Technology; Engineering; Environmental Sciences & Ecology.
4. Effects of Green HRM Practices on Employee Workplace Green Behavior: The Role of Psychological Green Climate and Employee Green Values.	Dumont et al.	2017	HRM	107	Psychology Business & Economics.
5. Green human resource management practices: scale development and validity.	Tang et al.	2018	APJHR	82	Business & Economics.
6. Green human resource management research in emergence: A review and future directions.	Ren et al.	2018	APJM	67	Business & Economics.
7. The effect of green human resource management on hotel employees' eco-friendly behavior and environmental performance.	Kim et al.	2019	IJHM	82	Social Sciences.
8. Role of big data analytics in developing sustainable capabilities.	Singh and El-Kassar	2019	JCP	71	Science & Technology; Engineering; Environmental Sciences & Ecology.
9. Greening the hospitality industry: How do green human resource management practices influence organizational citizenship behavior in hotels? A mixed-methods study.	Pham et al.	2019b	TM	64	Environmental Sciences & Ecology Social Sciences—Other Topics Business & Economics
10. Who is in charge? A review and a research agenda on the 'human side' of the circular economy.	Jabbour et al.	2019	JCL	56	Science & Technology—Other Topics; Engineering; Environmental Sciences & Ecology.
11. Green human resource management and the enablers of green organisational culture: Enhancing a firm's environmental performance for sustainable development.	Roscoe et al.	2019	BSE	47	Business & Economics; Environmental Sciences & Ecology
12. Promoting employee's proenvironmental behavior through green human resource management practices	Saeed et al.	2019	CRSOM	41	Business & Economics; Environmental Sciences & Ecology
13. Green innovation and environmental performance: The role of green transformational leadership and green human resource management.	Singh et al.	2020	TFSC	53	Business & Economics; Public Administration
14. Green human resource management and environmental cooperation: An ability-motivation-opportunity and contingency perspective.	Yu et al.	2020	IJPE	20	Engineering Operations; Research & Management Science
15. Leveraging Green Human Resource Practices to Enable Environmental and Organizational Performance: Evidence from the Qatari Oil and Gas Industry.	Obeidat et al.	2020	JBE	14	Business & Economics; Social Sciences—Other Topics.
16. The role of green human resource management in driving hotel's environmental performance: Interaction and mediation analysis.	Pham et al.	2020	IJHM	11	Social Sciences.

* International Journal of Management Reviews, Journal of Business Ethics, Journal of Cleaner Production, Human Resources Management, Asia Pacific Journal of Human Resources, Asia Pacific Journal of Management, International Journal of Hospitality Management, Tourism Management, Business Strategy and the Environment, Corporate Social Responsibility and the Environment, Technological Forecasting and Social Change, International Journal of Production Economics.

3.2. Bibliometric Maps

Next, the VOSviewer bibliometric maps resulting from the bibliographic reference coupling analysis (see Figure 4 and Tables A1–A4 in Appendix A) and the keyword co-occurrence network analysis (see Figure 5 and Table A5 in Appendix B) are presented. The 143 papers published between 2010 and 2020 were subjected to this analysis.

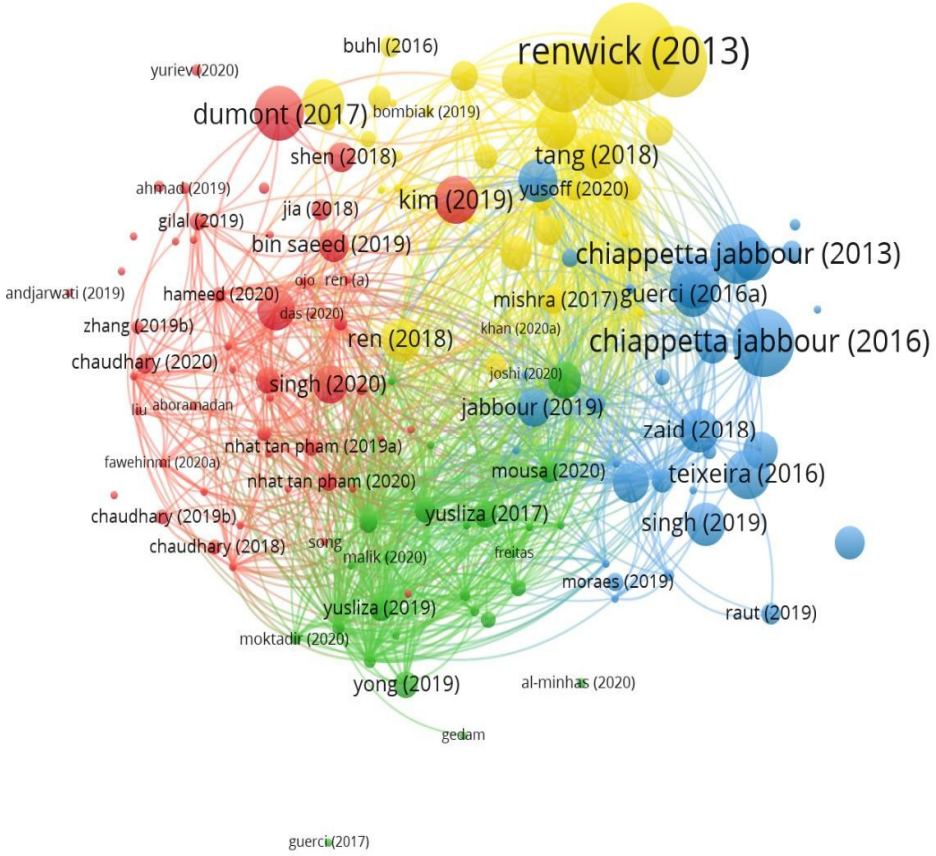

Figure 4. Bibliographic coupling.

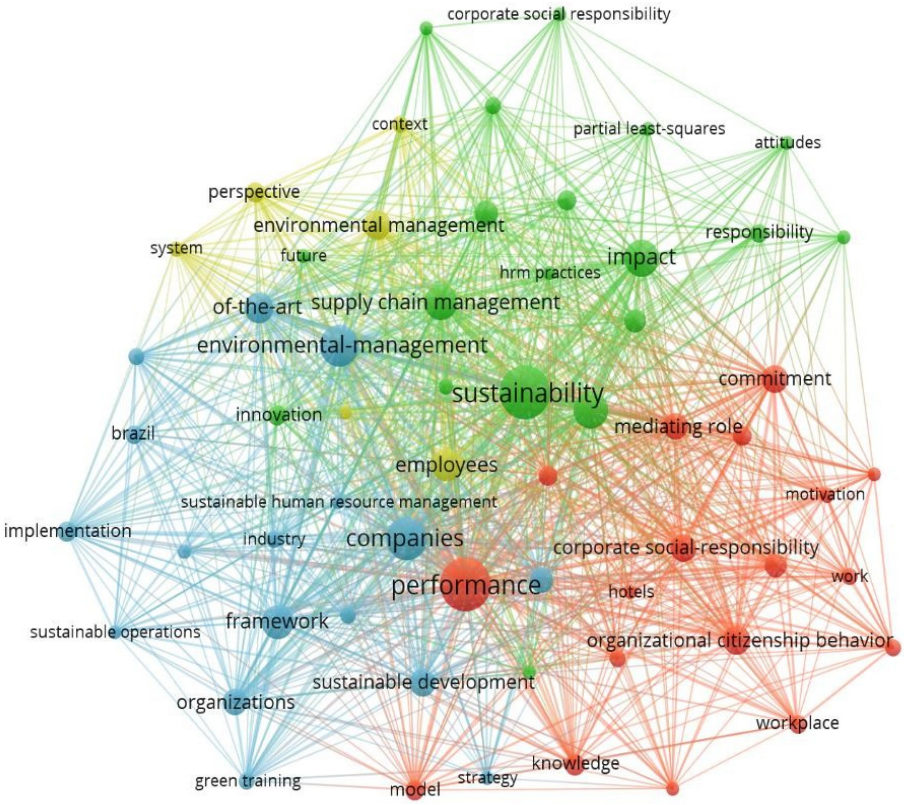

Figure 5. Keyword co-occurrence network.

Both maps were submitted to chronological processing between 2010 and 2020 (see Figures 6 and 7). The color gradation identifies the average date of co-occurrence of the keywords for the former, and for the latter, it identifies the year of publication.

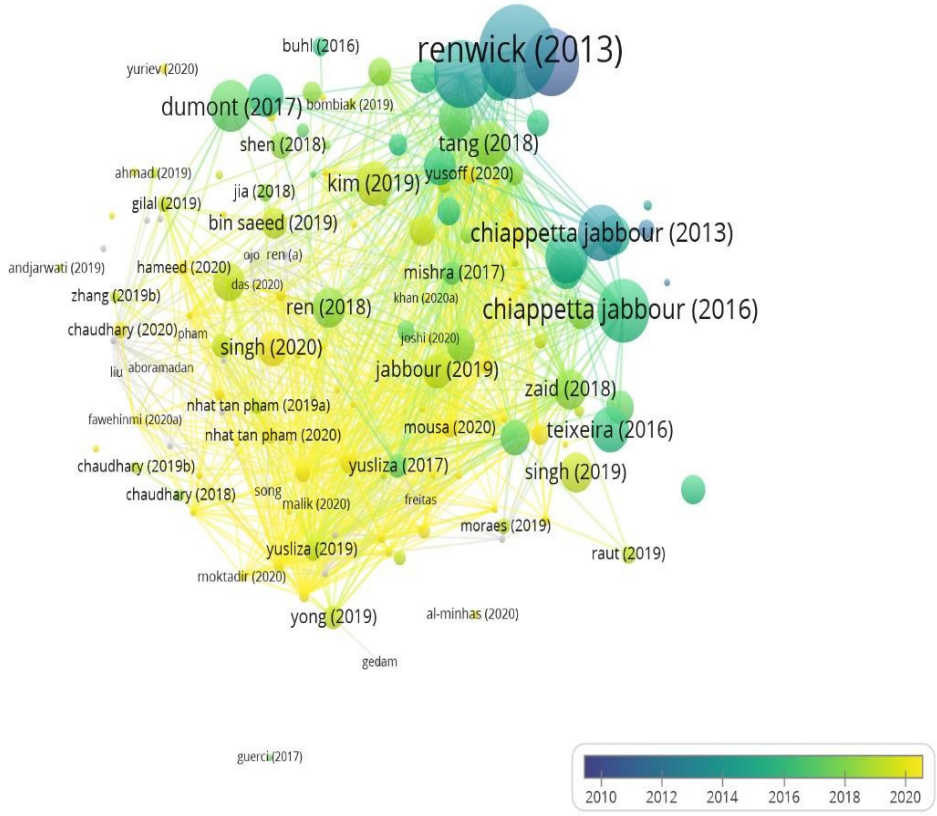

Figure 6. Bibliographic coupling with temporal analysis.

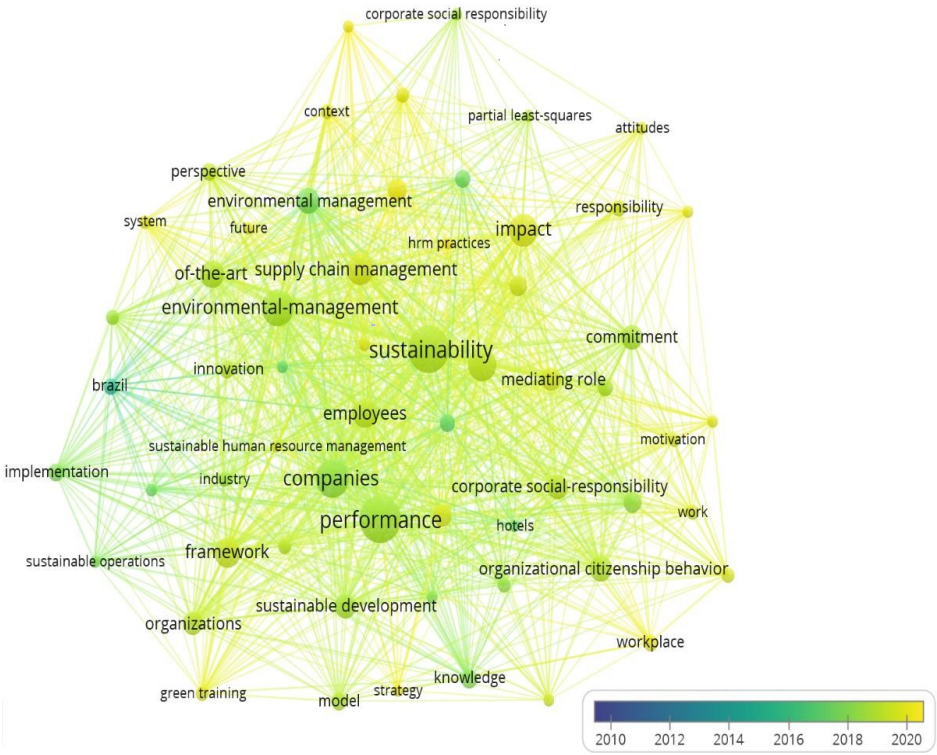

Figure 7. Keyword co-occurrence network with temporal analysis.

3.2.1. Bibliographic Coupling

Four distinct clusters emerged in this analysis (yellow, blue, green, red), as shown in Figure 4. These represent publications which are strongly linked through the references they share, thus suggesting different streams of literature (Bellucci et al. 2020). All papers present links to each other, with the exception of the correction article by Guerci et al. (2016). Note that some links are not visible as they are rather weak.

3.2.2. Co-Occurrence of Keywords

Of the 683 keywords identified, 57 are presented, resulting from the standard VOSViewer criterion that selects keywords repeated at least five times in the sample (see Figure 5). Note that this analysis included keywords plus an option provided by VOSViewer, which includes terms that occur frequently in the title of the bibliographical references of the sample. This selection was based on the fact that the resulting bibliometric map is richer in information, thus allowing for a more complete analysis of the sample.

3.3. Cluster Analysis

The map of the keyword analysis reflects the map of the bibliographic linkage of references. More specifically, the clusters of the keywords (see Figure 5) correspond to the clusters of the bibliographic linkage of references (see Figure 4). For instance, the keyword "Brazil" in the blue cluster is associated with the articles in the blue cluster of the bibliographic reference coupling map. As we will see below, the four colored clusters (blue, yellow, green and red) represent four distinct research lines.

The identification and analysis of the clusters (see Figures 4 and 5) was performed, similarly to the procedure adopted by Bellucci et al. (2020), with the selection of the 15 most cited articles in each cluster of the bibliographic coupling of references for analysis. Tables A1–A4 (in Appendix A) present the selected articles of each cluster, and Table A5 (in Appendix B) describes the frequency of occurrence of the keywords per cluster. By the reading and the analyses of the 15 most cited articles in each cluster, and by correlating the main themes founded on those articles with the most prominent keywords in each cluster, it was possible to identify the literature streams that characterize the clusters.

3.3.1. Blue Cluster: Implementation of GHRM as a Facet of Environmental Management

This cluster gathers 32 articles. The keywords "companies", "environmental management", "implementation", "green management", "strategy", "sustainable operations", "industry" and "organizations" are highlighted: the cluster highlights the implementation of environmental sustainability in HRM in light of environmental management (EM), (Jabbour et al. 2012; Teixeira et al. 2016). EM entails a tool in the pursuit of environmental goals that advocate sustainable development. One of the first empirical contributions reveals that when EM is an emerging goal, HRM practices tend to incorporate this environmental goal (Jabbour et al. 2012), such as training ("green training"), (Jabbour 2015; Nejati et al. 2017; Teixeira et al. 2016) or practices concerning GSC (Teixeira et al. 2016). Of note is the highlighting of the keyword "Brazil", since authors, such as Jabbour, have Brazilian companies as the sample of their studies.

Importantly, the cluster includes articles that bring EM closer to employees, highlighting their influence on environmental change. Pinzone et al. (2016) view EM as an organizational change which is dependent on employee support. The authors support the effectiveness of green practices to foster voluntary green behaviors. On the other hand, Obeidat et al. (2020) support the mediating role of GHRM in the relationship between management support, internal environmental orientation and environmental performance. With the intention of expanding the relationship of GHRM with other stakeholders, Guerci et al. (2016) conclude that green practices act as mediators in the relationship between environmental pressures and environmental performance.

Finally, the proximity of this cluster to the green cluster, which is also connected to EM, is highlighted, as we shall see below.

3.3.2. Red Cluster: Consequences for Employees

This cluster, composed of 50 articles, is dedicated to the study of HRM consequences for employees, mainly in the workplace. The attitudinal approach is represented by the terms "organizational citizenship behavior", "commitment", "knowledge", "pro-environmental behavior", "motivation", "employee green behavior" and "empowerment".

The analysis of the impact of green practices on employees is often carried out by performance outcomes. As an example, Kim et al. (2019) highlight that GHRM increases employees' organizational commitment in the hospitality industry, their green behavior and their environmental performance. Focusing on this industry as well, Pham et al. (2019b) observe that GHRM directly influences environmental organizational citizenship behaviors (OCB), i.e., behaviors not required by the organization or not listed as a job requirement and which impact environmental performance.

This cluster also contains multiple articles focusing on GHRM without exploring the environmental performance aspect. For example, the study by Saeed et al. (2019) suggests that green practices increase employees' pro-environmental behaviors through pro-environmental psychological capital. Two terms with high co-occurrence are notably "environmental sustainability" and "corporate social responsibility". The former is highlighted in the sample as the ultimate goal of GHRM (Chaudhary 2020), while the latter is related to GHRM in the sense that this HRM model "motivates employees to participate in an important aspect of CSR, green activities and initiatives" (Shen et al. 2018, p. 595).

3.3.3. Green Cluster: Consequences for Organizations

This cluster groups 26 articles associating organizational-level GHRM outcomes above all, mirrored in the map of keywords by the high occurrence of terms such as "sustainability", "environmental performance", "impact", "financial performance", "firm performance" and "innovation" (see Table A5 in Appendix B). The focus on the consequences of GHRM is particularly dedicated to organizational environmental performance; however, the financial facet is not neglected (Yong et al. 2020). It is relevant to point out that this cluster is also associated with EM, reflected by the proximity of "environmental performance" and "environmental management" to the blue cluster (see Figure 5). The keyword "sustainability" is also operationalized as an organizational outcome (Mousa and Othman 2020).

The empirical approach to GHRM implies measuring its implementation through green practices. Gupta (2018), after identifying the most important green practices through a literature review and consultation with experts, contributed to the field with an organizational environmental performance measurement grid.

From the articles analyzed (see Tables A1–A4 in Appendix A), it was found that there are also publications in this cluster focusing on the employees' attitudinal sphere ("attitudes"). Yong et al. (2019c), for example, suggest that green intellectual capital (GIC) and green relational capital (CRV) influence HRM. According to Chen (2008), green intellectual capital agglomerates the "totality of knowledge, skills, relationships and intangible assets related to environmental protection and green innovation" (p. 277), while green relational capital is the "totality of interactive relationships with customers, suppliers, network members and partners in corporate environmental management and green innovation" (p. 278).

Lastly, the state of the art according to Amrutha and Geetha (2020), which contributes to future directions of research on green practices, stands out. The authors explore a theoretical model that proposes a mediating role of green workplace behaviors in the relationship between HRM and social sustainability.

3.3.4. Yellow Cluster: Reviews, Models and Measurement

Bringing together 35 articles, this cluster is marked by bringing together reviews, models and measures of GHRM. Note the overlap of the blue cluster's "of-the-art" term and proximity to the green cluster, as both also include literature reviews. Of the 15 articles targeted for analysis, there are four literature reviews of GHRM (Ahmad 2015; Jackson

et al. 2011; Ren et al. 2018; Renwick et al. 2013) and one literature review of green employee empowerment in GHRM (Tariq et al. 2016). It is also worth mentioning the measurement of GHRM in the work of Tang et al. (2018), in which they contributed to the development and validation of a GHRM measurement instrument.

EM is also relevant in this cluster (see Table A5 in Appendix B), reflected in the proximity and overlap of the keyword "environmental management" in the blue cluster with this one. This is the least represented cluster in the map of keywords (see Figure 5). This is probably due to the fact that its content includes keywords from the other clusters. In other words, literature reviews, by recognizing different perspectives and literature streams, represent a more comprehensive view of the literature field, neutralizing the tendency in the reviews, models and measurement cluster to emphasize certain keywords associated with specific literature streams.

3.3.5. Evolution over Time

From the chronological bibliometric maps presented in Figures 6 and 7, it can be concluded that most of the keywords are present in more recent publications. The keywords circling 2016 and 2018 approximately are "Brazil", "environmental management" and "implementation". These keywords predominate in the blue cluster, resulting from works by Jabbour (2013, 2015), Jabbour and Jabbour (2016), Nejati et al. (2017) and Teixeira et al. (2016). These works connect GHRM to CFV, green product development and the environmental maturity of companies.

In older publications, we observed some references to the yellow cluster, such as the works of Jackson et al. (2011), Renwick et al. (2013, 2016) and Paillé et al. (2014). The bibliographic coupling map allows us to see that the blue and yellow clusters are less recent compared to the red and green clusters. Note that the latter two explore the consequences of GHRM on environmental performance and employees. A temporal transition centered on the organizational system to a more employee-focused approach can also be observed. The most represented keywords between 2019 and 2020 are "responsibility", "attitudes", "motivation", "impact", "workplace", "employee green behavior" and "pro-environmental behavior". It should also be noted that environmental training, despite being a highlighted term in the blue cluster, continues to be represented in more recent publications.

4. Discussion

By performing bibliometric mapping of the keyword search sample of publications, this study explored the evolution of GHRM during the 2010s, focusing mainly on the investigation of literature streams and the most recurring topics.

Then, the main contributions of the keyword search and VOSviewer are discussed, and finally, the stage of evolution of GHRM will be characterized.

The keyword search allowed the recent boom of the construct to be ascertained, namely from 2018 onwards (see Figures 2 and 3). GHRM is a topic attracting increasing attention from researchers from various scientific domains (e.g., management, environmental engineering and psychology). The fact that it is often described as a strategic element of EM applied to HRM leads to the conclusion that this is already a consolidated aspect in the definition of the construct. Despite this, there is still no consensual definition of GHRM (Benevene and Buonomo 2020; Ren et al. 2018). While, on one hand, there are proposals to redefine the construct suggesting a more holistic consideration that takes into account other facets of sustainability, such as the circular economy, on the other hand, a definition that focuses on the ecological dimension is proposed (Ren et al. 2018).

Regarding the results of the analyses carried out in VOSviewer, we highlight the fact that the map for the bibliographic coupling of references represents an almost perfect circular figure. This suggests that GHRM is a multidisciplinary research area and does not yet present totally clear and differentiated literature streams. Nevertheless, four groups of items related to each other emerged from the analyses, according to the similarity criterion assumed by the software (Van Eck and Waltman 2010, 2014). It was possible to identify a

differentiating theme in each of the four clusters: blue (implementation of GHRM as a facet of EM), red (consequences on employees), green (consequences at the organizational level) and yellow (reviews, models and measures). It should be noted, however, that all clusters present some publications that deviate from their main topic. As an example, the article by Moktadir et al. (2019), exploring the antecedents of GHRM, belongs to the green cluster and is mostly devoted to the organizational-level consequences of GHRM. This may be justified by the fact that there is still no representativeness of the study of antecedents in the GHRM literature; conversely, the exploration of GHRM consequences at the organizational and individual levels predominates (Benevene and Buonomo 2020). Although all clusters show some overlap, the yellow cluster is particularly ambiguous. While, on one hand, it brings together literature reviews (Jackson et al. 2011; Ren et al. 2018; Renwick et al. 2013; Tariq et al. 2016) and theoretical developments (Renwick et al. 2016), on the other hand, it also includes quantitative or qualitative empirical studies. These focus on the validation of HRM measurement scales (Tang et al. 2018) on the assessment of implemented green practices (Masri and Jaaron 2017) and on green behaviors in the workplace (Rayner and Morgan 2018) or outside the workplace (Bombiak and Marciniuk-Kluska 2018).

The temporal evolution maps reveal that the publications referring to the red and green clusters are the most recent ones, compared to the blue and yellow clusters. Although the map of keywords does not reveal a very clear temporal transition, it does show that the latest articles tend to focus on the attitudinal dimension, while the "older" terms (e.g., implementation, EM, sustainable operations) represent the initial conception of GHRM, which is more restricted to its implementation in organizations as an environmental management system or tool. Furthermore, it is important to note that by the middle of the decade, authors such as Jabbour, Renwick and Teixeira dominated the literature on GHRM, viewing it as a tool to achieve environmental sustainability. Thus, the efforts made were mainly focused on the analysis and understanding of the benefits of GHRM practices in relation to environmental performance. Contrastingly, authors who have recently stood out belong to a line of research that recognizes GHRM as an end in itself, capable of promoting attitudinal and behavioral changes, which also impact the performance of organizations. Authors such as Yusliza, Pham, Singh and Dumont represent this line of research. Another relevant aspect is the fact that most empirical studies are conducted in emerging economies, such as Malaysia and India. GHRM thus seems to acquire a more evident role in these contexts, since the large-scale industrial sector predominant in these countries requires a huge demand for natural resources and generates high CO_2 emissions. The implementation of GHRM will contribute to natural resource conservation, a reduction in greenhouse gas emissions and protection of the ecosystem (Yong et al. 2019a).

Ren et al.'s (2018) GHRM definition, which reinforces HRM as a relevant phenomenon to understand the relationships between the environmental impact of organizational activities and HRM systems, has, in our view, contributed to the delimitation of boundaries of the construct vis-à-vis other HRM specialties. These include Sustainable HRM, which refers to the triple bottom line approach and moves away from the environmental dimension (Ahmad 2015).

The delimitation of boundaries in relation to other HRM specialties, such as Sustainable HRM, seems to be a relevant path for future research. In this sense, it can be seen that the lack of a consensual definition of the construct is mirrored in the plurality of HRM measures. For example, we observe authors who resort to strategic HRM measurement instruments (Paillé et al. 2014). Let us note, in this scope, the contribution of the scale by Tang et al. (2018), focused on the ecological component of HRM practices. However, it will be important in the future to validate the instrument outside the Chinese context.

From our analysis, we could observe that there is no consensual definition within each cluster, but there is a strong tendency to integrate GA into the definition. It is prevalent for clusters to use the definition of Renwick et al. (2013), particularly in the red cluster (Dumont et al. 2017; Kim et al. 2019; Pham et al. 2019b, 2020; Saeed et al. 2019; Singh et al. 2020). However, in the yellow (Roscoe et al. 2019; Tang et al. 2018), blue (Obeidat

et al. 2020; Yu et al. 2020), and green clusters (Longoni et al. 2018), this definition is also used. Based on our study we could not conclude that GHRM practices are exclusively associated with a particular cluster. For example, green recruitment and selection practices are present in the yellow cluster (Masri and Jaaron 2017; Tang et al. 2018; Ren et al. 2018; Renwick et al. 2016; Roscoe et al. 2019), blue cluster (Guerci et al. 2016; Nejati et al. 2017), green cluster (Yong et al. 2020; Yusliza et al. 2017, 2019) and red cluster (Saeed et al. 2019; Singh et al. 2020). Other practices, such as green training and development, performance appraisal, reward and compensation, and employee empowerment, are also present in the different clusters. Rather than the green practices associated with specific clusters, we emphasize what appears to be the main differentiator of these clusters: the study of the influence of organizational antecedents and consequents on green practices and GHRM implementation. Concerning the methods used, empirical articles are mainly distributed across the blue, red and green clusters, with quantitative studies prevailing over qualitative studies. Mixed-method papers such as Paillé et al. (2014) from the yellow cluster, Pham et al. (2019b) from the red cluster and Yu et al. (2020) from the blue cluster make use of data from questionnaires and also from interviews. Regarding review articles, based on our literature review, only one bibliometric analysis paper on GHRM was found (Khan and Muktar 2020), and it also uses VOSviewer bibliometric maps.

In agreement with our findings, Benevene and Buonomo (2020) state that most studies are published from 2018 onwards, and they report a geographical trend, namely, an increasing number of publications in emerging countries over time. An interesting aspect highlighted by other papers is the fact that the number of articles addressing GHRM over time, as well as their geographical distribution, have been strongly influenced by regulations on sustainability and green standards across organizations (Amrutha and Geetha 2020; Benevene and Buonomo 2020). Comparing our results with Yong et al.'s (2019a) work, which identifies the streams of the GHRM literature from a sample of publications from 2007 to 2019, we observe that the themes identified in the present analysis are not far from their classification: (1) Reviews, models and concepts; (2) Implementation of GHRM; (3) Determinants of GHRM adoption (at the organizational level); (4) Consequences of GHRM adoption (at the organizational level); and (5) Outcomes of GHRM adoption (at the individual level). The yellow cluster (Reviews, models and measurement) coincides with theme 1 (Reviews, models and concepts), the red cluster (Consequences for employees) with theme 5 (Outcomes of GHRM adoption at the individual level), the green cluster (Consequences for organizations) with theme 4 (Consequences of GHRM adoption at the organizational level) and the blue cluster with theme 2 (Implementation of Green HRM). That leaves, of course, theme 3 (Determinants of GHRM adoption at the organizational level) without a cluster fit. This theme includes the articles presented in the blue cluster (Obeidat et al. 2020; Teixeira et al. 2016) and the green cluster (Yusliza et al. 2017). It is worth noting that the authors analyzed a sample of 70 articles, published in a distinct time span of the present review, which naturally limits our analysis when comparing the two results. Our findings also converge with Khan and Muktar's (2020) review that focused on the period 2008–2020 and used the Scopus database. This convergence is reflected in the focus of empirical studies on emerging economies and on the industrial sector, and it can be seen in the transition from the emphasis on environmental performance resulting from an EM at the organizational level, to an approach that returns importance to the agents of organizations, the employees, reflected in the emergence of studies focused on attitudinal variables.

According to the objectives proposed for this work, based on the literature reviewed and analyzed, and using Reichers and Schneider's (1990) model as a framework, it can be concluded that the GHRM construct is currently at the second stage of development, i.e., the assessment and augmentation stage. While it is true that there are studies focused on its antecedents and consequents, a condition of the first stage of development—introduction and elaboration—by contrast, there are already literature reviews, such as those by Benevene and Buonomo (2020), Ren et al. (2018) and Yong et al. (2019a), focused on the

research gaps, both in terms of GHRM's definition and conceptualization, and in terms of its measurement. These authors also suggest future research agendas in order to advance the topic at the level of the theoretical and research field. As the concept does not present an unambiguous definition and there is ambiguity in the distinction between GHRM and other HRM specialties, the contributions and suggestions of various authors, in an attempt to clarify, delimit, distinguish and link the construct to others that are close to it, are very relevant contributions to the development of the GHRM literature. Thus, the current debate on what GHRM is and how it is conceptualized and assessed, in our view, justifies the characterization of the construct at the assessment and augmentation stage. The increasing research focus on the topic of GHRM suggests that the next stage of development of the construct—consolidation and accommodation (Reichers and Schneider 1990)—may be reached in the medium term. In this phase, a clear prevalence of a reduced number of definitions and a predominant way of operationalizing GHRM, as well as the establishment of construct boundaries and the recognition of associated antecedents and consequents, will be observed. The emergence of meta-analyses that portray the results and compare contradictions between works are also expected.

5. Conclusions and Future Directions

The bibliometric analysis of the literature produced between 2010 and 2020 highlights the importance of GHRM today as an expanding field, particularly from the second half of the decade. The purpose of GHRM is to actively participate in the creation of greener societal paths and respond to environmental and ecological issues from the organizational context. This HRM specialty refers to one of the most important challenges faced by humanity.

By mapping the existing literature streams—implementation of GHRM as a strand of EM, consequences at the organizational level and consequences at the employee level—tracing their contributions and development in the last decade, and identifying the construct development stage, this paper has met its objectives. In short, the results obtained suggest that the implementation of green practices in organizations will be reflected in lower levels of environmental pollution and contamination. Despite the emphasis on the repercussions of GHRM at work, it goes beyond the labor sphere, since green environmental values are transferable from context to context, i.e., green behaviors applied at work are reflected in personal life and vice versa. The fact that the evolution of the construct has been going beyond a concept focused only on EM demonstrates the consideration of employees endowed with unique strategic value and their decisive role in organizational sustainability. The resource-based view (Barney 1991) is a theoretical contribution that points in this direction (Yusliza et al. 2017).

Despite the contributions of this work, it is also important to highlight some limitations and the attempts to overcome them. By using only one database, the WOS, we limited access to the universe of publications on GHRM, and therefore, the information that we extrapolated may contain some biases. However, in the category of bibliometric reviews, we found the work of Khan and Muktar (2020), which used the Scopus database, revealed results which are convergent with ours, a fact that suggests the reliability of the results obtained. In addition, we consider that the present bibliometric review extends the work of Khan and Muktar (2020), insofar as it crosses two similarity maps that allow the lines of research in GHRM to be mapped and the topics that build them to be identified, as it also aims to identify the stage of evolution of the construct. The last limitation refers to the fact that only the 15 most cited articles of each cluster obtained through VOSviewer were analyzed, resulting in a total of 60 articles compared to the 143 of the sample obtained. Although Bellucci et al. (2020) defend the credibility of this method, we feel we should mention this limitation.

Despite the growing interest of the scientific community in studying the topic of GHRM, we found that a high research potential remains. Thus, based on the discussion of the results, we suggest some recommendations for future work. It is important to achieve a

more consensual definition of GHRM (Ari et al. 2020) and to develop a more universal and unambiguous language for the construct. Thus, emphasis is placed on the need to study the relationship of GHRM with other related concepts, accessing the different approaches that have been proposed so that commonalities and differentiating aspects of the various constructs can be more accurately observed. We recall something which was already mentioned by Renwick et al. (2013), who produced one of the first systematic reviews of the construct. They highlight GHRM as an approach that allows for going beyond the strict conception of the economic side and includes the wellbeing of the various stakeholders at the heart of HRM. By delimiting boundaries with other HRM specialties, the definition, conceptualization and measurement of GHRM will be more approachable. On the other hand, it is relevant to highlight that the need for further studies on the contextualization of GHRM is important, as it is not only influenced by the most obvious organizational actors, such as leaders and employees, but by multiple stakeholders, such as teams, municipalities, regulators and legislators, which exert pressures and constraints on the implementation of GHRM (Ren et al. 2018). We also highlight the need to delve deeper into the antecedents of GHRM, in particular the antecedents at the employee level (Obeidat et al. 2020). The study of GHRM in developed countries should also receive attention, as they are less represented by current studies focusing on emerging economies.

Pursuit of the analysis of the relationship between GHRM and other organizational features, such as GSC and environmental certification systems, is also an important way forward. In organizational practices, the existence of complex performance agendas and objectives that transcend HRM objectives must be assumed. In this sense, understanding how GHRM relates and responds to the different aspects of the organization will allow us to study the impact of this specific way of managing human resources in real organizational circumstances. Finally, we highlight the fact that artificial intelligence and big data have come to dominate the way we work, and the benefit of the intersection of these areas constitutes an interesting direction in the study of GHRM.

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Appendix A

Table A1. Publications from the bibliographic coupling analysis—yellow cluster.

Yellow Cluster	Authors and Date	Title	Citation Frequency	TBF
	Renwick et al. (2013)	Green Human Resource Management: A Review and Research Agenda.	331	678
	Jackson et al. (2011)	State-of-the-art and future directions for green human resource management: Introduction to the special issue.	182	380
	Paillé et al. (2014)	Impact of Human Resource Management on Environmental Performance: An Employee-Level Study.	178	1083
	Tang et al. (2018)	Green human resource management practices: scale development and validity.	82	1180

Table A1. *Cont.*

Yellow Cluster	Authors and Date	Title	Citation Frequency	TBF
	Renwick et al. (2016)	Contemporary developments in Green (environmental) HRM scholarship.	79	586
	Masri and Jaaron (2017)	Assessing green human resources management practices in Palestinian manufacturing context: An empirical study.	73	1525
	Ahmad (2015)	Green Human Resource Management: Policies and practices.	72	891
	Ren et al. (2018)	Green human resource management research in emergence: A review and future directions.	67	1229
	Haddock-Millar et al. (2016)	Green human resource management: a comparative qualitative case study of a United States multinational corporation.	51	773
	Roscoe et al. (2019)	Green human resource management and the enablers of green organisational culture: Enhancing a firm's environmental performance for sustainable development.	43	860
	Bombiak and Marciniuk-Kluska (2018)	Green Human Resource Management as a Tool for the Sustainable Development of Enterprises: Polish Young Company Experience.	34	994
	Guerci et al. (2016)	Corrigendum.	34	310
	Tariq et al. (2016)	Green employee empowerment: a systematic literature review on state-of-art in green human resource management.	33	609
	Mishra (2017)	Green human resource management: a framework for sustainable organizational development in an emerging developing economy.	25	1256
	Rayner and Morgan (2018)	An empirical study of 'green' workplace behaviours: ability, motivation and opportunity.	22	664

TBF-total binding force.

Table A2. Publications from the bibliographic coupling analysis—blue cluster.

Blue Cluster	Authors and Date	Title	Citation Frequency	TBF
	Jabbour and Jabbour (2016)	Green Human Resource Management and Green Supply Chain Management: linking two emerging agendas.	159	1145
	Jabbour (2013)	Environmental training in organisations: From a literature review to a framework for future research.	125	791
	Jabbour et al. (2015)	Green product development and performance of Brazilian firms: measuring the role of human and technical aspects.	107	837
	Teixeira et al. (2016)	Green training and green supply chain management: evidence from Brazilian firms.	89	628
	Guerci et al. (2016)	Translating stakeholder pressures into environmental performance—the mediating role of green HRM practices.	70	960
	Zaid et al. (2018)	The impact of green human resource management and green supply chain management practices on sustainable performance: An empirical study.	69	1412
	Jabbour (2015)	Environmental training and environmental management maturity of Brazilian companies with ISO 14001: empirical evidence.	68	812
	Singh and El-Kassar (2019)	Role of big data analytics in developing sustainable capabilities.	68	370
	Nejati et al. (2017)	Envisioning the invisible: Understanding the synergy between green human resource management and green supply chain management in manufacturing firms in Iran in light of the moderating effect of employees' resistance to change.	55	1063
	Pinzone et al. (2016)	Progressing in the change journey towards sustainability in healthcare: the role of 'Green' HRM.	64	1105
	Bhardwaj (2016)	Role of green policy on sustainable supply chain management.	40	20
	Yu et al. (2020)	Green human resource management and environmental cooperation: An ability-motivation-opportunity and contingency perspective.	19	1142
	Jabbour et al. (2012)	Environmental development in Brazilian companies: The role of human resource management.	17	456

Table A2. *Cont.*

Blue Cluster	Authors and Date	Title	Citation Frequency	TBF
	Raut et al. (2019)	Examining the performance-oriented indicators for implementing green management practices in the Indian agro sector.	16	310
	Obeidat et al. (2020)	Leveraging "Green" Human Resource Practices to Enable Environmental and Organizational Performance: Evidence from the Qatari Oil and Gas Industry.	14	1214

TBF-total binding force.

Table A3. Publications from the bibliographic coupling analysis—green cluster.

Green Cluster	Authors and Date	Title	Citation Frequency	TBF
	Gupta (2018)	Assessing organizations performance on the basis of GHRM practices using BWM and Fuzzy TOPSIS.	49	1408
	Longoni et al. (2018)	Deploying Environmental Management Across Functions: The Relationship Between Green Human Resource Management and Green Supply Chain Management.	44	1055
	Yusliza et al. (2017)	Deciphering the implementation of green human resource management in an emerging economy.	26	1135
	Yong et al. (2019c)	Nexus between green intellectual capital and green human resource management.	25	857
	Yusliza et al. (2019)	Top management commitment, corporate social responsibility and green human resource management.	24	1443
	Yong et al. (2020)	Pathways towards sustainability in manufacturing organizations: Empirical evidence on the role of green human resource management.	21	1434
	Mousa and Othman (2020)	The impact of green human resource management practices on sustainable performance in healthcare organisations: A conceptual framework.	18	1633
	Amrutha and Geetha (2020)	A systematic review on green human resource management: Implications for social sustainability.	15	1878
	Al Kerdawy (2019)	The Role of Corporate Support for Employee Volunteering in Strengthening the Impact of Green Human Resource Management Practices on Corporate Social Responsibility in the Egyptian Firms.	10	754
	Ogbeibu et al. (2020)	Technological turbulence and greening of team creativity, product innovation, and human resource management: Implications for sustainability.	10	1013
	Yong et al. (2019a)	Green human resource management: A systematic review from 2007 to 2019.	7	1500
	Pham et al. (2019a)	Green human resource management: a comprehensive review and future research agenda.	7	1659
	Moktadir et al. (2019)	Antecedents for greening the workforce: implications for green human resource management.	6	869
	Raut et al. (2020)	Analysing green human resource management indicators of automotive service sector.	5	1107
	Yong et al. (2019b)	Exploratory cases on the interplay between green human resource management and advanced green manufacturing in light of the Ability-Motivation-Opportunity theory.	4	989

TBF-total binding force.

Table A4. Publications from the bibliographic coupling analysis—red cluster.

Red Cluster	Authors and Date	Title	Citation Frequency	TBF
	Dumont et al. (2017)	Effects of Green HRM Practices on Employee Workplace Green Behavior: The Role of Psychological Green Climate and Employee Green Values.	108	796
	Kim et al. (2019)	The effect of green human resource management on hotel employees' eco-friendly behavior and environmental performance.	82	626

Table A4. *Cont.*

Red Cluster	Authors and Date	Title	Citation Frequency	TBF
	Pham et al. (2019b)	Greening the hospitality industry: how do green human resource management practices influence organizational citizenship behavior in hotels? A mixed-methods study.	62	1172
	Singh et al. (2020)	Green innovation and environmental performance: The role of green transformational leadership and green human resource management.	53	768
	Saeed et al. (2019)	Promoting employee's proenvironmental behavior through green human resource management practices.	41	953
	Shen et al. (2018)	Employees' Perceptions of Green HRM and Non-Green Employee Work Outcomes: The Social Identity and Stakeholder Perspectives.	31	592
	Pinzone et al. (2016)	Effects of 'green' training on pro-environmental behaviors and job satisfaction: Evidence from the Italian healthcare sector.	26	940
	Jia et al. (2018)	The Continuous Mediating Effects of GHRM on Employees' Green Passion via Transformational Leadership and Green Creativity.	16	641
	Chaudhary (2020)	Green Human Resource Management and Employee Green Behavior: An Empirical Analysis.	14	658
	Gilal et al. (2019)	Promoting environmental performance through green human resource management practices in higher education institutions: A moderated mediation model.	13	923
	Pham et al. (2020)	The role of green human resource management in driving hotel's environmental performance: Interaction and mediation analysis.	12	1223
	Pham et al. (2019c)	Greening Human Resource Management and Employee Commitment Towards the Environment: An Interaction Model.	11	1047
	Hameed et al. (2020)	Do green HRM practices influence employees' environmental performance?	9	1177
	Chaudhary (2019)	Green human resource management and job pursuit intention: Examining the underlying processes.	8	629
	Anwar et al. (2020)	Green Human Resource Management for organisational citizenship behaviour towards the environment and environmental performance on a university campus.	8	1195

TBF-total binding force.

Appendix B

Table A5. Keywords from the keyword co-occurrence analysis.

Yellow Cluster		Blue Cluster		Green Cluster		Red Cluster	
Keyword	**Frequency**	**Keyword**	**Frequency**	**Keyword**	**Frequency**	**Keyword**	**Frequency**
Employees	25	companies	44	sustainability	66	performance	67
environmental management	22	environmental-management	42	environmental performance	33	organizational citizenship behavior	21
Perspective	11	framework	28	impact	33	commitment	19
Context	8	of-the-art	24	supply chain management	30	corporate social-responsibility	19
System	7	environmental management	22	financial performance	15	mediating role	18
behaviors	6	sustainable development	20	competitive advantage	14	knowledge	12
		organizations	17	firm performance	11	environmental sustainability	11
		behavior	16	innovation	10	Model	10
		implementation	10	responsibility	9	Systems	10
		Brazil	9	manufacturing firms	8	Workplace	9
		determinants	8	Malaysia	7	pro-environmental behavior	8
		green supply chain management	8	corporate social responsibility	6	Strategies	8
		green training	8	advantage	5	Work	8
		industry	8	attitudes	5	motivation	7
		sustainable human resource management	6	corporate	5	employee green behavior	6
		green management	6	future	5	Empowerment	6
		strategy	5	hrm practices	5	hotels	5
		sustainable operations	5	partial least-squares	5		
				pls-sem	5		

References

Ahmad, Shoeb. 2015. Green Human Resource Management: Policies and practices. *Cogent Business & Management* 2: 1030817.

Al Kerdawy, Mostafa Mohamed Ahmed. 2019. The Role of Corporate Support for Employee Volunteering in Strengthening the Impact of Green Human Resource Management Practices on Corporate Social Responsibility in the Egyptian Firms. *European Management Review* 16: 1079–95. [CrossRef]

Amrutha, V. N., and S. N. Geetha. 2020. A Systematic Review on Green Human Resource Management: Implications for Social Sustainability. *Journal of Cleaner Production* 247: 119131. [CrossRef]

Anwar, Nosheen, Nik Hasnaa Nik Mahmood, Mohd Yusoff Yusliza, T. Ramayah, Juhari Noor Faezah, and Waqas Khalid. 2020. Green Human Resource Management for Organisational Citizenship Behaviour towards the Environment and Environmental Performance on a University Campus. *Journal of Cleaner Production* 256: 120401. [CrossRef]

Ari, Engin, Osman M. Karatepe, Hamed Rezapouraghdam, and Turgay Avci. 2020. A Conceptual Model for Green Human Resource Management: Indicators, Differential Pathways, and Multiple Pro-Environmental Outcomes. *Sustainability* 12: 7089. [CrossRef]

Barney, Jay B. 1991. Firm Resources and Sustained Competitive Advantage. *Journal of Management* 17: 99–120. [CrossRef]

Bellucci, Marco, Giacomo Marzi, Beatrice Orlando, and Francesco Ciampi. 2020. Journal of Intellectual Capital: A Review of Emerging Themes and Future Trends. *Journal of Intellectual Capital* 22: 744–67. [CrossRef]

Benevene, Paula, and Ilaria Buonomo. 2020. Green Human Resource Management: An Evidence-Based Systematic Literature Review. *Sustainability* 12: 5974. [CrossRef]

Benn, Suzanne, Stephen T. T. Teo, and Andrew Martin. 2015. Employee Participation and Engagement in Working for the Environment. *Personnel Review* 44: 492–510. [CrossRef]

Bhardwaj, Broto Rauth. 2016. Role of Green Policy on Sustainable Supply Chain Management: A Model for Implementing Corporate Social Responsibility (CSR). *Benchmarking: An International Journal* 23: 456–68. [CrossRef]

Bombiak, Edyta, and Anna Marciniuk-Kluska. 2018. Green Human Resource Management as a Tool for the Sustainable Development of Enterprises: Polish Young Company Experience. *Sustainability* 10: 1739. [CrossRef]

Chaudhary, Richa. 2019. Green Human Resource Management and Job Pursuit Intention: Examining the Underlying Processes. *Corporate Social Responsibility and Environmental Management* 26: 929–37. [CrossRef]

Chaudhary, Richa. 2020. Green Human Resource Management and Employee Green Behavior: An Empirical Analysis. *Corporate Social Responsibility and Environmental Management* 27: 630–41. [CrossRef]

Chen, Yu-Shan. 2008. The Positive Effect of Green Intellectual Capital on Competitive Advantages of Firms. *Journal of Business Ethics* 77: 271–86. [CrossRef]

Correia, Maria Salome. 2019. Sustainability: An Overview of the Triple Bottom Line and Sustainability Implementation. *International Journal of Strategic Engineering* 2: 29–38. [CrossRef]

Crossan, Mary, and Tracy Guatto. 1996. Organizational Learning Research Profile. *Journal of Organizational Change Management* 9: 107–12. [CrossRef]

Dumont, Jenny, Jie Shen, and Xin Deng. 2017. Effects of Green HRM Practices on Employee Workplace Green Behavior: The Role of Psychological Green Climate and Employee Green Values: Effect of Green HRM on Employee Workplace Green Behavior. *Human Resource Management* 56: 613–27. [CrossRef]

Ehnert, Ina. 2009. Sustainability and Human Resource Management: Reasoning and Applications on Corporate Websites. *European Journal of International Management* 3: 419. [CrossRef]

Ellegaard, Ole, and Johan A. Wallin. 2015. The Bibliometric Analysis of Scholarly Production: How Great Is the Impact? *Scientometrics* 105: 1809–31. [CrossRef]

Gholami, Hamed, Ghasem Rezaei, Muhamad Zameri Mat Saman, Safian Sharif, and Norhayati Zakuan. 2016. State-of-the-Art Green HRM System: Sustainability in the Sports Center in Malaysia Using a Multi-Methods Approach and Opportunities for Future Research. *Journal of Cleaner Production* 124: 142–63. [CrossRef]

Gilal, Faheem Gul, Zubaida Ashraf, Naeem Gul Gilal, Rukhsana Gul Gilal, and Nisar Ahmed Chaana. 2019. Promoting Environmental Performance through Green Human Resource Management Practices in Higher Education Institutions: A Moderated Mediation Model. *Corporate Social Responsibility and Environmental Management* 26: 1579–90. [CrossRef]

González-Benito, Javier, and Óscar González-Benito. 2006. A Review of Determinant Factors of Environmental Proactivity. *Business Strategy and the Environment* 15: 87–102. [CrossRef]

Guerci, Marco, Fabrizio Montanari, Annachiara Scapolan, and Antonella Epifanio. 2016. Green and Nongreen Recruitment Practices for Attracting Job Applicants: Exploring Independent and Interactive Effects. *The International Journal of Human Resource Management* 27: 129–50. [CrossRef]

Gupta, Himanshu. 2018. Assessing Organizations Performance on the Basis of GHRM Practices Using BWM and Fuzzy TOPSIS. *Journal of Environmental Management* 226: 201–16. [CrossRef] [PubMed]

Haddock-Millar, Julie, Chandana Sanyal, and Michael Müller-Camen. 2016. Green Human Resource Management: A Comparative Qualitative Case Study of a United States Multinational Corporation. *The International Journal of Human Resource Management* 27: 192–211. [CrossRef]

Hameed, Zahid, Ikram Ullah Khan, Tahir Islam, Zaryab Sheikh, and Rana Muhammad Naeem. 2020. Do Green HRM Practices Influence Employees' Environmental Performance? *International Journal of Manpower* 41: 1061–79. [CrossRef]

Harrell-Cook, Gloria, Eileen Appelbaum, Thomas Bailey, Peter Berg, and Arne L. Kalleberg. 2001. Manufacturing Advantage: Why High-Performance Work Systems Pay Off. *The Academy of Management Review* 26: 459. [CrossRef]

Intergovernmental Panel on Climate Change (IPCC). 2018. *An IPCC Special Report on the Impacts of Global Warming of 1.5°C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty*. Edited by Valérie Masson-Delmotte, Hans-Otto Pörtner, Jim Skea, Panmao Zhai, Debra Roberts, Priyadarshi R. Shukla, Anna Pirani, Wilfran Moufouma-Okia, Clotilde Péan, Roz Pidcock and et al. Geneva: IPCC, *in press*.

Jabbour, Charbel José Chiappetta. 2013. Environmental Training in Organisations: From a Literature Review to a Framework for Future Research. *Resources, Conservation and Recycling* 74: 144–55. [CrossRef]

Jabbour, Charbel José Chiappetta. 2015. Environmental Training and Environmental Management Maturity of Brazilian Companies with ISO14001: Empirical Evidence. *Journal of Cleaner Production* 96: 331–38. [CrossRef]

Jabbour, Charbel José Chiappetta, and Ana Beatriz Lopes de Sousa Jabbour. 2016. Green Human Resource Management and Green Supply Chain Management: Linking Two Emerging Agendas. *Journal of Cleaner Production* 112: 1824–33. [CrossRef]

Jabbour, Charbel José Chiappetta, Ana Beatriz Lopes de Sousa Jabbour, Adriano Alves Teixeira, and Wesley Ricardo S. Freitas. 2012. Environmental Development in Brazilian Companies: The Role of Human Resource Management. *Environmental Development* 3: 137–47. [CrossRef]

Jabbour, Charbel José Chiappetta, Daniel Jugend, Ana Beatriz Lopes de Sousa Jabbour, Angappa Gunasekaran, and Hengky Latan. 2015. Green Product Development and Performance of Brazilian Firms: Measuring the Role of Human and Technical Aspects. *Journal of Cleaner Production* 87: 442–51. [CrossRef]

Jabbour, Charbel José Chiappetta, Fernando César Almada Santos, and Marcelo Seido Nagano. 2010. Contributions of HRM throughout the Stages of Environmental Management: Methodological Triangulation Applied to Companies in Brazil. *The International Journal of Human Resource Management* 21: 1049–89. [CrossRef]

Jackson, Susan E., Douglas W. S. Renwick, Charbel José Chiappetta Jabbour, and Michael Muller-Camen. 2011. State-of-the-Art and Future Directions for Green Human Resource Management: Introduction to the Special Issue. *German Journal of Human Resource Management: Zeitschrift Für Personalforschung* 25: 99–116. [CrossRef]

Jia, Jianfeng, Huanxin Liu, Tachia Chin, and Dongqing Hu. 2018. The Continuous Mediating Effects of GHRM on Employees' Green Passion via Transformational Leadership and Green Creativity. *Sustainability* 10: 3237. [CrossRef]

Kessler, Maxwell Mirton. 1963. Bibliographic Coupling between Scientific Papers. *American Documentation* 14: 10–25. [CrossRef]

Khan, Muhammad Hamza, and Syaharizatul Noorizwan Muktar. 2020. A Bibliometric Analysis of Green Human Resource Management Based on Scopus Platform. *Cogent Business & Management* 7: 1831165.

Kim, Yong Joong, Woo Gon Kim, Hyung-Min Choi, and Kullada Phetvaroon. 2019. The Effect of Green Human Resource Management on Hotel Employees' Eco-Friendly Behavior and Environmental Performance. *International Journal of Hospitality Management* 76: 83–93. [CrossRef]

Kramar, Robin. 2014. Beyond Strategic Human Resource Management: Is Sustainable Human Resource Management the next Approach? *The International Journal of Human Resource Management* 25: 1069–89. [CrossRef]

Li, Jie, and Andrew Hale. 2015. Identification of, and Knowledge Communication among Core Safety Science Journals. *Safety Science* 74: 70–78. [CrossRef]

Longoni, Annachiara, Davide Luzzini, and Marco Guerci. 2018. Deploying Environmental Management Across Functions: The Relationship Between Green Human Resource Management and Green Supply Chain Management. *Journal of Business Ethics* 151: 1081–95. [CrossRef]

Martínez-del-Río, Javier, José Céspedes-Lorente, and Eva Carmona-Moreno. 2012. High-Involvement Work Practices and Environmental Capabilities: How HIWPS Create Environmentally Based Sustainable Competitive Advantages. *Human Resource Management* 51: 827–50. [CrossRef]

Masri, Hiba A., and Ayham A. M. Jaaron. 2017. Assessing Green Human Resources Management Practices in Palestinian Manufacturing Context: An Empirical Study. *Journal of Cleaner Production* 143: 474–89. [CrossRef]

Mehta, Kathak, and Pawan Kumar Chugan. 2015. Green HRM in Pursuit of Environmentally Sustainable Business. *Universal Journal of Industrial and Business Management* 3: 74–81. [CrossRef]

Milliman, John. 2013. Leading-Edge Green Human Resource Practices: Vital Components to Advancing Environmental Sustainability: Leading-Edge Green Human Resource Practices. *Environmental Quality Management* 23: 31–45. [CrossRef]

Mishra, Pavitra. 2017. Green Human Resource Management: A Framework for Sustainable Organizational Development in an Emerging Economy. *International Journal of Organizational Analysis* 25: 762–88. [CrossRef]

Moktadir, Md. Abdul, Ashish Dwivedi, Syed Mithun Ali, Sanjoy Kumar Paul, Golam Kabir, and Jitender Madaan. 2019. Antecedents for Greening the Workforce: Implications for Green Human Resource Management. *International Journal of Manpower* 41: 1135–53. [CrossRef]

Mousa, Sharifa K., and Mohammed Othman. 2020. The Impact of Green Human Resource Management Practices on Sustainable Performance in Healthcare Organisations: A Conceptual Framework. *Journal of Cleaner Production* 243: 118595. [CrossRef]

Nejati, Mehran, Soodabeh Rabiei, and Charbel José Chiappetta Jabbour. 2017. Envisioning the Invisible: Understanding the Synergy between Green Human Resource Management and Green Supply Chain Management in Manufacturing Firms in Iran in Light of the Moderating Effect of Employees' Resistance to Change. *Journal of Cleaner Production* 168: 163–72. [CrossRef]

Obeidat, Shatha M., Anas A. Al Bakri, and Said Elbanna. 2020. Leveraging "Green" Human Resource Practices to Enable Environmental and Organizational Performance: Evidence from the Qatari Oil and Gas Industry. *Journal of Business Ethics* 164: 371–88. [CrossRef]

Ogbeibu, Samuel, Jude Emelifeonwu, Abdelhak Senadjki, James Gaskin, and Jari Kaivooja. 2020. Technological Turbulence and Greening of Team Creativity, Product Innovation, and Human Resource Management: Implications for Sustainability. *Journal of Cleaner Production* 244: 118703. [CrossRef]

Opatha, Hhdnp, and A. Anton Arulrajah. 2014. Green Human Resource Management: Simplified General Reflections. *International Business Research* 7: 101. [CrossRef]

Paillé, Pascal, Yang Chen, Olivier Boiral, and Jiafei Jin. 2014. The Impact of Human Resource Management on Environmental Performance: An Employee-Level Study. *Journal of Business Ethics* 121: 451–66. [CrossRef]

Pham, Nhat Tan, Hung Trong Hoang, and Quyen Phu Thi Phan. 2019a. Green Human Resource Management: A Comprehensive Review and Future Research Agenda. *International Journal of Manpower* 41: 845–78. [CrossRef]

Pham, Nhat Tan, Tan Vo Thanh, Zuzana Tučková, and Vo Thi Ngoc Thuy. 2020. The Role of Green Human Resource Management in Driving Hotel's Environmental Performance: Interaction and Mediation Analysis. *International Journal of Hospitality Management* 88: 102392. [CrossRef]

Pham, Nhat Tan, Zuzana Tučková, and Charbel José Chiappetta Jabbour. 2019b. Greening the Hospitality Industry: How Do Green Human Resource Management Practices Influence Organizational Citizenship Behavior in Hotels? A Mixed-Methods Study. *Tourism Management* 72: 386–99. [CrossRef]

Pham, Nhat Tan, Zuzana Tučková, and Quyen Phu Thi Phan. 2019c. Greening Human Resource Management and Employee Commitment Towards the Environment: An Interaction Model. *Journal of Business Economics and Management* 20: 446–65.

Pinzone, Marta, Marco Guerci, Emanuele Lettieri, and Tom Redman. 2016. Progressing in the Change Journey towards Sustainability in Healthcare: The Role of "Green" HRM. *Journal of Cleaner Production* 122: 201–11. [CrossRef]

Raut, Rakesh D., Bhaskar Gardas, Sunil Luthra, Balkrishna E. Narkhede, and Sachin Kumar Mangla. 2020. Analysing green human resource management indicators of automotive service sector. *International Journal of Manpower* 41: 925–44. [CrossRef]

Raut, Rakesh D., Sunil Luthra, Balkrishna E. Narkhede, Sachin K. Mangla, Bhaskar B. Gardas, and Pragati Priyadarshinee. 2019. Examining the Performance Oriented Indicators for Implementing Green Management Practices in the Indian Agro Sector. *Journal of Cleaner Production* 215: 926–43. [CrossRef]

Rayner, Julie, and Damian Morgan. 2018. An Empirical Study of "Green" Workplace Behaviours: Ability, Motivation and Opportunity. *Asia Pacific Journal of Human Resources* 56: 56–78. [CrossRef]

Reichers, Arnon, and Benjamin Schneider, eds. 1990. Climate and culture: An evolution of constructs. In *Organizational Climate and Culture*. San Francisco: Jossey-Bass, pp. 5–39.

Ren, Shuang, Guiyao Tang, and Susan E. Jackson. 2018. Green Human Resource Management Research in Emergence: A Review and Future Directions. *Asia Pacific Journal of Management* 35: 769–803. [CrossRef]

Renwick, Douglas W. S., Charbel José Chiappetta Jabbour, Michael Muller-Camen, Tom Redman, and Adrian Wilkinson. 2016. Contemporary Developments in Green (Environmental) HRM Scholarship. *The International Journal of Human Resource Management* 27: 114–28. [CrossRef]

Renwick, Douglas W. S., Tom Redman, and Stuart Maguire. 2013. Green Human Resource Management: A Review and Research Agenda*: Green Human Resource Management. *International Journal of Management Reviews* 15: 1–14. [CrossRef]

Roscoe, Samuel, Nachiappan Subramanian, Charbel José Chiappetta Jabbour, and Tao Chong. 2019. Green Human Resource Management and the Enablers of Green Organisational Culture: Enhancing a Firm's Environmental Performance for Sustainable Development. *Business Strategy and the Environment* 28: 737–49. [CrossRef]

Saeed, Bilal Bin, Bilal Afsar, Shakir Hafeez, Imran Khan, Muhammad Tahir, and Muhammad Asim Afridi. 2019. Promoting Employee's Proenvironmental Behavior through Green Human Resource Management Practices. *Corporate Social Responsibility and Environmental Management* 26: 424–38. [CrossRef]

Schuler, Douglas, Andreas Rasche, Dror Etzion, and Lisa Newton. 2017. Guest Editors' Introduction: Corporate Sustainability Management and Environmental Ethics. *Business Ethics Quarterly* 27: 213–37. [CrossRef]

Shen, Jie, Jenny Dumont, and Xin Deng. 2018. Employees' Perceptions of Green HRM and Non-Green Employee Work Outcomes: The Social Identity and Stakeholder Perspectives. *Group & Organization Management* 43: 594–622.

Shipton, Helen, Pawan S. Budhwar, and Jonathan Crawshaw. 2012. HRM, Organizational Capacity for Change, and Performance: A Global Perspective. *Thunderbird International Business Review* 54: 777–90. [CrossRef]

Shrivastava, Paul, and Stephanie Berger. 2010. Sustainability Principles: A Review and Directions. *Organization Management Journal* 7: 246–61. [CrossRef]

Singh, Sanjay Kumar, and Abdul-Nasser El-Kassar. 2019. Role of Big Data Analytics in Developing Sustainable Capabilities. *Journal of Cleaner Production* 213: 1264–73. [CrossRef]

Singh, Sanjay Kumar, Manlio Del Giudice, Roberto Chierici, and Domenico Graziano. 2020. Green Innovation and Environmental Performance: The Role of Green Transformational Leadership and Green Human Resource Management. *Technological Forecasting and Social Change* 150: 119762. [CrossRef]

Tang, Guiyao, Yang Chen, Yuan Jiang, Pascal Paillé, and Jin Jia. 2018. Green Human Resource Management Practices: Scale Development and Validity. *Asia Pacific Journal of Human Resources* 56: 31–55. [CrossRef]

Tariq, Sanober, Farzand Ali Jan, and Muhammad Shakil Ahmad. 2016. Green Employee Empowerment: A Systematic Literature Review on State-of-Art in Green Human Resource Management. *Quality & Quantity* 50: 237–69.

Teixeira, Adriano Alves, Charbel Jose Chiappetta Jabbour, Ana Beatriz Lopes de Sousa Jabbour, Hengky Latan, and Jorge Henrique Caldeira de Oliveira. 2016. Green Training and Green Supply Chain Management: Evidence from Brazilian Firms. *Journal of Cleaner Production* 116: 170–76. [CrossRef]

Van Eck, Nees Jan, and Ludo Waltman. 2010. Software Survey: VOSviewer, a Computer Program for Bibliometric Mapping. *Scientometrics* 84: 523–38. [CrossRef]

Van Eck, Nees Jan, and Ludo Waltman. 2014. Visualizing Bibliometric Networks. In *Measuring Scholarly Impact*. Edited by Ying Ding, Ronald Rousseau and Dietmar Wolfram. Cham: Springer International Publishing, pp. 285–320.

Wehrmeyer, Walter. 1996. *Greening People: Human Resources and Environmental Management*. Abingdon: Routledge.

Winn, Monika, Manfred Kirchgeorg, Andrew Griffiths, Martina K. Linnenluecke, and Elmar Günther. 2011. Impacts from Climate Change on Organizations: A Conceptual Foundation. *Business Strategy and the Environment* 20: 157–73. [CrossRef]

Yong, Jing Yi, Mohd-Yusoff Yusliza, and Olawole Olanre Fawehinmi. 2019a. Green Human Resource Management: A Systematic Literature Review from 2007 to 2019. *Benchmarking: An International Journal* 27: 2005–27. [CrossRef]

Yong, Jing Yi, Mohd-Yusoff Yusliza, Charbel Jose Chiappetta Jabbour, and Noor Hazlina Ahmad. 2019b. Exploratory Cases on the Interplay between Green Human Resource Management and Advanced Green Manufacturing in Light of the Ability-Motivation-Opportunity Theory. *Journal of Management Development* 39: 31–49. [CrossRef]

Yong, Jing Yi, Mohd-Yusoff Yusliza, Thurasamy Ramayah, and Olawole Fawehinmi. 2019c. Nexus between Green Intellectual Capital and Green Human Resource Management. *Journal of Cleaner Production* 215: 364–74. [CrossRef]

Yong, Jing Yi, Mohd-Yusoff Yusliza, Thurasamy Ramayah, Charbel Jose Chiappetta Jabbour, Simone Sehnem, and Venkatesh Mani. 2020. Pathways towards Sustainability in Manufacturing Organizations: Empirical Evidence on the Role of Green Human Resource Management. *Business Strategy and the Environment* 29: 212–28. [CrossRef]

Yusliza, Mohd-Yusoff, Nur Zahiyah Othman, and Charbel Jose Chiappetta Jabbour. 2017. Deciphering the Implementation of Green Human Resource Management in an Emerging Economy. *Journal of Management Development* 36: 1230–46. [CrossRef]

Yusliza, Mohd-Yusoff, Nurul Aimi Norazmi, Charbel José Chiappetta Jabbour, Yudi Fernando, Olawole Fawehinmi, and Bruno Michel Roman Pais Seles. 2019. Top Management Commitment, Corporate Social Responsibility and Green Human Resource Management: A Malaysian Study. *Benchmarking: An International Journal* 26: 2051–78. [CrossRef]

Yu, Wantao, Roberto Chavez, Mengying Feng, Chee Yew Wong, and Brian Fynes. 2020. Green Human Resource Management and Environmental Cooperation: An Ability-Motivation-Opportunity and Contingency Perspective. *International Journal of Production Economics* 219: 224–35. [CrossRef]

Zaid, Ahmed A., Ayham A. M. Jaaron, and Abdul Talib Bon. 2018. The Impact of Green Human Resource Management and Green Supply Chain Management Practices on Sustainable Performance: An Empirical Study. *Journal of Cleaner Production* 204: 965–79. [CrossRef]

Zibarras, Lara D., and Phillipa Coan. 2015. HRM Practices Used to Promote Pro-Environmental Behavior: A UK Survey. *The International Journal of Human Resource Management* 26: 2121–42. [CrossRef]

Zupic, Ivan, and Tomaž Čater. 2015. Bibliometric Methods in Management and Organization. *Organizational Research Methods* 18: 429–72. [CrossRef]