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A bibliometric analysis of the Global Reporting Initiative (GRI): global trends in developed and developing countries

Benoit Mougenot[1] · Jean-Pierre Doussoulin[2,3]

Abstract

The growing concern about climate change necessitates the development of models for long-term measurements of the sustainability performance. The Global Reporting Initiative suggests a framework for sustainability reporting. This study intends to fill two gaps in the existing literature. On the one hand, it assesses the Global Reports Initiative's impact on academics. This article, on the other hand, will compare public policies aimed at a Global Reporting Initiative in rich and developing countries from 1999 to 2020. The above research utilizes bibliometric analysis via Biblioshiny and the Scopus publications database, as well as an online interface for Bibliometrix analysis. For studying the Global Reports Initiative literature, this method offers a viable alternative to traditional bibliometric analysis. This is one of the first studies to use a computer approach to examine the literary paths of the Global Reporting Initiative issue. Among the findings we can mention that, the most GRI inquiries were distributed by the "Journal of Cleaner Production." The most useful GRI creators are Clarkson PM., Azapagic A., and Milne MJ. The findings of this paper suggest that the composition of the GRI addresses one of the keys to global monetary advancement, particularly in developing countries, for the foreseeable future. Our paper indicates that the Global Reporting Initiative principles have a strong potential to handle these connected issues in managing and maintaining the environment by adapting developed-country experiences to developing-country challenges.

Keywords Global Reporting Initiative · Bibliometric analysis · Sustainability

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1 Introduction

The Global Report Initiative (GRI) was founded in 1997 in Boston (United States of America) after calls for corporate transparency derived from the Exxon Valdez oil spill. Then, in 2000, the first version of GRI guidelines was launched, providing the first global framework for sustainability reporting. Various versions of the guide were also published in 2002 and 2006 to provide basic guidelines to elaborate sustainable development reports for enterprises using a firm's indicators of environmental performance.

The GRI forms can be systematized according to their inputs, item production forms, and yields. As inputs are transformed into objects, the forms are gaining in popularity.

Previous studies using bibliometrics tools to analyze the impact of sustainable business performance or the effect of the board on corporate social responsibility literature have been performed (Bota-Avram, 2022; Dwekat et al., 2020). However, the contribution of this paper considers the essential bibliometric examination related to GRI that focus about developed and developing countries utilizing Biblioshiny, a web interface for bibliometrix examination situated in R programming (Davidescu et al., 2022; Gagolewski, 2011; Moral-Muñoz et al., 2019; Mougenot & Doussoulin, 2021). The increased demand for GRI concerns validates the need for more feasible finance structures that prioritize sustainability.

This research aims to complement two existing gaps in the current literature. On the one hand, it evaluates the influence of the Global Reports Initiative on academics. On the other hand, this article intends to compare public policies aimed at a Global Reporting Initiative in rich and developing countries from 1999 to 2020.

The following is how the article is structured: the subsequent section portrays a bibliometric investigation of peer assessed writing regarding the matter. Part 3 recognizes focal associations, public coordinated efforts, and coherent joint efforts, with perhaps the most outstanding model being that the GRI thought has been dissected from an assortment of sensible viewpoints. Part 4 concludes with a list of roadblocks and a suggestion for a future course inquiry.

2 Background

Marimon et al., (2012) identifies three main aspects related to the significance of the GRI: First of all, the GRI is really the most generally involved overall norm for maintainability detailing. Furthermore, this drive addresses the most ideal choice accessible for SR (Social Obligation) considering that it depends on basics that think about financial, natural and social aspects (Manetti, 2011) and thirdly, after the ISO 14001 norm, the GRI is the second most persuasive standard with respect to social obligation (Berman et al., 2003). On the other hand, Marimon et al., (2012) propose that the application of GRI and worldwide diffusion has been concentrated in some developed countries. Del Mar Alonso-Almeida et al., (2015) indicate that this global diffusion has been catalyzed in part by academia and its research. It is relevant to mention that the evolution of GRI has gone hand in hand with the completion of the SGSs goals toward 2030 (García-Sánchez et al., 2020; Szennay et al., 2019) and waste and circular economy standard in 2020 (Doussoulin, 2020; Gunarathne et al., 2021). An example of these best practices is the GRI applications and bioeconomy framework in the food production sector in Europe (Istudor & Suciu, 2020; Mougenot & Doussoulin, 2021), other application is related to the High Education sector where some

difficulties are encountered in the integration of a vision that incorporates the role of their missions in standards related to triple bottom lines aspects (Bonatxea et al., 2021).

It is relevant to mention the efforts made by Petera and Wagner, (2015); Sikacz, (2017); Ye et al., (2020) in its GRI bibliometric analyzes and the impact on corporate performance. Despite this research, it is interesting to compare the application of this methodology between developed (DE) and developing countries (DI) including BRICS countries. GRI framework is increasingly used for sustainability reporting by developing countries companies because of its flexibility, consistency, legitimacy and its focus on continuous improvement (Dissanayake, 2020). For BRICS countries, Preuss and Barkemeyer, (2011) mentions the important role that these countries have in advancing corporate social responsibility and its performance measurement. The authors conclude that in the BRICS countries application of the GRI principles is not homogenous, for example in Russia the level of application of GRI is different than in South Africa.

Although GRI has made efforts to improve corporate sustainability. It is necessary to mention some criticisms that have been raised from developing countries. Despite its aim to leveraging the financial-oriented ideological side of double materiality, the extensive number of KPIs in the GRI framework making selections challenging, and the consequent difficulties associated to harm global position in producing multistakeholder standards for sustainability reporting and accountability (de Villiers et al., 2022; Dissanayake, 2020). Other criticisms of the GRI are especially due to its sectors of influence in the economy, such as: the energy sector has adopted the GRI principles to improve its image of being polluting and with an international exposure (Del Mar Alonso-Almeida et al., 2014) and the financial sector uses the GRI to build a new identity in the markets and attract new clients (Del Mar Alonso-Almeida et al., 2014). Other criticisms have been directed at its relationship with companies, such as: some of the improvements proposed by the GRI respond more to improving the corporate image than to achieving sustainability, there is an increasing trend in showing good practices, social and environmental but are not truly linked to the company and its operation (D'Onofrio, 2013) and some issues related to ethics in the assurance of sustainability reports have been criticized from the perspectives of the assurance providers (Boiral et al., 2019; Yang et al., 2021). Showing the relevance of the different degree of acceptance of GRI between developed and developing countries, Tilt (2018) shows an effort in developing countries to apply the Social and Environmental Accounting (SEA) principles, an example of this advance is proposed by Tilt et al., (2020) when studying the results in sustainability reports on the agenda and policies in the South-Sahara countries.

This article used Fantom and Serajuddin, (2016) framework to classify DE and DI based on Income available at World Bank database, additional information in Appendix 1. The following are examples of demonstration concerns in major countries: (see Table 1).

3 Methodology

3.1 Database and compilation

The Scopus database (https://www.scopus.com/) was used as the data source for this work. The following are the search phrases that were entered: [TITLE-ABS-KEY ("Global Reporting Initiative") AND (EXCLUDE (PUBYEAR, 2021)) AND (EXCLUDE (DOCTYPE, "no") OR EXCLUDE (DOCTYPE, "sh") OR EXCLUDE

Table 1 Concerns about demonstrations in major nations

Country	Scholar	Issues
Australia**	(Bhattacharyya & Yang, 2019; Golob & Bartlett, 2007; Rao & Tilt, 2016)	CSR reporting, biodiversity and national culture
France**	(Chelli et al., 2018; Kühn et al., 2014)	Promulgation of laws and regulations (Grenelle II Acts)
Canada**	(Chelli et al., 2018; Cho et al., 2020)	Promulgation of laws and regulations (51–102 and 51–333 acts)
US**	(Agle et al., 1999; McGuire et al., 1988)	Stakeholders and corporate reputation
Slovenia*	(Golob & Bartlett, 2007)	National culture
Israel**	(Leibs, 2007)	Stakeholders and corporate reputation
Spain**	(Luque-Vilchez & Larrinaga, 2016; Ortiz Martínez & Marín Hernández, 2014; Rosa et al., 2013)	Industrial performance in IBEX 35 and transparency. Bad translation of the reporting models
Italy**	(Cordazzo, 2005; Passetti et al., 2009)	Relationship between intellectual capital (IC), environmental and social reports
Sweden**	(Isaksson & Rosvall, 2020; Rimmel & Jonäll, 2013)	Biodiversity reporting
Brazil*,+	(Oliveira et al., 2014; Rosa et al., 2013)	Industrial performance
India*,+	(Islam et al., 2016; Yadava & Sinha, 2016)	Banking sector and company performance
China*,+	(Islam et al., 2016; Yang et al., 2021)	Banking sector and company performance
South Africa*,+	(Antoni & Hurt, 2006; Hindley, 2012; Tilt & Symes, 1999)	Mining industry and public bodies
Russian Federation**,+	(Orazalin & Mahmood, 2018; Preuss & Barkemeyer, 2011)	Oil and gas industry

Own elaboration, adapted from Gallén and Peraita, (2015)

*Developing countries; **Developed countries; +BRICS countries

(DOCTYPE, "ed") OR EXCLUDE (DOCTYPE, "Undefined")]. The time studied was 1999 to 2020; prior to this, scholarly productivity was restricted. All languages are included in the search language. The Scopus bibliographic citation database contains a variety of publications, including 735 articles, 2 books, 77 book chapters, 91 conference papers, and 43 reviews in this study. In the end, 948 documents from 503 sources were chosen for study. In addition, 1940 writers were found, including 172 single-authored document authors and 1768 multi-authored document authors (Table 2). Every distribution's whole records were changed over to a Scopus BibTex document and care taken into Bibliometrix and Biblioshiny all through the R programming climate.

4 Research method

4.1 Research software

The R language environment is used to run the free source packages Bibliometrix and Biblioshiny. Bibliometrix helps you to complete the entire scientific literature analysis and data processing procedure. Biblioshiny is an online data analysis platform that encapsulates the basic Bibliometrix algorithm (Aria & Cuccurullo, 2017). Biblioshiny is a web-based application that allows users to do relevant bibliometric and visual analyses.

Table 2 Descriptive information about the database

| Description	Results
Principal information about data	
Timespan	1999:2020
Sources (Journals, Books, etc.)	503
Documents	948
Average years from publication	6.03
Average citations per documents	26.6
Average citations per year per doc	3.48
Document types	
Article	735
Book	2
book chapter	77
conference paper	91
Review	43
Document contents	
Keywords Plus (ID)	1664
Author's Keywords (DE)	1955
Authors	
Authors	1940
Author Appearances	2443
Authors of single-authored documents	172
Authors of multi-authored documents	1768
Authors collaboration	
Single-authored documents	201
Documents per Author	0.489
Authors per Document	2.05
Co-Authors per Documents	2.58
Collaboration Index	2.37

Source: Biblioshiny
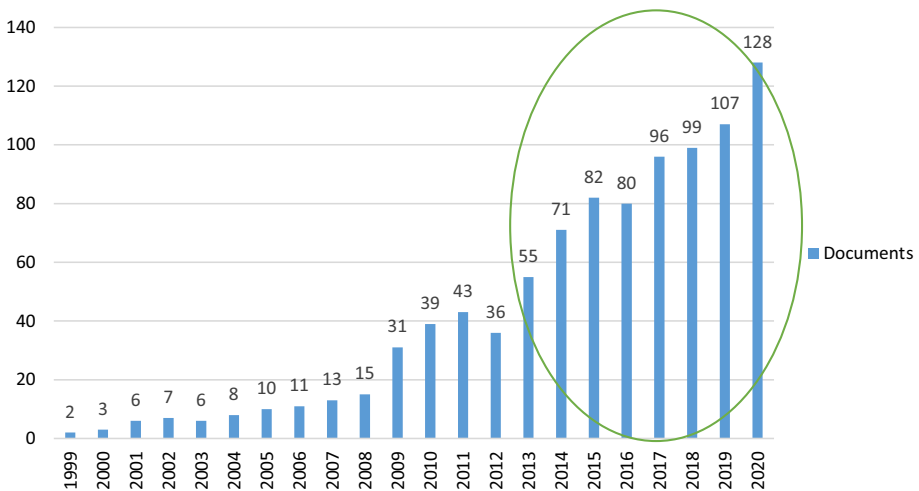
Fig. 1 Evolution of the scientific production (documents per year, 1999–2020). Source: Biblioshiny

4.1.1 Network study and mapping

The research shows bibliometric indicators on mining conflicts and ecological distribution conflicts in Latin America, such as publishing volume in number of papers, citation count, and keywords, using the Bibliometrix and Biblioshiny packages. The article then goes on to show statistics and maps such as a theme evolution map and an international collaboration network map to highlight research hotspots, research status, and subject dynamics across time.

The examination shows bibliometric indicators on GRI, for example, distributing volume in number of papers, reference count, and catchphrases, utilizing the Bibliometrix and Biblioshiny bundles. The article then, at that point, proceeds to show insights and guides, for example, a topic development map and a global coordinated effort network guide to feature research areas of interest, research status, and subject elements across time.

5 Results and analysis

5.1 Development of the scientific production

Figure 1 depicts the development of the amount of papers produced on the Global Reporting Initiative in the Scopus database from 1999 to 2020. Over the time period studied, the number of publications has grown significantly (21.9 percent annual growth rate). The graph depicts an increase in publications from 2 in 1999 to 128 in 2020, which is considered the apex of scientific output. Figure 1 illustrates a considerable growth following the Rio + 20 United Nations Summit in 2012, which was reinforced after COP25 in Paris and will continue to grow during COP26 in Glasgow (Fuessler et al., 2016; Obergassel et al., 2020).

5.2 Most relevant sources

Table 3 shows the journals that published the most articles regarding the Global Reporting Initiative from 1999 to 2020. The journal with the most papers published was "Journal of Cleaner Production" (47). The second most popular magazine was "Corporate Social Responsibility and Environmental Management," which had 44 articles. Furthermore, with a Hirsch index (H index) greater than 20, 'Journal of Cleaner Production' and "Corporate Social Responsibility and Environmental Management" are the fonts with the highest influence (28 and 23, respectively).

5.3 Most global cited documents

Table 4 represents the twenty most global cited documents on Global Reporting Initiative during the period 1999–2020. The most global cited document (1214 citations and the document with higher Total Citations (TC) per year (86.71) is the article wrote by Clarkson et al. (2008).

5.4 Most relevant affiliations

Table 5 represents the most relevant affiliations on Global Reporting Initiative. The University of Salamanca (Spain) is the affiliation with the highest publications (29 documents), followed by the Ryerson University (Canada) (12 documents). Most affiliations are related to Australia (5 affiliations), followed by Italy, Spain and Greece (2 affiliations).

In terms of the connection between public policies and the GRI, it is pertinent to note that Spain, the nation that is home to the University of Salamanca and sits a top Table 5, has a significant regulation in place that does just that (Camisón, 2010). The second university in Table 5's host nation of Canada also experiences a recurrence of this effect (Beare et al., 2014).

The tumultuous and ambivalent relationship between governments and GRI should be brought up. On the one hand, it is beneficial to both parties and enables the management of businesses to improve, but on the other, it is impacted by the interactions between political, corporate, and civil society actors, which have an impact on ethical and sustainable business practices (Albareda et al., 2007). This relationship has been studied in Europe (Steurer, 2010), but it was also examined in light of the environmental disputes that Latin American governments and mining companies have with one another (Doussoulin & Mougenot, 2022). Finally, there are authors as Beare et al., (2014) who argue that the GRI is not greatly influenced by public policies.

5.5 Mapping the scientific collaboration

The partnership of the major producing countries is depicted in Fig. 2. The thickness of the line represents the degree of collaboration. Scholars from Western Europe, Canada, the United States, China and Australia showed deepened cooperation and exchange. This figure emphasizes the collaboration between developed countries and it leaves developing countries in a secondary position and out of the great collaboration routes. This is also shown in the affiliations and main Universities in Table 4. This collaboration between countries has

Table 3 Most relevant sources

n	Sources	Documents	H_index
1	Journal of cleaner production	47	28
2	Corporate social responsibility and environmental management	44	23
3	Sustainability (switzerland)	32	14
4	Journal of business ethics	24	22
5	Social responsibility journal	19	8
6	Sustainability accounting management and policy journal	14	12
7	Accounting forum	13	11
8	Business strategy and the environment	12	10
9	Meditari accountancy research	9	7
10	Accounting auditing and accountability journal	8	7
11	Acta universitatis agriculturae et silviculturae mendelianae	8	3
12	Corporate communications	8	5
13	Ecological indicators	8	8
14	Environmental quality management	8	3
15	Australasian journal of environmental management	6	5
16	Gestao e producao	6	3
17	Corporate environmental strategy	5	2
18	Corporate governance (bingley)	5	3
19	Innovar	5	2
20	International journal of innovation creativity and change	5	2

Source: Biblioshiny

not only been used in GRI, but has also been used for the UN Global Compact (Adams & Petrella, 2010).

5.6 Keywords analysis

Figure 3 shows the evolution of the five most frequent keywords related to the Global Reporting Initiative during the period 1999–2020. The keyword "Sustainable development" presents the higher growth during the period.

We can distinguish a time prior to the "Global Compact" of 2000 when the curves in Fig. 3 began to increase. The Figure also shows the increase after the 5th GRI Global Conference in which cooperation with the global pact was renewed in 2016 on issues such as "Sustainability." This is also coincident with the adoption of the SGSs targets by corporations in 2015.

Figure 4 depicts a theme network with 50 words and a cluster frequency of 5 as the minimum (per thousands of documents). The size of the box represents the number of occurrences of the terms. The size of the box grows when more co-selected authors' keywords relating to the Global Reporting Initiative material are added. The distance between the components of individual pairings represents topic similarity and its relative intensity. Individual clusters were given different box colors. Figure 3 depicts a network made up of three primary clusters that reflect various study subfields.

Table 4 Most global cited documents

n	Documents	DOI	Total citations	TC per Year	Normalized TC
1	Clarkson PM, 2008, Account Organ Soc	10.1016/j.aos.2007.05.003	1214	86.7143	8.8014
2	Azapagic A, 2004, J Clean Prod	10.1016/S0959-6526(03)00075–1	590	32.7778	4.3105
3	Milne MJ, 2013, J Bus Ethics	10.1007/s10551-012-1543-8	463	51.4444	14.0768
4	Adams CA, 2004, Account Audit Account J	10.1108/09513570410567791	455	25.2778	3.3242
5	Gamerschlag R, 2011, Rev Manage Sci	10.1007/s11846-010-0052-3	355	32.2727	8.3874
6	Krajnc D, 2005, Resour Conserv Recycl	10.1016/S0921-3449(04)00120-X	320	18.8235	3.6994
7	O'dwyer B, 2005, Br Account Rev	10.1016/j.bar.2005.01.005	308	18.1176	3.5607
8	Roca LC, 2012, J Clean Prod	10.1016/j.jclepro.2011.08.002	307	30.7	6.2795
9	Brown HS, 2009, J Clean Prod	10.1016/j.jclepro.2008.12.009	301	23.1538	4.5208
10	Moneva JM, 2006, Account Forum	10.1016/j.accfor.2006.02.001	285	17.8125	4.75
11	Singh RK, 2007, Ecol Indic	10.1016/j.ecolind.2006.06.004	277	18.4667	9.0025
12	Clarkson PM, 2011, ABACUS	10.1111/j.1467-6281.2011.00330.x	266	24.1818	6.2846
13	Boiral O, 2013, Account Audit Account J	10.1108/AAAJ-04-2012-00998	263	29.2222	7.9961
14	Chen S, 2009, J Bus Ethics	10.1007/s10551-008-9794-0	260	20	3.905
15	Plumlee M, 2015, J Account Public Policy	10.1016/j.jaccpubpol.2015.04.004	249	35.5714	9.3962
16	Etzion D, 2010, Organ Sci	10.1287/orsc.1090.0494	237	19.75	5.6018
17	Lim A, 2012, Am Sociol Rev	10.1177/0003122411432701	207	20.7	4.2341
18	Lozano R, 2006, J Clean Prod	10.1016/j.jclepro.2005.11.041	202	12.625	3.3667
19	Nikolaeva R, 2011, J Acad Mark Sci	10.1007/s11747-010-0214-5	195	17.7273	4.6071
20	Fernandez-Feijoo B, 2014, J Bus Ethics	10.1007/s10551-013-1748-5	180	22.5	7.7127

Source: Biblioshiny

Table 5 Most relevant affiliations and country affiliations on Global Reporting Initiative (top 15)

n	Affiliations	Countries	Articles
1	Univ of Salamanca	Spain	29
2	Ryerson Univ	Canada	12
3	Univ of the Aegean	Greece	11
4	Univ of the Witwatersrand	South Africa	11
5	Democritus Univ of Thrace	Greece	10
6	Federal Univ of Bahia (UFBA)	Brazil	10
7	Deakin Univ	Australia	8
8	Macquarie Univ	Australia	8
9	Univ Autonoma de Madrid	Spain	8
10	Univ of Florence	Italy	8
11	Griffith Univ	Australia	7
12	Monash Univ	Australia	7
13	Swinburne Univ of Technology	Australia	7
14	Univ of Bologna	Italy	7
15	Univ of Reading	United Kingdom	7

Source Biblioshiny

Figure 4 displays three word groups. Sustainability, sustainable development, industry, economic and social effects, responsibility, environmental indicator, and reporting are some of the well-known terms. It is important to note that in Fig. 4, the word "public policies" is not highlighted. This is consistent with Beare's suggestion that there is no clear connection between GRI and public policies (Beare et al., 2014).

5.7 Keywords, top authors and sources relations

The relationships between the main author, the sources, and the keywords are illustrated in Fig. 5 by a three-field graph. As a result, the key parts were depicted in a diagram using rectangles with different colors. The size of the square is not entirely constant due to the relations that showed up between the component addressed by the square shapes and the graph of different components. The size of the square is not entirely constant for the quantity of connections that every component has.

The review uncovered which Worldwide Detailing Drive research subjects the essential essayists had investigated and which sources they had most often utilized. The examination subjects were utilized as the essayists' watchwords in this article. As per the investigation of watchwords, top journalists, and sources, there are eight creators (i.e., Guthrie, J.; Boiral, O.; Searcy, C.; Lozano, R., Garcia Sanchez I.M.; Nikolau, I.E; Gallego Alvarez, I; Skouroudis, A.) and 10 sources (i.e., Corporate Social Responsibility and Environmental Management; Journal of Cleaner Production; Sustainability (Switzerland); Journal of Business Ethics; Sustainability Accounting, Management and Policy Journal; Accounting Forum; Social Responsibility Journal; Business Strategy and the Environment; Accounting Auditing and Accountability Journal; Meditari Accountancy Journal) were firmly connected to the primary examination points of Global Reporting Initiative ("Sustainability Reporting"; "Global Reporting Initiative"; "Corporate Social Responsibility"; "Sustainability"; "GRI";
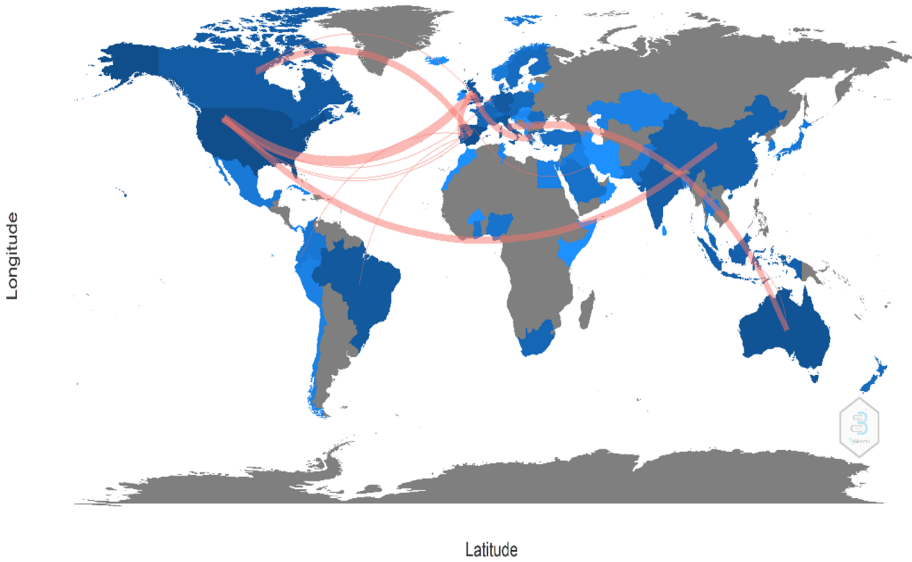
Country Collaboration Map

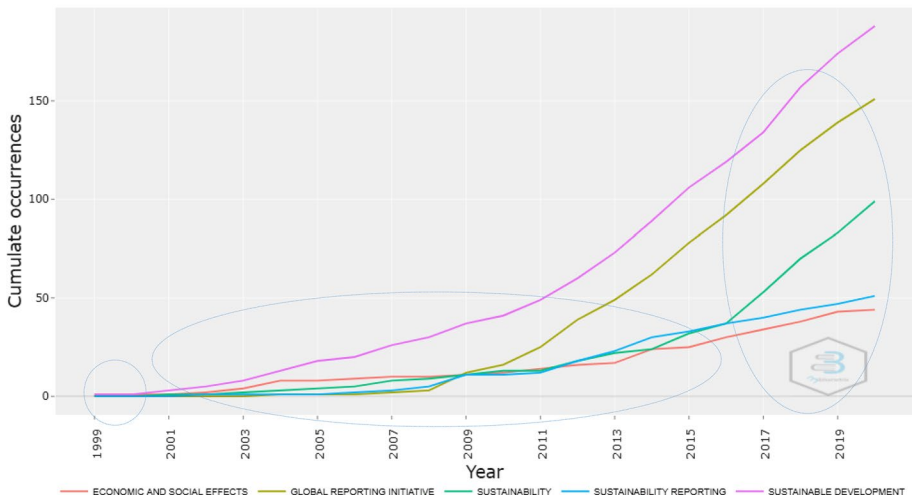**Fig. 2** Country collaboration map. Source: Biblioshiny

Word Growth

Fig. 3 Word growth of most frequent keywords (1999–2020). Source: Biblioshiny

'Content Analysis"; "Sustainable Development"; "Global Reporting Initiative (GRI)"; "Sustainability Report"; "CSR").

Fig. 4 Thematic grid. Source: Biblioshiny

Fig. 5 Three-field plot between authors (left), source (middle) and keywords (right). Source: Biblioshiny

6 Conclusion

The purpose of this study was to fill two gaps in the existing literature. On the one hand, we assess the Global Reports Initiative's impact on academics using bibliometrics tools and methods. Furthermore, from 1999 to 2020, this article compares public policies aimed at a Global Reporting Initiative in rich and developing countries.

All through this, we can see an increment in significant, consistent, and open commitment in GRI-related themes. In the course of the most recent twenty years, this slant has developed; however, there has been no work to carry out an efficient investigation of the subject and strategic inclinations that make up the GRI's applied design.

The reason for this article is to resolve the issue of arranging and assessing the Scopus information base. This article writes about the development of the amount of articles, the main sources, the science produce of principle nations and their joint effort, the co-reference framework, the advancement of maker watchwords, and the compass of the GRI's thinking in light of an exploratory making review.

While progress in normal bibliometric research is as often as possible seen as performing essential work by zeroing in on basic and contemporary issues, for example, supportability, the article has shown that the GRI makes an important assessment field; regardless of the way that, taking everything into account, the examination broke down in this study has likely currently been secured in related regions, or in a similar examination under various headings, for instance, the economical formulation and use.

The review laid out how an assortment of issues are entwined in the creation of information that drives the GRI's advancement after 1999. One of the issues tended to in this report was the quest for open doors for the execution of GRI procedures in different nations.

The GRI bibliometric investigation archives were gathered from the Scopus database. The report's most widely used dialect is English (948 records). Spain is the country that has done the most GRI research (29 articles). With respect to this point, it is vital to specify the broad participation and line of work among researchers from Canada, Greece, South Africa, Brazil and Australia. It is relevant to mention that there are important routes of scientific collaboration in developed countries.

Developing countries such as African and Latin American countries do not participate in this exchange and have a passive attitude. Based on this deficit, the authors of this article want to contribute to the discussion and inclusion of developing countries in the application of the GRI. As Tilt (2018) mentions, there has been an effort in developing countries to apply the SEA principles, but there are still opportunities to apply tools such as GRI to improve corporate performance. This development of the GRI can be exemplified by its application in African Countries (Tilt et al., 2020).

The "Journal of Cleaner Production" is the publication that distributed the most GRI inquiries (47 articles). Other important sources were Corporate Social Responsibility and Environmental Management, Sustainability, and the Journal of Business Ethics; as a result, the writing research should be expected to distinguish itself from two surveys on the GRI problem, each with more than 40 pieces published. Clarkson, Pm. (1214 total citations), Azapagic, A. (590 total citations), and Milne, Mj. (493 total citations) are the most useful GRI creators, and the co-citation arrangement of references disclosed three clusters: "industry" in green, "sustainable development" in red, and "environmental impact" in blue.

The development of society depends heavily on academia, and their involvement in sustainable development will be essential in transforming current social norms in that direction. There is no agreement in the literature about the relationship between GRI and public policies; some authors claim that it does not exist, while others claim that it has either positive or negative effects on how markets and companies operate.

Lastly, the outcomes obtained in this paper recommend that the composition of the GRI addresses one of the keys to worldwide monetary advancement, especially in emerging nations, for a long while to come.

6.1 Constraints and future direction of exploration

There are a couple of obstructions in the method of our assessment. The utilization of the Scopus information base is one of the limitations. Notwithstanding the way that the Web of Science (WoS) information base is very broad and solid, it is more reasonable to utilize different datasets like WoS, Google Science, Latindex, or HAL (open account), which take into consideration investigations in different languages like Spanish and French. Another issue we experienced was that the most conspicuous and influential makers were arranged by the quantity of circulations; as a result, dispersions with a solitary report yet numerous references might have their discoveries impacted.

Another limitation of our technique is that the most recognizable and appealing producers were grouped according to the number of distributions; as a result, distributions with a single report but many citations may provide unrepresentative results. A top researcher can produce a few seminal works on his or her topic of study. The influence of a significant work produced by a creator with few distributions may be difficult to capture using bibliometric analyses that use conventional variables like the h-index. Other indicators, such as Eigenfactor scores or affect variables, behave similarly (Bergstrom et al., 2008). In select circumstances, authors may cite articles to give credit to their trainers, or they may inflate their contribution by quoting them many times in a work (Abt, 1992).

Others authors consider illustrations of flawed strategies or deceiving that come about. These writings are moreover captured by bibliometrics and can cause a certain confusion about a bibliometric investigation variable (Bergstrom et al., 2008).

Given the emphasis on the sciences that are at the core of GRI research, the association between the GRI and its bigger cultural repercussions, for example, in monetary concerns, is a basic theme for future examination. Besides, the foundation of a GRI is needed to support the utilization and utilization of conventional biotechnologies in a wide scope of areas. This may incorporate considering extra assets that can be utilized to address the Coronavirus crisis recuperation issues. Subsequently, future exploration on the condition of the GRI should consider sensible progressions, yet additionally advance while considering monetary, regular, and open prosperity challenges at nearby and regional sizes.

Appendix 1 Economies and their classification by selected schemes

Economy	WBG	UN-HDR	UN-statistics	UN-WESP	OMF WEO
Argentina	H	VH	DI	Developing	EMD
Australia	H	VH	DE	DE	A
Brazil	UM	H	DI	DI	EMD
Canada	H	VH	DE	DE	A
Chile	H	VH	DI	DI	EMD
China	UM	H	DI	DI	EMD
France	H	VH	DE	DE	A
Greece	H	VH	DE	DE	A
India	LM	M	DI	DI	EMD
Italy	H	VH	DE	DE	A
Israel	H	VH	DI	DI	A

Economy	WBG	UN-HDR	UN-statistics	UN-WESP	OMF WEO
Mexico	UM	H	DI	DI	EMD
Peru	UM	H	DI	DI	EMD
Russian Federation	H	H	DE	T	EMD
Slovenia	H	VH	DE	DE	A
South Africa	UM	H	DI	DI	EMD
Spain	H	VH	DE	DE	A
United States	H	VH	DE	DE	A

VH: very high; *H*: high; *UM*: upper middle; *LM*: lower middle; *M*: medium; *DE*: developed; *DI*: developing; *EMD*: emerging market & developing; *A*: advanced; *T*: transition

Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2741183.

Declarations

Conflict of interest The authors declare no conflict of interest or competing interest.

References

Abt, H. (1992). Publication practices in various sciences. *Scientometrics, 24*(3), 441–447.

Adams, C., & Petrella, L. (2010). Collaboration, connections and change: The UN global compact, the Global Reporting Initiative, principles for responsible management education and the globally responsible leadership initiative. *Sustainability Accounting, Management and Policy Journal*.

Agle, B. R., Mitchell, R. K., & Sonnenfeld, J. A. (1999). Who matters to Ceos? An investigation of stakeholder attributes and salience, corpate performance, and Ceo values. *Academy of Management Journal, 42*(5), 507–525.

Albareda, L., Lozano, J. M., & Ysa, T. (2007). Public policies on corporate social responsibility: The role of governments in Europe. *Journal of Business Ethics, 74*(4), 391–407.

Antoni, M., & Hurt, Q. (2006). Applying the Global Reporting Initiative (GRI) for public bodies in the South African context: The eThekwini experience. *Development Southern Africa, 23*(2), 251–263.

Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics, 11*(4), 959–975.

Beare, D., Buslovich, R., & Searcy, C. (2014). Linkages between corporate sustainability reporting and public policy. *Corporate Social Responsibility and Environmental Management, 21*(6), 336–350.

Bergstrom, C. T., West, J. D., & Wiseman, M. A. (2008). The eigenfactor™ metrics. *Journal of Neuroscience, 28*(45), 11433–11434.

Berman, J. E., Webb, T., Fraser, D. J., Harvey, P. J., Barsky, J., Haider, A., & Williams, I. (2003). *Race to the top: Attracting and enabling global sustainable business, business survey report*. Working Paper, World Bank Group, October.

Bhattacharyya, A., & Yang, H. (2019). Biodiversity disclosure in Australia: Effect of GRI and institutional factors. *Australasian Journal of Environmental Management, 26*(4), 347–369.

Boiral, O., Heras-Saizarbitoria, I., Brotherton, M.-C., & Bernard, J. (2019). Ethical issues in the assurance of sustainability reports: Perspectives from assurance providers. *Journal of Business Ethics, 159*(4), 1111–1125. https://doi.org/10.1007/s10551-018-3840-3

Bonatxea, I. A., Gutiérrez-Goiria, J., Vazquez-De Francisco, M. J., & Sianes, A. (2021). Is the Global Reporting Initiative suitable to account for university social responsibility? Evidence from European institutions. *International Journal of Sustainability in Higher Education*.

Bota-Avram, C. (2022). Bibliometric analysis of sustainable business performance: Where are we going? A science map of the field. *Economic Research-Ekonomska Istraživanja*, 1–40.

Camisón, C. (2010). Effects of coercive regulation versus voluntary and cooperative auto-regulation on environmental adaptation and performance: Empirical evidence in Spain. *European Management Journal, 28*(5), 346–361.

Chelli, M., Durocher, S., & Fortin, A. (2018). Normativity in environmental reporting: A comparison of three regimes. *Journal of Business Ethics, 149*(2), 285–311.

Cho, C. H., Bohr, K., Choi, T. J., Partridge, K., Shah, J. M., & Swierszcz, A. (2020). Advancing sustainability reporting in Canada: 2019 report on progress. *Accounting Perspectives, 19*(3), 181–204.

Clarkson, P. M., Li, Y., Richardson, G. D., & Vasvari, F. P. (2008). Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis. *Accounting, Organizations and Society, 33*(4), 303–327.

Cordazzo, M. (2005). IC statement vs environmental and social reports: An empirical analysis of their convergences in the Italian context. *Journal of Intellectual Capital*.

Cordazzo, M., Bini, L., & Marzo, G. (2020). Does the EU Directive on non-financial information influence the value relevance of ESG disclosure? Italian evidence. *Business Strategy and the Environment, 29*(8), 3470–3483.

Davidescu, A. A., Petcu, M. A., Curea, S. C., & Manta, E. M. (2022). Two faces of the same coin: Exploring the multilateral perspective of informality in relation to Sustainable Development Goals based on bibliometric analysis. *Economic Analysis and Policy, 73*, 683–705. https://doi.org/10.1016/j.eap.2021.12.016

de Villiers, C., La Torre, M., & Molinari, M. (2022). The Global Reporting Initiative's (GRI) past, present and future: Critical reflections and a research agenda on sustainability reporting (standard-setting). *Pacific Accounting Review, 34*, 728–747.

del Mar Alonso-Almeida, M., Llach, J., & Marimon, F. (2014). A closer look at the 'Global Reporting Initiative'sustainability reporting as a tool to implement environmental and social policies: A worldwide sector analysis. *Corporate Social Responsibility and Environmental Management, 21*(6), 318–335.

del Mar Alonso-Almeida, M., Marimon, F., Casani, F., & Rodriguez-Pomeda, J. (2015). Diffusion of sustainability reporting in universities: Current situation and future perspectives. *Journal of Cleaner Production, 106*, 144–154.

Dissanayake, D. (2020). Sustainability key performance indicators and the Global Reporting Initiative: Usage and challenges in a developing country context. *Meditari Accountancy Research*.

D'Onofrio, P. A. (2013). *Análisis crítico de los indicadores de la Global Reporting Initiative*. Universidad de Buenos Aires.

Doussoulin, J. P. (2020). A paradigm of the circular economy: The end of cheap nature? *Energy Ecology and Environment, 5*(5), 359–368. https://doi.org/10.1007/s40974-019-00145-

Doussoulin, J. P., & Mougenot, B. (2022). Mapping mining and ecological distribution conflicts in Latin America, a bibliometric analysis. *Resources Policy, 77*, 102650.

Dwekat, A., Seguí-Mas, E., & Tormo-Carbó, G. (2020). The effect of the board on corporate social responsibility: Bibliometric and social network analysis. *Economic Research-Ekonomska Istraživanja, 33*(1), 3580–3603.

Fantom, N. J., & Serajuddin, U. (2016). *The World Bank's classification of countries by income*. World Bank.

Fuessler, J., Wunderlich, A., & GRI, L. T. (2016). International carbon asset reserve. *Prototyping for Instruments Reducing Risks and Linking Carbon Markets. Zurich: INFRAS*.

Gagolewski, M. (2011). Bibliometric impact assessment with R and the CITAN package. *Journal of Informetrics, 5*(4), 678–692.

Gallén, M. L., & Peraita, C. (2015). A comparison of corporate social responsibility engagement in the OECD countries with categorical data. *Applied Economics Letters, 22*(12), 1005–1009.

García-Sánchez, I.-M., Rodríguez-Ariza, L., Aibar-Guzmán, B., & Aibar-Guzmán, C. (2020). Do institutional investors drive corporate transparency regarding business contribution to the sustainable development goals? *Business Strategy and the Environment, 29*(5), 2019–2036.

Golob, U., & Bartlett, J. L. (2007). Communicating about corporate social responsibility: A comparative study of CSR reporting in Australia and Slovenia. *Public Relations Review, 33*(1), 1–9.

Gunarathne, N., Wijayasundara, M., Senaratne, S., Kanchana, P. D. K., & Cooray, T. (2021). Uncovering corporate disclosure for a circular economy: An analysis of sustainability and integrated reporting by Sri Lankan companies. *Sustainable Production and Consumption, 27*, 787–801. https://doi.org/10.1016/j.spc.2021.02.003

Hindley, A. T. (2012). *Integrated reporting compliance with the Global Reporting Initiative framework: An analysis of the South African mining industry*. North-West University.

Isaksson, R., & Rosvall, M. (2020). Understanding building sustainability–the case of Sweden. *Total Quality Management & Business Excellence*, 1–15.

Islam, M. A., Jain, A., & Thomson, D. (2016). Does the Global Reporting Initiative influence sustainability disclosures in Asia-Pacific banks? *Australasian Journal of Environmental Management, 23*(3), 298–313.

Istudor, L.-G., & Suciu, M.-C. (2020). Bioeconomy and circular economy in the European food retail sector. *European Journal of Sustainable Development, 9*(2), 501–511. https://doi.org/10.14207/ejsd.2020.v9n2p501

Kühn, A. L., Stiglbauer, M., & Heel, J. (2014). Does mandatory CSR reporting lead to higher CSR transparency? The case of France. *Corporate Ownership and Control, 11*(2), 29–45.

Leibs, S. (2007). Sustainability reporting: Earth in the balance sheet. *CFO Magazine, December*, 1.

Luque-Vilchez, M., & Larrinaga, C. (2016). Reporting models do not translate well: Failing to regulate CSR reporting in Spain. *Social and Environmental Accountability Journal, 36*(1), 56–75.

Manetti, G. (2011). The quality of stakeholder engagement in sustainability reporting: Empirical evidence and critical points. *Corporate Social Responsibility and Environmental Management, 18*(2), 110–122.

Marimon, F., del Mar Alonso-Almeida, M., del Pilar Rodríguez, M., & Alejandro, K. A. C. (2012). The worldwide diffusion of the Global Reporting Initiative: What is the point? *Journal of Cleaner Production, 33*, 132–144.

McGuire, J. B., Sundgren, A., & Schneeweis, T. (1988). Corporate social responsibility and firm financial performance. *Academy of Management Journal, 31*(4), 854–872.

Moral-Muñoz, J. A., López-Herrera, A. G., Herrera-Viedma, E., & Cobo, M. J. (2019). *Science mapping analysis software tools: A review* (pp. 159–185). Springer.

Mougenot, B., & Doussoulin, J.-P. (2021). Conceptual evolution of the bioeconomy: A bibliometric analysis. *Environment, Development and Sustainability*, 1–17.

Obergassel, W., Hermwille, L., & Oberthür, S. (2020). Harnessing international climate governance to drive a sustainable recovery from the COVID-19 pandemic. *Climate Policy*, 1–9.

Oliveira, M. A. S., Campos, L. M. S., Sehnem, S., & Rossetto, A. M. (2014). Relatórios de sustentabilidade segundo a Global Reporting Initiative (GRI): Uma análise de correspondências entre os setores econômicos brasileiros. *Production, 24*(2), 392–404.

Orazalin, N., & Mahmood, M. (2018). Economic, environmental, and social performance indicators of sustainability reporting: Evidence from the Russian oil and gas industry. *Energy Policy, 121*, 70–79.

Ortiz Martínez, E., & Marín Hernández, S. (2014). Global Reporting Initiative (GRI) as recognized guidelines for sustainability reporting by Spanish companies on the IBEX 35: Homogeneity in their framework and added value in the relationship with financial entities. *Intangible Capital, 10*(5), 855–872.

Passetti, E., Tenucci, A., Cinquini, L., & Frey, M. (2009). Intellectual capital communication: Evidence from social and sustainability reporting. *Available at SSRN 1443163*.

Petera, P., & Wagner, J. (2015). Global Reporting Initiative (GRI) and its reflections in the literature. *European Financial and Accounting Journal, 10*(2), 13–32.

Preuss, L., & Barkemeyer, R. (2011). CSR priorities of emerging economy firms: Is Russia a different shape of BRIC? *Corporate Governance: The International Journal of Business in Society, 11*, 371–385.

Rao, K., & Tilt, C. (2016). Board diversity and CSR reporting: An Australian study. *Meditari Accountancy Research*.

Rimmel, G., & Jonäll, K. (2013). Biodiversity reporting in Sweden: Corporate disclosure and preparers' views. *Accounting, Auditing & Accountability Journal, 26*, 746–778.

Rosa, F. S., Lunkes, R. J., Soler, C. C., & Feliu, V. M. R. (2013). Estudo sobre o Global Report Initiative de empresas de energia elétrica dos Estados Unidos, do Brasil e da Espanha no período de 1999 a 2010. *Revista Organizações Em Contexto, 9*(17), 99–124.

Sikacz, H. (2017). CSR reporting as an object of bibliometric analysis of scientific publications. *Prace Naukowe Uniwersytetu Ekonomicznego We Wrocławiu, 474*, 160–172.

Steurer, R. (2010). The role of governments in corporate social responsibility: Characterising public policies on CSR in Europe. *Policy Sciences, 43*(1), 49–72.

Szennay, Á., Szigeti, C., Kovács, N., & Szabó, D. R. (2019). Through the blurry looking glass—SDGs in the GRI reports. *Resources, 8*(2), 101.

Tilt, C. A. (2018). Making social and environmental accounting research relevant in developing countries: A matter of context? *Social and Environmental Accountability Journal, 38*(2), 145–150.

Tilt, C. A., Qian, W., Kuruppu, S., & Dissanayake, D. (2020). The state of business sustainability reporting in sub-Saharan Africa: An agenda for policy and practice. *Sustainability Accounting, Management and Policy Journal*.

Tilt, C. A., & Symes, C. F. (1999). Environmental disclosure by Australian mining companies: Environmental conscience or commercial reality? *Accounting Forum, 23*(2), 137–154.

Yadava, R. N., & Sinha, B. (2016). Scoring sustainability reports using GRI 2011 guidelines for assessing environmental, economic, and social dimensions of leading public and private Indian companies. *Journal of Business Ethics, 138*(3), 549–558.

Yakar Pritchard, G., & Çalıyurt, K. T. (2021). Sustainability reporting in cooperatives. *Risks, 9*(6), 117.

Yang, Y., Orzes, G., Jia, F., & Chen, L. (2021). Does GRI sustainability reporting pay off? An empirical investigation of publicly listed firms in China. *Business & Society, 60*(7), 1738–1772.

Ye, N., Kueh, T.-B., Hou, L., Liu, Y., & Yu, H. (2020). A bibliometric analysis of corporate social responsibility in sustainable development. *Journal of Cleaner Production, 272*, 122679.