



# Sustainability reporting scholarly research: a bibliometric review and a future research agenda

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## Abstract

Despite the substantial increase in sustainability reporting scholarly research, the comprehensive evaluation of scientific production in this area is scarce. This study combines the bibliometric and content analyses of sustainability reporting research to fill this gap. We map the development, conceptual structure, and thematic evolution of sustainability reporting scholarly research based on 1,053 Scopus peer-reviewed articles written by 2,071 scholars comprising 69 countries and published from 2000 to 2022. The findings suggest that sustainability reporting has witnessed exponential growth, moved from a “paucity” stage in 2000 to the “saturation” stage in 2022, and is still ongoing. The collaboration among institutions producing sustainability reporting research reflects “locally-centralized-globally-discrete” cooperation. The collaboration between developed and developing world research organizations can be termed the “North-South” divide. Authors have disciplinary or thematic similarities in their research interests (i.e., homophily impact). The study has explained the thematic categories and topics of interest in sustainability reporting. Based on our findings, we provide an agenda for future research directions. The study’s findings are of interest to scholars and practitioners in business, finance, and accounting.

**Keywords** Corporate sustainability · Corporate social responsibility · Sustainability reporting · Global reporting initiative · Greenium · Bibliometric analysis

## 1 Introduction

Sustainability reporting (henceforward, SR) evolved with critical events such as the publishing of the United Nations Brundtland Report in 1987. In the late 1990s, introducing the Global Reporting Initiative (GRI) promoted sustainability to balance economic and environmental issues (Clarkson et al. 2008; Milne and Gray 2013). SR is an essential communication tool that can help firms signal their commitment to sustainable development to numerous stakeholders (Ali et al. 2021). It provides useful financial and non-financial information to stakeholders more transparently and reliably (Al-Shaer 2020). Moreover, financial markets seek sustainability reports as sustainable investment increases, and shareholders are interested in having more information on the impact of sustainable practices on their investments (Livsey 2021). Although only a few countries mandate companies to issue a report in which companies disclose their social, environmental, and governance (ESG) performance, SR is becoming an integral part of the reports issued by major companies. Likewise, the recent COVID-19 pandemic has encouraged companies to focus on a much wider group of stakeholders. For example, listed companies nowadays are required in the European Union (EU), the USA, and China to disclose information related to their ESG performance. Such reports result from government pressure through the mandatory requirement for such reports and pressure from stakeholders who want to see more responsible corporations accountable for their social and environmental impacts (Boiral 2013). Recent statistics reveal that approximately 96% of the largest 250 companies produce sustainability reports compared to 80% of all companies (KPMG, 2020, p. 4). Besides, the Governance and Accountability Institute reveals that 39% of even small and medium-sized enterprises (SMEs) published sustainability reports in 2019.

Scholarly research on SR is vast and focuses on various research dimensions, including theoretical underpinnings of SR (e.g., Ali et al. 2021), antecedents (e.g., Ong and Djajadikerta 2020), consequences (e.g., Nguyen 2020; Shahzad and Sharfman 2017), Triple-bottom-line and GRI (Burritt, 2010; O'Dwyer and Unerman 2020; Perkiss et al. 2021), investor and stakeholders' perceptions (e.g., Diouf and Boiral 2017), and assurance (e.g., García-Sánchez et al. 2021; Buica et al. 2021) of sustainability reports. Prior research has also focused on different reporting dimensions of sustainability, such as reporting environmental damages (e.g., Denedo et al., 2017), carbon emission (e.g., Le Breton and Aggeri 2019), integrated thinking (e.g., Oliver et al., 2016), integrated reporting (e.g., Zinsou 2018), and stakeholder engagement (e.g., Kaur and Lodhia 2019; Alda 2019).

The evolution of a particular research area induces academic scholars to quantitatively evaluate its scientific production to recognize its "intellectual structure" (Rivera and Pizam, 2015). Thus, when a field of research matures, scholars should "periodically seek some sense of the knowledge produced and accumulated, to identify novel contributions, detect trends and research traditions, understand which topics are addressed, the theories and methods employed, delve into the intellectual structure of the discipline and its knowledge base, and prospect areas of future inquiry" (Ferreira et al., 2014). Bibliometric analyses use data visualization technology through sophisticated digital databases to track disciplinary development, research hotspots, and

research frontiers in a particular research area (Zou et al. 2018). This method has been applied to investigate the knowledge structure in several research areas, including social responsibility of SMEs (Guillén et al. 2022), cash holding (Khatib et al. 2021), religion and entrepreneurship (Block et al. 2020), corporate governance (Zheng and Kouwenberg 2019) and Islamic banking and finance (Hassanein and Mostafa 2022). Limited research concentrated on the assurance of SR (e.g., Hazaea et al. 2021). Our study comprehensively evaluates SR scholarly research from different thematic dimensions, including theoretical underpinnings, antecedents, consequences, quality, assurance, and stakeholders' engagement. Hence, this study fills this gap by combining bibliometric and content analyses to explore the status of SR research.

The current study aims to quantify, visualize, and analyze the contents of the scientific production of SR. It seeks answers to the following research questions. First, how has SR research evolved? Second, who are the most productive authors in the SR research? Third, what are the "core" academic journals of SR? Fourth, what are the research themes and topics of interest in SR? Fifth, how do the links between the authors and the institutions evolve into a collaborative research network? Finally, what are the future research directions in SR?

The study adds and contributes to the extent of literature as follows. First, it provides a comprehensive evaluation of SR scholarly research and presents interesting insights and avenues for future research. Specifically, this study is the first to provide a combination of bibliometric citation analysis and content analysis for SR scholarly research, offering a complementary approach going beyond the traditional literature review. This adds an innovative way of helping to build knowledge, gain an understanding, and show the future directions in this research area. Second, the study is based on a large sample of 1,053 Scopus peer-reviewed research articles related to SR published between 2000 and 2022 and written by 2,207 authors representing 69 countries. This large sample of research articles helps map the scientific production, identify the research themes and topics of interest, and outline potential avenues for future research in the SR area. Finally, unlike prior research focusing only on SR assurance (Hazaea et al. 2021), this study goes beyond the assurance of sustainability reporting. It identifies more comprehensive thematic categories and topics of interest in SR research (i.e., theoretical underpinnings, antecedents, consequences, quality, Greenium, assurance, and stakeholders' engagement), adding to the theoretical development in this field. Scholars can consider our findings when researching SR and discover potential opportunities and themes for future research.

The study proceeds as follows. Section 2 describes the research methodology. Section 3 presents the scientific production of SR. It describes the evolution of research, identifies the core journals and productive authors, and discusses the top-cited articles in SR. Section 4 presents the network analyses. It explains the authors' co-citations, the collaboration, and keywords co-occurrence networks. Section 5 explains the thematic categories and topics of interest in SR. Section 6 discusses the results and provides an agenda for future research directions. Section 7 presents the concluding remarks and limitations of the study.

## 2 Methodology

In this study, we use bibliometric analyses to explore SR scholarly research. We analyze different aspects of SR research, mainly journals and their impacts, productive authors, research institutions, and thematic research categories in SR. It develops “bibliometric networks” to identify the various networks, including authors’ co-citations, collaboration, and keywords co-occurrence. It also assesses the evolution, structure, and trends in SR scholarly research. The bibliometric analysis is more advantageous than the most advanced traditional review because it can examine more essential themes and provides an additional point of reference (Argoubi et al., 2020). Block and Fisch (2020) indicate that a study analyzing only factors such as productive authors, journals, and countries is not considered a bibliographic analysis study. The bibliometric study should go beyond mere descriptive reporting on prior research, elaborate on the interpretation and discussion of the findings, and evaluate the advances made and the thematic structure of the research area (Block and Fisch 2020). Consequently, the current study followed the tips suggested by Block and Fisch (2020) for bibliometric analyses to assess the development and thematic structure and show future research directions in SR.

The current study goes beyond the traditional review studies and conducts two analyses. First, it utilizes the bibliometric analysis to present various aspects of SR research, including the evolution of research, the core journals, the productive authors, and the top-cited articles. The bibliometric analysis helps identify the thematic evolution and trending topics in SR. Besides, we have developed co-citations, collaboration, and keyword co-occurrence networks using the VoSViewer. Second, following Paltrinieri et al. (2019), we conduct a content analysis review for the most relevant streams in SR research. The findings of bibliometric and content analyses have guided us in identifying the potential avenues for future research in sustainability reporting. This method ensures a comprehensive evaluation of the SR research scholarly research.

We used the R version 4.1 software (R Development Core Team, 2021) and several libraries, including the bibliometrix, world cloud, and ggplot2. We have used the VoSViewer software to perform citation and co-citation analyses. We identified the most productive SR authors based on their number of articles and total citations. The citation analysis categorizes the highly cited articles in the SR research. The VoS-viewer software visualizes chronological SR citations through network maps. It is a leading software instrument for building visualized maps for objects of interest and is commonly used in bibliometric studies such as cash holding (Khatib et al. 2021) and Islamic banking and finance (Hassanein and Mostafa 2022). We have followed the subsequent steps to conduct thorough bibliometric and content analyses. First, we selected the database, defined the search terms, and conducted a preliminary statistical analysis. Second, we performed the bibliometric network analysis. Finally, we identified the thematic and conceptual structure of SR.

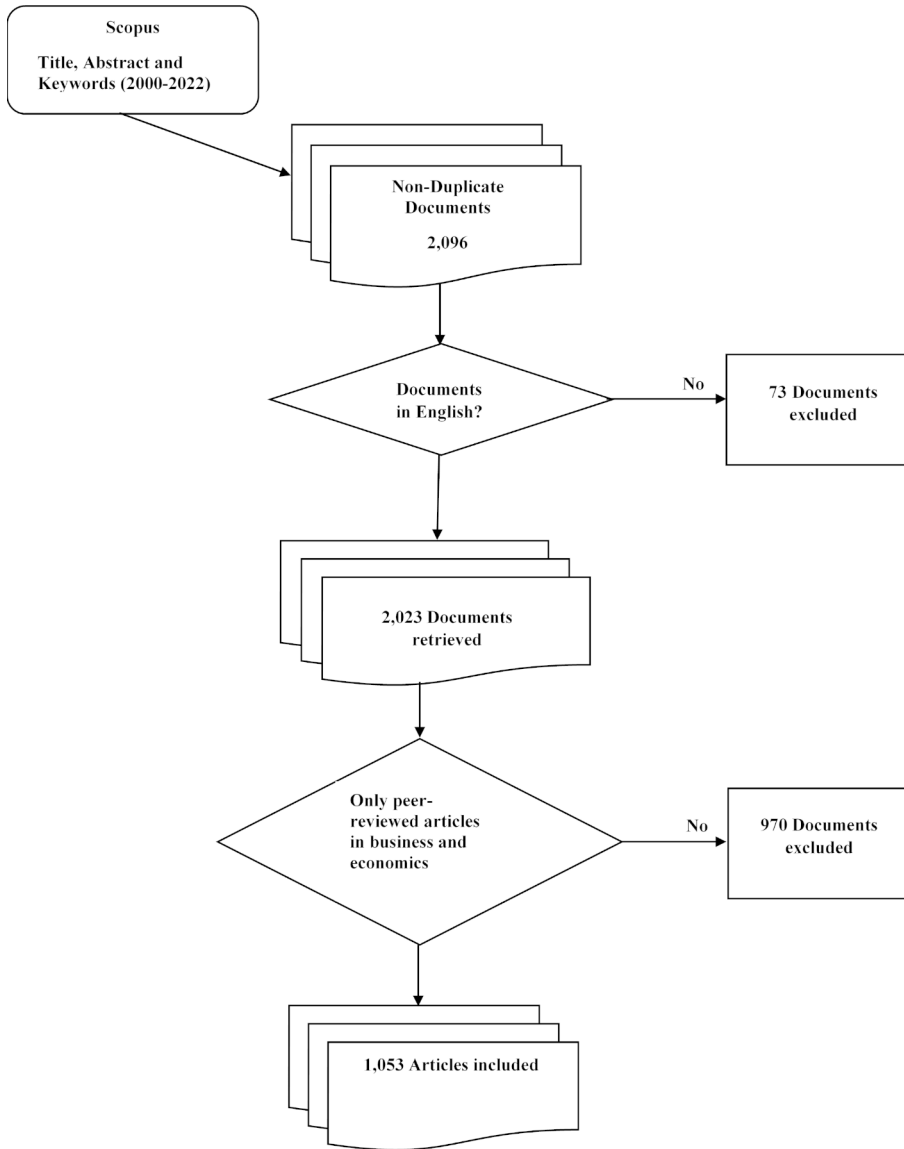
## 2.1 Database and documents extraction

The Scopus database was the source for this study's retrieved published documents on SR. Scopus is a leading peer-reviewed journal database and is considered the most extensive (Norris and Oppenheim, 2007), and researchers frequently rely on it to perform bibliometric analyses (Cunill et al., 2019; Khatib et al. 2021; Hassan et al., 2021). The advantage of Scopus is that it allows scholars to access a downloadable database containing the bibliographic information of a particular research field, such as journals, affiliations, citations, and references. We have studied publications, definitions, and categories of SR to develop a central theme search string. We have examined all journal articles that include the following terms, "Sustainability Reporting," "Sustainability Disclosure," "Corporate Social Responsibility Reporting," "Corporate Social Responsibility Disclosure," "CSR Reporting," "CSR Disclosure," and all possible variants in the titles, keywords, and abstracts of the journal articles. We have removed the duplicate documents, resulting in 2,096 non-duplicate research articles. We then narrowed our search to include only scholarly research papers written in English, excluding 73 documents written in non-English. The choice of the document type for analysis is debatable. For example, certain studies included exclusively peer-reviewed research articles (e.g., Block et al. 2020), while others included, in addition to journal articles, books, and book chapters (e.g., Mostafa 2020). Many other studies excluded abstracts, corrections, and editorials (e.g., Al-Khalifa 2014). Our study included only peer-reviewed articles because these articles "usually undergo a thorough peer-review process and are of high quality" (Chen et al. 2021, p. 206). We include only research articles published in peer-reviewed journals in business and economics. This led to the exclusion of 970 documents from the sample. We retrieved the bibliographic records of the selected articles, including the authors, titles, and keywords. The extracted papers were then converted to text to facilitate advanced analyses. We show in Fig. 1 the search strategy followed in this research.

Table 1 presents the primary SR research data. The Table shows that 1,053 peer-reviewed research articles published from 2000 to 2022 met the search criteria. These articles were authored by 2,071 scholars and included 59,255 references. The average number of citations per extracted research paper is 36.03, with an annual citation of 4.75. The Table also reveals that only 147 peer-reviewed articles were single-author articles, whereas multi-authors wrote 1,924 articles. The collaboration index is 2.17, indicating the non-dominance of a single-authored research article, as reported in prior research.

## 2.2 Bibliometric network analysis

A network is "a structure composed of a set of actors, some of whose members are connected by a set of one or more relationships" (Knoke and Yang 2010, p. 8). In social network analysis (SNA), the network relationship is represented by the connection of two nodes. It is indicated that "when used to synthesize the existing literature from a network perspective, the SNA technique can reveal valuable invisible patterns that can certainly facilitate theory development and uncover areas for future research" (Khan and Wood 2016, p. 388). Moreover, the network analysis was used



**Fig. 1** Sustainability reporting search Flowchart

extensively in prior research to explore authors' collaborations networks (Zou et al. 2018; Chen and Liu 2020), institutional collaboration among research entities (Ding 2011), and keywords co-occurrence networks (Blanckendorff, 2009), which would be developed in this study.

**Table 1** Data

<i>Documents and citations:</i>	
Period	2000–2022
Documents	1,053
Average citations per document	36.03
Average citations per year per doc	4.75
Total references	59,255
<i>Document types:</i>	
Peer-reviewed article	1,053
<i>Document contents:</i>	
Keywords	956
Author's keywords	2,207
<i>Authors:</i>	
No. of scholarly authors	2,071
Authors of a single-authored article	147
Authors of a multi-authored article	1,924
<i>Authors collaboration:</i>	
Articles per author	0.508
Authors per article	1.96
Co-Authors per article	2.64
Collaboration index	2.17

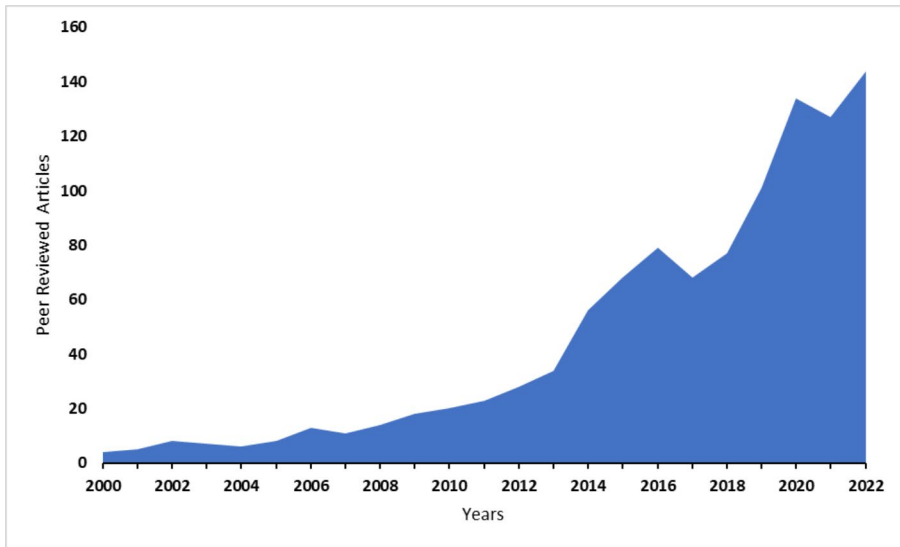
## 2.3 Conceptual and thematic structure

We used the keywords co-occurrence analyses to identify the clusters of thematic structure in sustainability reporting. The thematic cluster of research themes is used in the bibliometric analysis in several studies (Hassanein and Mostafa 2022; Khasseh et al. 2017). It can be used to study a research field's theoretical structure by segmenting it through drivers considered “knowledge clusters” (Wetzstein et al. 2019). Once the conceptual and thematic structure was identified, we used content analysis to identify the essential research streams in sustainability reporting.

## 3 The scientific production

### 3.1 Evolution of sustainability reporting research

In Fig. 2, we find the research tendencies in the SR field. The Figure indicates a rapid exponential annual growth rate but is not evenly distributed. For example, there was limited research on SR in the first decade (2000–2009), with only a handful of published research articles annually. This early decade could be considered “the initial” stage in SR research. However, the next five years (2010–2014) did see substantial growth in research dealing with SR. This period could be considered the “rapid growth” stage. It represents a high progression level in SR publications. The final period under consideration (2015–2022) could be labeled the “consolidation and stabilization” period since the SR research reached the “saturation” stage. Notably, research on SR was highly productive from 2016 to 2022 and is still ongoing. The Figure shows a drop in SR publications in 2021. This may be due to the delays in



**Fig. 2** Sustainability reporting research annual scientific production (2000–2022)

the review process of submitted manuscripts to journals as a result of the COVID-19 pandemic. Notably, our dataset includes peer-reviewed articles published by October 2022.

### 3.2 The core journals

In Table 2, we show the core Scopus-indexed journals publishing SR research. The Table indicates that six publishers owned the top 20 productive journals in SR. Emerald Group Publishing Ltd published eight of these journals. While Taylor and Francis Ltd published four journals, and Wiley-Blackwell published three. The rest of these publications were published by Elsevier [2 journals], Springer [2 journals], and Sage publications [1 journal]. The most productive journal is the “Journal of Cleaner Production,” with 89 articles representing approximately 17.2% of the total publications in the core journals cited in Table 2. The second productive journal is “Corporate Social Responsibility and Environmental Management,” with 56 [10.9%] articles in the SR field. The third journal is the “Accounting Auditing and Accountability Journal,” which published 51 [9.9%] articles. The fourth productive journal is “Sustainability Accounting Management and Policy,” which published 50 articles [9.7%], followed by the “Business Strategy and the Environment” journal [49, 9.5%], the “Meditari Accountancy Research” journal [39, 7.6%], the “Journal of Business Ethics” [34, 6.6%], and the “Social Responsibility Journal” [31, 6%]. The rest of the 20 productive journals (12 journals) counted for approximately 23% of the total publication in sustainability reporting; each journal counts for less than 5% of the total published articles. The Table also shows the H Index, the Scimago Journal Rankings (SJR), Impact Factor (IF), and the Academic Journal Guide (AJG) rankings to evaluate the quality of the top 20 productive journals. The H index is based on google



**Table 2** Core journals

	Total articles	Publisher	H Index	SJR	IF	AJG
Journal of Cleaner Production	89	Elsevier	232	1.92	10.96	2*
Corporate Social Responsibility and Environmental Management	56	Wiley-Blackwell	82	1.95	9.25	1*
Accounting Auditing and Accountability Journal	51	Emerald Group Publishing	105	1.47	4.88	3*
Sustainability Accounting Management and Policy Journal	50	Emerald Group Publishing	34	0.75	4.13	2*
Business Strategy and the Environment	49	Wiley-Blackwell	115	2.24	11.28	3*
Meditari Accountancy Research	39	Emerald Group Publishing	27	0.61	3.52	1*
Journal of Business Ethics	34	Springer	208	2.44	6.96	3*
Social Responsibility Journal	31	Emerald Group Publishing	37	0.63	3.72	1*
Accounting Forum	18	Taylor & Francis	50	0.84	4.56	3*
Corporate Governance (Bingley)	13	Emerald Group Publishing	64	0.85	5.05	2*
Journal of Applied Accounting Research	12	Emerald Group Publishing	27	0.44	2.09	2*
Australian Accounting Review	11	Wiley-Blackwell	40	0.51	2.79	2*
Pacific Accounting Review	11	Emerald Group Publishing	24	0.40	2.16	1*
Business and Society	10	SAGE Publications	81	2.72	7.53	3*
Environment, Development, and Sustainability	8	Springer	62	0.67	4.35	NA
British Accounting Review	7	Elsevier	72	1.31	5.00	3*
Journal of Financial Reporting and Accounting	7	Emerald Group Publishing	10	0.33	2.20	1*
Journal of Sustainable Finance and Investment	7	Taylor & Francis	20	0.64	3.65	2*
Social and Environmental Accountability Journal	7	Taylor & Francis	21	0.37	1.36	1*
Accounting and Business Research	6	Taylor & Francis	59	0.86	2.65	3*

SJR=Scimago Journal Rank; IF=Impact Factor; AJG=Academic Journal Guide

scholar citations. The SJR and the IF are based on the Scimago Journal Rank and the Clarivate Analytics of 2021, respectively. The AJG is based on the Academic Journal Guide of 2021, which categorize journals into five groups (i.e., 4\*, 4, 3, 2, & 1).

### 3.3 The productive authors

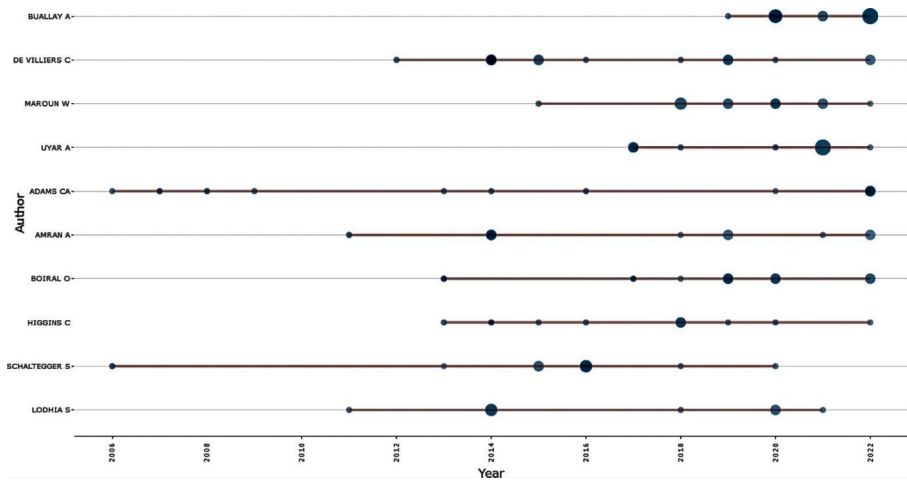
The substantial growth in SR research is noticeable, as indicated by the significant number of authors involved in SR research. A total of 2,071 authors contributed to our sample's 1,053 peer-reviewed research articles in SR. The top influential authors in SR research are shown in Table 3. The Table also presents the H indices of the authors based on Google Scholar citations and the Scopus database alongside their current affiliations. Although Google Scholar maintains a comprehensive source of

**Table 3** Productive authors

Authors	No. of SR articles	H Index-Google	H Index-Scopus	Current Affiliation	Country
Maroun, Warren	23	33	21	University of the Witwatersrand	South Africa
Lodhia, Sumit K.	20	31	23	University of South Australia	Australia
Schaltegger, Stefan C.	20	83	52	Leuphana Universität Lüneburg	Germany
Jones, Peter M.S.	19	41	39	University of Gloucestershire	UK
Boiral, Olivier	19	59	44	Université Laval	Canada
Lozano, Rodrigo	17	49	41	Hogskolan i Gavle	Sweden
Comfort, Daphne	17	30	28	University of Gloucestershire	UK
David Hillier, David	16	NA	35	Strathclyde Business School	UK
Adams, Carol A.	15	49	30	Durham University Business School	UK
Buallay, Amina	15	20	15	Ahlia University	Bahrain
Amran, Azlan	14	43	28	Graduate School of Business	Malaysia
Uyar, Ali	13	38	23	Excelia Business School	France
Villiers, Charl De	13	47	32	The University of Auckland Business School	New Zealand
Greiling, Dorothea	12	21	12	Johannes Kepler University Linz	Austria

The H indices (Google & Scopus) were extracted in October 2022

research articles, it does not exclude self-citations from the list of citations of the author. Scopus has consistently provided broad coverage of peer-reviewed journal articles with international and specialized disciplinary coverage but less than Google Scholar. Besides, Scopus has the option to exclude the self-citations of particular authors. Therefore, the citation count in Google Scholar is higher than the Scopus count. Given the advantage of Scopus, we will focus on the Scopus H index in our discussion. From the Table, the most productive author in this field is Maroun, Warren [Maroun, W], with 23 SR research publications and a 21 Scopus H index. Likewise, Lodhia, Sumit [Lodhia, S], with a Scopus H index of 23, and Schaltegger, Stefan [Schaltegger, S], with a Scopus H index of 52, have contributed 20 SR publications each. Besides, Jones, Peter [Jones, P], with a 39 Scopus H index, and Boiral, Olivier [Boiral, O], with a Scopus H index of 44, contributed 19 SR articles each. Lozano, Rodrigo [Lozano, R] from Sweden and Comfort, Daphne [Comfort, D] from the UK have contributed 17 SR publications each. The Scopus H indices of Lozano and Comfort are 41 and 28, respectively. Furthermore, Hillier, David [Hiller, D] from the UK has a Scopus H index of 35 and has contributed 16 SR publications. Moreover, Adams, Carol [Adams, C] from the UK [Scopus H index=30] and Buallay, Amina [Buallay, A] from Bahrain [Scopus H index=15] have each contributed 15 articles to SR research. Amran, Azlan [Amran, A] from Malaysia has a Scopus H index of



**Fig. 3** Sustainability reporting authors' dominance over the time

28 and has contributed 14 SR publications. Other productive authors include Uyar, Ali [Uyar, A] from France [Scopus H index=23], Villiers, Charl De [de Villiers, C] from New Zealand [Scopus H index=32] and Greiling, Dorothea [Greiling, D] from Austria [Scopus H index=12]. These authors have contributed 13, 13, and 12 SR articles, respectively.

Figure 3 shows the most influential authors in SR research over time. The authors' dominance is a bibliometric measure frequently used in prior studies (Hassanein and Mostafa 2022). For any given author, if considered the first author, the ratio is calculated as the number of first-author multi-authored peer-reviewed articles to the total number of multi-authored peer-reviewed articles. The Figure indicates that the dominance of the influential authors in SR varied over time. It reveals that the dominance of authors was absent before 2006. Adams, Carol was the most dominant author from 2006 to 2022. Likewise, Schaltegger, Stefan was seen as a dominant author from 2006 to 2020. Besides, Lodhia, Sumit was dominant from 2011 to 2021, Amran, Azlan from 2011 to 2022, and Villiers, Charl De from 2012 to 2022. Nevertheless, new authors in the SR field have also achieved some influence. Examples include Maroun, Warren (2015–2022), Uyar, Ali (2017–2022), and Buallay, Amina (2019–2022).

### 3.4 Top cited articles

Table 4 elaborates on the objectives and the main findings of the most-cited peer-reviewed articles in SR. The first most-cited article was written by Clarkson et al. in 2008 and was published in "Accounting, Organization, and Society." This article has been cited 1,454 times from 2008 to 2022. It develops a content analysis index for discretionary environmental disclosure based on the GRIs guidelines to examine the association between environmental performance and environmental disclosure. It found that firms with good environmental performance disseminated high environmental disclosures. Likewise, the socio-political theories were the basis for explain-

**Table 4** Top cited articles

Paper Journal	Total Citations	Purpose	Main findings
Clarkson et al. (2008) Accounting Organization and Society	1454	Exploring the nexus between firm environmental performance and its disclosure	Firms with good environmental performance are likely to disseminate higher levels of environmental disclosures The socio-political theories are the basis for explaining patterns in the data “legitimization” that economics disclosure theories could not explain
Gray (2010) Accounting, Organization, and Society	620	Initiating an auto-critique for accounting for sustainability and exploring future research avenues for sustainability reporting	Examinations of taxonomies in sustainable development are a necessary proposition for the suggestion of multiple and conditional descriptions
Milne and Gray (2013) Journal of Business Ethics	563	Critique of the current lack of connection between sustainability reporting practices and the urgency faced by the ecological system	Though necessary, the Triple-Bottom-Line and the GRI are not sufficient for organizations to contribute to the Earth’s ecology
Hubbard (2009) Business Strategy and Environment	487	Assessing sustainable performance through new measures	Sustainable Balanced Scorecard (SBSC) could be used as a conceptual framework Proposes a single-measure Organizational Sustainability Performance Index (OSPI) as a reference for sustainability assessment
Bos-Brouwers (2010) Business Strategy and Environment	427	Identifying the antecedents that could influence sustainable innovation in small and medium-sized enterprises (SMEs)	Firms will likely create value when sustainability is integrated into their orientation and innovation processes Efforts on sustainable innovation provide various opportunities for SMEs to improve their sustainability performance
Kolk (2008) Business Strategy and Environment	406	Exploring how corporate governance metrics can be incorporated into the reporting of the sustainability information of Fortune Global 250 firms	Multinational enterprises show interest in aspects including supervision of the board supervision, structuring responsibilities of sustainability, compliance, ethics, and external verification Suggests identifying relationships between managers, auditors, shareholders, and stakeholders and the dilemmas in dealing with accountability when reporting on sustainability
De Villiers et al. (2014) Accounting Auditing and Accountability Journal	395	Utilizing insights from accounting and accountability research to incorporate integrated reporting	There are challenges to the rapid adoption of integrated reporting due to policy development and the edification of the theoretical framework
Gray (2006) Accounting Auditing and Accountability Journal	370	Examining how shareholder value is affected by social, environmental, and sustainability accounting and reporting	Modern international financial capitalism is intended to maximize environmental destruction and annihilate the realistic notion of social justice, which is reflected and confirmed through sustainability reporting

**Table 4** (continued)

Paper Journal	Total Citations	Purpose	Main findings
Cho et al. (2015) Accounting Organization and Society	366	Illustrating the societal and institutional pressures pushing organizations to be hypocritical and develop fake facades	The sustainability disclosure literature would benefit from the notions of organized hypocrisy and organizational façade.
Roca and Searcy (2012) Journal of Cleaner Production	363	Detecting the factors that are disclosed in corporate sustainability reports	A significant portion, 33%, relied on GRI indicators.
Kolk (2003) Business Strategy and Environment	324	Analyzing the status of non-financial reporting progress since its initial introduction in the 1990s into the 21st century	Sustainability reporting is still of importance and growing, consequently A continuing interest in “conventional” topics such as environment, corporate philanthropy, and employees, and to a lesser extent, in the broader external societal issues
O’dwyer and Owen (2005) British Ac- counting Review	308	Evaluating the importance of assurance practice in improving transparency and accountability to organizational stakeholders	Auditors are cautious in their approach to providing assurance services for transparency and sustainability issues Reviewers opt more for an evaluative approach that may lead to increased assurance
Brown et al. (2009) Journal of Cleaner Production	301	Examining the GRI’s organizational field	The initial strategies of the first adopters have a significant and profound impact on the process of institutionalization The process of institutionalization reproduces existing power relations
Lozano and Huisingh (2011) Journal of Cleaner Production	298	Evaluating and reviewing sustainability reporting of academic institutions, particularly universities	Sustainability reporting in universities is still in its initial adoption phase Universities could emulate the experiences of corporate sustainability reporting Social and education dimensions should be the focus of sustainability reporting for universities
Lozano (2012) Journal of Cleaner Production	294	Analyzing sustainability initiatives on how they contribute to or address the different dimensions of sustainability reporting and corporate organization	Each initiative has advantages concerning the dimensions and focuses on the sustainability scope Each initiative has advantages concerning the corporate organizational features A proposal for a new framework, the Corporate Integration of Voluntary Initiatives for Sustainability, is made
O’dwyer et al. (2011) Accounting Organization and Society	287	Analyzing the evolution of the legitimization processes adopted by sustainability assurance practitioners in a large professional services firm	Developing pragmatic legitimacy with clients is of critical importance The internal risk department legitimacy of the firm impacts the moral legitimacy of non-client users
Moneva et al. (2006) Account Forum	285	Examining the impact of the adoption of the sustainable development approach on corporate reporting	The GRI guidelines are used as a new tool for legitimizing management decisions Sustainability guidelines have improved the non-financial information of the reporting organization

**Table 4** (continued)

Paper Journal	Total Citations	Purpose	Main findings
Adams and McNicholas (2007) Accounting Auditing and Accountability Journal	274	Understanding the corporate processes used in developing a sustainability report	Identification of the weaknesses and factors for change that were not included in prior theorizing
Clarkson et al. (2011) ABACUS	267	Examining the factors influencing firms' decisions to adopt an environmental strategy and if this improves financial performance	Financial resources of a firm in prior periods had the same directional impact (i.e., positive or negative) on reported environmental performance in subsequent periods Significant enhancements (declines) in environmental performance in the prior periods can lead to improvements (declines) in financial performance
Boiral (2013) Accounting Auditing and Accountability Journal	263	Exploring whether sustainability reporting could be used to conceal sustainability problems	Significant adverse events were not reported The pictures reported display a distorted image incoherent with the impact of business activities The non-accounting approach may be relevant in assessing the quality of sustainability reports

The total citations were extracted in October 2022

ing patterns in the data “legitimization” that economics disclosure theories could not explain. The second most-cited article was conducted by Rob Gray in 2010. It has 620 citations and was published in the “Accounting, Organization, and Society.” It initiated an auto-critique for sustainability accounting and investigated how accounting for sustainability might advance by exploring sustainable development’s meanings and contradictions. It highlighted that examinations of meanings and contradictions in sustainable developments are required and provided suggestions for developing multiple and conditional narrative reporting. Milne and Gray published the third most cited article in 2013 in the “Journal of Business Ethics,” with 563 citations till 2022. It provided a critique of the modern disconnect between the practice of SR and the urgent issue of sustaining life-supporting ecological systems. Graham Hubbard performed the fourth most cited SR article in 2009. It has been published in the “Business Strategy and the Environment” and has 487 citations. It developed an organizational measure for SR and performance. In particular, it proposed a stakeholders-based, sustainable, balanced scorecard and single-measure organizational sustainable performance index. Bos-Brouwers conducted the fifth most-cited research article in SR in 2010. It was published in the “Business Strategy and Environment” journal and had 427 citations from 2010 to 2022. This article identified the factors that influence the implementation of sustainable innovation within SMEs. It indicated that SMEs create value when sustainability is integrated into their orientation and innovation processes.

The sixth-most cited article, which has 406 citations, was written by Ans Kolk and published in the “Business Strategy and the Environment” journal. This paper

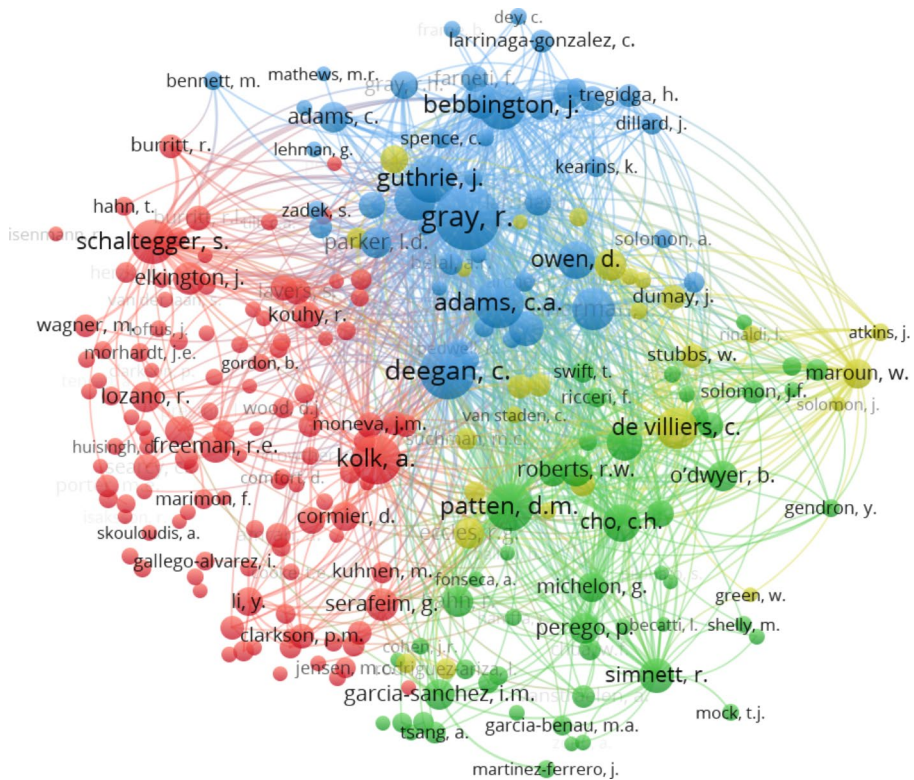
examined how the SR of the Fortune Global 250 firms incorporates corporate governance aspects. It found that multinational enterprises show interest in aspects including supervision of the board, structuring responsibilities of sustainability, compliance, ethics, and external verification of SR. In 2014, De Villiers published the seventh most-cited article in the “Accounting, Auditing, and Accountability” journal. This article has been cited 395 times from 2014 to 2022. It combined insights from research in accounting and accountability into the field of integrated reporting. The eighth most-cited article was written by Gray in 2006. It has 370 citations and was published in the “Accounting, Auditing, and Accountability” journal. Gray (2006) examined how social, environmental, and sustainability accounting and reporting (SEA) contribute to shareholder value. The paper found that modern international financial capitalism is intended to maximize environmental destruction and annihilate the realistic notion of social justice, which is reflected and confirmed through sustainability reporting. The ninth most-cited article has total citations of 366 and was published in the “Accounting, Organization, and Society” by Cho et al. in 2015. Cho et al. (2015) illustrated the societal and institutional pressures pushing organizations to be hypocritical and develop fake facades. The authors reported that sustainability disclosure literature would benefit from the notions of organized hypocrisy and organizational façade.

The tenth most-cited article was conducted by Roca and Searcy in 2012 and was published in the “Journal of Cleaner Production.” This article has 363 citations from 2012 to 2022. It detected the factors disclosed in corporate sustainability reports and found that a significant portion, 33%, relied on GRI indicators. The eleventh most-cited article has total citations of 324 and was published in the “Business Strategy and Environment” by Kolk in 2003. Kolk (2003) analyzed how and in what form the trend toward non-financial reporting. The author reported a continued and significant rise in sustainability disclosure. Besides, the traditional topics on the environment, corporate philanthropy, and employees receive much more attention than the broader external societal issues. O’dwyer and Owen conducted the twelfth most-cited article. It was published in the “British Accounting Review” in 2005, counting 308 citations till 2022. This article assessed how current assurance practice enhances SR transparency to organizational stakeholders. It found that auditors are cautious in providing assurance services for transparency and sustainability issues. Besides, reviewers opt more for an evaluative approach that may lead to increased assurance. More details about the purpose and findings of the most-cited articles in SR can be found in Table 4.

## 4 Network analyses

### 4.1 Authors’ co-citation network

The authors’ co-citation network is made when two scholars are mentioned together in a third reference. This helps to identify the flow of knowledge in a field of study. Figure 4 presents the SR research co-cited authors’ network. The Figure is built using the VoSViewer based on 567 journal articles with minimum citations of 5 times per

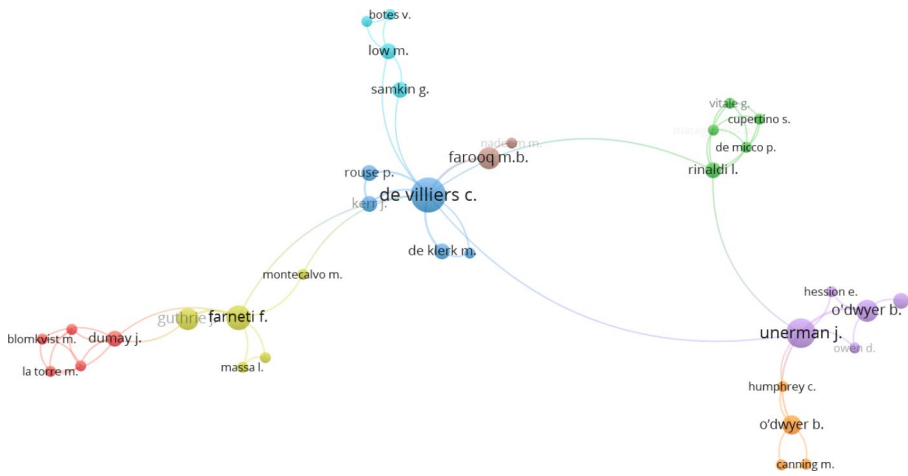


**Fig. 4** Sustainability reporting authors co-citation network

author. Several significant insights are evident from the Figure. The line thickness between authors indicates the strength of the connection between them. A larger node size would indicate that the author occupies a pivotal position in the cluster. Such authors might be seen as influential and dominant scholars in the field as they impact information diffusion in the network (Hassanein and Mostafa 2022). The Figure shows that authors such as Gray, Guthrie, Deegan, Kolk, Schaltegger, Bebbington, De Villiers, and Patten are highly cited by other authors.

Four distinct clusters are identified in the Figure. The red cluster is the biggest, comprising authors such as Schaltegger, Burritt, Kouhy, Lozano, Wanger, Elkington, Hahn, and Kolk. From the graph, we can also perceive that some nodes are very close, whereas others are distant. The reduced distance indicated a significant “homophily effect.” This effect is explained by McPherson et al. (2001) in Sociology, which may occur when authors, for example, in a virtual-room-like setting, discuss and debate research topics and common interests (Findlay and van Rensburg 2018). In bibliometric analysis, “homophily” indicates “disciplinary or research field similarity” (Jiang et al. 2019). For instance, Schaltegger and Hahn’s nodes are very close, indicating a possible “homophily effect.” The blue cluster comprises 46 authors, such as Adams, Bebbington, Deegan, Gray, and Owen. In addition, authors such as Patten, Roberts, Cho, Perego, and Simnett are included in the green cluster. Finally, minor





**Fig. 5** Sustainability reporting authors' collaboration network

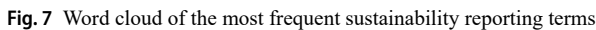
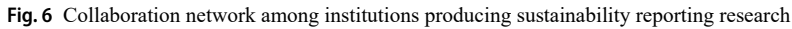
connections are indicated in a yellow cluster and include authors such as de Villiers, Durnay, Maroun, and Stubbs. The authors in the center of each cluster are considered influential authors.

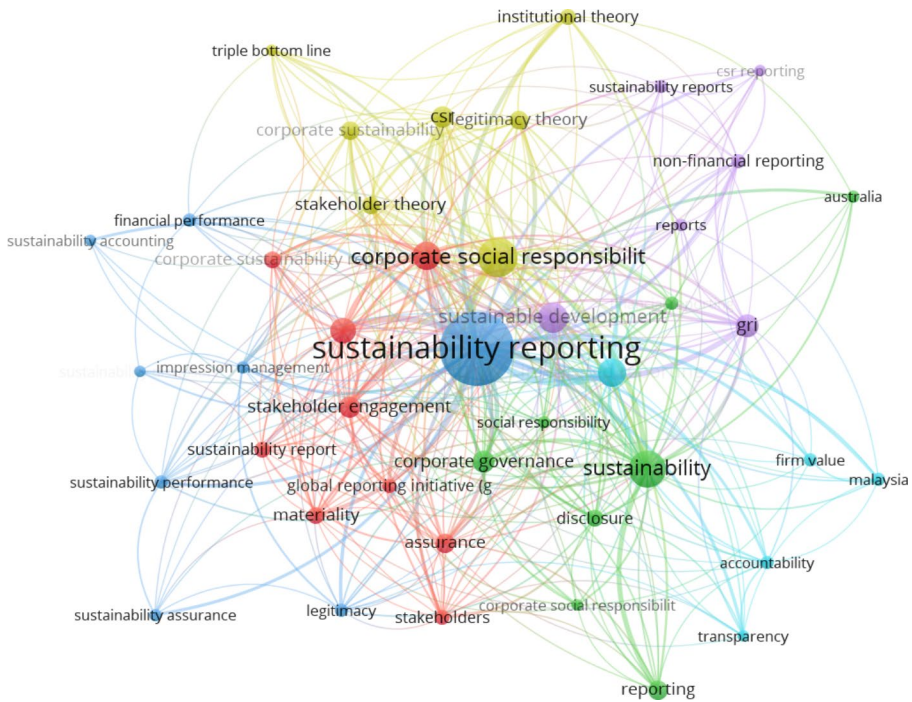
## 4.2 Collaboration networks

The collaboration network among authors identifies the frequency of their joint publications in SR. Figure 5 depicts the collaboration network among authors of SR. The node size is based on the author's number of publications, whereas the thickness of the link is based on the number of co-authored articles. The graph shows eight different clusters of collaborations between authors. However, the thin network indicates limited cooperation among authors in SR research. The thinness of the network infers that influential researchers in the SR area are more likely than not to work in isolated "silos."

Figure 6 depicts the collaboration network of SR research at the institutional level. The link thickness is proportionate to the institution's collaboration; however, the node size is based on each institution's publications. The graph shows that most collaboration in SR research occurs among universities in Eastern Europe, such as Slovakia, Latvia, Poland, Estonia, Lithuania, Poland, Hungary, Czech Republic, Romania, and Croatia. Few remarkable exceptions are reflected in collaborations among universities in Western Europe, such as the UK and Germany. Countries like the US and African countries are absent from the institutional collaboration network. Thus, the collaboration network between institutions generating SR research can be called "locally-centralized-globally-discrete" cooperation (Zou et al. 2018). There is also an apparent weakness in the collaboration and cooperation between developed and developing world research organizations, which can be termed as "North-South" divide,

## 4.3 Keywords and co-occurrence network analysis.

 Springer

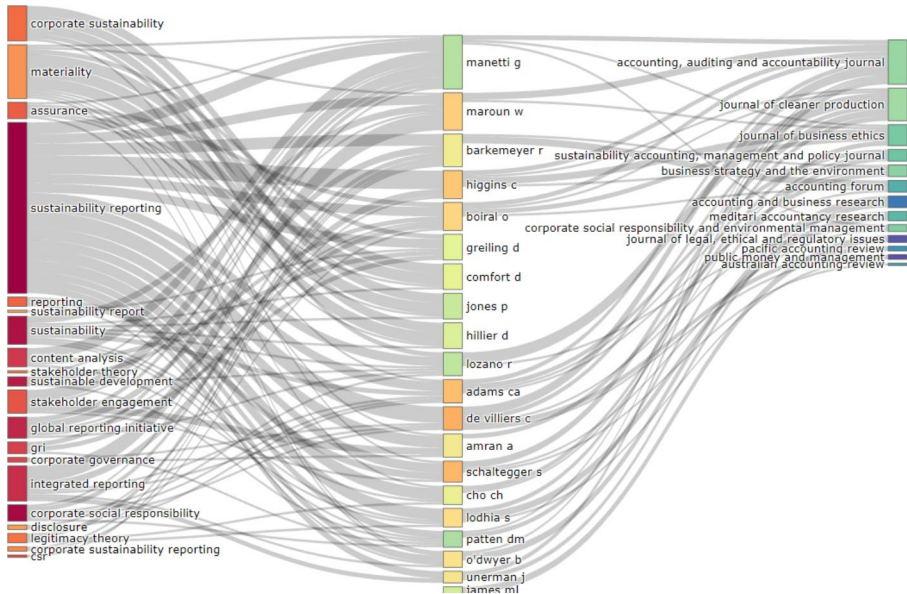


**Fig. 8** Co-occurrence network for sustainability reporting keywords

the keywords in the abstracts of the SR research. It reveals that the most frequent keywords used in SR research are “sustainability,” “global reporting initiative,” “corporate social responsibility,” “CSR,” “stakeholders,” “corporate strategy,” “economic and social effects,” “corporate sustainability,” “economic and social effects,” “environmental impacts,” “environmental management,” and “environmental protection.”

The keyword co-occurrence analysis recognizes the main domains, topics, thematic structure, and contents in a field of research on the assumption that keywords are a potentially coherent proxy of the content of the research paper (Su and Lee, 2010). The link thickness between two keywords is a function of the frequency of these keywords appearing in a given research article. The number of links indicates the total frequency that these keywords occur together. Following Block et al. (2020), we have identified a minimum frequency of occurrence of a keyword to be three. This means that keywords will appear on the co-occurrence map only if the two keywords occurred at least three times in the research article. The keyword co-occurrence map has been conducted using 632 research articles. Figure 8 shows the resulting keywords co-occurrence network of SR research. It reveals four main clusters which are relatively interrelated and connected.

The first cluster (green-colored) includes words like “sustainability,” “disclosure,” “reporting,” and “corporate governance.” This cluster is likely to report on issues related to the disclosure of sustainability information (e.g., Hubbard 2009) and the impact of corporate governance mechanisms on such disclosure (e.g., Amidjaya and Widagdo 2020; Cucari et al. 2018; Ong and Djajadikerta 2020; Furlotti et



**Fig. 9** Sankey diagram for sustainability reporting research flow (keyword-author-source)

al. 2019). The second cluster (blue-colored) includes words such as “sustainability reporting,” “sustainability accounting,” “financial performance,” and “impression management.” This cluster may include, but is not limited to, research articles that explore the relationship between firm performance and SR (e.g., Nguyen 2020) or the association between impression management and SR (e.g., Sandberg and Holmlund 2015; Diouf and Boiral 2017). The third cluster (yellow-colored) includes keywords such as “institutional theory,” “legitimacy theory,” and “stakeholders’ theory.” This cluster is likely to focus on the theoretical underpinnings of SR (e.g., Diouf and Boiral 2017; Hahn and Kühnen 2013; Hahn and Kühnen 2013; Hörisch et al. 2020). Finally, the red-colored cluster includes keywords such as “stakeholders,” “stakeholders’ engagement,” “sustainability assurance,” “global reporting initiatives,” and “corporate sustainability.” This cluster is likely to explore research related to quality, assurance, and stakeholders engagement in SR (e.g., Boiral et al. 2019; Simoni et al. 2020; O’dwyer et al., 2011; Bellucci et al. 2019; Stocker et al. 2020; Koh et al. 2022).

We used the Sankey diagram, known as the three-field plot, to study the trend linking the flow of keywords (left), authors (middle), and sources (right). The size of the boxes is proportionate to the associated quantity (keyword, author, or source). Figure 9 shows the Sankey diagram of the SR scholarly research, displaying the flow among keywords, authors, and journals. The edge widths flowing from keywords such as “sustainability reporting,” “corporate sustainability,” “integrated reporting,” “assurance,” “stakeholders engagement,” and “materiality” are the largest, signifying that many authors used these keywords. We also see that some authors have used a long list of keywords reflecting the diversity of their research (e.g., G Manetti), and others used a single keyword (e.g., C Cho). This infers that their research covered numerous themes and topics of interest in SR, which is evidenced by their publi-

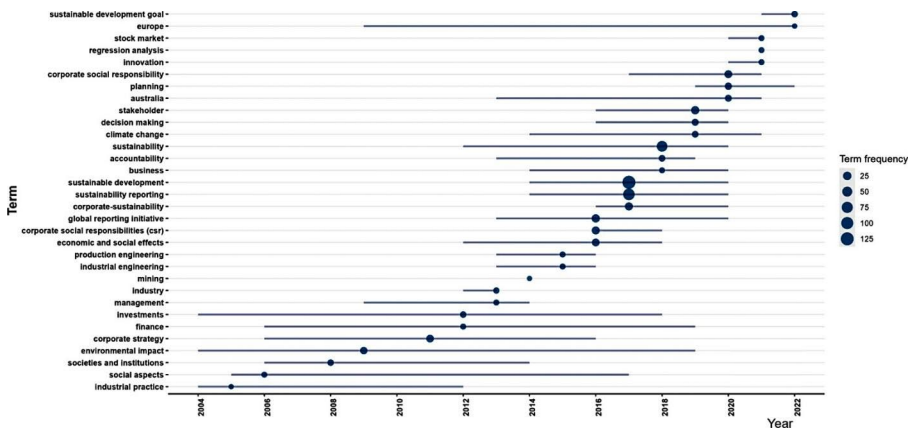


Fig. 10 Sustainability reporting research trending topics

cations in diversifiable and high-quality academic journals such as the “Journal of Cleaner Production,” “Accounting, Auditing, and Accountability Journal,” and “Journal of Business Ethics.”

### 4.3 Trending topics

Figure 10 shows the major trending topics in SR. We detect a move from established SR topics such as “industrial practice,” “social aspects,” and “societies and institutions” (2005–2008) and “corporate social responsibility,” and “reporting initiatives” (2014–2018) to new topics such as “ESG disclosure” and “sustainable development goals” of the United Nations (2020 onwards). It also shows that the most frequent terms are “corporate sustainability,” “sustainability reporting,” and “sustainable development.” These thematic clusters might be considered “trending research topics” in SR research. The trending topics often indicate evolving themes in a specific research field or hotspots (van Eck and Waltman 2014), suggesting that future research is promising on these topics.

## 5 Themes and topics of interest

Table 5 exhibits the most frequently thematic categories and topics of focus in SR scholarly research. We have identified four broad thematic categories of SR research; (i) theoretical underpinnings, (ii) antecedents, (iii) consequences, and (iv) quality, assurance, and stakeholders’ engagement. Besides, we have highlighted the topic of “Greenium.” The following subsections discuss the related topics of SR in each of these thematic categories.



**Table 5** Thematic categories

Theme	Topic(s) of interest	Articles (e.g.)
Theoretical underpinnings	Legitimacy theory	Dowling and Pfeffer (1975); Diouf and Boiral (2017); Ali et al. (2020); Hahn and Kühnen (2013)
	Stakeholder theory	Freeman (2016); Hahn and Kühnen (2013); Skouloudis and Evangelinos (2009); Hörisch et al. (2020)
	Institutional theory	De Villiers and Marques (2016); Orazalin and Mahmood (2020); Ong and Djajadikerta (2020)
	Resource constraint theory	Luo et al. (2013); De Villiers and Marques (2016); Orazalin and Mahmood (2020)
	Impression management theory	Sandberg and Holmlund (2015); Diouf and Boiral (2017)
Antecedents	Firm-specific characteristics	De Villiers and Marques (2016); Orazalin and Mahmood (2020); Kouloukoui et al. (2019)
	Corporate governance attributes	Orazalin and Mahmood (2020); Amidjaya and Widagdo (2020); Cucari et al. (2018); Ong and Djajadikerta (2020); Furlotti et al. (2019)
	Country characteristics	Holland and Foo (2003); De Villiers and Marques (2016); Uyar et al. (2021)
	Earnings quality	Kim et al. (2012)
	Firm visibility in the market	Haddock and Fraser (2008)
Consequences	Impression management	Sandberg and Holmlund (2015); Diouf and Boiral (2017)
	Management perceptions	Qian et al. (2020)
	Firm performance	Nguyen (2020)
	Cost of capital	Dhaliwal et al. (2011); Gholami et al. (2022)
	Corporate efficiency	Xie et al. (2019)
	Forecast accuracy	Dhaliwal et al. (2012)
	Share price and Firm Value	De Villiers and Marques (2016); Schädewitz and Niskala (2010); De Klerk and De Villiers (2012); De Klerk et al. (2015); Yu et al. (2018)
Quality, assurance, and stakeholders' engagement	Quality	Romero et al. (2019); Boiral et al. (2019); Koh et al. (2022)
	Assurance	Simoni et al. (2020); O'dwyer and Owen (2005); O'dwyer et al. (2011)
	Stakeholders engagement	Manetti (2011); Bepari and Mollik (2016); Bellucci et al. (2019); Stocker et al. (2020)
Greenium	Green Premium	Zerbib (2019); Baker et al. (2018); Bauer et al. (2020); Cornell (2020); Friedman and Heinle (2016)

## 5.1 The theoretical underpinning of sustainability reporting

Over the last two decades, many articles have been published, and academic scholars used several theories to explain the practices of reporting sustainability information. The stakeholders' theory is the most popular theory for SR. It suggests that a firm is not accountable only to its shareholders; it should have some accountability to a broad group of stakeholders such as debtors, creditors, consumers, government, media, human rights groups, and environmentalists (Dumay and Hossain 2019). In

response, firms disclose sustainability information to meet the different needs of various stakeholders. This theory is extensively applied in SR research (e.g., Hahn and Kühnen 2013; Skouloudis and Evangelinos 2009; Hörisch et al. 2020). The legitimacy theory is also one of the most applied theories in SR research. It assumes that various activities of a firm are “legitimate” by society (Dowling and Pfeffer 1975). It is based on social contact between the firm and society; consequently, a firm should act within the constraints and norms of the society within which it operates (Hahn and Kühnen 2013). Thus, SR conveys social and environmental performance to society to meet its expectations (Diouf and Boiral 2017; Ali et al., 2020). Remarkably, the legitimacy theory considers society as a whole; however, the stockholders’ theory focuses only on a specific power group within this society.

The institutional theory is another popular theory in SR research. It explains the reporting of sustainability information due to isomorphism (Meyer and Rowan 1977). It links firm practices to the values and norms of the society within which it operates in order to drive the firm to maintain its legitimacy (Smith et al. 2011), and the reporting of sustainability information can be considered a part of the institutional practices of a firm (Amran and Haniffa 2011). Research has examined how different firm and country characteristics can affect the reporting of sustainability information (e.g., De Villiers and Marques 2016; Orazalin and Mahmood 2020; Ong and Djajadikerta 2020; Herold 2018; Amran and Haniffa 2011; Smith et al. 2011). The resource Constraint theory can also explain the SR practice. It argues that the availability of resources promotes disclosure and the lack of resources restricts it (Luo et al., 2013). Thus, SR is a function of the availability of resources at the company level (De Villiers and Marques 2016; Orazalin and Mahmood 2020). It is found that SR is a positive function of firm size because large firms are affordable on the costs of disclosure (Hassanein and Hussainey 2015). Conversely, a high debt level may reduce the ability of a firm to bear the disclosure costs. Finally, the impression management perspective may explain the practice of reporting sustainability performance. It claims that sustainability information is a soft-talk discussion, and there is no regulatory framework for this information. Thus, firm managers can use this discretionary nature of sustainability information to form a positive impression in the stakeholder’s minds (Sandberg and Holmlund 2015; Diouf and Boiral 2017). Firms may use sustainability reports to highlight the positive aspects of their sustainability performance, and they are used to obfuscate the negative features of their sustainability actions (Diouf and Boiral 2017).

## 5.2 Antecedents of sustainability reporting

Scholarly research has examined whether the firm that reports sustainability information behaves differently from other firms. Table 6 illustrates research on the antecedents of sustainability reporting. Kim et al. (2012) find that firms with an SR orientation are less willing to manage their earnings, suggesting that they provide more transparent and reliable information to investors than other firms. Qian et al. (2020) reveal that SR is affected by stakeholders’ pressure. A stream of research has explored the characteristics of firms disseminating sustainability information. It is found that SR is a positive function of firm size, suggesting that larger firms disclose more sustain-

**Table 6** Antecedents of sustainability reporting

Paper	Focus	Design	Main findings
Orazalin and Mahmood (2020)	Firm-specific characteristics & auditor type	Kazakhstan 2013–2015 Panel data analysis	The reporting of sustainability information (i.e., level, nature & quality) is substantially influenced by: the presence of a standalone report, the language used, the firm's profitability, the size of the company, and the type of the auditing firm
Kouloukoui et al. (2019)	Firm-specific characteristics	Brazil 2009–2014 Panel data analysis	An insignificant relationship between the industry within which the firm operates and the level of climate risk disclosure A significant positive relationship between financial performance and the amount of climate risk disclosure A significant positive relationship between firm size and the amount of climate risk disclosure A significant positive relationship between country of origin and the amount of climate risk disclosure
Bhatia and Tuli (2017)	Firm-specific characteristics	India BSE 200 Multiple regression analysis	A significant inverse relationship between firm profitability and sustainability disclosure level A significant inverse relationship between firm leverage and sustainability disclosure level A significant inverse relationship between firm growth and sustainability disclosure level A significant inverse relationship between firm advertising intensity and sustainability disclosure level
De Villiers and Marques (2016)	Country characteristics Firm-Specific characteristics	The top 500 European firms 2007–2010 Regression analysis	SR is high when the firm operates in countries with a high degree of investor protection, democracy, government effectiveness, regulation quality, high level of press freedom, and low obligation to environmental rules Significant positive relationships between sustainability reporting and various firm characteristics, including size, age, profitability, leverage, a book to market ratios, and environmentally sensitive industries
Holland and Foo (2003)	Country characteristics	UK & US 2000 Content analysis	The types of information disclosed in the sustainability reports by UK and US firms are influenced by the legal and regulatory framework for each country
Uyar et al. (2021)	Country characteristics	All Tourism firms 2011–2016 Panel Logistic and Position regression	Disclosure of sustainability information is a positive function of the sustainable development level of a country, as measured by governance, social and environmental indicators Sustainability disclosure is more affected by governance indicators than social indicators
Cucari et al. (2018)	Corporate governance	Italy 2011–2014 Regression analysis	A significant positive relationship between sustainability disclosure level and the percentage of independent directors A significant inverse relationship between sustainability disclosure level and the presence of female director
Furlotti et al. (2019)	Corporate governance	Italy Regression analysis	A significant positive relationship between the presence of a female in the top position of a chairperson and types of CSR gender policy An insignificant relationship between the presence of a female in the top position of CEO and the probability of CSR gender policy



**Table 6** (continued)

Paper	Focus	Design	Main findings
Ong and Djajadikerta (2020)	Corporate governance	Australia Correlation analysis; non-parametric Kendall's tau-b	Significant relationships between sustainability disclosures and various corporate governance attributes, including the percentage of independent directors, multiple directorships, and the presence of female directors on the board
Amidjaya and Widagdo (2020)	Corporate governance	Indonesia 2012–2016 Panel data regression	A significant positive relationship between sustainability reporting and foreign ownership A significant positive relationship between sustainability reporting and family ownership
Qian et al. (2020)	Stakeholders pressure	Survey questionnaire and interviews Indo-Pacific region	The pressure from stakeholders drives sustainability reporting
Kim et al. (2012)	Earnings quality	KLD data 1991–2009 Regression analysis	Firms with sustainability reporting are unwilling to use discretionary accruals to manage their earnings Firms with sustainability reporting avoid the manipulation of real operating activities
Sandberg and Holmlund (2015)	Impression management	Qualitative analysis of sustainability reports	Sustainability reports can be used as an impression management strategy Firms use eight impression management tactics used in sustainability reporting
Diouf and Boiral (2017)	Impression management	Semi-structured interviews with stakeholders	Sustainability reports provide impression management strategies to firms, helping them to highlight the positive aspects of their sustainability performance Sustainability reports are used to obfuscate the negative aspects of their sustainability performance
Haddock-Fraser and Fraser (2008).	Firm visibility in the market	UK 2005 FTSE 250	Close-to-market firms and brand-name-firm are likely to disseminate several forms of sustainability information, such as their product life cycle and supply chain.

ability information. This is because large firms are more visible and face pressure from stakeholders (Orazalin and Mahmood, 2020; Bhatia and Tuli 2017; Kouloukoui et al. 2019). Likewise, they are affordable on the costs of disclosure (Hassanein and Hussainey 2015). Firm profitability also enhances the firm capability to bear the disclosure costs. Subsequently, empirical research finds that profit-making firms report substantial sustainability information (Orazalin and Mahmood 2020; Kouloukoui et al. 2019). Besides, empirical research finds that older firms disseminate sustainability information more than new firms, suggesting that SR is driven by firm age (Bhatia and Tuli 2017; De Villiers and Marques 2016) find that SR is positively associated with firm size, age, profitability, leverage, a book to market ratios, and firms operating in environmentally sensitive industries. Apart from firm characteristics, other studies explored how country characteristics can affect the reporting of sustainability information. Kouloukoui et al. (2019) indicate that the country of origin significantly influences corporate climate risk disclosure. Holland and Foo (2003) reveal that each country's legal and regulatory framework affects the type of information disclosed in the sustainability reports. Besides, De Villiers and Marques (2016) find that SR is high when the firm operates in countries with a high degree of investor protection,

democracy, government effectiveness, regulation quality, high level of press freedom, and low obligation to environmental rules. Conversely, a high-level debt may reduce a firm's capability to bear the disclosure costs. Recently, Uyar et al. (2021) found that sustainability disclosure is a positive function of the sustainable development level of a country, as measured by governance, social and environmental indicators. Nevertheless, it is more affected by governance indicators than social indicators.

Scholarly research investigates how corporate governance promotes SR. Corporate governance ensures that corporate managers act in stakeholders' best interests and enhance firm transparency (Hassanein, 2022; Alm El-Din et al. 2022; Benameur et al. 2022; Hassanein and Kokel 2022; Hassanein and Elsayed 2021; Hassanein et al. 2021; Alazzani et al. 2017). Research has examined the relationship between SR and various corporate governance attributes, including board of directors (Furlotti et al. 2019; Ong and Djajadikerta 2020; Maroun and Prinsloo 2020), gender diversity (Cucari et al. 2018; Furlotti et al. 2019; Ong and Djajadikerta 2020) and ownership structure (Amidjaya et al., 2020). The independent board members control the opportunistic behavior of other board members and mitigate the information asymmetry issue (Benameur et al. 2022). In support, Ong and Djajadikerta (2020) find that firms with more independent board members provide high SR. Gender diversity is also a beneficial corporate governance mechanism enhancing SR. Furlotti et al. (2019) find that a female in the top chairperson positively affects all types of SR. Cucari et al. (2018) find that a female on the board of directors is inversely correlated with SR. Research has also addressed the role of foreign ownership in SR. It is argued that foreign investors may find it difficult to obtain information, inducing firms to reduce the information asymmetry and disclose more information. Empirically, SR is positively associated with foreign ownership (e.g., Amidjaya and Widagdo 2020). Besides, the firm disseminates more sustainability information when it is a client of a big auditing firm (Orazalin and Mahmood 2020).

Few studies have considered the discretionary soft talk nature of the SR section (e.g., Sandberg and Holmlund 2015). They find that firms use sustainability reports as an impression management strategy. Firms may use sustainability reports to highlight the positive facets of their performance, and they are used to obfuscate the negative features of their sustainability performance (Diouf and Boiral 2017). However, Swarnapali (2020) indicates that sustainability disclosure and discretionary accruals are inversely associated, suggesting the quality of sustainability information. Little attention has been paid to the firm visibility in the market as a driver for firm sustainability reporting. Haddock and Fraser (2008) argue that sustainability disclosure is based on the closeness of the firm in the market. They empirically find that close-to-market firms and brand-name-firm disseminate several forms of sustainability information, such as product life cycle and supply chain information. Overall, the shreds of evidence from the research on the antecedents of SR are inconclusive, suggesting potential avenues for future research.

### 5.3 Consequences of sustainability reporting

Reporting sustainability information provides investors with the information they need, helping them assess the firm risk and future cash flow, reducing information

asymmetry, and leading to positive economic outcomes. Research has explored the consequences of SR. The consequences of SR are elaborated on in Table 7. Qian et al. (2020) survey the perceptions of management toward SR. They find that SR enhances investors' confidence and increases customer satisfaction. Besides, Zimon et al. (2022) reveal that sustainability disclosure enhances corporate reputation. Therefore, management believes that they receive a win-win outcome through SR. Research is extensive on how SR enhances firm performance and value. Corporate managers should consider only activities to increase the shareholders' value, and sustainable activities lead to this objective. Prior research explores the association between SR and firm performance. This research tests whether firms "do well by doing good." Herbohn et al. (2014) find that firm performance is a positive function of its SR. In support, Nguyen (2020) conducts cross-country analyses using a sample from Japan, India, South Korea, and Indonesia from 2009 to 2014. They find that SR positively enhances the performances of all firms. Nevertheless, this effect is more observable in developed than in developing economies. Consistently, other studies examine how SR affects the value of a firm. Schadéwitz and Niskala (2010) use a sample from Finland from 2002 to 2005 to find that sustainability information decreases the asymmetric information issue between corporate managers and investors and improves the firm's value. Likewise, De Klerk and De Villiers (2012) investigate the top 100 firms in South Africa to reveal that the value of a firm is higher for firms with higher SR. Consistently, De Klerk et al. (2015) find that the value of the top UK firms is higher for companies with higher SR. Yu et al. (2018) conducted cross-sectional analyses for the top 1996 firms across 47 developed and developing countries. They find that sustainability information enhances the value of firms in developed and developing economies. Overall, literature confirmed the positive effect of SR on the market value of a firm in different contexts, including Finland (Schadéwitz and Niskala 2010), South Africa (De Klerk and De Villiers 2012), and the UK (De Klerk et al. 2015).

Other studies examine whether SR enhances the corporate share price. For instance, De Villiers and Marques (2016) examine the SR of the 500 largest European firms and reveal that SR provides value-relevant content to existing and potential investors leading to a positive effect on the share prices. However, Hassel et al. (2005) indicate a contradictory result: firms reporting higher environmental disclosure exhibit lower share prices. Other research stream reports some other economic consequences of reporting sustainability information. For instance, firms trying to raise funds may consider SR to mitigate the issue of information asymmetry to reduce capital costs. Empirically, Dhaliwal et al. (2011) used a sample of US firms from 1993 to 2007 to find that reporting corporate social responsibility information led to a decrease in the cost of equity capital. In support, Gholami et al. (2022) find that sustainability disclosure reduces the cost of capital and the firm idiosyncratic risk. Besides, Dhaliwal et al. (2012) examined firm-level data from 31 countries, and the results suggest that analyst forecast accuracy was higher for firms disclosing a separate sustainability report. Moreover, Xie et al. (2019) examined firms from 74 countries in 2005 to explore how SR affects corporate efficiency. They find that high disclosure of environmental, social, and governance information is associated with higher corporate efficiency. Besides, this link between disclosure and corporate efficiency is higher for governance information, followed by environmental and social information.

**Table 7** Consequences of sustainability reporting

Paper	Focus	Design	Main findings
Qian et al. (2020)	Management perceptions	Survey questionnaire and interviews Indo-Pacific region	Firms receive a win-win outcome from sustainability reporting Sustainability reporting enhances investor's confidence and increases customer satisfaction
Zimon et al. (2022)	Corporate reputation	Iran 2013–2020 Multiple Regression	Disclosure of sustainability information enhances the corporate reputation CEOs play a significant role in the relationship between sustainability reporting and corporate reputations
Herbohn et al. (2014)	Firm performance	Australia 339 mining and energy firms Multiple regression	Sustainability reporting leads to enhancement in firm performance Enhancement in firm performance is observable in firms with a proactive communication strategy
Nguyen (2020)	Firm performance	Cross-country; Japan, India, South Korea & Indonesia 2009–2014 Multiple Regression	Sustainability reporting positively affects firm performance The effect on firm performance is higher for developed than developing economies
Scha-déwitz and Niskala (2010)	Firm value	Finland 2002–2005 Ohlson's (1995) model Regression analysis	Reporting corporate social responsibility information decrease the information asymmetry issue and enhances the value of a firm
De Klerk and De Villiers (2012)	Firm value	South Africa Top 100 firms Ohlson's (1995) model	The value of a firm is higher for companies with higher reporting of corporate social responsibility information
De Klerk et al. (2015)	Firm value	UK Top 100 firms Ohlson's (1995) model	The value of a firm is higher for companies with higher corporate social responsibility information The value relevance of this information is higher for firms operating in environmentally-sensitive industries
Yu et al. (2018)	Firm value	Top 1996 firms across 47 developed and developing countries Tobin's Q ratio Regression analysis	High reporting of environmental, social, and governance information enhances the value of firms in developed and developing economies
De Villiers and Marques (2016)	Share price	Top 500 EU firms [based on the market value] 2007–2010 Ohlson's (1995) model	High levels of sustainability reporting lead to high share prices Low levels of sustainability reporting in sensitive industries lead to low share price Sustainability reporting provides value-relevant information to investors
Hassel et al. (2005)	Share price	Sweden June 1998–September 2000 Residual income valuation model	Firms reporting higher environmental disclosure exhibit lower share prices

**Table 7** (continued)

Paper	Focus	Design	Main findings
Gholami et al. (2022)	Cost of capital	Australia 2007–2017 Multiple regression	Cost of capital is negatively associated with the reporting of sustainability information Sustainability disclosure reduces the firm idiosyncratic risk
Dhalwal et al. (2011)	Cost of capital	US 1993–2007 Logistic regression	Reporting sustainability information reduces the cost of equity capital for firms
Dhalwal et al. (2012)	Accuracy of analysts' forecasts	Firm-level data 31 countries	The analysts' forecast accuracy is higher for firms disclosing a separate sustainability report
Xie et al. (2019)	Corporate efficiency	Firms from 74 countries 2005 Data Envelopment Analysis	High reporting of environmental, social, and governance information is associated with higher corporate efficiency The link between disclosure and corporate efficiency is higher for governance information, followed by environmental and social information.

#### 5.4 Quality, assurance, and stakeholders engagement

Sustainability reports inform numerous stakeholders about the firm sustainable performance and development (GRI, 2013). Nonetheless, to be credible for stakeholders, it should be reliable and follow defined rules (Boiral 2013). To achieve this objective, the GRI (2013) suggests that sustainability reports should have the principles for report quality. Boiral et al. (2019) analyzed the sustainability reports of firms operating in the mining and energy industries from 2006 to 2013. They report that sustainability reports lack significant misstatements, errors, or inaccuracies. These reports are accurate, balanced, clear, and reliable. In support, Romero et al. (2019) developed a quality index for sustainability and integrated reports of Spain firms. They conclude that the quality of sustainability reports is higher than that of integrated reports. Besides, the quality of information is better when a firm produces separate sustainability reports or integrated reports than when sustainability information is disclosed in the annual reports. Furthermore, Koh et al. (2022) reveal that the quality of the sustainability report of a firm is a positive function of its sustainability performance. Academic scholars highlight the issue of assurance of sustainability reports. Firms seek assurance for their SR to enhance their credibility, accountability, and stakeholders' confidence (Simoni et al. 2020; Bellucci et al. 2019; O'dwyer et al., 2011). Likewise, companies assure their sustainability reports to inform stakeholders of the actions taken in response to sustainability issues (Stocker et al. 2020; Maroun and Prinsloo 2020) identify different firm characteristics associated with using sophisticated assurance models to ensure the reliability of sustainability reports. They find that large-sized and profit-marking firms are not essentially using extensive mutual assurance models. However, some governance features, such size of the board and its independence, lead to a more substantial obligation to implement codes of best practice of assurance. Simoni et al. (2020) claim that assurance of SR is motivated by the necessity to keep relationships with various stakeholders.

Nonetheless, O'dwyer and Owen (2005) argue that accountant assurors adopt cautious and inadequate methods, leading to inadequate assurance of SR. However, consultant assurors are better and provide a substantial level of assurance. Similarly, Haider and Nishitani (2020) use semi-structured interviews and a questionnaire survey to identify the perceptions of corporate managers about “formal assurance” and the use of “third-party commitment” in the assurance of SR in Japan. They reveal that “third-party commitment” enhances the credibility of sustainability reports. Besides, they identify the primary obstacles to the assurance of SR, including substantial assurance fees, a lengthy assurance process, and less demand for sustainability assurance from the side of stakeholders. Therefore, scholars suggest the engagement of stakeholders in the process of assurance of SR. Bepari and Mollik (2016) claim that assurance of SR practice cannot be considered an accountability enabler in case of the absence of stakeholders' engagement in the assurance process. Manetti (2011) highlights the importance of stakeholders' engagement in the assurance of SR. They argue that stakeholders help discover the materiality and relevance of SR and are effective instruments in SR decisions. In support, Bellucci et al. (2019) argue that SR is a vehicle for stakeholders to express their opinions, and through the effective engagement of numerous stakeholders, SR can become a platform for dialogic accounting systems. Torelli et al. (2020) examined the association between applying the materiality principle in sustainability reports of Italian firms in 2017 and stakeholder engagement. They find that applying the GRI standards and engagement of various stakeholders in the reporting process is necessary to achieve good SR quality for stakeholders. Scholarly SR research on quality, assurance, and stakeholders' engagement is elaborated in Table 8.

## 5.5 The Greenium

The “Greenium,” the “Green Yield Discount,” or the “Green Premium” has been debated since the introduction of “green” bonds. It refers to pricing benefits investors are likely to pay more or agree to take lower yields in exchange for sustainable impact (Alessi et al. 2021). The idea is that investors in green bonds would accept lower yields because of their social and environmental convictions. The yield differential between “traditional” and “green” investments is a consequence of an investor's decision to allocate capital to greener options. The greenium considerations in investment decisions and reporting issues are relatively new, coming to the fore recently due to the concern over sustainability information considerations when making investment decisions. As the markets incorporate green companies' information, assuming it is material, an adjustment period would be observed where discount rates fluctuate to reach an equilibrium. Zerbib (2019) finds a small significant yield differential when comparing investments based on their sustainability performance. Investments with positive sustainability performance had a yield somewhat lower than that of non-green investments. In the same vein, Baker et al. (2018) found that green bonds were priced at a slight premium. Outside the USA, Bauer et al. (2021) undertook an experimental study to find that 68% of the participants favored investing their savings in sustainable assets, even if that could result in lower returns. Alessi et al. (2021) go beyond the green bonds to assess market reaction to green information,

**Table 8** Quality, assurance, and stakeholders' engagement

Paper	Focus	Design	Main findings
Boiral et al. (2019)	Quality	Qualitative content analysis Mining and energy industries 2006–2013	Sustainability reports lack significant misstatements, errors, or inaccuracies Sustainability reports are accurate, balanced, clear, and reliable
Romero et al. (2019)	Quality Stakeholders engagement	Spain Quality Index 2013–2015	The quality of sustainability reports is higher than that of integrated reports The quality of information is better when a firm produces separate sustainability reports or integrated reports than when sustainability information is disclosed in the annual reports Firms engage in dialogue with stakeholders
Koh et al. (2022)	Quality Stakeholders engagement	US 2774 sustainability reports 2003–2015	The quality of the sustainability report of a firm is a positive function of its sustainability performance Sustainability reports of firms with good sustainability performance include incremental information to the stakeholders
O'dwyer and Owen (2005)	Assurance	Content analysis Assurance guidelines [GRI]	Accountant assurers adopt cautious and inadequate methods, leading to inadequate assurance of sustainability reporting Consultant assurers are better and provide a substantial level of assurance. Direct engagements with assurers are required
O'dwyer et al. (2011)	Assurance	Critical analysis	Developing pragmatic legitimacy with clients Moral legitimacy with non-client users depends on the pragmatic legitimacy of the company's internal risk division that approves the wording of assurance statements
Simoni et al. (2020)	Assurance	417 firms from the European countries 2012–2016 Panel regression analysis	The assurance of sustainability reporting is motivated by the necessity to keep relationships with various stakeholders A significant association between the presence of controversies about business ethics and assurance of sustainability reporting Firms operating in non-environmentally sensitive economies use sustainability reporting assurance more consistently than firms in environmentally sensitive economies
Haider and Nishitani (2020)	Assurance	Semi-structured interviews and a questionnaire survey Top 500 firms listed on the Tokyo Stock Exchange	Third-party commitment, a unique practice in Japan, enhances the credibility of sustainability reports The main obstacles to the assurance of sustainability reporting are substantial assurance fees, a lengthy assurance process, and less demand for sustainability assurance from the side of stakeholders
Maroun and Prinsloo (2020)	Assurance	Top 50 firms [Johannesburg Stock Exchange] 2013–2018 Regression analysis	Board experience substitutes the use of complex assurance methods Large-sized and profit-marking firms are not essentially using extensive mutual assurance models Some governance features, such size of the board and its independence, lead to a more substantial obligation to implement codes of best practice of assurance



**Table 8** (continued)

Paper	Focus	Design	Main findings
Manetti (2011)	Stakeholders' engagement	Analysis of 174 sustainability reports [English, Spanish, & Portuguese]	Stakeholders help to discover the materiality and relevance of sustainability reporting Stakeholders are effective instruments in sustainability reporting decisions
Bepari and Mollik (2016)	Assurance Stakeholders' engagement	Content analysis Assurance guidelines [GRI; standards AA1000AS, 2008; ISAE 3000]	Assurance of sustainability reporting practice cannot be considered an accountability enabler in case of the absence of stakeholders' engagement in the assurance process Assurance practice serves as an internal control instrument than a social auditing tool
Bellucci et al. (2019)	Stakeholders' engagement	Content analysis 299 firms Semi-structured interviews	If stakeholder engagement is effective, sustainability reporting can become a platform for dialogic accounting systems Sustainability reporting can be a vehicle for stakeholders to express their opinions
Stocker et al. (2020)	Stakeholders' engagement	40 countries 119 sustainability reports Analysis criteria and classification model	Identification of engagement strategies that can be used to improve sustainability reports Stakeholders' engagements are classified into information strategy, response strategy, and involvement strategy levels Stakeholders, when engaged, influence the choices and decisions of the company
Torelli et al. (2020)	Stakeholders' engagement	Italy Content analysis Sustainability reports of 2017	The industry type is critical in the quantity and quality of sustainability reports Applying the GRI standards and engagement of various stakeholders in the reporting process is necessary to achieve good SR quality for stakeholders

including greenhouse gas emissions disclosure. They find that greenium is not, or only mildly, significantly different from zero when the factors are taken individually. This finding concurs with certain assumptions with the findings of Larcker and Watts (2020). However, when combining “greenness” and “environmental transparency,” they did find that investors invest in green and transparent companies while expecting a decreased return on investment. In an extensive study, Löffler et al. (2021) of over 180,000 bonds split between green and non-green bonds did find that the return of the green bonds was lower than that of conventional bonds, indicating a presence of greenium in the analyzed sample.

Cornell (2020) indicates that a warning is warranted regarding SR studies because of the relatively short period of sustainability-related observations that can be extracted from existing databases dating back to 2009. Moreover, Cornell (2020) states that the premium associated with investing in highly rated companies has nothing to do with sustainability. Larcker and Watts (2020) go beyond prior studies (e.g., Cornell, 2020) to reveal that investors forego financial benefits to invest in environment-friendly assets. They argue that “even in states with preferences for environmental sustainability, the greenium is zero.” This contradicts Pástor et al. (2021) conclusion that investors in green companies expected returns to be less in equilibrium perpetrating the ambiguity and confounding results of studies on the subject.



## 6 Future research directions

The findings of the bibliometric analysis along with the content analysis of SR research, have guided us to identify several gaps and future research directions. This section discusses our main findings and provides a future research agenda, as in Table 9.

First, our findings reveal an evolution of SR research that enriched our knowledge of its theoretical underpinnings, antecedents, consequences, quality, assurance, and stakeholders' engagement. Specifically, the key literature foci have addressed SR in large firms (e.g., Orazalin and Mahmood 2020; Furlotti et al. 2019; Kim et al. 2012; Sandberg and Holmlund 2015; Diouf and Boiral 2017; Qian et al. 2020; Nguyen 2020; Dhaliwal et al. 2011; Xie et al. 2019; Dhaliwal et al. 2012; De Villiers and Marques 2016; Yu et al. 2018). This may imply that SR has reached its saturation stage. Nevertheless, this may raise a question about whether saturation equally affects all sustainability dimensions. Some sustainability aspects receive little attention that may pave the way for future research, including environmental management accounting (e.g., Essid and Berland 2018; Sheldon and Jenkins, 2020), environmental damages (e.g., Denedo et al., 2017), carbon accounting (e.g., Le Breton and Aggeri 2019; Revellino 2019), integrated thinking (e.g., Oliver et al., 2016), and stakeholder engagement (e.g., Stocker et al. 2020). Besides, research on SR has primarily been carried out on large firms, with growing attention to SMEs (Guillén et al. 2022). SMEs play a substantial role in the economy. Given the limited research on sustainability in SMEs (e.g., Bos-Brouwers 2010), future research should be conducted to scrutinize the SR practices in SMEs. This research stream can examine different perspectives of SR in SMEs, such as their reporting for environmental damages, carbon reporting, and integrated reporting. Besides, future research can identify the appropriate form of SR for SMEs.

Second, the findings from the bibliometric analysis reveal that the collaboration in SR research occurred among institutions in Eastern Europe, with limited exceptions among universities in Western Europe. This type of collaborative work could be termed "locally-centralized-globally-discrete" cooperation. Besides, there is an apparent absence of cooperation between developed and developing world institutions, termed the "North-South" divide. Furthermore, authors in this area have a "homophily impact," meaning they have disciplinary or thematic similarities in their research interests. Future research on SR should boost collaboration among different authors and institutions to share experiences and gain more insights from different perspectives (authors/ regions) in this research field. Authors should encourage interdisciplinary research on SR to understand the research questions from different perspectives. Besides, examining country-level factors that affect SR can help increase cooperation among authors in different countries. Furthermore, comparative analysis of SR practices between developed and developing countries can help increase collaboration among these economies, thus gaining more insights into SR practices.

Third, SR has been explored from different theoretical perspectives. The stakeholders, legitimacy, institutional, and resource constraints theories are popular and have received particular attention and applied heavily in SR (Dowling and Pfeffer 1975; Meyer and Rowan 1977; Skouloudis and Evangelinos 2009; Diouf and Boiral 2017;

**Table 9** Main findings and future research directions

Findings Theme	Discussions	Future Research Directions
Scientific production of sustainability reporting	<p>There is an exponential annual growth in scholarly research in sustainability reporting</p> <p>It is moved from a paucity of only a handful of papers per year to a tremendous increase in publications in this area (maturity or saturation stage)</p> <p>Literature addressed sustainability reporting from different perspectives, including its theoretical underpinnings, antecedents, consequences, quality, assurance, and stakeholders' engagement</p>	<p>Does the saturation equally affect all sustainability reporting dimensions?</p> <p>More investigations are required in some aspects of sustainability reporting, including environmental damages, carbon accounting, integrated thinking, and stakeholder engagement.</p> <p>Is a common framework for sustainability reporting available?</p> <p>Was saturation of sustainability reporting reached to research on SMEs compared to large firms?</p> <p>What are the contributions of SMEs in sustainability reporting?</p> <p>What form of sustainability reporting is appropriate for SMEs?</p>
Collaborative work and authors of sustainability reporting	<p>Collaboration occurred among institutions in Eastern Europe, with limited exceptions among universities in Western Europe</p> <p>Cooperation is best described as "locally-centralized-globally-discrete"</p> <p>There is an apparent lack of cooperation between developed and developing world institutions (i.e., the "North-South" divide)</p> <p>Authors have disciplinary or thematic similarities in their research interests (i.e., homophily impact)</p>	<p>Comparative analysis of sustainability reporting practices between developed and developing countries can help increase collaboration among these economies, thus gaining more insights into sustainability reporting practices</p> <p>Examining country-level factors that affect sustainability reporting can help increase cooperation among authors in different countries</p> <p>Conducting interdisciplinary research can boost cooperation among authors and regions in sustainability reporting</p>
Theoretical underpinnings	<p>Stakeholders, legitimacy, institutional, and resource constraints theories have received particular attention and are applied heavily in sustainability reporting</p> <p>Other theories, such as the media agenda-setting and behavioral finance theories, receive less attention</p>	<p>How can media affect public expectations about a firm sustainable performance?</p> <p>What is the role of social media in transforming sustainability information?</p> <p>What are the implications from the behavioral finance perspective for reporting sustainability information?</p>

**Table 9** (continued)

Findings Theme	Discussions	Future Research Directions
Antecedents	Some attributes received greater attention in sustainability reporting research. However, others received less attention.	<p>What is the effect of managerial attitudes on sustainability reporting?</p> <p>What is the impact of demographic characteristics of CEOs on sustainability reporting practice?</p> <p>What is the impact of the psychological characteristics of the CEOs on sustainability reporting practice?</p> <p>What is the role of entrepreneurship and innovation in sustainability reporting?</p> <p>What is the effect of financial distress on sustainability reporting?</p> <p>What is the effect of the Covid-19 pandemic on sustainability reporting?</p>
Consequences	Reporting sustainability information is associated with some economic benefits to the firm. Nonetheless, the pieces of evidence are not conclusive	<p>What is the contribution of sustainability reporting to the firm abnormal return?</p> <p>Does reporting sustainability information enhance the liquidity of a firm stock?</p> <p>What are the effects of country characteristics (e.g., investor protection, democracy, government effectiveness, &amp; environmental regulations) on the value-relevance of sustainability information?</p> <p>What are the effects of sustainability reporting on information intermediaries?</p>
Quality, assurance, and stakeholders' engagement	Assurance of sustainability reports is still an emerging practice, and little is known about the stakeholders' engagement in sustainability reporting assurance	<p>What are the standards used for the assurance of sustainability reports?</p> <p>Are there common standards for assurance for sustainability reports?</p> <p>What are the skills of external assurers of sustainability reports?</p> <p>What is the perceived value of sustainability reporting assurance across countries, industries, and firms?</p> <p>What is the role of the auditor in the assurance of sustainability reports?</p> <p>To what extent is the assurance of sustainability reports affected by stakeholder engagement?</p> <p>What is the role of institutional factors in the assurance of sustainability reporting?</p>
Greenium	Research is scarce about the role of sustainability reporting in promoting investment in green firms	<p>What is the contribution of sustainability reporting to the investment in green bonds?</p> <p>What is the contribution of sustainability reporting to the investment in environment-friendly assets?</p> <p>Does reporting sustainability information enhance the liquidity of green bond markets?</p>

Orazalin and Mahmood 2020; Ong and Djajadikerta, 2020). Other theories receive less attention, such as the media agenda-setting theory, which argues that media is powerful to different stakeholders and reveals issues that get the public's attention, such as environmental pollution, climate change, and social inequality. Thus, firms may disclose their sustainability performance to meet the public expectation and reduce any legitimacy gap. Future research can utilize the media agenda-setting theory to explore whether and how media can affect public expectations about firms' sustainable performance. Besides, examining the role of social media in transforming sustainability information would be an interesting research prospect. Future research

can also examine the reporting of sustainability information from other theoretical perspectives, such as a behavioral finance theory (e.g., Sedliačiková et al. 2020). It would be interesting to examine the cognitive, psychological, and emotional factors that affect the decisions in terms of sustainability reports. The behavioral finance perspective's insights can improve sustainability reports' accuracy and efficiency.

Fourth, there is growing research examining the association between SR and corporate governance attributes such as independence of the boards, board gender diversity, foreign ownership, and family ownership (e.g., Orazalin and Mahmood 2020; Amidjaya and Widagdo 2020; Furlotti et al. 2019). However, other attributes have received little attention, demanding a future investigation. For instance, research investigating the impact of managerial attitudes on SR is scarce, warranting future investigation. Besides, the upper echelons theory suggests that managers' demographic and psychological characteristics influence accounting outcomes (Alazzani et al. 2017; Pavlatos and Kostakis 2018). Therefore, future research can explore how the demographic (e.g., age, gender, education, functional track, tenure, and financial experience) and psychological (e.g., overconfidence, narcissism, Machiavellianism, and integrity) characteristics of CEOs affect SR practices. Likewise, the limited research on sustainable CEO compensation (Winschel and Stawinoga 2019) may induce scholars to identify the determinants and consequences of this research area. Furthermore, Zhang et al. (2021) find that the entrepreneurial orientation of a firm CEO affects its CSR activities. Thus, an interesting area for future research is examining the role of entrepreneurship and innovation as contributors to SR. Furthermore, future research can also examine the impact of some economic conditions, such as financial distress and the Covid-19 pandemic, on SR.

Fifth, the consequences of SR have been investigated from the perspective of the stock market, including its impact on the stock price and market value of a firm (Hassel et al. 2005; Schädewitz and Niskala 2010; De Klerk and De Villiers 2012; De Klerk et al. 2015; Yu et al. 2018). However, the pieces of evidence are not conclusive. Future research can go beyond the stock price and examine the contributions of SR to the abnormal return of a firm (Hassanein, 2022) and whether it enhances the stock liquidity of the firm. Besides, future studies can conduct cross-country analyses for the effects of different country characteristics, such as investor protection, democracy, government effectiveness, and environmental regulations, on the value-relevance of SR. Furthermore, SR research is rare in terms of information intermediaries. It would be interesting to explore the effect of SR on analysts' accuracy and the number of analysts following the firm.

Sixth, the assurance of SR is still an emerging practice. There are variations in the standard used in assurance for SR, including the GRI, the AA1000AS, and the ISAE 3000 standards (Bepari and Mollik 2016). Future research can examine the role of policy setters and regulators in identifying and developing common standards for the assurance of SR. It is unclear whether assurance differs among countries, industries, and companies. Therefore, future research can investigate the perceived value of SR assurance across countries, industries, and firms. Proposed research may explore the skills needed and educational background of external assurers of sustainability reports. Besides, it can investigate the roles of the external auditor and stakeholders' engagement in the assurance of sustainability reports. Future research also can

explore the institutional factors (e.g., country characteristics & institutional investors) that can affect the assurance of sustainability reports.

Finally, little is known about the role of SR in promoting investment in green companies. Future research is promising in this area and can examine the contributions of SR to enhance investment in green bonds or environment-friendly assets. Besides, it may explore whether reporting sustainability information enhances the liquidity of green bond markets.

## 7 Concluding Remarks and Limitations

Sustainability reporting is a crucial communication tool helping firms signal their sustainable development commitment to numerous stakeholders. Research on sustainability reporting has witnessed exponential growth annually during the last two decades and moved from a “paucity” stage in 2000 to the “saturation” stage in 2022 and is still ongoing. Likewise, scholars have recently shown interest in exploring how the COVID-19 pandemic influences firm sustainability (Adams and Abhayawansa 2022), suggesting potential research avenues in this area.

The current study is motivated by an interest in exploring sustainability reporting scholarly research over the last two decades. It adds to the literature by utilizing bibliometric and content analyses—an innovative way to map the scientific production, gain an understanding and provide agenda for future research in the sustainability reporting area. The study analyzes 1,053 research articles published from 2000 to 2022, written by 2,071 authors and containing 59,255 references. It presents a “big picture” of sustainability reporting scientific production, describes the evolution of research, identifies the core journals and productive authors, and discusses the top-cited articles in sustainability reporting. It also explains the authors’ co-citations, the collaboration, and keywords co-occurrence networks and identifies the thematic evolution and trending topics in sustainability reporting. Furthermore, it discusses the thematic categories and topics of interest in sustainability reporting scholarly research. Finally, the study provides an agenda for future research directions.

Our research results reveal a phenomenal growth in sustainability reporting scholarly research, evidenced by the number of peer-reviewed publications, authors, and institutions. Results also indicate that the most productive author in this field is Maroun, Warren [Maroun, W], followed by Lodhia, Sumit [Lodhia, S] and Schaltegger, Stefan [Schaltegger, S]. Yet, the dominance of authors was absent before 2006. Adams, Carol was the most dominant author from 2006 to 2022. Likewise, Schaltegger, Stefan was seen as a dominant author from 2006 to 2020, Lodhia, Sumit from 2011 to 2021, Amran, Azlan from 2011 to 2022, and Villiers, Charl De from 2012 to 2022. Nevertheless, new authors in the sustainability reporting field have also achieved some dominance, such as Uyar, Ali (2017–2022), and Buallay, Amina (2019–2022). The most-cited article was written by Clarkson et al. in 2008 and was published in “Accounting, Organization, and Society.” This article has been cited 1,454 times from 2008 to 2022.

The network analyses indicate “homophily impact” among the productive authors meaning that they share a disciplinary or thematic similarity in their research inter-

ests, leading to a high coordination level among themselves. Besides, there is limited cooperation among authors in sustainability reporting research. The thin network implies that influential researchers in the sustainability reporting area are more likely than not to work in isolated “silos.” Furthermore, most collaboration in sustainability reporting research occurs among universities in Eastern Europe, with few notable exceptions reflected in collaborations among universities in Western Europe. Thus, the collaboration network between institutions generating sustainability reporting research can be called “locally-centralized-globally-discrete”. There is also an apparent weakness in the collaboration between developed and developing world research organizations, termed the “North-South” divide. The sustainability reporting research trending topics moved from established sustainability reporting topics such as “industrial practice,” “social aspects,” and “societies and institutions” (2005–2008) to new topics such as “ESG disclosure” and “sustainable development goals” of the United Nations and “Greenium” (2022 onwards). These research topics can be considered “trending research topics” in sustainability reporting.

Finally, we have identified four broad thematic categories of sustainability reporting research; (i) theoretical underpinnings, (ii) antecedents, (iii) consequences, and (iv) quality, assurance, and stakeholders’ engagement. Besides, we have highlighted the topic of “Greenium”. The related topics in each of these thematic categories have been explained. Based on our study findings, we have developed an agenda for future research directions, as discussed in Sect. 7 and elaborated in Table 9.

The study has some limitations. First, data of the current study have been collected only from the Scopus database, covering only peer-reviewed research publications. Hence, the analyses may not capture all scientific output on sustainability reporting. Using the same research methodology and utilizing publications from multiple data sets such as Scopus and the Web of Science may be an avenue for future research. Second, our analyses focus only on English peer-reviewed research articles, restraining the scope of research coverage. Future studies can analyze research articles in different languages, such as Arabic, German, and French, to generalize the results. Finally, we have employed the co-citations networks. Using self-organization- maps and continuous space is a methodological future research avenue.

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## Declarations

**Conflict of interests** All authors declare that they have no conflict of interest.

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