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Bibliometric study on environmental, social, and governance research using CiteSpace

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This paper offers an overview of the status of and emerging trends in environmental, social, and governance (ESG) research through a bibliometric approach using CiteSpace. In particular, our study aimed to elucidate the overall intellectual structure of the environmental, social, and governance academic field. To this end, we performed a topic search related to the environmental, social, and governance field and gathered published articles (2007–2021) from the Web of Science. Subsequently, we identified productive authors, institutes, and countries/regions to determine main research forces in the environmental, social, and governance field. Additionally, we conducted a co-citation analysis to identify highly cited authors, journals, and literatures in the environmental, social, and governance field. Furthermore, we performed a literature-co-citation-based cluster analysis and literature citation burst analysis to confirm the main themes and hotspots of the environmental, social, and governance field. These analyses can contribute to the investigations of key contributing forces in the environmental, social, and governance field at the author, institution, country/region, and journal levels and provide insights into the knowledge structures and orientations of the environmental, social, and governance field for future research.

KEYWORDS

environmental social and governance (ESG), citespace, co-citation analysis, literature-co-citation-based cluster analysis, literature citation burst analysis

1 Introduction

The environmental, social, and governance (environmental, social, and corporate governance; ESG) concept involves three components: the environment, social responsibility, and corporate governance. Among these, the environment indicates the need for enterprises to improve their environmental performance and decrease the environmental costs associated with their production and operation (Brooks and Oikonomou, 2018). Social responsibility implies that an enterprise adheres to high

legal standards and business and social ethics and considers human rights and relationships with the external society important (Lee et al., 2016; Gao et al., 2021). Corporate governance is interpreted as a scientific management system in which the rights of shareholders and the management of the board of directors must be reasonably divided, centering on those who can be delegated responsibilities (Aguilera et al., 2007; Gao et al., 2021).

Notably, a United Nations Global Compact (2004) report first postulated the ESG approach, which highlighted that companies should develop guidelines on the incorporation of the ESG concept into asset management and security brokerage services. This point of view was supported by large banks, asset owners, asset managers, and others (Lim et al., 2022a). Additionally, the United Nations Environment Programme Finance Initiative (2005) proposed a report discussing the fiduciary duty of employing ESG-related information in making investing decisions and simultaneously offering groundbreaking evidence on the financial relevance of the ESG concept. As noted by Eccles et al. (2020), the aforementioned two reports formed the basis of the United Nations Principles for Responsible Investment released in 2006.

As indicated by Atkins (2020), 63 investment enterprises with 6.5 trillion dollars in assets under management (AUM) have signed up to integrate ESG concerns. Since then, over 2,450 signatories have signed above 80 trillion dollars in AUM. Furthermore, as reported in the paper authored by Lim et al. (2022a), a number of enterprises have been involved in ESG reporting and are attempting to make an impact through numerous other associated initiatives (e.g., Global Reporting Initiative).

In line with this trend, the number of ESG-related studies has increased. Additionally, some scholars (Gao et al., 2021; Singh et al., 2022) have conducted bibliometric review research to identifying the intellectual structure of the ESG field. However, these studies only involve citation analyses to analyze the citation performance in this field. As indicated by Boyack and Klavans (2010) and Kleminski et al. (2022), in addition to a citation analysis, researchers should also conduct a co-citation analysis to facilitate a better understanding of the citation performance. Therefore, to address the limitations of prior bibliometric studies of ESG, we primarily conducted several co-citation-based analyses in the ESG area.

Specifically, following the guidelines stipulated by previous studies (Abbas et al., 2019; Chen and Liu, 2020; Azam et al., 2021; Sun et al., 2022), we conducted the following analyses. First, we explored key research forces by identifying productive authors, institutes, and countries/regions. Second, we investigated highly cited authors, journals, and literatures by conducting a co-citation analysis. Third, we investigated primary themes by employing a literature-co-citation-based cluster analysis. Fourth, we explored hot and emerging research topics in this

field by performing a literature citation burst analysis. Overall, these analyses can address the following research questions (RQs).

RQ1: Who are the most productive scholars, institutes, and countries/regions in the ESG area?

RQ2: What are the most impactful authors, journals, literatures in the ESG area?

RQ3: What are the major and hot research topics in the ESG area?

We believe that these analyses can elucidate the intellectual framework of the ESG field (see Di Vaio et al., 2022; Zhang et al., 2022), thereby providing a reference for ESG development to aid scholars and stakeholders in easily understanding the basics of this field.

2 Literature review

2.1 Bibliometric review

Typically, a bibliometric review objectively assesses performance and maps science across domains (Lim et al., 2022b). Compared with other review types (e.g., systemic review), a bibliometric review analysis is more objective and less prone to bias because it is based on automated or semi-automated quantitative data and tools (Donthu et al., 2021; Paul et al., 2021; Lim et al., 2022b). Thus, in addition to the general contributions made by other review types such as a systemic literature review (Mukherjee et al., 2022), a bibliometric analysis makes some original theoretical and practical contributions. Therefore, unlike Lim et al. (2022a), who conducted a systemic literature review related to the ESG concept, we selected a bibliometric analysis to explore performance, influence, and map science in the context of ESG research.

2.2 Previous bibliometric review studies on ESG

Along with the rapid development in the ESG field, several scholars have conducted numerous bibliometric reviews related to the ESG concept to provide insights into this academic area. The representative studies can be summarized as follows.

Galletta et al. (2022) conducted a bibliometric analysis on ESG-related performance in the context of the banking industry. Ellili. (2022) explored the knowledge structure of ESG disclosure by performing a bibliometric analysis. These studies have, indeed, enhanced our understanding on the development status of ESG in the context of a specific area (e.g., banking industry).

Furthermore, unlike the above-mentioned review studies, Singh et al. (2022) and Gao et al. (2021) provided an overall understanding of the ESG concept in the academic field *via* a bibliometric approach. Based on the outcomes of bibliometric analyses, both Singh et al.

TABLE 1 Data extraction process.

Data source	SSCI, SCIE, ESCI, A&HCI of the WOSCC databases
Search query	Topic = “environment* social* and govern*” OR “environment* social* govern*” OR “environment* social* corporate govern*” OR “environment* social* and corporate govern*”
Selection criteria	Documents type: “Article” or “Review Article”
	Document language: “English”
	Publication years: 2007–2021
Retrieved time	5 October 2022
Number of articles	849

(2022) and Gao et al. (2021) implied that the ESG concept was derived from socially responsible investment (SRI), and it evolved from corporate social responsibility (CSR). However, these two studies only employed citation analyses to identify citation performance in the ESG area. As implied by Boyack and Klavans (2010) and Kleminski et al. (2022), to better understand citation performance in specific fields, both citation analysis and co-citation analysis are essential. Therefore, to address the limitations of these prior studies, we conducted a co-citation analysis on the status of ESG research. Additionally, unlike Singh et al. (2022) and Gao et al. (2021), we performed a literature citation burst analysis to explore the emerging trends and hot topics in the ESG field.

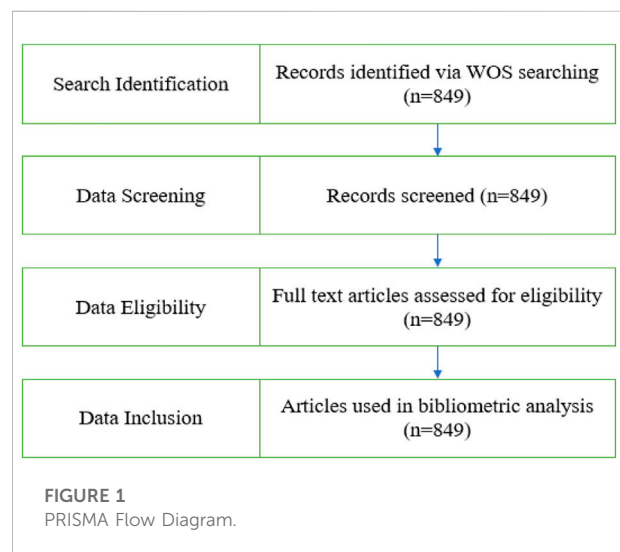
3 Methods

3.1 Data extraction

The Web of Science (WOS) is a representative source of citation data typically used for bibliometric analyses because it is a reliable bibliographic-indexing tool for scientific knowledge (Chen, 2006; Chen and Liu, 2020; Azam et al., 2021). Thus, based on the guidelines provided by existing studies (Chen and Liu, 2020; Azam et al., 2021), the WOS was considered as the source of ESG-related literature data in this study. Note that the data collection date was 5 October 2022.

Specifically, the main data sources used in our study were the Social Science Citation Index (SSCI), Science Citation Index Expanded (SCIE), Emerging Science Citation Index (ESCI), and Arts & Humanities Citation Index (A&HCI) provided by the WOS Core Collection (WOSCC) databases.

The keywords used for the topic search were as follows: “environment* social* and govern*” OR “environment* social* govern*” OR “environment* social* corporate govern*” OR “environment* social* and corporate govern*.” Articles containing these words in their titles, abstracts, or keywords were collected. Unlike Singh et al. (2022) and Gao et al. (2021), we additionally considered keywords such as “environment* social* corporate govern*” and “environment* social* and



corporate govern*” to gather exhaustive data (see Karwowski and Raulinajtys-Grzybek, 2021).

For document types, we selected “Article” and “Review Article.” In addition, only articles written in English were selected. To offer more precise bibliometric analysis results, an entire year’s data were evaluated (Kumar et al., 2021), and thus, only articles published between 2007 and 2021 were selected, and articles published after 2021 (in 2022) were excluded.

According to the points mentioned above, we searched for documents on the WOS (see Table 1). Then, following the guidelines of prior studies (Chhabra et al., 2021; Di Vaio et al., 2022; Hassan et al., 2022), we executed the process outlined in Figure 1 to collect 849 ESG articles for our analysis.

3.2 Data analysis

CiteSpace is one of the most prominent information visualization tools (Abbas et al., 2019; Ye et al., 2020). This tool is designed to highlight the structure and dynamics of a

TABLE 2 Parameter settings used in CiteSpace.

Parameters	Conceptualization
Time slicing	One year data for all
Pruning	Pathfinder and pruning sliced networks
Node type	Cited author, cited journal, or cited References
Links	Default
Selection criteria	g-index (k = 25)
Visualization	Static cluster view and merged network

specific field (Chen, 2016). Furthermore, compared with other bibliometric software such as Vosviewer and Gephi, CiteSpace provides a wide range of functions for network analysis and visualization (Cobo et al., 2011; Che et al., 2022).

Notably, the latest version of CiteSpace (CiteSpace 6.1. R3.) was used in this study. Table 2 lists the parameter settings employed in our analysis. After setting the parameters for our co-citation analysis, CiteSpace was used to obtain information on networks and details regarding authors, literatures, and journals with citation counts.

4 Results and discussion

4.1 Productive authors, institutions, and countries/regions

As already indicated by several scholars (Chen and Liu, 2020; Azam et al., 2021), the key research forces in a specific field can be identified as productive authors, institutions, and countries/regions. From this viewpoint, this study first attempted to

investigate the core research forces in the ESG field at the author, institutional, and national levels.

4.1.1 Author analysis

The top 11 most productive authors ranked based on the number of published papers are listed in Table 3. Among these, Amina Buallay, Maria Angeles Fernandez-Izquierdo, and Maria Jesus Munoz-Torres contributed eight papers each in the ESG field. These results indicate that the aforementioned three authors are the most productive scholars in the ESG field. Particularly, the studies conducted by Amina Buallay focused on examining the role of the ESG concept in the banking and financial industries (e.g., Buallay, 2018; Buallay et al., 2020).

4.1.2 Institutional analysis

The top 13 affiliations of authors ranked by the number of published papers are listed in Table 4. The results revealed that the Sapienza University of Rome ranked first, contributing 16 articles, followed by the University of Oxford (13 articles), the University of Zaragoza (13 articles), and the University of Queensland (11 articles).

4.1.3 Country/regional analysis

The top 10 countries/regions ranked by the number of published papers are reported in Table 5. The United States (USA) had the highest number of published papers (179), followed by England (102), Italy (75), Australia (67), and Spain (60). These results indirectly reveal the Frontier status of Western academic fields in the ESG area. We also discovered that most of these countries/regions were economically developed. This phenomenon could be attributed to active business operations and the high density of educational institutes (Zemigala, 2019; Ye et al., 2020).

TABLE 3 Top 11 most productive authors ranked by the number of published papers.

Rank	Number of papers	Authors
1	8	Amina Buallay/Amina Mohamed Buallay
2	8	Maria Angeles Fernandez-Izquierdo
3	8	Maria Jesus Munoz-Torres
4	6	Alena Kocmanová
5	6	George Serafeim
6	5	Eduardo Ortas
7	5	Patricia Crifo
8	5	Marie Pavlakova Dočekalová
9	5	Robert G. Eccles
10	5	Elena Escrig-Olmedo
11	5	Ali Uyar

TABLE 4 Top 13 institutes ranked by the number of published papers.

Rank	Number of papers	Affiliations
1	16	Sapienza University of Rome
2	13	University of Oxford
3	13	University of Zaragoza
4	11	The University of Queensland
5	10	Macquarie University
6	9	Harvard University
7	9	Stellenbosch University
8	9	University Jaume I
9	8	Ahlia University Bahrain
10	8	Brunel University
11	8	University of Cambridge
12	8	University of Portsmouth
13	8	University of Groningen

TABLE 5 Top 10 countries/regions ranked by the number of published papers.

Rank	Number of papers	Country/region
1	179	United States
2	102	England
3	75	Italy
4	67	Australia
5	60	Spain
6	56	China
7	48	France
8	43	Germany
9	36	Canada
10	35	Malaysia

4.2 Co-citation network analysis

Typically, when two or more articles, journals, and authors are simultaneously cited by a third article, they exhibit a co-citation association (Chang et al., 2015). In this regard, co-citation analysis is a method adopted to construct a structure of specialties and investigate the level of interrelationships between these specialties (Small, 1973; Sun et al., 2022). In the current research, we conducted a co-citation analysis at the journal, author, and literature levels in the ESG field.

TABLE 6 Results of the journal co-citation analysis: top 10 journals ranked based on the citation counts.

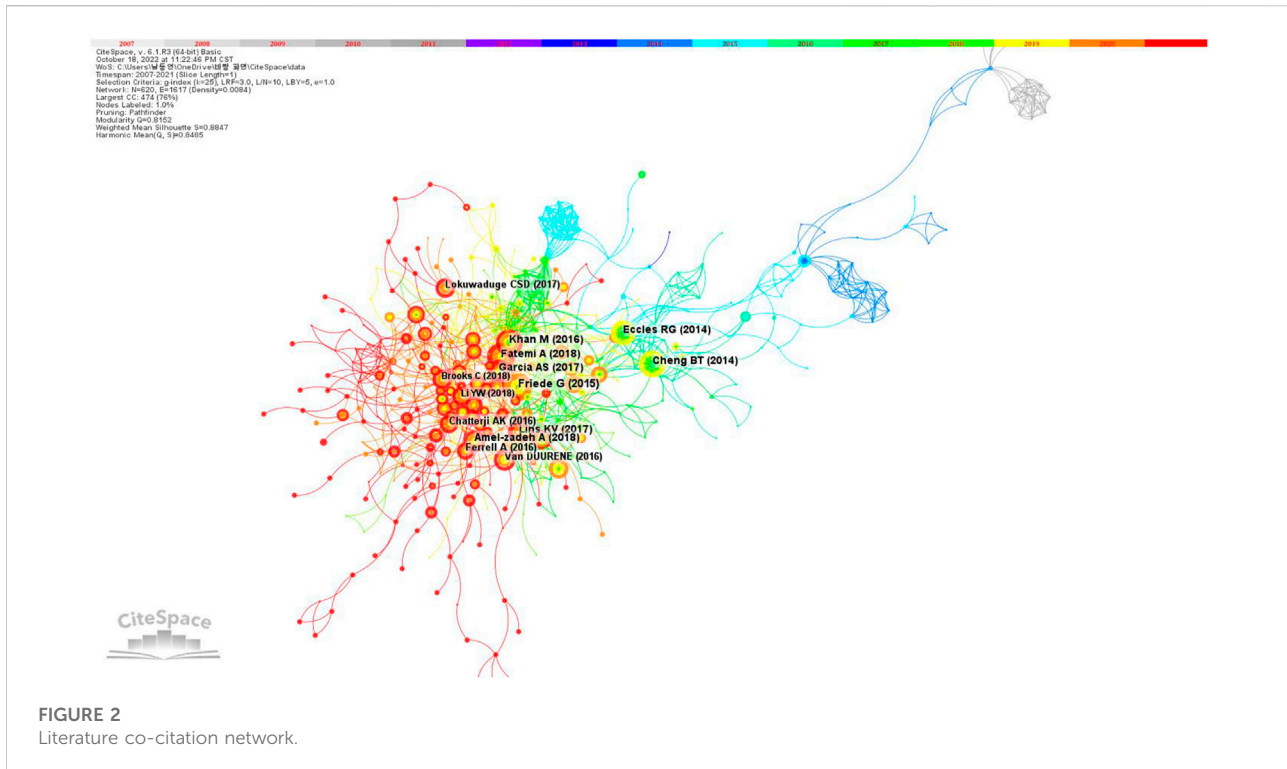
Rank	Cited counts	Journal name
1	501	Journal of Business Ethics
2	348	Strategic Management Journal
3	316	Journal of Financial Economics
4	296	Journal of Finance
5	291	Academy of Management Review
6	282	Journal of Banking and Finance
7	266	Journal of Cleaner Production
8	247	Academy of Management Journal
9	240	Business Strategy and the Environment
10	232	Sustainability-Basel

TABLE 7 Results of the author co-citation analysis: top 11 authors ranked based on the citation counts.

Rank	Cited counts	Author
1	145	Robert G. Eccles
2	143	R. Edward Freeman
3	134	Marc Orlitzky
4	114	Eugene F. Fama
5	110	Sandra A. Waddock
6	106	Abigail McWilliams
7	105	Stephen Brammer
8	101	Gunnar Friede
9	101	Michael E. Porter
10	98	Sadok El Ghoul
11	94	Michael C. Jensen

4.2.1 Journal co-citation network analysis

Two journals are considered co-cited if at least one of their respective articles is simultaneously cited in the citing article (McCain, 1991). In our research, applying CiteSpace, a journal co-citation network analysis was performed, and the top 10 journals ranked based on the citation counts are presented in Table 6. The Journal of Business Ethics had the highest citation counts (501) in the ESG field. This journal was followed by the Strategic Management Journal (348), Journal of Financial Economics (316), and Journal of Finance (296). Therefore, the Journal of Business Ethics is one of the most crucial journals in the ESG area.



4.2.2 Author co-citation network analysis

Author co-citation analysis is one of the most representative methods adopted for investigating the layout of highly cited authors (influential authors) in a particular field. Typically, the high citation counts of an author indicate that the author is an influential scholar in a specific academic area. In this study, applying CiteSpace, the author co-citation network analysis was performed, and the top 11 authors ranked based on their citation counts are listed in Table 7. The results indicate that the listed 11 authors made critical contributions to the ESG field, paving the way for the upcoming development in the ESG area. Among these authors, Robert G. Eccles (145) made the most critical contributions in the ESG area, followed by R. Edward Freeman (143) and Marc Orlitzky (134). Thus, these authors are the most influential scholars in the ESG field. In particular, an article authored by Robert G. Eccles was identified among the highly cited papers in our literature co-citation network and literature burst citation analyses (see Section 4.2.3 and Section 4.2.5). Robert G. Eccles, affiliated with the Oxford University (previously affiliated with Harvard University), is a leading scholar working on the integration of ESG elements with resource allocation decisions made by enterprises and investors.

4.2.3 Literature co-citation network analysis

Notably, literature forms the major component of knowledge databases. Literature co-citation analysis is a methodology widely employed for investigating the knowledge framework of a specific

academic area (Chen and Liu, 2020; Sun et al., 2022). In Figure 2, the literature co-citation network of the ESG area is plotted, and literature with 25 or more citations are highlighted. Here, a node indicates a literature/article, whereas the connected line between two nodes denotes a co-citation association between two articles. Note that the larger the node size, the more numerous the citation counts for an article. A close gap between two nodes indicates a high co-citation frequency for the articles.

The top 12 highly cited literatures are listed in Table 8. These 12 articles strongly influenced the ESG area. Specifically, the paper authored by Friede et al. (2015) was cited 50 times. This was followed by papers authored by Fatemi et al. (2018), Cheng et al. (2014), and Khan et al. (2016), with citation counts of 45, 42, and 40, respectively.

Based on a review of core articles in the ESG area (see Table 8), our major findings can be summarized as follows:

First, the article authored by Friede et al. (2015) had the highest citation count in the ESG field. In that study, the authors examined the association between the ESG concept and corporate financial performance (CFP). Consequently, they discovered a non-negative association between the two, indicating that ESG generally has a positive influence on CFP. Furthermore, Garcia et al. (2017), ranked sixth in Table 8, investigated the association between the ESG concept and CFP. In line with the notion that the topics addressed in highly cited papers indirectly indicate significant research topics in an academic area (Abbas et al., 2019), we propose

TABLE 8 Top 12 articles ranked based on the citation counts.

Rank	References	Cited counts	Published journal
1	Friede et al. (2015)	50	Journal of Sustainable Finance and Investment
2	Fatemi et al. (2018)	45	Global Finance Journal
3	Cheng et al. (2014)	42	Strategic Management Journal
4	Khan et al. (2016)	40	The Accounting Review
5	Lins et al. (2017)	38	Journal of Finance
6	Garcia et al. (2017)	37	Journal of Cleaner Production
7	Amel-zadeh and Serafeim (2018)	37	Financial Analysts Journal
8	Eccles et al. (2014)	34	Management Science
9	Van Duuren et al. (2016)	31	Journal of Business Ethics
10	Chatterji et al. (2016)	28	Strategic Management Journal
11	Lokuwaduge and Heenetigala (2017)	28	Business Strategy and the Environment
12	Ferrell et al. (2016)	28	Journal of Financial Economics

that exploring the association between the ESG concept and CFP constitutes one of the most significant research topics in the ESG academic area.

Second, [Fatemi et al. \(2018\)](#), ranked second in [Table 8](#), investigated the effect of ESG performance on firm values. Specifically, their investigation indicated that ESG strengths resulted in greater firm values and that ESG weaknesses resulted in lower firm values. Thus, examining the association between the ESG concept and firm values is also among the noteworthy topics in the ESG field.

Third, [Lins et al. \(2017\)](#), [Cheng et al. \(2014\)](#), [Chatterji et al. \(2016\)](#), and [Ferrell et al. \(2016\)](#) focused on CSR. Their findings indicated that CSR and ESG were strongly related. This close association can be explained as follows. CSR is a precursor of ESG. In particular, ESG represents the manner in which enterprises and investors integrate the ESG concept into their business models. CSR refers to the activities of enterprises aimed at making the enterprises socially responsible and enterprising citizens. Thus, ESG directly includes governance, whereas CSR indirectly includes governance issues related to environmental and social concerns. Therefore, the ESG concept is highly related to CSR and can be considered a more expansive term than CSR. This perspective was adopted by [Gillan et al. \(2021\)](#) and [Garcia et al. \(2017\)](#).

Fourth, [Khan et al. \(2016\)](#) and [Eccles et al. \(2014\)](#) focused on corporate sustainability. The results of their studies revealed a notable association between corporate sustainability and the ESG concept. This association can be explained as follows. Corporate sustainability aims at developing long-term stakeholder values *via* the fulfillment of business strategies with a concentration on diverse aspects such as ethical, social, environmental, cultural, and economic aspects ([Ashrafi et al., 2019](#)). Moreover, corporate

sustainability can be estimated based on indicators such as environmental, social, and corporate governance ([Dočekalová and Kocmanová, 2016](#)). Therefore, ESG is highly related to and can be considered as a component of corporate sustainability.

Fifth, [Amel-Zadeh and Serafeim \(2018\)](#) and [Van Duuren et al. \(2016\)](#) focused on ESG investing, whereas [Lokuwaduge and Heenetigala \(2017\)](#) focused on ESG reporting. Therefore, these two topics can also be considered as primary research topics in the ESG area.

Sixth, although the Global Finance Journal is an ESCI journal (based on Journal Citation Reports 2020), an article published in this journal ([Fatemi et al., 2018](#)) was found to represent a core study in the ESG area. This result indicates that the Global Finance Journal is likely to be a crucial journal in the ESG research field in the future, despite not being identified as a highly cited journal in our co-citation analysis.

4.2.4 Literature co-citation-based cluster analysis

To explore the primary themes of the ESG area, we conducted a cluster analysis on a literature co-citation network and discovered 13 clusters ([Figure 3](#)). The labels of these clusters were generated based on the log-likelihood ratio (LLR) algorithm ([Chen, 2006](#); [Pestana et al., 2020](#); [Che et al., 2022](#)). Particularly, note that this methodology is capable of generating high-quality clusters with high intra-class variability, low inter-class similarity, and similarity between classes ([Chopra et al., 2021](#)).

Among the generated clusters, Cluster #1 (banking industry), Cluster #2 (sustainable investment), and Cluster #4 (board gender diversity) are deemed to be the most significant clusters in the ESG area (see [Table 9](#)). The

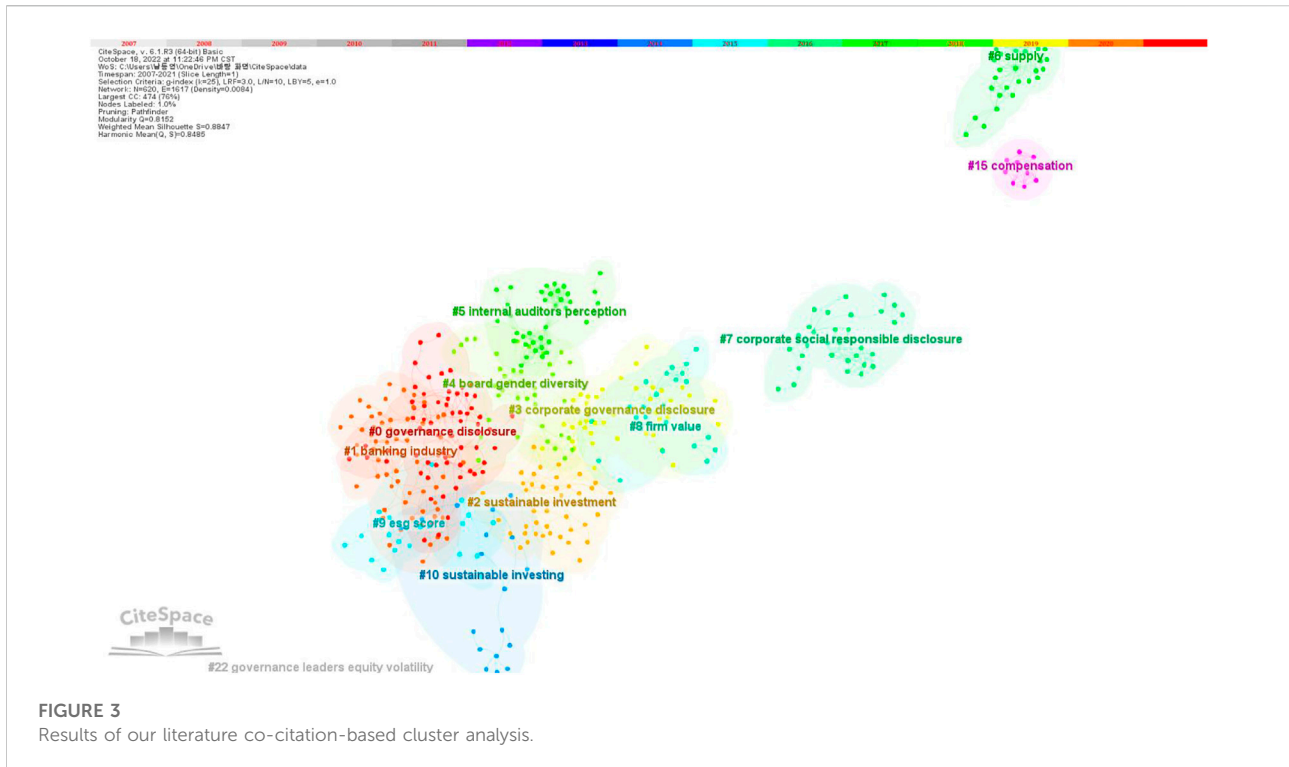


FIGURE 3
Results of our literature co-citation-based cluster analysis.

TABLE 9 Major clusters.

Cluster	Size	Silhouette	Label (LLR)	Label (latent semantic index)
1	68	0.856	Banking industry	Banking industry
2	50	0.889	Sustainable investment	Financial performance
4	43	0.913	Board gender diversity	ESG performance

Note: “Size” indicates the number of cited references in a cluster. “Silhouette” indicates the homogeneity of a cluster (Widziewicz-Rzońca and Tytła, 2020).

reasons for this are as follows: first, all their silhouette values are greater than 0.8, which indicates that their clusters have excellent fits (Chen et al., 2014; Pestana et al., 2020). Second, the size of these clusters is ranked among the top five of all the clusters. Overall, based on the results, we propose that ESG roles in banking industry (Cluster #1; e.g., Miralles-Quirós et al., 2019; Bătae et al., 2021), ESG roles in sustainable investment (Cluster #2; e.g., Escrig-Olmedo et al., 2017), and relationships between board gender diversity and ESG performance (Cluster #4; e.g., Cucari et al., 2018) constitute the major themes of the ESG area.

4.2.5 Literature citation burst analysis

Typically, the dynamic characteristics of an academic field are represented by enhancements in literature citations (Abbas et al., 2019). These enhancements are referred to as

“burst citations.” As noted by Chen (2016) and Abbas et al. (2019), burst citations identify areas with the most significant research interest (i.e., research hotspot). Thus, scholars and stakeholders can identify core research topics or areas at a particular point in time by investigating temporal trends in the burst citations. The associated fields and topics vary in intensity and in the duration of bursts, and the content of their research continues to evolve and change. The results of our literature citation burst analysis on ESG research are reported in Figure 4.

The main findings of our literature burst analysis can be summarized as follows:

First, evidently, the burst of ESG-related studies began in 2013. This result implies that from 2013, the field of ESG has evolved as the focus of the underlying research community, making significant academic achievements.

Top 10 References with the Strongest Citation Bursts

References	Year	Strength	Begin	End	2007 - 2021
Freeman RE, 2010, STRATEG MANAG, V0, P1, DOI 10.1017/CBO9781139192675.003, DOI	2010	6.93	2013	2015	
EI GHOULS, 2011, J BANK FINANC, V35, P2388, DOI 10.1016/j.bankfin.2011.02.007, DOI	2011	6.37	2015	2016	
Cheng BT, 2014, STRATEGIC MANAGE J, V35, P1, DOI 10.1002/smj.2131, DOI	2014	14.37	2016	2019	
Eccles RG, 2014, MANAGE SCI, V60, P2835, DOI 10.1287/mnsc.2014.1984, DOI	2014	12.16	2017	2019	
Galbreath J, 2013, J BUS ETHICS, V118, P529, DOI 10.1007/s10551-012-1607-9, DOI	2013	4.55	2017	2018	
Servaes H, 2013, MANAGE SCI, V59, P1045, DOI 10.1287/mnsc.1120.1630, DOI	2013	4.55	2017	2018	
Halbritter G, 2015, REV FINANC ECON, V26, P25, DOI 10.1016/j.rfe.2015.03.004, DOI	2015	4.73	2018	2021	
Dhaliwal D, 2014, J ACCOUNT PUBLIC POL, V33, P328, DOI 10.1016/j.jaccpubpol.2014.04.006, DOI	2014	4.41	2018	2019	
Dimson E, 2015, REV FINANC STUD, V28, P3225, DOI 10.1093/rfs/hhv044, DOI	2015	4.14	2018	2021	
Friede G, 2015, J SUSTAIN FINANC INV, V5, P210, DOI 10.1080/20430795.2015.1118917, DOI	2015	11.24	2019	2021	

FIGURE 4

Top 10 literatures ranked by the beginning year of burst.

Second, the topic of the study conducted by Cheng et al. (2014) was identified as the hottest, with the strongest burst strengths (14.37) and longest burst time (2016–2019). The authors demonstrated that enterprises with better CSR performance encountered fewer capital constraints. This finding is consistent with ESG ratings being employed as a shock to CSR performance. That is, Cheng et al. (2014) implied that ESG ratings should be considered when exploring the role of CSR performance. Moreover, an investigation into the role of ESG ratings in influencing CSR performance forms one of the hottest research topics in the ESG research area.

Third, the paper authored by Eccles et al. (2014) had the second highest burst strength. Eccles et al. (2014) focused on corporate sustainability. They discovered that the ESG disclosure score had a significant and positive relationship with corporate sustainability. This indicated that companies with high ESG scores may possess high sustainability.

Fourth, the paper authored by Friede et al. (2015) had the third highest burst value (11.24). The authors examined the connection between the ESG concept and CFP. Hence, considering that the paper authored by Friede et al. (2015) presented burst improvements in the recent 3 years (2019–2021), we infer that exploring the connection between the ESG concept and CFP may become one of the hottest research topics in the future.

5 Conclusion

This study aimed at investigating the knowledge structure of the ESG field using bibliometric analysis. Based on the outcomes, the main findings can be summarized as follows:

At the author level, Amina Buallay, Maria Angeles Fernandez-Izquierdo, and Maria Jesus Munoz-Torres were identified as the productive scholars, and Robert G. Eccles, R.

Edward Freeman, and Marc Orlitzky were identified as highly cited scholars. At the institutional level, the major research forces were the Sapienza University of Rome, University of Oxford, and University of Zaragoza. At the country/region level, United States and England contributed core research forces.

At the journal level, the Journal of Business Ethics, Strategic Management Journal, and Journal of Financial Economics were identified as the core journals in the concerned field. Notably, we also discovered that although the Global Finance Journal is an ESCI journal (based on Journal Citation Reports 2020), one of its published articles (Fatemi et al., 2018) was identified as a highly cited article in the ESG area. This indicates that the Global Finance Journal is likely to become a crucial journal in the ESG research field in the future, despite not being identified as a highly cited journal in the co-citation analysis of our research.

Additionally, we discovered that exploring the influence of ESG performance on CFP and firm values forms a significant research topic in the ESG area (see Friede et al., 2015; Fatemi et al., 2018). In particular, exploring the relations between ESG performance and CFP may constitute the hottest research topics in the ESG area in the future (see Section 4.2.5). Moreover, exploring ESG roles in the banking industry may be identified as one of the most significant themes in this area (see Section 4.2.4).

Furthermore, considering that existing bibliometric studies focusing on ESG (Gao et al., 2021; Singh et al., 2022) only conducted citation analysis to evaluate citation performance in the area, our study notably contributes to our understanding of the knowledge structures of the ESG field by employing several co-citation analyses (i.e., author co-citation analysis, journal co-citation analysis, literature co-citation analysis, literature-co-citation-based cluster analysis, and literature citation burst analysis).

In terms of theoretical implications, we identified that the concepts of corporate sustainability, ESG, and CSR are related (see Section 4.2.3). That is, they are conceptually complementary and influence one another. These results imply that academic research

related to ESG must consider the notions and roles of CSR and sustainability (see Eccles et al., 2014; Lins et al., 2017). In summary, our study identified notable relationships among the concepts of corporate sustainability, ESG, and CSR from a bibliometric perspective. Considering that ESG is derived from SRI (Gao et al., 2021; Singh et al., 2022), this finding also indicates that the ESG concept plays a role in connecting these three concepts (corporate sustainability, CSR, SRI) from the viewpoint of knowledge structure.

With regard to practical implications, our research provides additional insights for companies and investors to effectively engage with productive and influential institutions or academics in the ESG field to help develop more effective ESG strategies.

Despite the evident significance of the findings of our study, they have the following limitations. As the data were sourced from the SSCI, SCIE, A&HCI, and ESCI of the WOSCC databases, and only papers written in English were considered, a linguistic bias and negligence of other data sources could have resulted in some discrepancies. Additionally, considering that sustainability is highly related to the ESG concept (Eccles et al., 2014), and sustainable development has long been considered a major global trend (Lim, 2022a; Lim, 2022b), future research can focus on exploring the knowledge structure of the ESG field in the context of sustainable development.

Author contributions

XZ: conceptualization, methodology, formal analysis, writing-original draft, writing-review and editing DN:

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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